



C I R R U S

U N E M E T Brazil

January - April 2008

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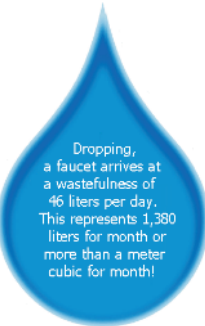
***Fresh water!***

***Drop by Drop is becoming***

***a Scarce Resource***

***and Badly Distributed***

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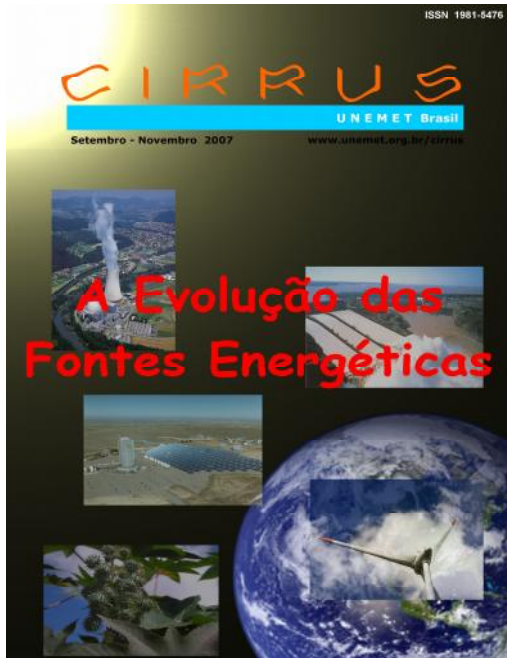
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## LOVER FOR THE CIRRUS

Dear friends, my name is Natália, student of fifth period in Meteorology at the UFAL. Currently I obtained a research scholarship in SIRMAL, and from there I knew the Cirrus magazine, and I can say that it is a very interesting magazine, and that it cannot lack in my professional life. I became fan of the Cirrus has little time, but I am impressed with subjects and information that it comes bringing me, and would be very happy still if it received this magazine printed, because I do not possess computer in my house, and would be of great importance it has in mine day-by-day, in all the places where I go. But, for the time I am satisfied with online version, and go giving a skill to read it thus exactly, therefore I cannot be without the information that it offers to me. Thus, what I need to make to receive it in my house?

**Natália Tavares**

SIRMAL/UFAL, Maceió, Alagoas, Brazil.

Dear Natália, we are many happy with your message and this is a proof that our work is in the correct way. In relation your request, inform that we are inquire sponsorship for publication and our perspective that in 2008 is published the first version printed. Ahead of this, in this phase of the project, we opt to approach in the version online. Version printed possesses a sufficiently limited circulation that is sent to some of our partners. Moreover, we stand out that all our publications are free, because we have as main premise to make public and to debate of pertinent subjects in Meteorology and similar areas of universal form. If you will have interest in all magazine editions are available at the Federal Government page ([www.dominiopublico.gov.br](http://www.dominiopublico.gov.br)). Thus, if you still will have interest, send your data (postal address), and as soon as possible, we will send a n issue of our publication. In the expectation of its understanding, we are thankful.

## WORKING BY METEOROLOGY

Hi friends of UNEMET. Initially I would like to desire a happy 2008 all your and to congratulate them for more edition of the Cirrus Magazine and for chosen theme. Best regard and desire that continues: BATTLING BY METEOROLOGY.

**Maria Gertrudes Justi da Silva**

SBMET President, Rio de Janeiro, RJ, Brazil.

Dear professor Maria Justi, UNEMET team desire you, family and all peoples of the SBMET an excellent 2008. Thanks for congratulations by publication of 11<sup>st</sup> edition of the Cirrus magazine. This made with that let us to be very happy. Thank you and we must and we must always to fight in favor of our profession



## EXAMPLE OF CONSTANT ADVANCE

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Dear colleagues of UNEMET, I would like to desire them to much success in all your activities and much happiness, health and good luck in the present year of 2008. I wish enormously to thank the sending of the Cirrus magazine that to each day comes presenting excellency and quality, resulting in an example of constant advance in its institution and benefits to those people who surround them. I reiterate my gratefulness and I greet them with all attention.

**Edgar Imaña**

Director of Agrometeorology Sector of the  
SENAMHI, La Paz, Bolivia.

## REFERÊNCIA MUITO VALIOSA

---

Hi friends and colleagues of UNEMET, your English translation of the comprehensive article of the CALMet is a very valuable reference that can be used in the future whenever there will be a discussion on history, roots and ideas around CALMet conferences. I am impressed of the work that you have put into this article. With your permission I would also like to add this document into *Eumetcal IntraLibrary*.

**Vesa Nietosvaara**

Finnish Meteorological Institute and  
Co-Chairman of CALMet, Helsinki, Finland.

## GREAT DOCUMENT

---

Hello UNEMET friends, thank you so much for making this happen! It is a great document to have, so we appreciate your hard work to put it together and have it translated to English as well. As soon as I can get some time, I'll add a link to this from the CALMet *Website*.

**Patrick Parrish**

Cooperative Program for Operational  
Meteorology, Education and Training  
COMET/UCAR/USA and Co-Chairman of  
CALMet, Boulder, Colorado, EUA.

## VERY VALUABLE REFERENCE FOR FUTURE OF CALMET

---

Dear friends of UNEMET Team, very impressive your work! As Patrick Parrish and Vesa Nietosvaara said, I will do the same, to put a *link* to the *Website* and as well as the PDF into our intranet. The summary of the Past, Present and Future of CALMet is crucial to review what we have done and will do; the purpose is to it better. Thanks for your great work!

**Ms. Fan Hong**

International Training and Cooperation Centre/  
China Meteorological Administration Training  
Centre, Beijing, China.

## CIRRUS SUBSCRIPTION

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Dear publishers of Cirrus magazine, I am student of the Environmental Sanitation Course of CEFET-CE (Center of Technological Education in Ceará). Firstly I would like to congratulate them for the magazine and if possible I wanted to know as can receive the magazines issues, and to be a subscriber

**Manuel Albano Silveira Filho**

Center of Technological Education in Ceará  
CEFET-CE, Fortaleza, Ceará, Brazil.

✉ Hi Manuel Albano, we want to thank your words of compliments our work in regards to Cirrus. The reasons are not these that in take them not to publish! We have few resources yes, because we are a non-governmental organization (NGO)! Thus, in this fist phase of the project, we opt to the approach in the version online. Version printed possesses a very limited circulation that is sent to some of our partners. However, we are searching new sponsorships and we soon wait to be able to extend our printed issue. Moreover, all our publications are free, because we have as main goal to make public to all the people, independent of instruction level, information on Meteorology and similar areas, where therefore we do not make signature and yes therefore we do not make signature and yes we do registers of people. If you will have interest we can send all our issues via email. In the expectation of its understanding, we are thankful.

## DOUBT

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Hello folk of the Cirrus Magazine. I would like to congratulate them for the excellent work developed in the Cirrus Magazine, and I would like to know as I do to receive Cirrus issues in my house.

**Carlos Roberto Weide Moura**

Federal University of Viçosa (UFV), Viçosa,  
Minas Gerais, Brazil.

✉ Hi Carlos Moura, before everything we want to thank its interest in our work. About your inquiry, we inform that the Cirrus Magazine not yet is to make public at format printed. In this phase of the project, we opt to the approach in the version online. Version printed possesses a very limited circulation that is sent to some of our partners. However, we are searching new sponsorships and we soon wait to be able to extend our printed issue. But, if you still will have interest, send your data (postal address), and as soon as possible, we will send an issue of our publication.

## PRIOR ISSUES OF CIRRUS

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Hi, initially I would like to congratulate them for this magnificent initiative of to make public and to support to the activity of research meteorological in our country, so wanting of the fruits of the scientific work and at same time so indifferent to this area. Congratulations! You must continue with this beautiful service! I'm formed in Meteorology, but due to change of the life I not work in my profession. In spite of this, whenever possible I try to remain myself in contact with Meteorology, therefore the Cirrus magazine to have called my attention. Would be possible to send for my email the eight first editions of the Cirrus Magazine? I did not find them at UNEMET Website, however if they will be there could send me *link*? I am thankful since already your attention and I wait your reply, renewing votes of regard and success by battle of your for benefit of Meteorology.

**Raimundo Moura de Sousa Filho**  
Belém, Pará, Brazil.

✉ Dear Raimundo Sousa Filho, firstly I would like on behalf of the UNEMET to thank for beautiful words for our work on spreading of meteorological science in all its essence in our country. You can have certainty that is gestures and words as your that fortifies us so that each time more we can improve our activities and products, mainly our publications of scientific divulgation. Was with this objective that we create UNEMET because we feel, in this time (2002), which in Brazil had an enormous lack in terms of Meteorology spreading for all Brazilian society. Therefore, we are very happy with you message, because we observe that our objectives are being fulfilled. Concerning your request, we will be sending the Cirrus issues. Unfortunately not yet it was possible to put all issues in our website. This happened because has little time that we reformulate our site to improve the interaction between UNEMET and our readers.

## GRATEFULNESS FOR CONDOLENCE NOTE

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Dear friends of UNEMET, us of the family of the professor Alicia de Garín we want to thank for published text and envoy your colleagues. We will go to donate some academic materials her, that it meets in Buenos Aires University (UBA) on different papers and studies, that can be of great importance for your colleagues. Later we will keep contact to see as we could send this material to Brazil, for some airline or another way that you suggested.

**Maria Rosa de Garín, Sister of Professor  
Alicia de Garín**  
Buenos Aires, Argentina.

## NOTE

All messages sent readily had been answered. We inform that some messages had been suppressed because to the great volume of information of this edition. We are thankful all which collaborate with suggestions and critical by to improve of the CIRRUS.

**EDITORS**

## THE PROBLEMATIC OF THE WATER IN CURRENT TIMES



Actually the society is facing diverse global environment problems, and one of them without a doubt none is water scarcity. The constant population growth and development of the activities human, with distributions almost always not homogeneous space, and also irregular water disposal, contributes for the pressure increase on existing springs. Thus, the water scarcity in the planet becomes evident as a world-wide concern.

Universal Declaration of Water Rights in its Article 1 says that "Water is part of the planet's patrimony. Each continent, each people, each region, each city, each citizen is fully responsible to the eyes of all".

As all other natural resources, water also meets threatened by pollution, contamination and changes that the human being has provoked. Basic to the maintenance of biodiversity and to all natural cycles, food production and preservation of the proper life, water comes becoming each time more a strategical resource for humanity. The great civilizations already depend and will go to depend, each time more, of the water for its economic and biological survival, beyond economic and cultural development.

Currently, more than 1 billion of people lack of regular access drinking water to drink, to take bath or to cook, and two million children die to each year because your families do not have access to drinking water or due to basic sanitation. The Organisation for Economic Co-Operation and Development (OECD) estimated that 3.9 billion people in the world can suffer with water lack up to 2030, being 1.7 billion more than today. This represents 47% of the world-wide population estimated for 2030.

And, although projections are more dramatic to poor nations, 2.2 billion these people will be distributed by emergent ones as Brazil, Russia, India and China.

In sight of its scarcity, the theme "water" has become each more time polemic and there are forts rumors on possible wars where water will be the main reason. Thus, to give just prominence to these numbers and projections we choose to speak in this issue on this precious liquid, which drop by drop is becoming a scarce resource and badly distributed.

Profiting the main theme we speak of the curious aspects concerning precipitation measurements and, at Reading Room, we suggest two books so that our readers can extend your knowledge on this subject. Also the events that had been prominences on environment, World Meteorological Day celebrations in Brazil, and many other information enough useful that certainty will go to be agreeable them.

Make good use and have a Good Reading!

**Ednaldo Oliveira dos Santos**  
Editor

## Stay of Eye!

### INMET HAS GOAL OF 500 AUTOMATIC STATIONS INSTALLED IN 2008



In 2007 National Institute of Meteorology (INMET) from Brazil finished year with a balance of 281 installed automatic stations. The goal of the INMET for 2008 is to reach 500 superficial automatic stations, operating in all Brazilian states.

With installation of more 219 automatic stations, observation net, which has covered all Brazil, will increase the precision of the forecasts, reflecting on reliability in the applications of the meteorological information by agriculture and other areas of economic and social importance, as defense civil, industry, tourism and water resources.

The data collected for stations are integrated and transmitted, hourly – via satellite and cellular telephony - for a data base situated at INMET headquarters, in Brasilia, where they are put, in real time, in the Internet. According to General-Coordinate of Communication Systems of the INMET, Jose Mauro de Rezende, the objective of the System is to monitor the country, the time all and immediate form, with hourly observations, in a synoptic grid, that is, spaced to each 150 km. "The importance biggest is to avoid accidents and risk mitigations to agriculture", said Resende.

Data collected at automatic stations can be had access by INMET website ([www.inmet.gov.br](http://www.inmet.gov.br)), at menu Stations Net, link Automatic Surface.

Source: SBMET.

### METEOROLOGY FORESEES TEMPERATURE OF 24,9°C IN BEIJING OLYMPIC GAMES



The average temperature during Beijing Olympic Games, which will occur from 8 - 24 August, 2008, will be about 24.9 degrees Celsius, emphasized Chinese Meteorological Service Director, *Guo Liwen*, assuring that is difficult that athletes have to face difficulties with temperature before fears of many sportsmen.

Chinese Service calculated this temperature on climatological basis of last 30 years saying, moreover, that only has 0.4% of possibilities that thermometers go up beyond 35 degrees during games. *Guo* insisted that climate will be "amiable with athletes", and blamed some foreign ways press to be giving incorrect numbers citing that during August month, in Beijing, average temperature round 30°C. "This is the average maximum temperature", clarified the specialist.

The Beijing Organizing Committee for the Games of the XXIX Olympiad (BOCOG) already had said previously that, if necessary, could be created artificial rain (or also to diminish precipitation amount) in Olympiad.

For this, the Meteorological Service uses, among others methods, airplanes and cannons where launch chemical products in clouds in order to increase or to reduce its condensation.

Source: Estadão Online Journal.

## MINIOBSERVATORY OF INPE OPEN INSCRIPTION



The Miniobservatory of the National Institute for Space Research (INPE) opened inscription for schools interested at sessions of Remote Observation Astronomical, that will be carried through from April to October at Thursday nights.

According INPE, at the session remote students of any city can to visualize space of proper schools them, via Internet, like were ahead of the telescope situated in the Miniobservatory of the Institute that is in São Jose dos Campos, São Paulo.

A computational system makes possible the aiming of the telescope and the acquisition of Astros digital images, among others tasks, with researcher orientation of the Astrophysics Division/INPE. It is not necessary advanced knowledge of computer science or astronomy to participate.

Students and professors are stimulated to execute simple observational projects, as to make a tour by sky (capturing, for example, planet images and accumulations of stars) or to follow apparent movement of an asteroid. After each remote session, celestial images can be manipulated in classroom with intention to fix concepts in mathematics, physics and astronomy.

The remote sessions will be carried exclusively Thursday from 19h to 22h, and in function of the favorable meteorological conditions.

To participate of remote observation sessions is necessary to enroll yourself filling form that finds below at available Website.

To know more surf by homepage: [www.das.inpe.br/miniobservatorio/obsremotas](http://www.das.inpe.br/miniobservatorio/obsremotas) or sends message to following e-mail: [miniobservatorio@das.inpe.br](mailto:miniobservatorio@das.inpe.br).

Source: Astrophysics Division/INPE.

## BRAZIL WILL HAVE NET TO MONITOR EARTHQUAKES



Brazil is mounting its first national net of seismology. Composed for about 50 stations spread by Country, it goes to monitor the rare strong earthquakes which happen in places, lesser tremors, more frequent, and also to serve of tool for geologic research. The National Observatory (ON), agency linked to the Science and Technology Ministry, located at Rio de Janeiro, will center the operation.

The implantation will cost around R\$ 20 million, calculates of the Institution director, Sergio Luiz Fontes. The mount of money comes of Petrobras, via Oil Law, that internally determines application of 1% of the income obtained by giant exploration in research – part internally, in laboratories of the proper company, part in other scientific institutes. According Fontes Petrobras guarantees the project maintenance per 20 years.

The first part of net alone must start to function in 2009 middle - the Chinese search by seismographs has provoked an order line, and manufacture process, to a large extent as artisan, does not follow the demand. It will be composed by 11 littoral stations at South and Southeastern regions, distributed with a distance of about 130 kilometers between one and another.

Earthquakes as which reached Itacarambi city, north of Minas Gerais State, in December past, are rare in Brazil. In that occasion, the event reached 4.9 points at *Richter* scale and killed a child. The Net could be used to emit alerts to the authorities at case of imminent risk and, mainly, to help Brazilian scientists to better understand the tectonic dynamics in country.

More information in homepage [www.on.br](http://www.on.br).

Source: Press Sector of MCT .

## Check what it was prominence

### XVII BRAZILIAN SYMPOSIUM OF WATER RESOURCES AND 8<sup>th</sup> HYDRAULICAL SYMPOSIUM AND WATER RESOURCES OF THE PORTUGUESE OFFICIAL LANGUAGE COUNTRIES



Brazilian Association of Water Resources (ABRH) jointly with Portuguese Association of Water Resources (APRH) accomplished between 25 to 29 November, 2007, the XVII Brazilian Symposium of Waters Resources (XVII SBRH) and 8<sup>th</sup> Hydraulic Symposium and Water Resources of the Portuguese Official Language Countries (8<sup>o</sup> SILUSBA), in São Paulo /SP. The central theme was "Management of Waters Resources, Integration Politics and Sustainable of the Urban Environment". Extremely appropriate, this theme reference to the conjuncture lived for Brazil in current days.

The opening occurred in 25, November, at São Paulo Room, situated in Cultural Complex Julio Prestes. "We have surplus reasons to commemorate 10 years of approval of the Water Resources Law, however becomes necessary to advance, over all face to water resources degradation. We must have done more and better", affirmed São Paulo State Environment Secretary, Xico Graziano, that pronounced lecture at opening solemn session of XVII SBRH and 8<sup>th</sup> SILUSBA.



Solemn Opening of Symposium in São Paulo Room.



Opening Table in 11/26, at Maksoud Plaza.

During five days - opened in Sunday (11/25), at São Paulo Room/Cultural Complex Júlio Prestes, and with continuity, in following days, at Maksoud Plaza Hotel -, questions had been debated like "Impact of the Climatic Changes in the Brazilian Hydrographic Basins", "Charging by Water Use", "Advances and Difficulties of the 9433/97 Law and its Interface with Sanitation the Law", "Protection and Vulnerability of Underground Water", "Challenges of the Capacity Expansion of the Matrix Hydro Power Generation" and "The Multiple Use of Water".

Beyond the ample space given to the expositors, diverse scientific debates on state of the art in Superficial and Underground Hydrology, Fluvial and Maritime Hydraulical, Coastal Engineering and Environmental Engineering had been carried during XVII SBRH and 8<sup>th</sup> SILUSBA. The Symposium received 900 contributions techniques and 1,400 participant inscriptions, 30% more than in 2005.

## 2<sup>nd</sup> BRAZILIAN SYMPOSIUM OF NATURAL AND TECHNOLOGICAL DISASTERS - II SIBRADEN



The Brazilian Association of Engineering Geology and Environmental (ABGE), with support of the ABEPPOLAR, Geosciences Institute/USP, SBMET and ABMS, carried the II SIBRADEN in 09 - 13 December, 2007, at Conventions Center Plaza and Panorama Hotel, in Santos/SP. This edition had as central subject "Risk Management and Prevention - Tools and Challenges to Public-Private Integration", with objective to congregate professionals of knowledge diverse areas in recent years to analyze and to debate experiences and advances, beyond to indicate which will be main challenges to be won and definitions of public and social politic strategies for facing of the problems.

This second edition brought new features, mainly in enlargement and renewal of the subjects involving Natural and Technological Disasters, discussing with most diverse actors of professionals until institutions, which possess linking with diagnosis, prevention, recovery and after-disaster activities. The main concern was to show that these problems go beyond the physical ambient in which the accidents occur.



Round Table "Risks Management and Prevention of Disasters" coordinated by Dr. Jair Santoro, Scientific researcher of Geological Institute (IG), São Paulo State Environment Secretariat.

Various presentations of scientific papers throughout Symposium had occurred, as for example, of the Scientific Researchers Rodolfo M. Mendes and Daniela G. of the Geologic Institute, shown to the right.



## X INTERNATIONAL WORKSHOP OF CLIMATIC EVALUATION FOR SEMI-ARID NORTHEASTERN



X Workshop Internacional  
de Avaliação Climática



GOVERNO DO  
ESTADO DO CEARÁ  
Secretaria da Ciência, Tecnologia  
e Educação Superior

Held by FUNCEME and Science, Technology and Innovation Secretariat of Ceará State, at 16 - 18 January, 2008, had been congregated in this Workshop, occurred in Hotel Sonata of Iracema, Fortaleza/CE, about 90 participants amongst meteorologists, researchers and students, as well as representative of the Meteorology agencies of states northeast and research Institutes to elaborate of the climatic prognostic to rainy period of the semi-arid northeastern and north of the Northeast Region of Brazil, with emphasis at trimester February, March and April (FMA) of 2008, associated to presence of the Intertropical Convergence Zone (ITCZ), the cloud system that penetrates in the region, come of the Atlantic Ocean.



With theme "Climatic Variability, Climatic Change and the Brazilian Northeast", the III International Meeting of Climatic Studies applied to Brazilian Northeast, parallel event to the X Workshop, dedicated to the presentation of lectures and scientific papers of researchers, technician and students. The several papers had looked for to bring contributions to evaluate potential impacts of the global warming and of the climate variations on Northeast, emphasizing the influence on water resources and agriculture.

The opening lecture was given by Dr. Pedro Leite da Silva Dias, General Director of LNCC (National Laboratory of Scientific Computation) and Intergovernmental Panel on Climate Change (IPCC) member, called "Changes Climatic and Natural Variability: How to identify them?". Also at opening, Dr. Eduardo Sávio Martins, FUNCEME President, made a balance of the Institution advances in climate studies. The events had been coordinated by Dr. Alexander Costa, manager of the Meteorology Department/FUNCEME and professor of Applied Physical Sciences in UECE.

The conditions of the Pacific (*La Niña*) and Atlantic (next to neutrality) Oceans had been evaluated, as well as global and regional dynamic models and empirical models results of diverse institutions. Considering the relative consensus among prognostics of these models, but also taking in account the relative uncertainties to the evolution of the sea surface temperature (SST) in Atlantic Ocean, was decided to attribute the following set of probabilities for rain total in trimester FMA: 40% above average historical, 35% around historical average, 25% below of the historical average. Due to be spatial and temporal variability a characteristic of rains northeastern, does not have to wait a distribution uniform, nor for all region, nor throughout all rainy station, even with a trend by precipitations normal to above average.

Meteorology and Water Resources Foundation of Ceará (FUNCEME), *Centre for Weather Forecast and Climatic Studies*/National Institute for Space Research (CPTEC/INPE), National Institute of Meteorology (INMET), National Laboratory of Scientific Computation (LNCC), Inter-national Research Institute for Climate and Society (IRI - USA), Institute de Recherche pour le Développement (IRD - France), Executive Agency of Water Management of Paraíba (AESAPB), Meteorology and Water Resources Center of Sergipe (CMRH), Direction of Meteorology/Environment and Water Resources Secretariat of Alagoas (DMET/SEMARH-AL), Rio Grande do Norte Agricultural Research Corporation (EMPARN-RN), Meteorology Laboratory of Pernambuco/Technological Institute of Pernambuco (LAMEPE/ITEP-PE), State University of Ceará (UECE), Federal University of Ceará (UFC), University of São Paulo (USP), State University of Feira de Santana (UEFS), Municipal Coordination of Civil Defense of Fortaleza (COMDEC), Sciences Academy of Ceará (ACECI) participated of this Workshop.

## BRAZIL RECEIVED STAGE FROM INTERNATIONAL FORUM OF CLIMATE CHANGE



Foto: Deputada Federal Rebecca Garcia.

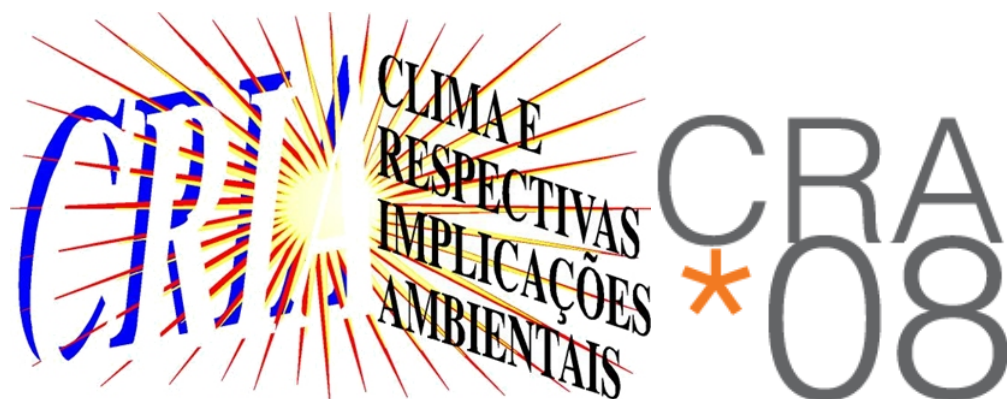
For the first time, Brazil received a round International from International Forum of Climate Change. Formed by representatives of the G8 - block that congregate seven countries more industrialized and Russia - and block of five countries of emergent economy, G+5 (included Brazil), debated between 19 to 21 February, 2008, the elaboration of a document on proposals of climate change facings, to be led to the next G8 meeting, in July (Japan). The document treats about questions as biocombustibles, financial incentives to the deforestation reduction, among others. The Forum was organised by *GLOBE* - Global Legislators Organisation for a Balanced Environment founded in 1989 - and had as important point the contribution of Legislative of the involved countries in the inquiry global politics to greenhouse gas effect reduction, against planet global warming.

According Sergio Jellinek, World Bank spokesman for Latin America and the Caribbean, the first time that an emergent economy country is accomplished of this meeting, to be due to the role from Brazil has in worldwide scene as "solutions supplier for climate change question", in reference to clean energy matrix and Brazilian investments in biocombustibles. At forum opening Arlindo Chinaglia (PT-SP), Chamber of Deputies President of Brazil, spoke that the role of the Brazilian parliament is fundamental to define the mitigation measures of the climate change impacts because the Congress "is segment politician who better represents the society". Chinaglia said also that the debate on energy will be permanent subject at the Chamber and announced the creation of a special commission to deal with renewed energy sources.

The temporary Minister of the Foreign Affairs, Samuel Guimarães Pinheiro, also emphasized the legislator paper at the climate change debate. "Everything will depend on the public politics adopted in relation to the energy consumption and production standards and the elaboration of these politics will fit to them parliamentarians". A special session on technology transfer was carried and had participation of Sergio Rezende, Brazilian Minister of Science and Technology; Anders Wijkman, European Parliament member and President of the Commission of Adaptation to the Climate Changes, established for Swedish First-Minister; and Stephen Byers, British Parliament member and Ex-Minister of Commerce and Industry. The Meeting included a session bringing together legislators from forest-rich African countries with Marina Silva, Brazilian Minister of Environment and Forestry, to agree specific measures to combat deforestation.

More than 90 legislators of diverse countries had participated of the International Forum of Climate Change, hosted by Brazilian Congress on behalf of *GLOBE* International and Alliance of Communicators for Sustainable, in Brasília/DF. Brazil was represented for the Antonio Palocci (PT-SP) and Augusto Carvalho (PPS-DF) and senators Serys Silhessarenko (PT-MT), Cícero Lucena (PSDB-PB) and Renato Casagrande (PSB-ES).

## INTERNATIONAL WORKSHOP ON CLIMATE AND NATURAL RESOURCES IN THE PORTUGUESE LANGUAGE COUNTRIES



This International Workshop was promoted by Agency of the Portuguese Official Language Countries for the Climate Area and Respective Environmental Implications (CRIA), Meteorology Institute of Portugal (IM) and Cape Verde National Meteorology and Geophysics Institute (INMG), that had justified for global nature of the climatic and environmental problems, which its local repercussions, create a favorable environment for the attainment of consensuses and supports in national and international level to facilitate the development of strategical partnerships, involving the institutional sector, universities and economic agents to will promote programs of applied research of common interest.

This Workshop was carried through Belorizonte Hotel on Salt Island (Cape Verde), 02 to 07 March, 2007, whose main theme was "Partnerships in the Climate Area and Environment", and counted on scientific sections with presentation of oral communications on distinct thematic areas, like Agrometeorology, Micrometeorology, Biometeorology; Urban Climatology and Atmospheric Pollution, especially Health Impacts; Natural disasters/Water Resources and Renewed Energy; variability and Alterations Climatic; Modelling of Weather and Climate in Macro- and Meso-Scale; Oceanography and Remote Detection, among others.



Cape Verde



Salt Island



Belorizonte Hotel

The opening session had with participation of the Cape Verde Minister of the Environment, Maria Madalena Neves; Executive Secretary of the Community of Portuguese Language Countries (CPLP), Luis de Matos Monteiro da Fonseca; General Secretary of WMO, Michel Jarraud; and President of the Cape Verde National Institute of Meteorology, Ester Araújo Brito. The closing session was presided by the Cape Verde Minister of the Environment and by the Portugal Minister of the Environment, Territory Ordinance and Regional Development, Francisco Nunes Leather Correia.

At WSCRA08 four thematic panels with demonstration conferences had been presented: International Cooperation on Climate Change and Development; Climate and Environmental Monitor; Climate and Sustainable Development; and "Capacity Building" Strategies and its articulation with Research and Development CPLP in the Climate, Environment and Development areas. Moreover, several debates concerning new projects inserted at some activity areas of support to the sustainable development happened.

## COURSE OF TRAINING ON CLIMATE RISK MANAGEMENT IN AGRICULTURE SECTOR



### CURSOS INMET - IRI GESTÃO DO RISCO CLIMÁTICO

The Brazil National Institute of Meteorology (INMET), in cooperation with The International Research Institute for Climate and Society (IRI), its institution is part of the Columbia University (New York, USA), and with support of World Meteorological Organization (WMO), hosted in Institute University (Brasilia-DF), from 3 to 7 March, 2008, the **Course of Training on Climate Risk Management in Agriculture Sector**.

This Training was given by Dr. Walter Baethgen (IRI), with contribution of Brazilian specialists invited that presented lectures on specific subjects. It was destined to professionals of the agriculture area who need to use climatic information in your performance as government agencies assessors and/or private initiative, as well as researchers and technician of Meteorology organizations and agriculture research which act in agricultural planning. Planned initially to 30 people, but it had great demand, started to receive 49 professionals, 20 of INMET, 23 of Brazilian public and private institutions with performance related to thematic in the course, and 6 at agronomical research institutions of neighboring countries (Argentina, Chile, Paraguay, Peru and Uruguay).



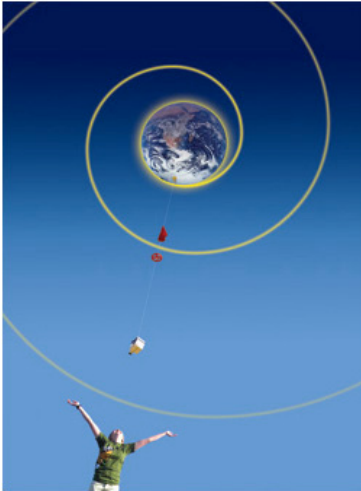
Photo to the Left show activities during the Course, while to the right is an official photo with Course participants.

The Course is part of the **Climate Forecasting Applications Training Program**, with emphasis in Agriculture and Water Resources. This program, which it was divided in three modules, aims to assist initially to the internal public from INMET/Brazil. However, due to a recommendation of the WMO, as well as the intense demand by this type of information, INMET started to share this training with others society sectors. The priority was given for institutions partners, acting in pertinent areas to the subjects of each one of the training modules, as well as representatives of institutions invited of other South America countries.

The programming detailed on training, copy of the used didactic material, some complementary material and participant list and photos is available at: [http://www.inmet.gov.br/documentos/cursoII\\_INMET\\_IRI](http://www.inmet.gov.br/documentos/cursoII_INMET_IRI).

It is still foreseen third module, directed to the "Climate Risk Management in Water Resources" which will have to occur at the first semester of 2008, in place to be announced opportunely.

## Celebrations of World Meteorological Day in Brazil



Each year, on 23 March, the World Meteorological Organization, its 188 Members and the worldwide meteorological community celebrate World Meteorological Day. This Day commemorates the entry into force, on that date in 1950, of the WMO Convention creating the Organization.

It has become customary for the WMO Executive Council to select a specific theme to commemorate each World Meteorological Day (WMD). On the occasion of its 58<sup>th</sup> Session (Geneva, 20-30 June 2006), the WMO Executive Council decided that the theme for World Meteorological Day 2008 would be "Observing our planet for a better future", in recognition of the scientific and socio-economic benefits derived by WMO Members and their National Meteorological and Hydrological Services (NMHSs) from the expanded, wide-ranging and authoritative observations made in the context of WMO's mandated activities in weather, climate and water.

### BRASÍLIA - DF

"**Observing our Planet for a Better Future**" is theme this year for World Meteorological Day, which was commemorated on 25 March with a lectures cycle, promoted for the National Institute of Meteorology (INMET), tied with Ministry of Agriculture, Cattle Raising and Supply (MAPA), and that had on the presence of the Brazil's Minister Reinhold Stephanes at the opening session. The conferences had occurred of 08:30AM to 01:00PM hosted in the INMET Auditorium, Brasília/DF.

The conference program was developed by INMET jointly with National Water Agency (ANA), Hydrographic Center of Navy (CHM), *Centre for Weather Forecast and Climatic Studies*/National Institute for Space Research (CPTEC/INPE), Air Space Control Department (DECEA) and Brazilian Society of Meteorology (SBMET)

At in opinion of the INMET Director, Antonio de Lima Moura, theme of this year is very important, a time that collection, dissemination and archive of data constitute basic elements for accomplishment of activities of research, weather forecast, climate forecast, studies on climate change, among others.

Chosen for WMO Executive Council, this theme is appropriate to the labor that INMET develops. Until 2008 middle, INMET intends to complete the installation of 500 automatic meteorological stations, 308 of which already are active. The idea is to establish an

observation net, in a grid with distance of the order one by one degree of resolution (that is, to each about 100 km, will have an installed automatic station), covering all Brazil. The meteorological data (temperature, humidity, atmospheric pressure, rain, solar radiation and direction and speed wind), collected in all stations hourly, are integrated and transmitted instantaneously, via satellite or cellular telephony, to the INMET headquarter and are available in real time, at Institute Website.

So, the society disposes of meteorological information each time more accurate and reliable, emphasizes INMET director at the opening solemnity.

### BAURU - SP

The Meteorological Research Institute of UNESP/Bauru (IPMET) carried through on 25 March in the IPMET Auditorium allusive event to the commemorations to World Meteorological Day.

The event counted on the participation of Ana Maria Gomes Held, IPMET Director, which opened the works and read message WMO referring to WMD; and Lucí Hidalgo Nunes, professor of the Geosciences Institute (UNICAMP), that pronounced a conference named "Social Impacts of the Severe Atmospheric Events". This Event finished as cocktail.



## **BELÉM - PA**

The allusive commemorations to the World Meteorological Day in Belém had been organized by the Meteorology Department/Geosciences Institute of the UFPA.

A special programming with a conference cycle on 27 March, from 8h00min to 18h00min was organized at Geosciences Institute Auditorium involving WMO theme of this year. These conferences had been pronounced by some professors of the Institute.

## **CAMPINAS - SP**

The CEPAGRI (Center of Meteorological and Climatic Research Applied to Agriculture), agency linked UNICAMP, promoted on 27 March the Permanent Forum of Agribusiness with topic "Observing Our Planet for a Better Future", to celebrate the World Meteorological Day, hold at UNICAMP Convention Center, in Campinas/SP.

"Beyond the importance that Meteorology has to the agricultural Brazilian development, the theme chosen for World Meteorological Day in 2008 is, also, of highest relevance by agribusiness national due to be an activity based on use of the available natural resources at Earth: "Observing Our Planet for a Better Future", detached Jurandir Zullo Júnior, CEPAGRI director.

According him, this Forum take advantaged the commemoration to discuss like Earth observation can contribute for a sustainable development of the Brazilian agribusiness, considering, also, the great current concern on climate changes after divulgence of the IPCC fourth report in 2007.

Altogether occurred four conferences called as: The Importance of the Observation Oceans at the Earth Observation, by Prof. Edmo Jose Dias Campos (Oceanographic Institute/USP); The Importance of the Earth Observation to Meteorology and Agrometeorology, given by Dr. Luiz Toledo Machado (CPTEC/INPE); The Earth Observation to the Natural Resources Conservation - PrevFogo Center, by Dr. Gabriel Zacharias (IBAMA); and The Importance of the Earth Observation for Agriculture, by Dr. Jose Carlos Neves Eiphânio (DSR/INPE).

## **MACAPÁ - AP**

The Hydrometeorology and Renewed Energy Center/Scientific and Technological Research Institute of Amapá ((NHMET/IEPA) organized on 25 March activities to commemorate the World Meteorological Day (WMD). The event was carried through at morning on 25 March in the Environment Secretariat Auditorium (SEMA) of Amapá, in Macapá city.

The solemnity occurred in the morning with reading of World Meteorological Organization (WMO) message. Later, it had conference of opening pronounced by M.Sc. Edemir dos Santos Jesus (NHMET/IEPA), called "Evaluation of the Hydrometeorological Data at Amapá Sate".

Soon afterwards others conferences had happened: "Hydrographic Basin of Araguari River: Evaluation of Environmental Sceneries in High and Medium Araguari River with Application of Computational Numerical Modelling", given by Prof. Dr. Alan Cavalcante da Cunha, NHMET Coordinator, and "Social and Economic Impacts caused by Extreme Event: Flood at Laranjal do Jarí in 2000" by Alzira Dutra Marques, student of the Social Sciences course (UNIFAP).

## **MANAUS - AM**

"Observing Our Planet for a Better Future: A Challenge for the Amazonia". This was the name of the event promoted, 24 - 25 March, for the coordination of Meteorology Course and Meteorology and Hydrology Center of the Amazon Sate University (UEA), in commemoration to World Meteorological Day. This event was accomplished at Superior School of Technology Auditorium, located in Manaus, in the period from 5:00 PM - 10:00 PM)

The opening occurred on 24 March in the afternoon with called lecture "Diurnal Precipitation Variation in the Amazonia: Planning Instrument", given by professor Dimitrie Nechet (UFPA); afterwards had participation of local institutions: SIPAM, INMET, INFRAERO, INPA, Cindacta4, EMBRAPA, Civil Defense (State and Municipal), CPRM, Petrobras and CREA-AM, that had spoken on related activities to Meteorology and Hydrology at the Amazon, followed of the accomplishment of a round table.

Following the chronogram of activities, on 03/25 (5:00 PM) happened the presentation of the Amazon Sate Meteorology System (SIMEAM), made by professor Pablo Kuhn, Superior Studies for Humid Tropic of the Center of the UEA. Afterwards was carried through a mini-course called "Will be that it goes to rain? How to foresee the weather" given by Gustavo Escobar, Weather Forecast Center of CPTEC/INPE.

### MACEIÓ - AL

Students and professors of Federal University of Alagoas (UFAL) celebrated the World Meteorological Day in the Atmospheric Sciences Institute (ICAT) dependencies (25 - 26 March) with theme "Observing Our Planet for a Better Future". Officially this date is commemorated on 23 March, but this year, exceptionally, was commemorated on 25 March, for order of WMO.

According Luiz Carlos Molion, ICAT/UFAL Director, "The Mission of Meteorology is to foresee weather and climate. To foresee weather assures the life human. To foresee climate guarantees the survival him. To reach this objective is basic to observe the atmosphere".

At programming, prominence by installation of an Automatic Meteorological Station, in the external patio of the Atmospheric Sciences Institute building, in Maceió/Alagoas, for visitation and weather observation, coordinated by Prof. Dr. Marcos Moura (ICAT/UFAL).

Moreover, several conferences given by UFAL and CEFET professors had occurred, beyond presence of Emanuel Ramos Teixeira, Agrometeorology specialist of the Environment and Water Resources Secretariat of Alagoas, which spoke on "Meteorology Direction Services - Environment and Water Resources Secretariat of Alagoas".



#### Collaborators in this Edition:

- M.Sc. Rodrigo Santos Costa, Student Doctor of INPE and UNEMET member.
- Dr. Alailson Venceslau Santiago, MDA/PNUD and UNEMET member.
- Communication Assessors of UFAL, UFPA, UEA, INMET, FUNCEME and CEPAGRI/UNICAMP.
- Press Assessors of CETESB and Geological Institute/São Paulo State Environment Secretariat.
- NHMET/IEPA Coordination.

If you want to publish some event related with Meteorology and/or similar areas, it is enough to send an email to [cirrus@unemet.org.br](mailto:cirrus@unemet.org.br)

## Precipitation Analysis using Test of Hypothesis and Energy Flux Simulation for the São Francisco River Transposition Project

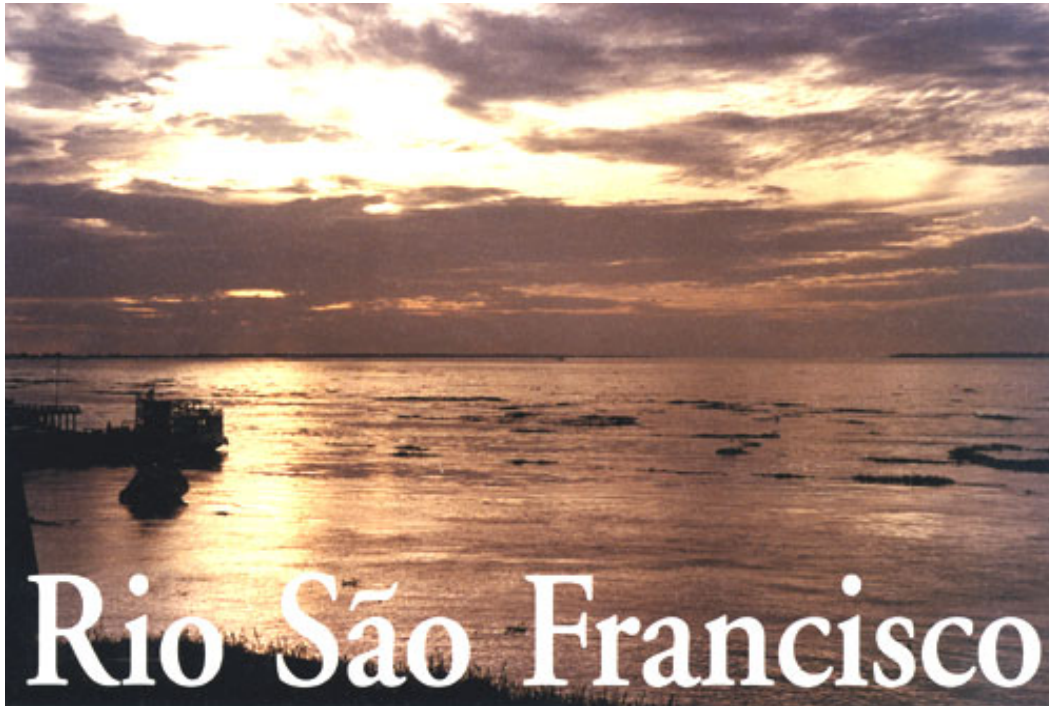


Foto: Roberto Malvezzi.

Climate adversities have frequently generated hydrological extreme events, as precipitation, floods and droughts, being able to influence negatively the social-economic development of a given region. The hydric developmental interest has been concentrated in the northeast region of Brazil. In turn, since long date the project of transposition of the waters of the São Francisco river has deserved the attention of Brazilian society as a possible solution for such challenge.

### INTRODUCTION

The study of the hydrological cycle is very important, given that although not always explicit, water is an essential element to the development of the civilizations. Brazil is privileged when the subject is hydric resources. It is estimated that approximately 12% of all fresh water available for human use in the world is in Brazil. However, it suffers with the imbalance between supply and demand, wastefulness and environmental pollution.

In the Northeastern region particularly, the irregular pluviometry in time and in space has led to no significant evolution of the Human Development Index (HDI - United Nations) of the region throughout the last decades. In this context, the discussion of the project for the transposition of the waters of the São Francisco river basin gains relevance under the meteorological perspective, little studied until now.



The identification of the energy balance components at the surface from the available solar radiation is fundamental for studies of the nature of the transposition project proposed. In this direction, the objective of this study was to analyze the latent and sensible heat fluxes at the donors and recipients regions of the São Francisco River basin water transposition project by using the regional atmospheric model RAMS (*Regional Atmospheric Modeling System*) during an El Niño period<sup>1</sup>, as well analyze the stationarity hypothesis<sup>2</sup> for the precipitation time series.

## STUDY AREA

The study region is defined at the domain: 35°W to 46°W and 2°S to 15°S, and have the Northeast and part of the Atlantic Ocean as domain. These simulations were performed for the 9°S latitude, water catchment region, and 5°S, water recipient region (Figure 1).

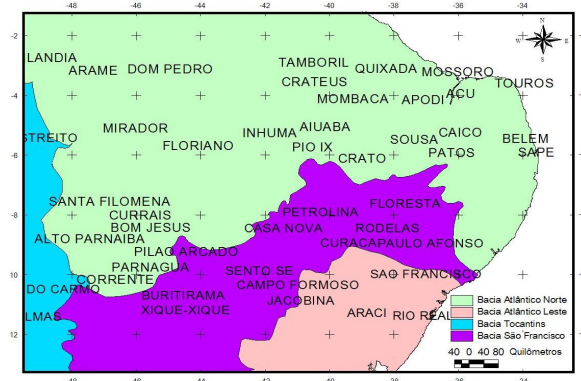


Figure 1 - Municipalities located at the latitudes 11°S, 9°S, 7°S and 5°S.

## CLIMATIC CHARACTERISTICS

According to Wladimir Köppen (1948) classification, the study region have three climatic types: (a) Cwb - mild temperate climate with warm summer (mean temperature of the hottest month below 22°C) and mild winter (mean temperature of the coldest month below 18°C); dry season coincides with winter; (b) Cwa - mild temperate climate with hot summer (mean temperature of the hottest month above 22°C) and - mild winter (mean

temperature of the coldest month below 18°C); (c) Aw - tropical climate, rainy, hot and humid, with dry winter and rainy summer (mean temperature of the coldest month always above 18°C); this climatic type occurs at the other areas of the sub-basin.

## ATMOSPHERIC MODELING

In this study, the model RAMS version 3.b was chosen objecting a better understanding of the sensible and latent heat fluxes for the month of April during an El Niño (1983) period. The month choice was due to the fact that this month is part of the rainy season when the El Niño phenomenon interference is more severe on the volume of water available at the sub-medium and lower São Francisco.

The soil cover used is classified as semi-desertic type, with volumetric humidity of 25% and sandy-clay texture. The adopted formulation was the non-hydrostatic. The following parameterizations were activated<sup>3</sup>: short-wave and long-wave radiation; cumulus; soil and vegetation; turbulent diffusion and cloud microphysics.

Table 1 shows the simulations spatial and temporal configurations, while Table 2 presents the simulations vertical grid dimension.

Table 1 - Simulation spatial and temporal configuration.

Grid	$\Delta x$ (m)	$\Delta y$ (m)	$\Delta t$ (s)	Points in x	Points in y	Domain
1	40000	40000	60	36	36	NE and part of Atlantic Ocean

Table 2 - Vertical simulation configuration.

Number of levels in z	28
$\Delta z$ (min.)	60
$\Delta z$ (Max.)	1,200
Increase factor	1.2

## TEST OF HYPOTHESIS

The hypothesis was evaluated using Wilcoxon or Mann Whitney or u-test (BRADLEY, 1968), at 95% confidence level. Regional stationarity of the basin was evaluated.

<sup>1</sup> Atmospheric-oceanic phenomenon characterized by an abnormal heating of the superficial waters of the Pacific Ocean that can affect the regional and global climate.

<sup>2</sup> It is a decision taken by the analyst, to verify the model adjustment to the reality being investigated.

<sup>3</sup> Process which defines the parameters - usually a model - that are evident to the question asked from this model.



Under the null hypothesis of stationarity of the whole basin, and assuming the independence between the pluviometric stations series, the number of rejected series in a test with significance level  $\alpha$  is an aleatory variable with binomial probability distribution with mean  $np \alpha$ , where  $np$  is the total number of stations. The probability of rejection of many stations in the tests increases when there are significant non-stationary effects at some or all sub-regions of the basin. The conduction of the test is presented next:

- Null hypothesis: there is regional stationarity;
- Alternative hypothesis: there is no regional stationarity;
- Significance level:  $\alpha=0.05$ ;
- Criteria: accept null hypothesis if  $A > 0.05$ .

$$A = \sum_{i=nr}^{i=np} \left[ \binom{np}{i} (\alpha)^i (1-\alpha)^{np-i} \right]$$

where A - probability rejection of  $nr$  or more stations;  $nr$  - number of stations rejected in the stationarity test;  $np$  - total number of stations;  $\alpha$  - significance level.

## RESULTS AND DISCUSSION

The energy fluxes behavior is an important boundary condition in the distribution of the radiative energy absorbed at the soil surface as sensible heat (H) and latent heat (LE).

Atmospheric thermodynamic characteristics influence the surface fluxes distribution.

Figures 2 and 3 are related to the sensible heat flux, while Figures 4 and 5 illustrate the latent heat flux behavior. The sensible and latent heat fluxes configurations were determined for the donor and recipient regions respectively.

Possibly there is a significant difference in the sensible heat fluxes between the plateaus and the flat areas, directly related to the solar radiation rate at the soil surface. There is a noticeable increase at the region between 36°W and 43°W during most of period (Figure 2). At the latitude 5°S (Figure 3) there was a small reduction, with the highest values registered between 38°W and 43°W.

Fluxo calor sensível - 9S - abril 1983

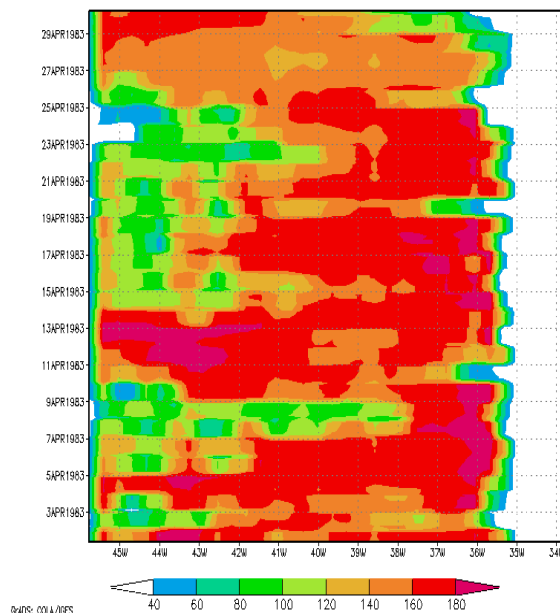


Figure 2 - Daily sensible heat flux ( $W/m^2$ ) simulated for the latitude 9°S in April 1983.

Fluxo calor sensível - 5S - abril 1983

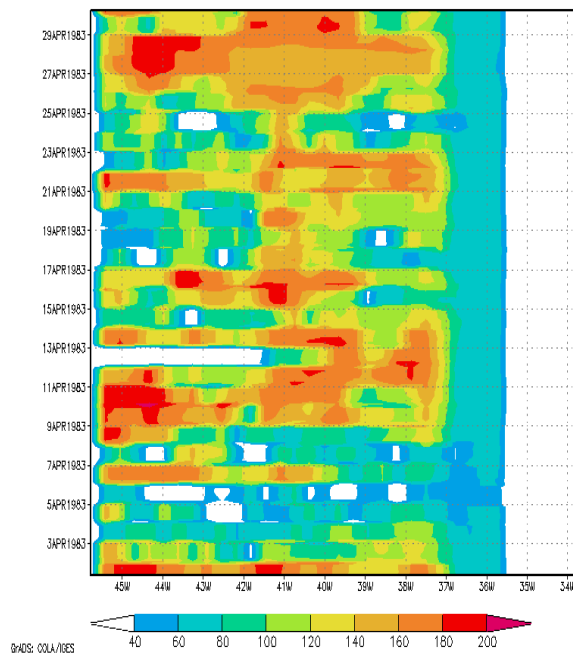


Figure 3 - Daily sensible heat flux ( $W/m^2$ ) simulated for the latitude 5°S in April 1983.

For these simulated scenarios, it is noticeable the importance and the influence of the climatological phenomenon El Niño of 1983. Although soil humidity is an important variable of the energy balance at the surface, in this evaluation it was considered constant at the donors and recipient regions of the project.

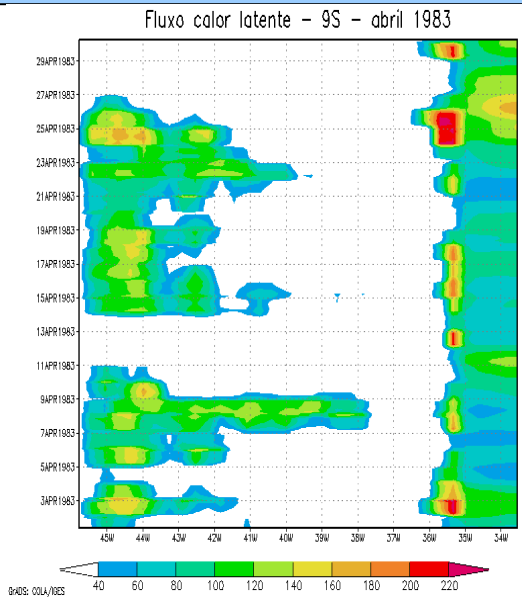


Figure 4 - Daily latent heat flux ( $W/m^2$ ) simulated for the latitude  $9^\circ S$  in April 1983.

The important of soil humidity in the simulated scenarios is observed in Figures 4 and 5, given that a higher concentration of daily latent heat flux was found at the northeastern Brazilian coast ( $36^\circ W$ ) and part of the Atlantic Ocean ( $33^\circ W$  to  $36^\circ W$ ), at the time of El Niño.

On the other hand, it is observed that at the recipient region (Figure 5) there were higher concentrations of latent heat flux throughout the entire area, when compared to the results for the donor region (Figure 4). Notice that simulations results indicate higher atmospheric humidity at the recipient region.

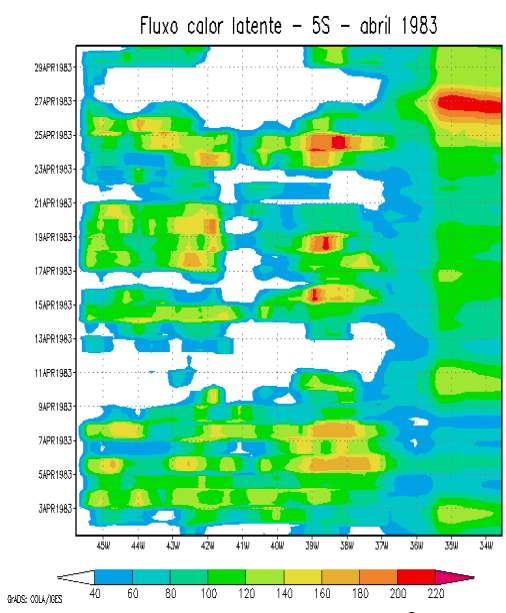


Figure 5 - Daily latent heat flux ( $W/m^2$ ) simulated for the latitude  $5^\circ S$  in April 1983.

Initially it was expected that the northern semi-arid, which contains the recipient region, would have lower humidity availability. This expectation was refuted by the simulation results. The results had shown the acceptability of the null hypothesis of stationarity of the pluviometric data as well as the hypothesis of regional stationarity at the 95% confidence level.

**CONCLUSION AND FINAL CONSIDERATIONS**

As previously mentioned, the objective of this study was to simulate the energy fluxes at the water donors and recipients regions at the São Francisco river basin during an El Niño climatic event period, and verify the stationarity of the basin. An important result to be highlighted is that the low humidity found in the Brazilian northeastern soils is not necessarily connected to the low atmospheric humidity contents but to the controlling atmospheric mechanisms.

The study try to demonstrate that it is necessary to adopt a greater scientific rigor in the versions divulged by different media about the water availability at the donor and recipient regions of the project of transposition of the waters at the São Francisco river basin. This affirmation is supported by the fact that the discussion did not incorporate adequately the meteorological study of the donors and recipients regions.

**REFERENCES:**

BRADLEY, 1968. **Distribution-Free Statistical Tests**. Prentice Hall, Chapter 12.

**To Learn More:**

MARQUES DA SILVA, A. P. L., 2004. **Avaliação Hidrológica e Meteorológica para a Transposição de Aguas da Bacia do Rio São Francisco**. Tese de Doutorado, Curso Interdisciplinar de Ciências Atmosféricas, Programa de Engenharia Civil/COPPE/UFRJ, 268 p. Available at [http://www.coc.ufrj.br/index.php?option=com\\_content&task=view&id=1269&Itemid=31](http://www.coc.ufrj.br/index.php?option=com_content&task=view&id=1269&Itemid=31).

**Ana Paula Lima Marques Fernandes**

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# A genda

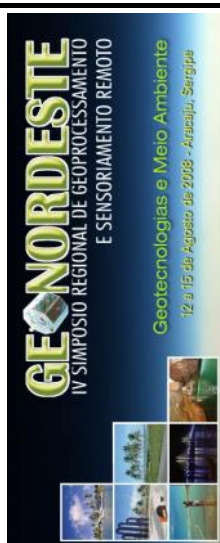
## You must Program Yourself

You confer below the listing of the main events, in Brazil and the world, that will go to happen in 2008.

### IV REGIONAL SYMPOSIUM OF GEOPROCESSING AND REMOTE SENSING

12-15/Aug./08

<http://www.exitoeventos.com.br/geonordeste/>



Multidisciplinary of the geotechnology and multifinality of their instruments demand a great exchange effort among several professionals that it uses them. To build a periodic forum of debates and discussions on the theme is a need, mainly in the distant areas of the great economical centers.

So, the accomplishment of IV GEONORDESTE attests the consolidation, the progress and the fecundity of the geotechnology studies in the Northeast. The IV Regional Symposium of Geoprocessing and Remote Sensing, that year with the theme "GEOTECHNOLOGY AND ENVIRONMENT", will discuss relevant themes on use of the geotechnology in the study and development of the biomes, urban areas, rural areas, hydrographic basins etc. of the Brazilian Northeast, tends as guide the basic principles of the rational use of the natural resources.

IV GEONORDESTE will happen in Aracaju, Sergipe, between 12 and 15 August and it is being accomplished by EMBRAPA/TABULEIROS COSTEIROS and by ESGEO.

For more information to visit the electronic page above or through the telephone: (55 79) 2107-8585

### VIII BRAZILIAN SYMPOSIUM OF GEOGRAPHICAL CLIMATOLOGY

24-29/Aug./08

<http://www.ig.ufu.br/8sbcg.htm>



Climatology and Hydro Resources Laboratory of the Geography Institute of the Federal University of Uberlândia (UBU) will be accomplishing from 24 to 29 August , 2008 in the Alto Caparaó city (Minas Gerais) the VIII Brazilian Symposium of Geographical Climatology (8th SBCG). This event has support of the Brazilian Association of Climatology (ABCLIMA).

The accomplishment of 8th SBCG with the theme "Technological and Climatological Evolution" comes from encounter with need to analyze and to discuss new information originating from recent researches about climatology's role and its constant evolution in the aid of the society development in their different ones landscapes through debates and forums. During this event will be offered seven mini-courses and "Chat of Fireplace" that is the students' encounter with research and researcher, being an informal conversation "heated up" with wine. In the third day will happen the Assembly of the Brazilian Association of Climatology (ABCLIMA) .

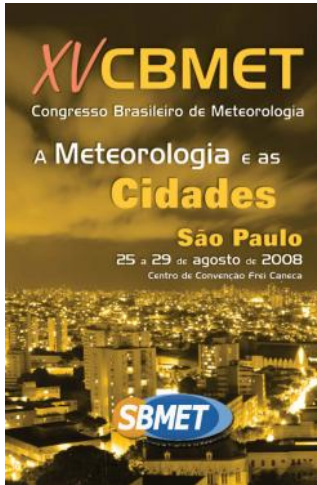
Further information to contact through e-mail: [viiisbcg@ufu.br](mailto:viiisbcg@ufu.br), [washington@ufu.br](mailto:washington@ufu.br) and [clima@ufu.br](mailto:clima@ufu.br) or by telephones (55 34) 3239-4436/4169.



## XV BRAZILIAN CONGRESS OF METEOROLOGY

**24-29/Aug./08**

<http://www.sbmet.org.br/>



Brazilian Society of Meteorology (SBMET) is accomplishing from 24 to 29 August 2008, in the Convention Center of Frei Caneca, in São Paulo, the Fifteenth Brazilian Congress of Meteorology (XV CBMET).

The objective of that Congress, following the steps of the previous editions, is to gather scientific community to present and to discuss the results of the new discoveries in Meteorology and similar areas, focusing the benefits that those results and discoveries can bring for society as a whole.

With the theme "**Meteorology and the Cities**" XV CBMET activities will consist of round tables, conferences, mini-courses and communication presentations in oral and poster forms.

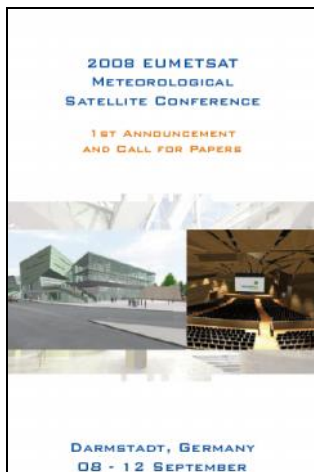
In parallel this event, it will be accomplished a technical exhibition of Meteorology hydrology, telecommunication and computer science equipments. The participants of the Exhibition will have the opportunity to publish its company, with insert of material promotional in the participants' pastes, and in other event pieces.

For more information can be obtained by e-mail: [cbmet@sbmet.org.br](mailto:cbmet@sbmet.org.br) or [secretaria@sbmet.org.br](mailto:secretaria@sbmet.org.br).

## CONFERÊNCIA ANUAL DE SATÉLITE METEOROLÓGICO DA EUMETSAT

**08-12/Sept./08**

<http://www.conferences.eumetsat.int>



The annual EUMETSAT Meteorological Satellite Conference has enjoyed a succession of host countries over the years, from as far north as Tromsø – the gateway to the Arctic, to Dubrovnik - the jewel of the south, but it has never been held on home ground – in Darmstadt. In 2008, EUMETSAT will have the pleasure of welcoming you to Darmstadt from 8 – 12 September 2008. The venue will be Darmstadt's new Science Congress Centre, the Darmstadttium, named after a chemical element that was first discovered in 1994 by the Darmstadt-based GSI (Gesellschaft für Schwerionenforschung) Research Institute for Heavy Ions.

High-interest themes which were on the agenda at the 2007 EUMETSAT/AMS Joint Conference will be featured again but there will be a shift of focus from polar satellites to climate and oceanography.

The scope for information exchange in oceanography, particularly with the aim of helping us to better understand the forces behind global changes of climate and the physics of the ocean, is infinite! Equally important is the contribution of satellite data to Numerical Weather Prediction applications and the session on this field of satellite meteorology is sure to stimulate ideas. The complete range of topics include: Nowcasting; Climate Monitoring with operational satellites; Oceanography; Numerical Weather Prediction applications; Advanced Sounding; Towards operational monitoring of air quality from space systems; Hydrometeorology; Monitoring Land Use; Sensor Calibration and Activities for Learning in Meteorology.

Further information can be obtained in the homepage above .

## 44º BRAZILIAN CONGRESS OF GEOLOGY – 44º CBG

26-31/Oct./08

<http://www.44cbg.com.br>



44º CBG will be carried between 26 and 31 October, 2008 at Station EMBRATEL Convention Center (EECC), located in Curitiba, Paraná, Brazil. This Congress is a promotion of the Brazilian Society of Geology (SBG) and is supported by diverse Brazilian institutions and company.

This year the theme is "Earth Planet in Our hands", that goes of finds to commemorations of the International Year of the Earth Planet which possess two main objectives: to stimulate and to motivate the scientists to develop research in ten subjects considered with priority for UN and UNESCO, and to divulge jointly to the society in general the importance of Earth Sciences for welfare and even though the survival at the planet.

The objective of 44º CBG is search of synergy among system inquiries of the Planet and thought and vision approach of researchers and uncultured in their responsibilities with wealth, vulnerability, quality and sustainability. In the 44º CBG scope will have to remain debate on large challenge that presents by Geosciences professional, in what says respect to its paper front to the society future.

More information with Congress Executive Secretariat by email: [44cbg@44cbg.com.br](mailto:44cbg@44cbg.com.br) or by phone: (55 11) 3871-3626

## 11<sup>st</sup> NATIONAL MEETING OF ASTRONOMY – 11<sup>st</sup> ENAST

15-16/Nov./08

[http://www.ceaal.al.org.br/11ENast/11enast\\_inicio.html](http://www.ceaal.al.org.br/11ENast/11enast_inicio.html)



The Astronomical Studies Center of Alagoas (CEAAL) will be organizing 11<sup>st</sup> ENAST to be carried through in 15 - 16 November, 2008, at dependences of the Federal Center of Technological Education (CEFET-AL), in Maceió, Alagoas, Brazil.

Since its origin the ENAST has as objective to promote interchange among astronomers, professionals, fans and interested person in astronomy from diverse regions of Brazil. Moreover, during of this meeting some lectures are presented for some of the most important Brazilian astronomers, beyond papers developed by observatories and institutions of all country. Also 2 mini-courses will be offered to the participants: "Astrophotography with Digital Cameras and Webcam - Placing hand in the mass" and "Analysis of CCD images – Astrometry and Photometry".

The ENAST also configures a forum to subject discussion of astronomical community interest. The accomplishment of this meeting objective still to divulge astronomy, making possible access of the population in general to the scientific knowledge.

Complete information on meeting can be gotten at website above or via email [ceaal@fapeal.br](mailto:ceaal@fapeal.br) or by phone (55 11) 3259-2766.

**Note:** If you want to publish some event related with Meteorology, or similar areas, is necessary only to send an email to:

[cirrus@unemet.org.br](mailto:cirrus@unemet.org.br)

## Freshwater! Drop by drop a Scarse and Badly Dictributed Resource



**The** Water we daily drink is one the most important natural resource for the life in our Planet. However this vital resource is becoming scarce and contaminated. According to the United Nations (UN) about 1.1 billion persons do not have access to potable water nowadays, and 2.6 billions do not have proper basic sanitation. Obviously that talking about water the Meteorology is closely link to it. Thus, this text brings all information and water characteristics, its importance and aspects for further reflection, bringing an opportunity for general awareness of all the needs for a sustainable use of this resource avoiding misuse and waste. A worse scarcity case would be not having potable water for the humanity survival.

Life emerges from Earth at about 3.5 billion years. Since then the biosphere changes the environment for a better adaptation. In the early Earth, according to specific temperature and pressure conditions, water accumulated in the surface, in both solid and liquid state, establishing the hydrological cycle.

Among the natural resources, water is the most important element for the species subsistence, which depends on its availability for metabolic functioning. Almost all aspects of human life depend on the water, reason for

what the mankind has developed in proximity to water sources.

The importance of water to life on Earth is undeniable. There are no living being in this planet that can renounce to the presence of water to its existence.

Therefore, the understanding of the key cycles and the life on Earth rely, among few other aspects, on the knowledge of water.

As seen in all natural resources, the water is threaten by pollution, several the contamination derived from human activities, including alteration related to climate changes.



In this context, on understanding the increasing scarcity and threat that this precious good is facing, there is a need to change the way we manage and consume water, once it is not an exhaustive resource, as people in general might perceive.

Even Brazil, that holds an important portion of the global freshwater resources, cannot squander it without control. This could drive to serious scarcity in the future and the risk water lacking to the population.

Thus, in this text we present the major characteristics and priorities that define this important and crucial substance and show actions and techniques that can be applied for water conservation and sustainable use.

### What is water?

If we ask this question, people in general will say that water is a precious liquid and that cannot be missing in our lives. Chemically a broad definition would be: *"Water is a clear, colorless, odorless, and tasteless substance, formed by two atoms of hydrogen and one of oxygen - H<sub>2</sub>O"*.

Water can occur in three states: solid, liquid and gaseous (vapor). These different states of molecular configuration depend on environmental conditions, overall pressure and temperature.

### What does water contain?

Water is considered universal solvent, with an extraordinary capacity of dissolving other substances. Sea water contain, at minimum, 40 kind of different metals; as well, inland freshwater holds almost all elements existing in the nature, being the mineral salts in its composition responsible for satisfying our thirsty. In the commercial 'mineral water' labels one can observe the amount of elements present in the water, which in fact will define its taste.

Another interesting information is that, in a normal rain the water pH – hydrogen ion potential – is higher than 5.0 (pH is an index to characterize acidity), while in the called 'acid rain' the pH is generally lower than 4,5. A portion of the rain acidity is due to the presence of sulfur, nitrogen and carbon compounds. Those gases are normally originated from fossil fuel (petroleum, coal), burning in industries and transportation.

### Water: Essential for Life

The developed process to synthesize proteins for the first one alive still the same is used by vegetables until the present, according to more accepted theory. When breathing thanks to Chlorophyll, the plants assimilate carbon of the dioxide carbon (CO<sub>2</sub>) and water vapor (H<sub>2</sub>O) to the formation of the glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>); leaving it exempts in air the oxygen. Whereas in the animals, the process is inverse; when breathing they become to combine the oxygen with carbon and hydrogen, being thus restituted the carbonic gas and the original waters.

Gaia Theory is what best shows the integration among waters, parts don't live of the planet (rocks, oceans and atmosphere), and alive parts (plants, microorganisms and animals).

As already chemist Lavoisier said "In the life anything if it creates and anything if it loses everything it transforms". Along millennia with a lot of water, the minerals developed likeness, the vegetables sensibility; the animals developed the instinct, the savage, the intelligence and finally the man in the 30th millennium he is learning how to discern.

### THE NATURAL SPRINGS OF WATER SUPPLY



The natural sources of water supply: Water of the rain, superficial waters (rivers, streams, lakes) and underground waters (watery, manantial, etc.).

The sources of water constitute an unit, being fundamental part of the ecological system and indispensable for the economical development.

Without a doubt, of the volume of existent water in the planet, only 1% is available for the man's activities and its distribution on the Earth is unequal.

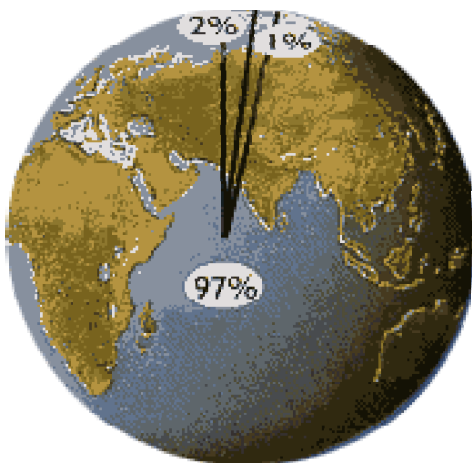
## WATER AND ITS SPACIAL DISTRIBUTION

In spite of the lay people's imprecise statement that water is "ending", however the global distribution of water is highly uneven from its origin, just happening the increment of a tiny fraction, named juvenile water, that it is expelled by volcanos. The water that today we used is the same that our ancestors drank. The one that has been altered is growing demands on freshwater resources, and of its distribution in the natural and artificial pools and the loss of the quality, what elevates the cost and increases of the social exclusion.

It should be stood out that, although the total amount of water in the Earth is constant, its distribution for phases have been modifying along the time. At that time of maxim glaciation, the medium level of the oceans was about 140 m below the current level.

Those waters are distributed in aerial pools (atmosphere), superficial (oceans, seas, rivers, lakes, ponds, swamps and artificial deposits) and of sub-surface (groundwater), and they become complete in a closed circuit, forming the Water Cycle or Hydrologic Cycle.

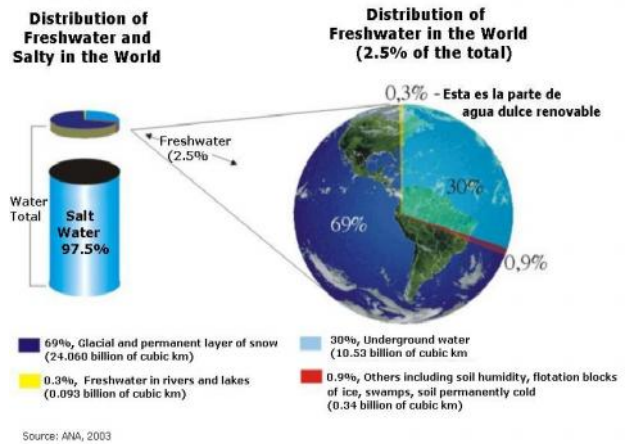
Although most of the planet is covered by water, the vast majority is not available for human consumption, because approximately 97% are salt water, found in the oceans and seas, and 2% form inaccessible glaciers. In other words, only 1% is fresh that could be already appropriated for human and animal use. And of this total one 97% are stored in groundwater sources.



FOTOGRAFIA: J. GARCÍA

The Earth's total volume is of about 1.386 billion km<sup>3</sup> that would be equal a volume sphere of 1,385 km of diameter.

It is distributed by the three main pools, in the following approximate percentages: oceans 96.54%, continents (involving rivers, lakes, groundwater, soils, glaciers, etc.) 3.459%, and atmosphere 0.0009%. Other important information is that the amount of the salt water from oceans (1.338 billion km<sup>3</sup>) is approximately 38 times the amount of the present freshwater on continents and atmosphere (35 million km<sup>3</sup>).



The water of the continents concentrates practically on the polar ice caps, glaciers and in the underground, being distributed the portion remaining, very small, for lakes and swamps, rivers, superficial area of the soil and biosphere. The groundwater is about 30% of the freshwater in the continents, but it almost totality locates in superior depth to 800 m, while the biosphere contains a very small fraction of the water of the continents being about 1/2,500.

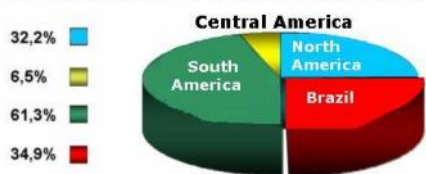
In brief, almost totality of the freshwater of the continents presents, with enormous difficulties of use, the inconvenience only to be annually renewable in a very small fraction, and is tended accumulated along thousands of years.

With respect to distribution of freshwater on American continent, it is observed that more than 60% are located in South America, where Brazil almost possesses 35%. Other interesting information standing out is that of the superficial freshwater total in the world Brazil represents more than 13%.



Brazil, although being the country holder of the largest hydric availability of the planet, responsible for almost totality of the nasal discharge medium of South America, possesses an unequal distribution of its hydric resources, with its largest basin (Amazonian) located in an area with reduced demographic density, while smaller basins have been degraded by inadequate form of the land use change. So, Brazil already confronts problems with water supply due to urban growth and degradation of the water quality in those more populous basins.

#### Distribution of Superficial Freshwater for Continent

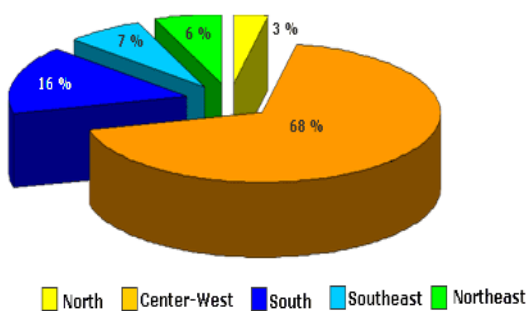


#### Distribution of Superficial Freshwater in the World



The graph below display the distribution of the hydric resources in Brazil, by region, observing that regions with smaller demographic density are those that have largest percentile. North region, where it locates great part of the Amazon basin, possesses lowest demographic density of the Brazilian regions (2,6 peoples/km<sup>2</sup>), following by Center-West region (16% of the resources) with a demographic density of 5,8 peoples/km<sup>2</sup>, while Southeast region, the most populous, with 67,7 peoples/km<sup>2</sup>, has only 6% of the hydric resources.

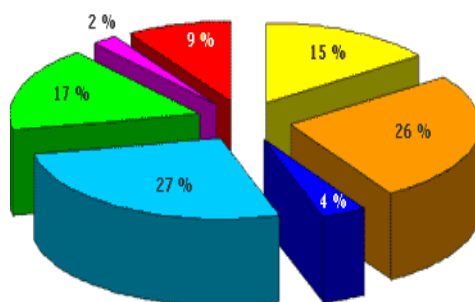
#### Distribution of the Water Resources in Brazil, for Region



Source: IBGE.

According UN, in the last 50 years the water availability for inhabitant reduced 60% in the planet, while in the same time the population increased 50%. The consumption of water bends every 20 years, while the estimates indicate that 50% of the liquid that supplies the great cities are wasted.

The relative distribution of the hydric resources renewable in the world doesn't feel in an uniform way but in a quite unequal way. According to the Hydrological International Program of the United Nations for Education, Science and Culture (UNESCO), now 6 billion people use about 54% of the available freshwater in rivers, lakes and watery. In Asian continent, that possesses 26% of the freshwater, live 60% of the world population, while in South America, where only 6% of the population live, it is had 27% of the freshwater.



Europa Ásia Oceania A. Sul A. Norte A. Central África

Source: UNESCO.

Another organ of the United Nations, Organization for Food and Agriculture (FAO) indicates that the main forms of the freshwater use are: irrigation by agriculture (70%), industry (22%) and domestic use (8%).

## WATER QUALITY

There are two ways to characterize the hydric resources: a linked one to the amount and other the quality of these resources, where these characteristics are intimately related. It is verified that water quality depends directly of the amount of existent water to dissolve, to dilute and to transport the substances.

Water quality is defined through their physical, chemistries and bacteriological characteristics, which are determined by physical test and chemical and bacteriological analyses, accomplished at laboratory.

The **physical test** determines physical characteristics of the water: color, turbidity, taste, odor and temperature.

The **chemical characteristics** of the water are determined by presence of chemical substances originating from soils through where it passed, or that it received contribution of their tributaries. That determination is only made by analytical methods and the results are supplied by substance concentration in mg/l (milligram per liter). Those substances are: calcium, iron, magnesium, etc.

The bacteriological analyses are determined if water presents conditions of potability. The decisive element is the presence, or no, of coliforms, mainly fecal ones that, in the drinking water, should not exist. However, if the water be submitted to a treatment, in its rude state, it can contain the maximum of 4.000 fecal coliforms per 100 milliliters.

## TYPES OF WATER ACCORDING ITS COMPOSITION AND QUALITY

The composition of the waters varies according to the soil type and climate of the regions where arise and traverse. So, with base on amount of salts dissolved in the waters, it can be classified in **saline, salty or fresh**.

Each class possesses certain uses, as for instance, saline waters can be used in some activities, even industrial, but they are not for the human supply.

As well as freshwater, recommended for the domestic use, should not be wasted in less demanding activities as in the cooling of industrial equipments, for instance.

CONAMA (National Council for the Environment) in resolution 20/86 classify waters in Brazil according its salinity. The waters are considered **FRESH** when present smaller salinity or same to 0.5%. The variation from 0.5% to 30% in the concentration of the dissolved salts, takes those waters to be considered as **salty**. Already the waters that present salinity same or superior to 30% are considered **salines**.

Depending on the use conditions, the water can be classified in five types:

**PURE WATER** - If it be considered as pure the water composed exclusively by hydrogen and oxygen, it will be reached the conclusion easily that doesn't exist water absolutely pure in the nature. This because, through where passes, it is going dissolving and transporting substances that incorporate during its way. The pure water will only be found when produced artificially at laboratory, and its purpose is, almost always, the production of remedy, or some other more sophisticated industrial process.

**DRINKING WATER** - it is what one can drink. It is fundamental for the human life, and it is obtained through treatments that eliminate any impurity.

World Health Organization (WHO) classifies as drinkable the water with mineral tenor of until 500 mg per liter (mg/l). In Brazil is considered acceptable the water with mineral tenor of up to 150 mg/l. In areas less provided, as Northeast, that percentile one until it can pass to 200 mg/l.

**SERVED WATER** - it is the water that was used by man and it was dirty. It is the sewer.

**POLLUTED WATER** - it is the one that received substances that left it darkens, or that altered its color, odor or taste, turning it unpleasant. It is the water that suffered change in its physical and chemistry characteristics.

**POLLUTED WATER** - it is the one that contains toxic substances or microbes capable to produce diseases. The contamination can be invisible to our eyes or imperceptible to the palate. It is the water that causes damage to the health.

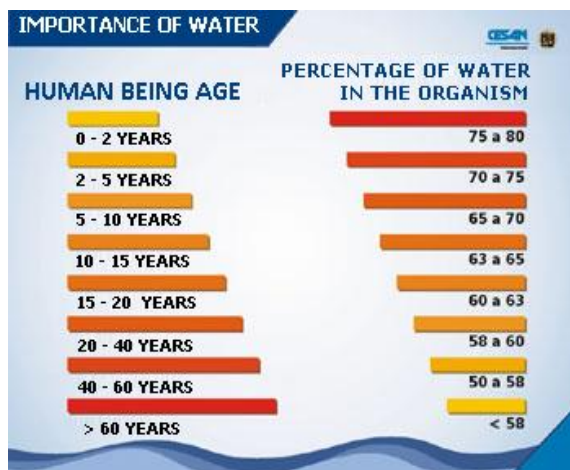
## WATER FOR PEOPLE AND FOR LIFE

The human being can be up to 5 minutes without breathing, until 35 days without eating, but dies in 5 days if it doesn't ingest liquids. The water is essential to the life. Every alive being of the planet, depends on a continuous water flow and of the balance among water that organism loses and one that it restores.

As well as the water irrigates and feeds the Earth, that has 71% of her surface formed by water; the blood irrigates and feeds our

body that is also constituted by 70% of water. When our body loses liquid, it increases the concentration of sodium that one find dissolved in water. When perceiving that increase, brain organizes the production of hormones that provoke the thirst. Not to drink water, the human being enters in dehydration process and can die from thirst in about two days.

The human body possesses a lot of water, and can even to say that he is a tank of water that several substances are dissolved. To have an idea, a baby in the mother's belly has 95% of his weight in water; the newly born has 80% and adult people has about 70% of water ; as dehydration is one of the particularities of the old age, senior has just about 40% of the weight in water.



Source: Clinical Hospital of UNIFESP.

The water on our body is as a navigable river because propitiates in the cells, in the blood of the veins and arteries, in the interstitial liquid and in the lymph that runs on lymphatic vases, favorable conditions for transport and action of several indispensable molecules to the life. Truly, when drinking water, we are also restoring salts minerals as sodium, potassium, calcium, among other dissolved in her.

All water that we drank is not stopped in our organism, because she is always in constant movement; adult can shifts of 5% to 10% of the water consumed per day.

We lost water on temperature control of the body when we sweated and on metabolism of the own breathing; the amount depends on ambient temperature and intensity of physical exercises that we do.



We can eliminate from 1 to 20 liters of urine per day, and this control is made by kidneys and urinary apparel. Daily an adult loses about 1.5 liters of water: by urine - 1 liter; by perspiration - 200 ml; by breathing - 100 ml and by evacuation - 200 to 300 ml. To supply this lack and to maintain the good organic working, the mechanism of the thirst is activated.

## WATER AND METEOROLOGY

Meteorology has to do everything with theme of the water because one of the most important parameters is the rain, that all of us knew. There is until a sub-area of the meteorological science that specifically studies those subjects: Hydrometeorology.

The water is necessary not only as a punctual support for fauna and flora life, but also as motor of a group of cyclical movements of renewal and transformation that generates the named water cycle or hydrologic cycle.

**Hydrologic cycle is characterized as the natural behavior of the water: origin, form, transformations and relationships with alive beings.**

Three great compartments of the hydrologic cycle keep waters for different times: atmosphere, terrestrial surface and underground. This way, waters constantly circulate by planet through evaporation, condensation and precipitation phenomena.

All water of our planet is in continuous cyclical movement among liquid, solid and gaseous phases. The cycle represents interdependence and continuous movement of the water in their different phases. The components of the hydrologic cycle are:

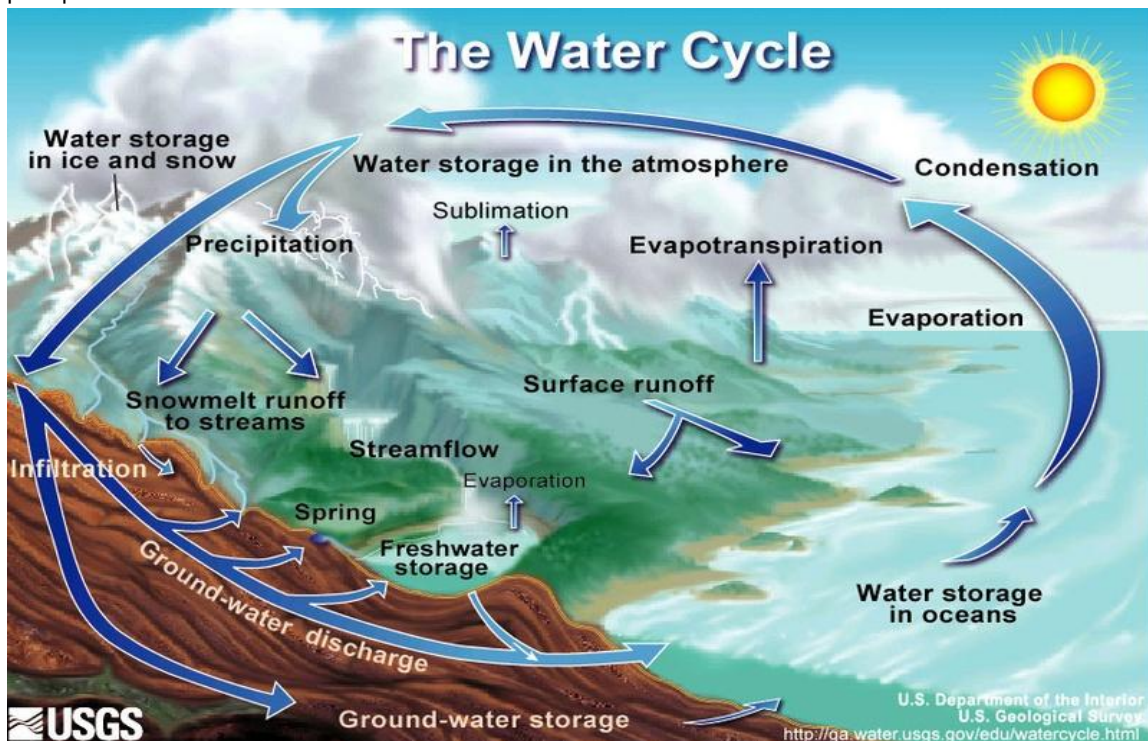
- ☞ Precipitation - is any product of the condensation of atmospheric water vapour that is deposited on the earth's surface. It can be liquid (rain) or solid (snow or ice);
- ☞ Evaporation - Process of transformation from liquid water to gaseous phase (water vapour). Most of the evaporation feels starting from oceans, very away, occurs evaporation in lakes, rivers and dams;
- ☞ Evapotranspiration - Term used to describe the sum of evaporation and plant transpiration from the earth's land surface to atmosphere;
- ☞ Infiltration - Process by which water on the ground surface enters the soil;
- ☞ Percolation - Process where water enters by soil and by rocky formation until aquifer;
- ☞ Drainage - Movement of the water displacement of the surfaces during precipitation.

In each one of those "circles" of the hydrologic cycle water stay certain times; they can stay some days in atmosphere, weeks or years in soils, rivers and lakes, from 100 to 3,000 years in the oceans and even more than 10,000 years in the polar caps and in the underground.

Water has as interesting characteristic her extraordinary mobility degree: it passes from liquid to gaseous state, returns to the liquid state, could pass again to the solid state and continues like this in a permanent process of changes that links with energy, originating from Sun.

It is also main responsible by current form of the terrestrial surface because destroys rocks of the mountainous areas and, as glaciers, rivers, waterfalls, or rapids, transports material continually resulting from this erosion by lowest areas, depositing them on valleys, meadows, lake bottom or ocean.

In other words, water is master of recycled, auto-conversion and auto-purification. This process happens because the waters oceanic or continental pass to the gaseous state by evaporation due to the energy which receives from sun. Evaporation levels depend of the temperature and amount of vapor or humidity that is found in the surrounding air. There is also an important evaporation that comes from plants, that in this case is called transpiration.





The inverse process to the evaporation is the condensation. The vapour returns the turn into water when air saturated with humidity absorbs more humidity through other substances or when there is a drop in the temperature of the air saturated with humidity. The vapour condenses in the air and form minuscule drops of water; these for its time form the clouds.

Air that contains vapour or clouds is transported by wind of a place to other, by this reason, the wind plays an important part in the possibility that it rains or not in a place.

As minuscule drops that constitute the clouds don't have possibility to fall in the soil by small size, it is possible that they turn again in vapour. It is made calculations that each millions of those minuscule drops can form so only a rain drop.

These big drops are ones that fall on terrestrial surface in precipitation form. According to the climatic conditions, the drops join, sometimes, with ice crystals and form snow flakes that can turn into water as fall on surface or precipitate in hail form. When it rains, water doesn't drain for surface only, but party is absorbed by soil.

The possibility that soil absorbs water depends on several circumstances, among them, degree of soil porosity, existent vegetation and layers that result impenetrable. For instance, on the cities, the asphalt doesn't allow water to be absorbed by soil. In whole this process there is also possibility that natural sources of water are created, particularly when rain is kept in the rocky layers.

Like this, the amount of existent water in our Planet doesn't increase nor decreases. The abundance of water is relative. It is necessary to take into account the estimated volumes of water accumulated and medium time that it stays on terrestrial environmental.

For instance: in the rivers the estimated volume of water is about 1,700 cubic kilometers and the residence time in the river source is of two weeks. Glaciers and snow have 30 million cubic kilometers and water should be frozen for thousands of years. Atmospheric water has volume of 113 thousand cubic kilometers and stays for 8 to 10 days in the air.

The alive beings also participate on the water cycle, vegetables and animals constantly absorb water form environment and return it in form of feces and urine, besides, through the breathing and transpiration water returns to the environment in vapour form.

## MULTIPLE USES OF THE WATER



The water is used, in the whole world, mainly in the supplying of cities and domestic uses, energy generation, irrigation, navigation, fishing among others.

Generally, water uses understand the activities human in its set. So, the water can serve for consumption or as input in some productive process.

The availability of this resource is each lesser time, on the other hand, because it must be shared by distinct activities and another one, because is not used of rational and efficient form. Thus, for example, industry and mining use technologies that demand great amounts of water, and in consequence they generate great amounts of residual water that are returned to the water sources, in large extent, without previous treatment.

At agriculture, the water demand also is very great, especially in sites where rains are not constant. Moreover, use irrigation systems that waste enormous volumes of water. The chemical fertilizers and pesticides also contribute for the contamination of the water courses.

Therefore, in synthesis the man uses water mainly for following purposes: domestic, public, industrial and agricultural.

### Domestic Use

The water is used in innumerable daily activities and personal hygiene. It serves to take bath, to prepare foods, to wash wares and clothes, and to satisfy thirsty.

It must be of first quality and fill the potability requirements.



The access to the potable water supply is vital for the health. The water is not only essential to drink, but also it is necessary for good hygiene and sanitation, which help to protect the health of the families and communities. The water is a resource frequently disputed, because it has many users competing for its access and because many people do not possess enough water for its necessities.

Water treatment to become it potable is basic for the public health, but it represents costs for the company of supplying (public and private) as for the consumers.

### Public Use

The water is used for the cleanness of public areas, irrigation of parks and gardens, fire prevention, recreation etc. The activities of leisure are several that the water provides, since the practical one of nautical sports (yacht, rowing, etc.), until relaxing exercises as swimming and baths of rivers and waterfall.



### Industrial Use

The water is used to generate energy, move machines, cool parts, manufacture drunk and foods etc.

In Brazil, the water is the main source of electric energy generation. For this, the rivers are dammed and the force of the waterfall puts into motion the turbines, generating electricity.



The factories use water in diverse processes as in the cleanness and cooling of machines. And, more directly, as raw material, in the foods and paper industries and, clearly, of mineral water.

### Rural Use

In a general way, water is used for irrigation of plantations and creation of animals. Currently, most of the freshwater of the planet (about 70%) is used to irrigate plantations in sites where the amount of rain is not enough. It is exactly in this area where it must be made efforts to reduce the exaggerated consumption, with practical of irrigation that does not waste the water - irrigation for dripping, for example.



## WATER: SUPPLY IN BRASIL

According to World Health Organization (WHO), the human being would need for its basic necessities of only 40 liters per day. For the parameter of the United Nations (UN), the consumption of a person would have to be of 180 liters per day. In accordance with data of the Brazilian Research of Basic Sanitation (PNSB), the daily volume of water distributed for general net, in 2000, was of 260 liters for inhabitant. This volume, however, varied as region of Brazil, being that in the Southeast reached 360 liters person/day, while northeastern was in 170 liters person/day. Most of this water is distributed for the population after some treatment. The analysis of the ratios between volumes of water distributed with and without treatment is similar in the majority of Brazilian regions, with exception of the North region where more than 30% of the distributed water do not receive nothing type of treatment. Comparing the data of 1989 with the ones of 2000, it is possible to verify that the volume of water distributed for the population increased, passing of 200 liters to 260 liters inhabitant/day.



In Brazil, in a residence with four fixed inhabitants, the expenses of water with shower use represent 46% of the consumption. The sanitary vase can arrive 12% of the consumption and the kitchen 14%. More than 14 million people in Brazil does not have access the nets of water distribution and the contamination is increasing.

The access to the water of good quality and adequate amount must be a priority, mainly in the urban areas, and is directly to link the population health. It must be emphasized that diverse illnesses have its origin in the contaminated water and represent more the half of the hospital internments in the public net of health.

IBGE data inform that only 2% of the Brazilian cities (about 116 cities) did not count, in 2000, with any service of water supply for general net. Most of these cities were situated in the North and Northeast regions. Although to have had a reduction, in these regions, of the number of cities without supplying, it had, in the last decade, an increase of its proportional weight: passed of 50% for 56% in Northeastern and 21.7% for 23.3% in North region, indicating that the investment carried through of the expansion of the general net of water supply did not occur in the same ratio that in the too much regions.

These data are related to the existence or not of net, independently of the covering, efficiency and number of domiciliary connected to it. This picture had as base the National Research of Basic Sanitation (PNSB) data, published in 2002, combined with information of the Census 2000 and institutions of the government and university.

According Census 2000, 10% of the Brazilian domiciles in urban areas (that represent about 3.9 million families or 14.4 million people) were not served by water supply net. The majority of these domiciles, however, counted with canalized water come from other sources, such as fountain and wells. And great part of this population lived in peri-urban areas - that are immediate neighborhoods of the cities - and still counted on sources with reasonable quality, but that present trends of degradation in function of the urban expansion on these areas, without the well-taken care of had ones with the sanitation services, as sewer nets. In agricultural areas, the situation was sufficiently differentiated, because 43% of the rural domiciles did not make use of no type of canalized water and only 18% of the agricultural domiciles were on to the supplying net.

The increase of the access to the water duly treated must be faced as priority and followed of reduction programs of losses in the nets, because is estimated that the water wastefulness in the public systems of supplying is about 45% of the offered volume. For reduction of these losses are necessary programs that involve fiscalization of clandestine linkings, substitution of old nets, maintenance of hydrometers, research of leak, among others procedures. Beyond the structural measures to minimize the losses in the nets, fiscalization of uses and of occupation in the areas of sources is necessary, to prevent the degradation of the water sources, together with explanation campaigns next to population on adjusted use of these important natural resources.

## IMPORTANCE OF THE WATER IN THE CURRENT SOCIETY AND THE NATURE



Source: CORSAN.

Since always the water was considered basic for survival of the human civilizations and in general for maintenance of the balance of the nature. In the arts it was used as life symbol. Today knows that it is constituent basic of the organic matter, decisive for all the dimensions of the sustainable development of the planet.

The man does not survive many days without water, and it isn't of if admire, because the first acts of conscientious management of the water uses centered in the direct use for man. This management generated of a form or another one, scarcity and insufficiency of the available water for natural processes. Thus, it is necessary that the management of the water is guided to assure the good functioning of aquatic ecosystems as well as terrestrial ecosystems. The management of water supply thus is completed by management of the water search.

The increase of the water search must the demographic growth, industrial development and expansion of the irrigated industry. The World Water Council (WWC) foresee that use of the water will increase in 40% and will be necessary an additional one of 17% for food production in 2025.

We see, therefore that water supply must be balanced in the space and the time for the constant evaluation of the search and its true motivations. The water necessities (search) must be evaluated and evaluated the respective impact on aquatic ecosystems and terrestrial ecosystems of them dependents (possible offers).

The water regimen in the nature is not constant, having excess cycles and lacks. This fact has taken investments in the retention of

great water masses that in turn can generate asymmetries in the space distribution of water-bearing the natural ones with regulation necessity supply national. Moreover, these water masses are used to advantage for some economic uses, for contradictory times: fishing, navigation, production of electric energy, irrigation and water supply.

The available volume of water, vital element for the human use and other types of species, has been reduced. Great part of the used water is launched without treatment in the hydrological system: for example, one  $1 \text{ m}^3$  of contaminated used water aggravates and spoils more than  $10 \text{ m}^3$  of pure water.

It is estimated that about 2050 more than four billion people - almost half of the world population - will be in countries with necessity permanent and chronicle of water. The industry is one of the greater users of water, consuming 21% of the available water total in the planet, while the domestic use is around 10%.

Today, about 500 million people live in countries with chronic water scarcity, and approximately 2.4 billion inhabit in countries where hydric system is threatened. The peoples who inhabit the regions more droughts are in Africa and Asia. Almost  $4,000 \text{ km}^3$  of freshwater are consumed per year, giving a average of 1,700 liters per person daily. The domestic consumption is in approximately 170 liters per person every day.

The domestic use of the water has shown wastefulness evidences, because most part of this water is lost in leaks, arriving 40% of loss. The water that drip of the faucets can imply in bigger wastefulness of what the used one to drink and to cook, to pointing out that about 30% of domestic waters is lost in the discharges of the sanitary vases.

In developing countries, 20 liters of water per person are considered a luxury. However, the inhabitants of the developed countries consume these 20 liters alone to water its gardens, for example.

Some numbers of the water use in the agricultural and cattle production world-wide deserve to be mentioned:

- ☞ To cultivate one kilo of rice are necessary 1,900 liters of water.
- ☞ One kilo of potato consumes 500 liters of water.
- ☞ One kilo of wheat consumes 900 liters of water.



- ☞ One kilo of soy consumes 1,650 liters of water.
- ☞ The sheep and ox meats also have a high volume of the water use: one kg of meat consumes 15,000 liters of water.

The possible solution would be to cultivate and to create animal with lesser water use, what it would consist of an efficient measure to not only supply with foods the world-wide population, as to rationally efficient and water use. However, agriculture is each industrialized time more.

In relation to the industrial process properly said, the water consumed in the weighed industry, - between which we can cite chemistry and petrochemical, metal, wooden one, paper and cellulose, food processing and machines -, consume about 20% of all freshwater of the Planet, what it represents annually 130 m<sup>3</sup> per person.

To have an idea at developed countries, 59% of all the water are used in the industrial process. At underdeveloped countries or development, the problem of the pollution of waters is more acute and serious because the rivers become true sewers the opened sky, whose industrial garbage without treatment is main responsible one - about of 70% of the sewer is industrial garbage -, and 30% remains being urban sewers.

A serious problem for life quality of the population is the effluent ousting of domiciliary sewer and responsible industries by manufacture of pesticides and fertilizers, highly toxic, without any treatment, in rivers and dams that supply the cities and irrigate the plantations. The more polluted will be water, greater amount of chemical products will be necessary to become drinking waters for human consumption, as well as greater will be the possibility of contamination of the agricultural products, being able to provoke diseases as diarrhea, yellow fever, hepatitis, amebiasis, among others.

### **Brazilian Demand of the Water Use**

The biggest demand for water in Brazil, as it happens to most part of the countries, is agriculture, especially irrigation, with about 65% of the total. The domestic use represents for 18% of the water, after industry and, finally, cattle raising.

Historically, Brazil always privileged the use of this resource for energy production, in detriment of others, as human supplying. Code of Waters, 1934, the government called attention for necessity of the use industrial of water and for implementation of measures that facilitated, particularly, its potential of water power.

But, multiples use of waters of the hydrographic basins - navigation, irrigation, fishing and supplying, beyond water power - had unchained conflicts in the regions where pressures on demand are great.

In 1997, because of these problems, was intentionally Law for the Waters that establishes National Politics of Water Resources (PNRH) and creates National System of Management of Water Resources (SNGRH). In this new reading of the importance of water, in situations of use scarcity and conflicts, the human supplying and use for animal become priorities, as he had been established for Brazil's 1988 Constitution. Moreover, the law foresees management of the water uses for hydrographic basins and generation of financial resources to be employed with priority in the proper basin, by means of the charging for water use where has conflicts or scarcity.

As much in city as in the field, different users of the water competes between itself for this resource and they worry solely in to collect and to use water that needs, without thinking about effect that cause to the other users and the environment in its set.

Therefore, the use each more intense time of water resources comes compelling to the adoption of regulation measures and modification of the water courses what generates variations in ecosystems and microclimates, with damages to flora, fauna and habitat.

So far human, fauna and flora come surviving to change situations, but if contamination to increase the capacity of regeneration and adaptation will diminish, causing the extinguishing of species and environments that before constituted in life source. So, it is urgent a process of planning to prevent and to reduce these damages will occur.

As water is part of the environment, therefore, its conservation and good use are essential to guarantee the life in our planet.

## MENACE TO WATER RESOURCES

Amongst the natural resources, water today is threatened of the planet. Threatened for scarcity and also threatened in its quality.

The intense and increase aggressions to the environment come more compromising each time the quality and amount of the available water resources.

In many countries knows that people who live in zones deprived count with a deficient water service for human consumption. This must to the physical and geographic characteristics of settlements, in which to implement adequate sanitary infrastructure would represent costs very raise that population cannot assume.

Moreover, there is a generalized drinking water scarcity as much in cities as in the field, where it has covering limited at domiciles. A deficient service of potable water supply affects health of the populations. Therefore, it is important to have with an adequate system of supply.

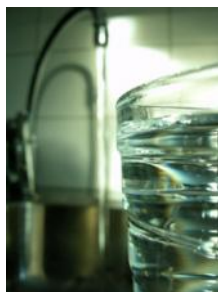
### THE SCARCITY

The expansion and development of the cities provoke exhaustion of the sources where they are supplied, compelling them will search it others each time more distant, becoming sufficiently expensive.

Water scarcity is resulted of the consumption each bigger time, bad use, deforestation, pollution and wastefulness.

### WASTEFULNESS

Unfamiliarity and lack of orientation of the people are main responsible ones for water wastefulness, which happens, most of the time, inside of the proper residences.



The concrete acts of water wastefulness are: to leave the open tap while one brushes teeth or one beard; while soap is used, in the bath; while washes the dishware; to wash car or sidewalk with hose; to sprinkle the garden when the sun already upright.

Also it is wastefulness to be in house with a tap dripping or pipe leaking water. The problems of leak in the public system also are responsible for good parcel of water wastefulness.

## WATER BAD USE



One of the activities that more wastes water is irrigation for canals and aspersion. In the first method, the water intensely is evaporated and

in the other is indiscriminately dispersed, also causing evaporation.

It is necessary that new methods of irrigation are used so that really is used to make use good each available drop of this precious liquid.

### DEFORESTATION

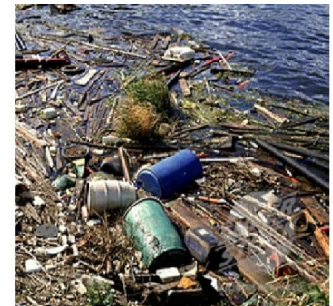
Deforestation in the fountain provokes gradual disappearance of the source. In the river margins, streams, lagoons and dams provoke serious problems as silting of the water bodies, carry material of all size and species, inclusively pesticides, generally used agriculture.

Without tree root protection, the margins of the water bodies are removed, providing overflow and consequences and disastrous floods.

### POLLUTION

It can occur due natural causes, as torrents, that bring solid material and dissolved salts in water bodies, and rains that, "washing the atmosphere", deposit dusts and gases in the water.

But, who more has contributed to pollute the water is man, when he uses the water resources as sewer collector of the cities



and effluent of the industries loaded of toxic products and metals heavy.

Pesticides used in agriculture, garbage launched in the water or in river margins and dams, and vacant, corrals and pigsties constructed in the neighborhoods of the water bodies also are pollutant.

Exactly occurring of eventual form, we cannot forget of the accidents with dangerous loads that are launched into water bodies.

## BETWEEN WASTEFULNESS AND SCARCITY

Through the centuries, different uses of the water by man had increased excessively, resulting in environmental degradation and pollution. Deterioration of the water sources is related with growth and diversification of agricultural activities, increase of the urbanization and intensification of activities human in the hydrographic basins. The intense use, without well-taken care, puts at risk the availability of this precious resource and generates problems of scarcity in many e regions countries

The current and future problem of water scarcity in the majority of the countries, with exception of those regions where it has natural limitations, more is related to quality of what the amount of available water. The water exists, however each more time compromised in function of the bad use and inadequate management of this resource.

So, new international conflicts, motivated because for water dispute, will have to appear in the next decades. Forecasts show that in regions as Middle East and River Nile Basin, in Africa, water will go to substitute oil as great causer of discord. The reason is scarcity of the precious transparent liquid at these places.

Of the 2.5% of freshwater, only 0.3% is available to human consumption. This value demonstrates clearly the difference between water and hydric resources, i.e., passible water of use as good economic. The water total amount of the planet, therefore, is enough to supply all population with recess. This because water cycle keeps a constant flow of the water volume, at 41.000 km<sup>3</sup>/year. Of this flow, more than half arrives at oceans before it can be caught and 1/8 reaches very distant areas to be able to be used.

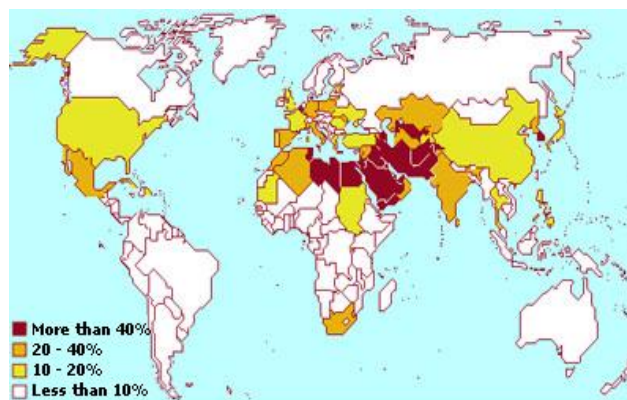
It is estimated that water availability effective is between 9,000 and 14,000 km<sup>3</sup>/year. Meanwhile, the total water demand foreseen at 2000 was about 4,500 km<sup>3</sup>/year. Thus, in worldwide, danger of water scarcity does not exist.

Inequality in the water source distribution, however, becomes that some countries are extremely poor and others very rich.

Desert countries like Kuwait, Saudi Arabia and Libyan, and insular small countries, like Malta, Qatar and the Bahamas islands,

possess less that 200 m<sup>3</sup>/year per person, while the recommended by UN is about 1,000 m<sup>3</sup>/person/year. Regions like Canada, asian Russia, Guyana and Gabon have more than 100,000 m<sup>3</sup>/person/year. Brazil is in the category served between 10,000 and 100,000 m<sup>3</sup>/person/year.

Moreover, the water use varies enormously of country by country. The data on as water use is distributed according to domestic expenses, agricultural and industrial are scattered and incomplete. However, it can be an idea of the variability observing that in the Guyana, for example, 1% of the water use is for domestic aims and 99% in agriculture and industrial; already in Equatorial Guinea, the ratio is practically inverted: 81% of the water expense would be for domestic aims and alone 19% for agriculture and industry. Both countries are in regions with more than 100,000 m<sup>3</sup>/person/year of freshwater.



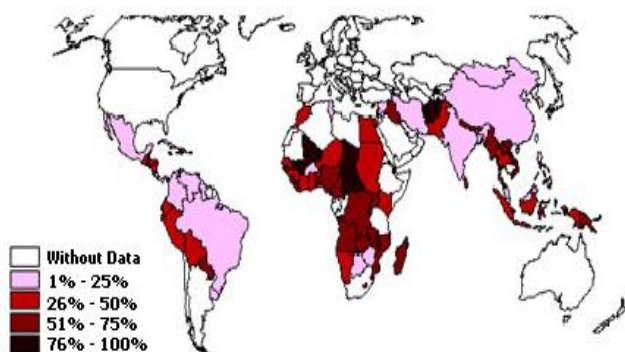
*Expense of worldwide water in relation the amount of freshwater available. Source: WMO*

To have an idea of the result of the conjunction between natural inequality and water use, the map above shows the water expense by country in relation to the amount of freshwater available. The countries with bigger relative expense of water are concentrated in Middle East.

These maps, however, do not show the real situation of each country how much to the scarcity or abundance of water. In part, because some countries present rain scarcity during periods of the year and abundance in remaining portion, and others, like countries of the Sahel Zone (Africa), possess areas of the desert-like territory, but are cut by some river of great volume, like Nile or Niger, and thus part of its territory has enough water and part has scarcity.

Moreover, these data do not take in consideration politic and cultural causes that can drastically change the access of the population to drinking waters. Pollution, for example, become that the available water by consumption can exist in very lesser amount than totality of the freshwater available.

Aggravated for factors as wastefulness and lack of public initiative to decide about water problems, it his leaves millions of people without access drinking waters around world. Such factors can cause water scarcity even in countries with great abundance of freshwater, like Brazil. It is estimated that 74% of the worldwide population have access to drinking waters, being that, in Africa, this ratio low for only 46%, arriving extremities like Chad and Mali, with less than 24%.



Worldwide population without access to drinking water. Source: P. H. Gleick, 1998.

### Basic Facts on Global Situation of the Water

Currently we are more than 6 billion people in the planet, and would have for consumption - discarding the high costs of the desalinization processes - 2.5% of the existing water, that is freshwater. However, being about freshwater, for each liter considered of easy access there is about 350 liters of difficult access, for being, for example, situated in polar glaciers. Even thus, freshwater is considered abundant.

Adopting a global perspective, it is verified that nothing less that 60% of the freshwater of easy access meet in 9 countries, while - in one another extremity - 80 countries need to face varied levels of scarcity. In this same line is calculated that a minority of people is consuming most of the existing water in the planet (86%).

Meanwhile, for nothing less than 1.4 billion people the water are insufficient; and for 2 billion are untreated. This picture explains because 85% of the registered cases of diseases are hydric propagation.

Brazil, Russia, China and Canada are the biggest water detainers of the planet. Kuwait, Israel, Jordan, Saudi Arabia and Iraq, in Asia; Libyan, Algeria, Ethiopia and Cape Verde, in Africa; Hungary, France, Spain and Belgium, in Europe; Mexico and United States, in North America, are examples of countries that face situations of water scarcity.

Brazil possesses, alone, more than 13% of the freshwater superficial of the planet, being considered a rich country in water resources. However, also faces problems related with space distribution: nothing less than 70% of the water volume is found at Amazonia; about 15% are situated in Center-West region. Modest 6% are in South and 6% in Southeast, and lowermost 3% remain for Northeast. This last region is one that more suffers with scarcity; however, other regions had started, in recent years, to present serious problems of supplying, related mainly with water quality. It is not enough to have water in amount, but is necessary also that it has quality.

In addition, the growth of the population - as much vegetative growth how much that caused by migrations - did not take in account criteria related with water availability and its quality. Therefore, regions with water scarcity had started to count on high population amounts, reducing availability per capita; the same it has occurred in regions with quality problems.

Of this form, we can conclude that yes, we have water. The problem is in its localization and population concentrations in regions with low water availability. For example, in Brazil millions of people are Northeast - where climate, rocky formations and soils do not collaborate for water storage; there are millions of peoples in Center-South, region with more favorable conditions than Northeast, but with a population contingent that demand many services and that counts on intense industrial and mineral activity, what also comes causing the exhaustion of the existing natural resources - included water.

At last, there is a latent crisis around a water of decreasing quality and a demand in exponential growth in Brazil, that that is stated by tragedy announced for welfare of the Brazilian future generations.

It more does not advance to cry over spilled water. It is at time to diminish or same to close ours faucets. While this valuable liquid flows for drain of the pollution, wastefulness and occupation of the sources, population growth and consequent increase of the demand for water threaten of collapse the freshwater reserves still available.

Without the conscience of the society on importance by water resource preservation, it is impossible to guarantee water of good quality for our generation and future generations. But it is not enough to have conscience about problem, is necessary to preserve the nature, much-needed to the survival of our planet, that is, the action of preservation becomes still more essential and it must count, therefore, with participation of all society.

And it is in this perspective of the involvement and participation that we consider that must have, between its with priority action, the development of strategies and educative programs that look for to guarantee the preservation of the water resources.

Thus, we are publishing this edition, as form to contribute for this process, so that it serves as instrument of reflection and support to the development of an ampler educative work, carried through to include of integrated way the diverse sectors (users, civil society and service public) at preservation of this so valuable resource: **WATER**.

We finish this matter leaving a reflection in form of music written by Guilherme Arantes, singer and Brazilian composer, who ahead of its so deep and current letter would have always to be remembered and used daily for all we whom we want and must that the rational and equality use of the water occurs, good so essential to all living beings at our **PLANET LAND**.

## WATER PLANET

*"Water that comes from the  
Placid spring of world  
And digs a deep canyon  
Water that form an innocent  
Creek and flows into the  
Stream of the brook...*

*Dark waters of the rivers  
That bring fertility to the Hinterlands  
Water that bathe villages  
And quench the thirst  
Of the population...*

*Waters that fall from the rocks  
Veil of cascades,  
Roar of thunder  
And then sleep calmly  
On the bed of lakes  
On the bed of lakes...*

*Water of the creeks When the  
mother of the waters, Iara,  
Is a mysterious song  
Water that the sun evaporates,  
Heads to the sky  
To become cotton clouds...*

*Raindrops happy rainbow  
Over the plantation  
Raindrops, So sad,  
They are tears In the flood...*

*The waters that move mills  
Are the same waters  
That soak the ground  
And always return, humble,  
To the bottom of the earth  
To the bottom of the earth...*

*Earth! Water Planet  
Earth! Water Planet  
Earth! Water Planet...*

*Water that comes from the  
Placid spring of world  
And digs a deep canyon  
Water that form an innocent  
Creek and flows into the  
Stream of the brook...*

*Dark waters of the rivers  
That bring fertility to the Hinterlands  
Water that bathe villages  
And quench the thirst  
Of the population...*

*The waters that move mills  
Are the same waters  
That soak the ground  
And always return, humble,  
To the bottom of the earth  
To the bottom of the earth...*

*Earth! Water Planet  
Earth! Water Planet  
Earth! Water Planet...*

(Guilherme Arantes)

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THE BRAZILIAN NATIONAL WATER AGENCY - ANA:  
[www.ana.gov.br](http://www.ana.gov.br)

WATER Online:  
<http://www.aquaonline.com.br>

FRIENDS OF THE WATER:  
<http://www.amigosdaagua.com.br>

BRAZILIAN ASSOCIATION OF WATER RESOURCES - ABRH:  
<http://www.abrh.org.br>

GTÁGUAS: THE BRAZILIAN MAGAZINE OF THE WATER:  
<http://revistadasaguas.pgr.mpf.gov.br/aguas/edicoes-da-revista/edicao-atual/>

NATIONAL WATER RESOURCES PLAN: <http://pnrh.cnrh-srh.gov.br/>

TV CULTURA:  
<http://www.tvcultura.com.br/aloescola/ciencias/agua-desafio/index.htm>

UNIVERSITY OF THE WATER:  
<http://www.uniaqua.org.br>



Ministério do  
Meio Ambiente



## Excellent Reasons to Surf the Net



A place to put wisdom and knowledge to the service of Human Being.  
A place where human beings experiment and generate new Concepts.

Innovation Arts & Science  
Human Being Emotion  
Quality of Life Experience  
Knowledge Sustainability

### 1 <http://www.sapiensparque.com.br>

The Sapiens Park is an innovation park, where Arts and Science & Technology will converge in order to help the Human Society to face and overcome the challenges of the Sustainable Development in the 21st Century. It is an urban and environmental complex composed of scientific-technological, tourist, business and educational enterprises that seek to provide an unforgettable experience for visitors and clients through a group of distinct services, a special environment and a concept of learning, integrated to entertainment and the application of technology. Sapiens Park seeks to integrate the positive elements of these experiences from a perspective of sustainability, diversity and competitiveness in a way that it can be called an Innovation Park for the Promotion of Economic, Social, Technological and Environmental Development.

To transform the concept of Sapiens into reality, two developments were conceived that should concentrate precisely on the two central elements of the project: the human being and knowledge. It is composed for two main interactive spaces: *Experientia* is a development conceived in the form of a new concept called an "**Experience Park**", which joins elements of a **Science Museum, Theme Park, R&D laboratory and Show Room of new technologies and solutions**; and *Scientia* that intends to establish a large habitat for innovation comprised of **Advanced university centers, Company R&D units, Laboratory of NGOs** and other organizations that want to be located in an ideal environment for research, development and experimentation of new technologies and solutions.



Brazilian Society for the  
Progress of Science

### 2 <http://www.sbpcnet.org.br>

This year where SBPC does 60<sup>th</sup> anniversary, it is being prepared a series of commemorative activities and accomplishments that started with its new website. With objective to extend communication channels between scientific community and society, this new site was reformulated to be an open space to the spreading and debate on science in Brazil.

In 1997 was launched first SBPC website, that also it passed by transformations. The new presented model has characteristics necessary to store an increasing volume of contents and, therefore, to publish better and bigger notice, articles, news, commentaries, and notes on events of the more diverse sources. All these contents will be stored in data bases, in way that at the future could be recouped for purposes as research and sources for studies. This new Website has spaces reserved for diverse public and types of organizations. Moreover, it also intends to contemplate specific public as educators, young and children, and job opportunities and career for new researchers and/or university professors.



3 [http://ccd-ckd.cebem.org/index\\_eng.php](http://ccd-ckd.cebem.org/index_eng.php)

Portal Cooperation, Knowledge and Development (CKD) is a project promote and further develop an Internet-based model that supports North-South and South-South knowledge partnerships based on management of information and learning activities, implemented through ICT-based pedagogical approaches, resources and practices. This portal is an initiative of a group of institutions from Latin America and Canada led by **CEBEM** and is funded by **IDRC-CANADA**.

This initiative is a combination of research and experimentation. Operationally it fits within a forty-year tradition of using information and communication technologies (ICTs) to facilitate information sharing for development; theoretically, it is grounded in a constructivist approach to knowledge creation. In other words, it is designed within the social definition paradigm wherein the dominant role of the outside expert in defining problems and solutions is tempered by that of individuals and communities who are experiencing reality. The initiative is part of a global effort to reduce the gap between knowledge, decision-making and action, and to recognize and value knowledge created by communities, in this case of individuals who contribute in one way or another to development in the course of their work.

A central concern of this project is the promotion of a constructivist educational philosophy on knowledge creation. The overall structure provides the conceptual framework and space, tools and resources, both human and technological, to test the approach to collaborative learning and knowledge creation.

Inside of Portal good information can be found on What this Website, there is a virtual library with vary contents, courses on online education, newsletter, forums, beyond resources as Pos-graduation, research, projects, net of integration and cooperation, productive sector, bulletins and publications available of the Canada as of Latin America.

**ReSinc / HLB**

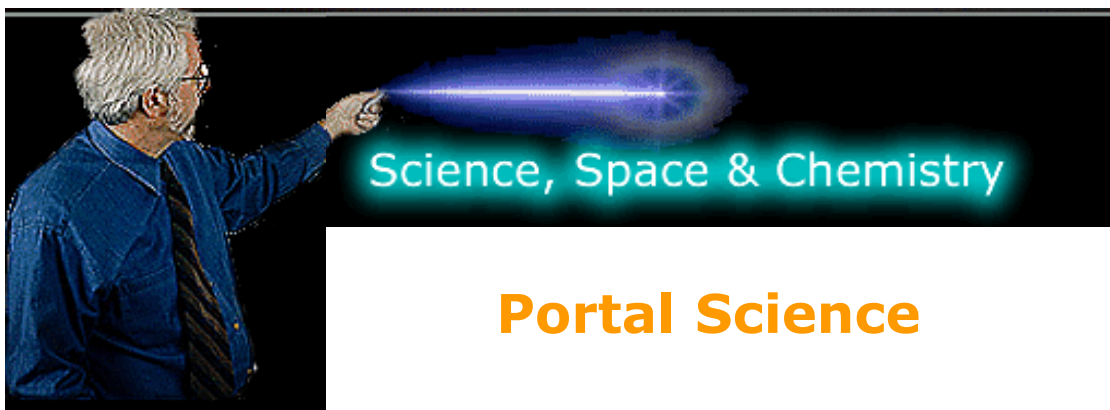


4 <http://pcdsh01.on.br/SincEmp.html>

The National Observatory (ON), the oldest institution of Research from Brazil, created by emperor Don Pedro I, in 1827, has as legal attribution the generation, conservation and dissemination of the Brazilian Legal Hour. Linked to the Bureau International des Poids et Mesures (France) participates of the Universal Time Coordinate, together with agencies disseminated of time and frequency of the others countries.

ON, through of Division Service of the Hour, offers a server of protocol NTP that allows a one computer to synchronize to the Brazilian legal hour through the Internet. The users of the Internet can synchronize its computers to Brazilian Legal Hour that is generated by Division Service of the Hour with high precision, of the National Observatory situated in Rio de Janeiro city. This service already is available at the Division Service of the Hour, through a new server of protocol NTP, whose direction is: **200.20.186.94, door 123 UDP**.

According to engineer Ricardo Jose de Carvalho, Division Service of the Hour manager, "the objective of this service is each time more to improve the act of receiving of the Brazilian Legal Hour, not only for great users, as well as for peoples that have microcomputers in house".



## Portal Science

5 <http://www.portalciencia.net/meteoima.html>

The science concept derives from Latin "scire" that it means to know, but is a very ample concept because it means knowledge, practice, erudition; therefore the science concept is equivalent from this meaning to all knowledge's class. In the course of the time the science definition needed getting to mean a set of systematic knowledge on a discipline or academic matter. The scientific knowledge tries to correct the possible distance of those aspects susceptible to be resisted with the reality, about this science worries to relate the common sense and the reflective thought to the empirical contrast

From this reflection was created this Website that has content sufficiently varied, including information on knowledge main areas of natural and exacts sciences: Astronomy, Paleontology, Anthropology, Meteorology and Geology. Moreover, possess two *links* that must be salient and view: **Enigmas of Sciences** and **Geniuses of Science**. In addition has a news canal updated above all that occurs on world of science, dedicated to news, novelty and advances about knowledge fields cited above.

The Portal Science must always visited for all enthusiast peoples in science because dispose information that can be used by students, professors, professionals and curious in scientific knowledge.



6 <http://www.vodafone.pt/main/live/maiscanais/lazer/e-escolas.htm>

The Program **e-escolas** was created in Portugal by Vodafone, Portuguese telephonic company, offers portable computers with mobile broad band access to students of 10<sup>th</sup> year of education (e-escola), basic and secondary education professors (e-professor) and workers in formation subscripts at the initiative New Chances (e-oportunidades).

By students who inscribe in 10<sup>o</sup> year of education, in next 3 years, they can receive a PC Portable + Mobile Broad band, having that to have 36 months fidelity, paying only 150 Euros. By all basic and secondary education professors, also paying 150 Euros, will receive a PC Portable + Mobile Broad band or ADSL. Finally, by workers in formation and to those subscripts at the initiative New Chances will be able to get a Portable PC + Mobile Broad band paying this exactly price.

This Program is a beautiful example that would have to be followed by established companies of telephony from Brazil

## The Awakening of Brazilian Climatology



**"The contact with the reality determines, by itself, the beginning of all a learning process".**

Carlos Miguel Delgado de Carvalho (1884-1980)

In this tenth second edition we go to speak of one of the precursors to diffusion and to systematization of Meteorology and Climatology in Brazil together with Henrique Morize, especially in the Brazilian semi-arid. He was also one renowned professor of physical geography. He received diverse honors and prizes in sight from his dedication to diverse sciences that go since Sociology until orientation of Modern Geography.

### Life and Labor of Delgado de Carvalho

Carlos Miguel Delgado de Carvalho was born in 10 April, 1884, at Paris, due his father to be diplomat. At the time, the Countess of *Barral* foretold, in letter to D. Peter II, the one child would not survives, and, however, would arrive at the 96 years old.

Son of Carlos Dias Delgado de Carvalho and Lydia Tourinho (she died some days after his birth, in 08 May, 1884), and grandson of Jose Dias Delgado de Carvalho and Maria Carlota de Azevedo Torres. His family descended from *Viscondes de Tourinho* and Itaboraí, which took his father to exert position of Empire Legation Secretary.

He belonged to an entailed family to Brazilian aristocracy and, as integrant of the wealthy elite had access to famous European schools. He lived with maternal uncles in England where initiated his studies. After second marriage of his father, at 1889, was to live in Lyon, France, where studied from eleven to eighteen old in a *Dominican* College.



Blazon of Delgado de Carvalho Family. Source: Sergio de Freitas: Noble families and their Blazons.

When concluding his studies in the College joined up to the French army. However, when he rendered military service was infected with typhoid fever, thus was obliged to shut up the military career.

He was graduated in Literature at 1905 by University of Lyon, France. Afterwards entered at the University of Lausanne, Switzerland, in the Course of Advocacy. At the same time, studied History of the Civilization, come to conclude his studies in the "*Ecole des Sciences Politiques de Paris*". He also studied

Social Sciences in the "London School of Economics". Because of his European education spoke English, French and German. Portuguese he only learned in 1906 when was to Brazil, because his father loses the position with the Republic advent.

He entered at Course of Diplomacy in the *Sciences Politics School of Paris*, where in his Doctorate thesis, started to study about Brazil. On account of this, his father, Brazilian diplomat and adept to monarchy, disinherited him. In 1906, moved by curiosity, he travelled to Brazil, when came to know country that already studied in his thesis. Come of the Europe with twenty-two years old, he had our citizenship, but did not know the Brazil and in no wise spoke Portuguese.

His first job was at *Journal of the Commerce*, in Rio de Janeiro, where wrote articles of international politics using his European contacts, and that was very important to the elaboration of his thesis. From 1909, he directed the *American Magazine* edited by same periodical. At first edition, published in October 1909, to write the editorial, leaves to be transparent his intellectual role:

**"To divulge several spiritual manifestations of America and to follow the same of step, parallel to the superior tracing of its politician-economic evolution, presents especially as an union trace among representative figures of the intellectuality of this part of the world".**

As much the periodical as the magazine, provided to Carvalho a construction of a sociability circle with other very important intellectuals for his formation. This contribution in Carioca periodicals deepened his knowledge of geography, through the observation and analysis method. The conviviality with Oliveira Lima, Luiz Delphino, Rocha Pombo, José Oiticica among others was fundamental by his labor to the measure that they were a referential for who live much more time at Europe than at Brazil (SANTOS, 2006)<sup>1</sup>.

<sup>1</sup> SANTOS, F. A., 2006. *A Geografia no Ensino Primário: Representações em Confronto*. VI Congresso Luso-Brasileiro de História da Educação, Uberlândia/MG, 17 a 20 de abril de 2006.

In 1913 he published the book that would become landmark in the history of Brazilian geography scholar: *Geography of Brazil*. When blew up First World War he came back to France, where there stayed per six years. He only returned to Brazil in 1919 after to be invited for extraordinary professor of the High Studies School of the Brazilian Historical and Geographical Institute (IHGB).

During 1920s he increases his dedication to the education mainly in the Pedro II College, giving classes of English, Sociology and Geography. Everything started in October 1920, when Delgado de Carvalho inscribed in one concourse to substitute professor for English discipline, classifying himself at first rank. For this he talked on following theme "Historical Outline of the Origin and Formation of the English Language". He was designated at December 23, 1920, and took possession of the position at December 28, of this same year.



Old Photo of the Scholar Unit Center Building of the Pedro II College.

Promoted to lecturer in September 24, 1924, he substituted Carlos Américo dos Santos, died in July 20 of this year. The Pedro II College Congregation at this occasion was presided for the Prof. Dr. Raja Gabaglia. In November 21, 1927 Carvalho was transferred from English to Sociology discipline, which was being temporarily conducted by substitute professor Adriano Delpech (Promoted to French Lecturer of the Pedro II College in December 5, 1927).

From 1930 to 1931, Delgado de Carvalho was Pedro II College Director. At this time it had significant advances at infrastructure of the College, mainly in the laboratory and classrooms, as much that was prepared room destined to Universal History classes, newly created. In November 28, 1931 leaved to College direction, passing the post to the Dr. Enrique de Toledo Dodsworth.



Old room of Geography kept in its original structure at in Pedro II College.

From 1930s he assumes important positions at National Education Council and Educational Research Institute until 1935, when is designated Lecturer of Geography Human at Federal District University (UDF), that he saw to changed to University of Brazil, but did not arrive to visit it as Federal University of Rio de Janeiro (UFRJ). However, immediately afterwards, in 1936, he moves to Modern History and Contemporary cathedra and in his place assumes Pierre Deffontaines, French geographer. In 1943 he was exonerated returning in 1945, as effective Lecturer to teach Modern History and History Contemporary disciplines.

At Schools of Intendancy and Major State Army he was, per ten years, professor of Economic Geography and Geography of Brazil. He also lectured at Bennett College and Education Institute, both located in Rio de Janeiro city.

Amongst his activities are mentioned:

- Rio de Janeiro Geography Society Partner (1931);
- National Education Council Member (1931);
- Director-Founder of Research Institute of the Department of Education (1933).
- Didactic Book Commission Member in 1939;
- *Royal Meteorological Society* Member;
- "Royal Society of Literature" Correspondent;
- Brazilian Historical and Geographical Institute (IHGB) Member;
- Brazilian Sciences Academy Member (ABC);
- Pluviometry Section Director of the "Inspectorate of Services against Droughts Northeast".

In 1910, the first one of a book series was edited by Delgado de Carvalho which would dedicate to write throughout his life. They are part of his labour task: *Le Bresil Meridional: Sur as Étas du Sud São Paulo, Paraná e Rio Grande do Sul* (1910), *Geographia do Brasil* (1913), *Esboço Histórico da Origem e Formação da Língua Ingleza* (1920), *Methodologia do Ensino Geographico* (1925), *Chorographia do Districto Federal* (1926), *História da Cidade do Rio de Janeiro de Acordo com os Programas das Escolas públicas municipais* (1926), *Atlas Histórico com Manoel Maurício de Albuquerque* (1927), *Introdução a Geographia Política* (1929), *Geographia Regional do Brasil para Quarta Série* (1930), *Sociologia* (1930), *Sociologia Educacional* (1933), *Sociologia e Educação* (1934), *Sociologia Aplicada* (1934), *Sociologia Experimental* (1934), *Geographia Humana e Política e Econômica* (1935), *História Geral* (1935), *Práticas de Sociologia* (1938), *Geografia Elementar* (1940), *O Canto das Sereias* (1940), *Geografia Regional do Brasil* (1943), *Geografia Física e Humana do Brasil* (1943), *Súmulas de História Colegial* (1947), *Didática das Ciências Sociais* (1949), *Textos de Sociologia Educacional* (1951), *Aspectos Geográficos da Terra Bandeirante* (1954), *Introdução Metodológica aos Estudos Sociais* (1957), *História Geral; Compêndio de Informação para Uso de Docentes* (1956), *Geografia Humana* (1963), *OSP* (1967), *Relações Internacionais* (1971), *História das Américas* (1975).

According JÚNIOR and SAMPAIO (1995)<sup>1</sup> the first book of Delgado de Carvalho is considered a landmark to the Brazilian Geography, because it develops a new regional division of Brazil from the study of natural and human elements. Previously, Geography was just descriptive, told to only names and details of geographic accidents and the Brazil division was confused with the regional politician interests of the oligarchies.

His second book was *Geography of Brazil* in 1913. The Oliveira Lima preface beyond to present the author to the readers of the Portuguese language, detaches the importance of this study: the natural regions analysis of the country and its formation since

<sup>1</sup> JUNIOR, R. C.; MACHADO, M. S., 1995. Delgado de Carvalho e o Contexto Pré-Institucional da Geografia Brasileira: Uma Leitura do Brasil Meridional. Rio de Janeiro.



the colonization, launching a regional division that, later, finished being officially adopted.

Many of the intellectuals cited in this book, such as Capanema, Homem de Melo, Sylvio Romero, Euclides da Cunha, João Ribeiro assembled at Brazilian Historical and Geographical Institute, between them proper Delgado de Carvalho, having like objective to provide the knowledge of these two branches of philology (History and Geography) by means of public education. They worked books at the same sense: the exploration of the country, so that from this knowledge, had the construction of a national identity, since they did not consider it one organic one all.

### **The Awakening Educational of Delgado de Carvalho**

*Geography of Brazil*, published in 1913, passes to be used by professors, although not to have specifically been written with didactic aims. Edited some times, many generations had known geography through it. Everardo Backheuser, Brazilian Education Association member (ABE), compares it with *History of Brazil* (1900) of João Ribeiro and, it defines so: "revolutionizes methods of education and gives new lines of direction. It marks a age". This book finished for constructing a linking of the author with professors, to the measure that he was invited to give to lectures and courses, and awaking him to the Education role, to the nation progress considered uncultured and sick.

Truly, his first book directed to the professors was *Methodology of Geographic Education* edited in 1925. It had a particularity: it was written previously, in 1922, for the Congress of Education, because he belonged to Pedagogical League.

The text of the *Methodology of Geographic Education* book begins making critical to the Brazilian education of geography. According Delgado de Carvalho was based at the imagination and memorization, arriving to compare it to a telephonic list due to extension of knowledge. The preface used the *Geography of Brazil* book (1913) to guide the professors as to give disciplines it. He defended the regional study, from the man-made influences on ambient, language, race and religions, affirm COSTA (2006)<sup>2</sup>.

Delgado de Carvalho declared:

***"The moment arrived to study, for example, some demographic phenomena based on censuses and to teach to the pupils to use numbers to future comparisons, scientifically to study the influences of the different climates on habits and things of the life, to understand the role of the islands and the oceans in the distribution and differentiation of the languages, etc."***


According to COSTA (2006), in 1926 Carvalho published *History of the Rio de Janeiro City* with same objective of the book previous, but directed toward History. At preface he again emphasized the importance of education from the reality of the pupil:

***"It is of large didactic value that preliminarily to be given to the pupils a historical summary whose main elements, local monuments and vestiges, are still our visions, to the reach of our directions and can more easily impress young imaginations, of what other narrations, whose pictures need an effort of the spirit for its reconstitution"***.

Having awaked for education, Delgado de Carvalho associated to the educational leagues. It must be opened parenthesis to register that the existing Leagues at that time, some States, had been the first initiatives to surpass the republican national delay through the fight by popular education with alphabetization projects and enlargement of primary education. The Leagues worked in the direction to surpass the sentimentalism impeding that the social problem of the country was surpassed, and hence is necessary to alphabetize in mass.

Although Delgado de Carvalho participates of this discussion circle, when writing the book above, had little experience in teaching profession, because he has seen admitted at previous year (1924) in the Pedro II College like English professor, but, however, already was recognized by teachers as the

<sup>2</sup> COSTA, P. C., 2006. Uma Escrita aos Professores: Os Prefácios dos Livros de Delgado de Carvalho. Uberlândia, MG, Anais do COLUBHE06, pp. 3386-3396.



author of *Geography of Brazil* (1913). Thus presents himself as author of compendiums, assuming the role of adviser establishing so a hierarchy.

In 1924 he creates, together to Everardo Backeuser among others, Brazilian Education Association (ABE), where became its first president, and narrowed bows of work and friendship with other liberal that thought to educational modernization, specially with Anísio Teixeira.

The Brazilian Education Association was a particular initiative of inspired educators who together with the reformer movement of the New School presented solutions to the large national problem: the precarious educational system. Its associates had as goal to divulge new practical educational based in the science defending an education integrated in all Brazil.

Many members of the Brazilian Education Association between them, Delgado de Carvalho, had been signatory of the Manifest of the New Education Pioneers. The "Manifest of the New Education Pioneers" consolidated the vision of a segment of the intellectual elite who, even so with different ideological positions, glimpsed the possibility to intervene with the organization of the Brazilian society through the education.

Between 1925 and 1935, he worked with larger proximity with signatories of the Manifesto of the New Education Pioneers, and used them as communication channel with the professors. This debate space very influence discourse him. In this case, the Historical and Geographical Brazilian Institute (IHGB) and international associations of Geography complete his influence circle (MACHADO, 2000)<sup>3</sup>.

### **Precursor of Modern Brazilian Geographic Science**

At the beginning of the 20<sup>th</sup> Century, some peoples had fought to introduce in Brazil to modern geography, before its university institutionalization, in 1934: Manuel Said Ali Ida, Everardo Adolpho Backheuser, Fernando Antonio Raja Gabaglia, the French Pierre Deffontaines and Delgado de Carvalho. Therefore, they are known as pioneers of the modern Geography in Brazil. The understanding of the politician and pedagogical

role of Geography, on the part of these pioneers, is extraordinary: they had clarity of the Geography Teaching role to the education of the Brazilian people, of the character politician of Geography, and of the existence of relations between Geography and Geopolitics (VLACH, 2005)<sup>4</sup>.

Delgado de Carvalho together with Fernando Antonio Raja Gabaglia and Pierre Deffontaines had in common not only extraordinary erudition, but also the intention in modernization of geographic science in Brazil. They had been the pioneers of practical scientific in Geography, and precursors of the modernization of the geographic studies in the country. Keeping the had ratios, all had defended the entrance of a modern criterion of science guided in the model of the modern science practiced in Europe, mainly in French, that was a positive, descriptive, experimental and explicative science.

From the influence of these professionals, can be affirmed that a modern Brazilian Geography is effective, starting to be guided not more for the pure rhetorical and literary style, that dominated medium and superior education at end of the 19<sup>th</sup> Century and beginning of 20<sup>th</sup> Century, but for the practical scientific of laboratory and inquiry, supported by empirical evidences.

The research shows that until 1960s little was known on research production related to education and learning of geography, with exception of the critical ones carried through by historians and authors who, like Delgado de Carvalho, wrote books on Methodology of Geography in the decade of 1930 (PONTUSCHKA, 2005)<sup>5</sup>.

Delgado de Carvalho is considered one of the scholars that more contributed to the construction of geography while discipline at curriculum scholar. The publication *Methodology of Geographic Education* (1925), which is consecrated as work most important of Brazilian geography, configures him as a professor worried with basis, organization, methods, learning and research of one discipline that appeared.

He also is known as that one that established better proposal of regional division

<sup>3</sup> MACHADO, M.S., 2000. *A Implantação da Geografia Universitária no Rio de Janeiro*. Revista Electrónica de Geografía y Ciencias Sociales. Universidad de Barcelona, Nº 69 (5), 1 de agosto de 2000.

<sup>4</sup> VLACH, V., 2005. *O Ensino de Geografia no Brasil: Uma Perspectiva Histórica*. In: Vesentini, José William (org.). *O Ensino de Geografia no século XXI*. Campinas: Papirus.

<sup>5</sup> PONTUSCHKA, N. N., 2005. *A Geografia: Pesquisa e Ensino*. In: CARLOS, Ana Fanni Alessandri (org). *Novos Caminhos da Geografia*. 5ª. ed., São Paulo: Contexto.



(1913), based on the natural regions, adopted for official institutions and in geography learning programs at the age. This division, in five great natural regions (north, northeast, east, south and center-west), was subdivided in physiographic zones, characterized by elements of order human, basically established by means of the regional division of the Technician Council of Economy and Finances.

With a sufficiently erudite intellectual formation, Delgado de Carvalho act in diverse facets of work, overpassing history and geography. Although not working at the university directly with geography, his contribution was basic to the installation of the scientific practical modern in the Brazilian geography area. He was, in fact, the great precursor of modern Brazilian geographic science.

### **The Systematization of the Brazilian Climatology**

The concepts of weather, climate and all synthesis of the knowledge at that age elaborated by *Hann*, the methodological proposal of the regional climates characterization of *Köppen* and the theoretical assays of *Napier Shaw*, in summary, formed the base of all scientific knowledge of the Climatology and Meteorology in Brazil, presents in the end of the 20<sup>th</sup> Century.

This set of knowledge founded the pioneer studies of our first climatologists, like Louis Cruls, Henrique Morize, Frederico Draenert, Carlos Delgado de Carvalho and Arrojado Lisboa.

With this respect, FERRAZ (1934) apud SANT'ANNA NETO (2003)<sup>6</sup> commented:

*"In Brazil, the first meteorological activities, as were waited, had restricted it the basic climatological observations. Small series here and there, without great uniformity of methods and equipments, however, lead-of, some, with notable care and affection. In the last fourth of the 19<sup>th</sup> Century and beginning of the 20<sup>th</sup> Century, point to the first meteorological organizations, always with the same objective limited of the climatology, whose larger series*

*already are manipulated by the great foreign masters, interested in the worldwide studies". And adds "Not to be for one or another special research lead at the Astronomical Observatory of the Castello, whose Pleiad brilliant of scientists very must to Brazilian Meteorology, all the attentions were turned by Climatology".*

Thus, Climatology is previous to Meteorology in Brazil. Even considering that the Rio de Janeiro Observatory has initiated its section of Meteorology, as well as Navy, through its Central Division of Meteorology, in the second half of 20<sup>th</sup> Century, practically all studies carried through were about topics and analyses eminently climatological.

At any rate, initial conditions for the Climatology development in our country already were given. Of a side, the first institutions of research composed by a select group of competent researchers had been created, and they used information and methodologies proceeding from centers of knowledge of the age, mainly by Delgado de Carvalho. For another one, the production of the first works on the climate, more systematic, in Brazil was beginning.

Thus, Frederico Draenert was pioneer in an approach more geographic of the Climatology in Brazil, and without a doubt must be detached the important role represented by two great scientists who had proceeded to the systematization of the Climatology in our country: Henrique Morize and Delgado de Carvalho.

Henrique Morize, engineer who dedicated to Geography and Meteorology, per many years directed the National Observatory, beyond to teach Physical and Meteorology in the Polytechnic School of Rio de Janeiro. We will not go to say more him because already was cited in previous edition of the Cirrus.

Delgado de Carvalho was one of the most shining geographer of his time and, perhaps, first geographer Brazilian responsible by densest and complete analysis of the climate in Brazil at beginning of 20<sup>th</sup> Century.

Author of a vast piece that includes varied geographic themes lived most of his life in Europe, having published his paper in French, almost all unpublished ones in Portuguese language: "Un Centre Économique

<sup>6</sup> SANT'ANNA NETO, J. L., 2003. *A Gênese da Climatologia no Brasil: O Despertar de uma Ciência*. Revista Geografia, AGETEO, Vol. 28, pp. 5-27.

au Brésil" of 1908, "Le Southern Brésil", of 1910, and "Climatologie du Brésil", of 1916, that although summarized, already pointed the general conceptions on weather and climate.

However, his main contribution came with publication "Météorologie du Brésil", published in 1917, better elaborated than previous one, written when he made a period of training at Museum of London, where it dealt more of the climatic aspects than what meteorological. This publication enabled him to work at the Pluviometry Service of Brazil, elaborating, decade following, hundreds of Northeast maps.

Due his long permanence in Europe, mainly in France, Delgado de Carvalho assimilated and divulged in Brazil, the main publications and conceptions of the Geography that was produced in France. Beyond Paul Vidal de *La Blache* and Jean Brunhes, who more influenced him was Emmanuel de Martonne, who few years before had published "*Traité de Géographie Physique*", in 1909.

In contrast to Morize, Delgado de Carvalho searched an explanation geographic of the climate, admitting that the climatology study area was of the zone of contact between atmosphere and solid and liquid globe that would constitute par excellence in the domain of the observation geographer. He assumed the conceptions of De Martonne that not only admitted a geographic conception of the climate, as revealed very critical in relation to the studies which launched hand of the normal averages of the meteorological elements.

The influence of De Martonne at geographic conception of the climate in Delgado de Carvalho appears in all his publications on Climatology and, is more clearly, when he dealt with meteorological factors, which in the reality, was related to the geographic factors of the climate, as continentality, latitude and altimetry.

Delgado de Carvalho structuralized his book published in 1917 in three parts: the first one dealt of the theory and of the elements and climatic factors, specifically in the south hemisphere; second, of the variability, seasonality and distribution of the meteorological factors; e third that he called of "Climatography", considered a climate classification in Brazil.

It is noticed at his publications a concern sufficiently accented in characterizing the climatic types in the perspective to demonstrate the influences of the tropical

climates at economic development and at adaptation of the man. But, in contrast to Henrique Morize, he did not leave to influence for climatic determinism and, assumed a possibility position, such which was dominant thought at French Geography of this time.

On this, Delgado de Carvalho said:

***"These general influences of the tropical types on the man, all told very favorable to his development, become intertropical zones of the regions very populated, to a large extent or not dominated by desert. How much to Brazil, its populated part is extended between Amazon estuary and Tropic of Capricorn. One of the reasons of the sudden growth of the tropical populations must have due to extreme easiness of the life, caused by generosity of the Nature and agreeable climate".***

After to discourse for three chapters to characterize cosmic influences, wind regimen of the and rain regimen taking as base data of the national meteorological network, in number reduced if compared to Morize in publication made in 1922, Delgado de Carvalho dedicated about 2/3 of his work to the deepening of a proposal of climatic classification of the regional types, what possibly was his bigger contribution to the climatology in Brazil.

The climatic classification proposal by Delgado de Carvalho, although apparent similarity with Morize proposal, was sufficiently conflicting, mainly linked to the limits between tropical, subtropical and tempered climates. But, for ethical questions and enormous respect which Delgado de Carvalho had by Morize, of very elegant form, he did not appear at debates between both.

The climatic division proposal him understood three climatic groups subdivided in characteristic types. Moreover, for each one of climate types, he still considered one another subdivision contemplating regional factures, more or less well delimited, considering aspects term-pluviometrics and general traces of the atmospheric circulation, therefore, of much more meteorological character of what proposal by Morize, with additional advantage to incorporate, in the inferior scales (regional and sub-regional) geographic factors.

The fact is that Delgado de Carvalho not only produced piece most complete on Brazilian climatology of his time, as introduced an eminently geographic analysis. This classification, according to SEREBRENICK (1942)<sup>1</sup> represented a notable advance, given the role most scientific and the used terminology, demonstrating total tuning with production of knowing of his contemporaries of countries most advanced.

All methodological procedure and conceptions used in climatological analyses show that this piece can be considered as the first one produced under a geographic paradigm in Brazil, at a time where Geography not yet existed while specific area of the knowledge and, therefore, was not institutionalized in our country.

Carlos Delgado de Carvalho died in Rio de Janeiro at October 4, 1980, left two sons (Lídia and Carlos Alberto), and remained in history as great educator and professor.

In summary, his contribution was basic for the installation of the scientific practical modern in the Brazilian geography area. Moreover, he was great scholar in Meteorology and Semi-arid Climate Northeastern, at early of the last Century, leaving a legacy for current studies and that all his life and piece can serve as stimulate to the new generations.

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<sup>1</sup> SEREBRENICK, S., 1942. *Classificação Meteorológica dos Climas do Brasil*. In: Congresso Brasileiro de Geógrafos, Nº 9, Florianópolis, Anais: Rio de Janeiro: CNG/IBGE, vol. 2, pp. 440-459.

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Painting by René Magritte (1898-1967): Hegel Vacation of 1958.

## Pluviometry: Historical and Technician Aspects

# The

rain is without a doubt the atmospheric phenomenon that more interferes with our daily one. Either in the pleasure aspect, either in the economic aspect, mainly in Brazil whose energy matrix is based at hydro power which depends primordially on rain the regimen, either in the social aspect, because in periods very rainy riverine and suburb populations at great cities suffer with floods, diseases boom, fall of hillsides; in periods of drought, families who depend on subsistence agriculture suffer with food scarcity. Brazil with its "continental" area presents immense climatic diversity, which reflects at space and temporal distribution of the precipitation. To mention, the Northeast region of Brazil, in coastland the annual volume arrives to 1,600mm or more that, whereas at inland the annual only arrives 400 mm or lesser, similar to other regions semi-arid of the world like Sahel, northeast of Africa and parts of India.

Pluviometry, from latin "*pluvia = rain + metria = measurement*", is about the process or measurement technique of the precipitation, either this liquid or solid. Treating to solid precipitations (snow, hailstorm or hail) the measurement is made after ice fusion.

The instrument used to quantify precipitation that arrives to surface is known as rain gauge, udometer or pluviograph. The measure unit of the precipitation is millimeter, that is, one millimeter of rain is equal to 1 liter per 1m<sup>2</sup> by convention.

The precipitated volume is normally express for the water layer thickness that it would form on a horizontal surface, plain and impermeable, with a area of 1m<sup>2</sup>:

$$1 \frac{\text{litro}}{\text{m}^2} = 1 \frac{\text{dcm}^3}{100\text{dcm}^2} = 0,1\text{cm} = 1\text{mm}$$

### BRIEF HISTORY

#### Measurers of Surface

The origin of the first rain register is uncertain and the literature that deals of subject is scarce. Thus, we go to deal of the historical aspects with some exceptions how much dates and names, mainly when will be dealt with previous subjects to modern age, that is, previous to XV Century.

At *Aristotle* documents (340 B.C.), more specifically in his book of natural philosophy "*Meteorologica*", certainly presented topics such as clouds, mist, rain, snow, etc, but did not mention the measurement of precipitation.

In the ancient times, man depended upon atmospheric conditions of rain and drought because they were farmers and hunters. Aristotle's ideas were almost unchallenged for nearly 2000 years. The



beginning of Meteorology as a true science in the Western World did not come about until around the end of the 16<sup>th</sup> century. However, some research indicates that around 100 A.D., rain gauges were being used around Palestine to measure rainfall for agricultural purposes.

According to some authors to be credited to a king in Korea called King *Munjong* (son of King *Sejong* and fourth king at *Joseon* Dynasty) who reigned from 1418 to 1450, the development of the earliest quantitative rain gauge whose intention was to perfect agricultural techniques and to provide adequate food to his vassals. The gauge was invented in the fourth month of 1441 according to records while *Munjong* made measuring rainfall at the palace and perceived that instead of digging into the soil to check rain levels, it would be better to use a standardized container that stood on a pillar to measure the rainfall. These containers were sent a rain gauge to every village, and they were used as an official tool to measure the farmer's potential harvest. As also were used these measurements to determine what the farmer's land taxes should be.

The rain gauge invented by *Christopher Wren* in Europe around 1661, used the standard of weight, or sometimes volume of the liquid precipitation. It is necessary to remember, however, that the metric system as we know it did not exist then. The instrument idealized by *Wren* is still used in many of the automated electronic gauges today.

His device is endowed with a container divided in two symmetrical compartments in relation to the cross wind axe that supports it (similar to the next figure). When one of the compartments fills, the container tumbles by side and water flows, while other compartment starts to full. When emptying one of the compartments, a mechanism that made punctures in a paper ribbon was set in motion. The number of punctures was proportional to the amount of accumulated rain



Rain Gauge with tipping bucket structure.

At past, the most of the regions of the World if not in all, the rain gauge networks had been developed of aleatoric form. In England, from 1860 to 1861 the systematic work of rain observation by *G. J. Symons* had beginning, with about 500 stations distributed by about 300,000 kilometers squared, where is today the Ireland Republic. Due to the personal effort of Mr. Symons, until his death in 1900, the number of stations increased for about 3,500.

In 1866, the Reverend T.E. *Crallan* began observing rainfall catches with gauges of uniform openings, but composed of different materials. These were also spread over different areas and elevations to see how the effect of elevation and wind direction changed the readings. The results were that they needed more testing until 1890. Some of the conclusions of that study are listed below:

- Materials: The material of the gauge is important. It must be a smooth surface that is durable in all weather conditions. Ebonite was recommended, but copper was found to be much less expensive with very little change in results.
- Size of Opening: Different openings were carefully examined and experiments conducted using gauges with various sized openings all being the same height above the ground. It was found that the gauges between 4 and 24 inches were very close in readings, so the five inch gauge was most practical.
- Altitude: It was found that the more altitude a gauge had, the less rain was captured. Wind was the variable that caused this discrepancy.

Among his discoveries, *Mr. Symons* also observed that wind had a dramatic affect on the amount of rain collected at various altitudes above the ground. His studies actually gave the basis of modern day standardization of rain gauges.

The conclusions were:

<b>1</b>	A five inch copper gauge was most practical.
<b>2</b>	A standard height of the rim of the gauge should be one foot.
<b>3</b>	Gauges must be level; a change in slope should be avoided.
<b>4</b>	Sheltering influences, such as trees and buildings should be avoided for precise measurements.

## MEASUREMENT FOR REMOTE SENSING

The precipitation is an atmospheric phenomenon that presents large variability space-temporal. The pluviometric network is not capable still to cover all regions, mainly deserts and of difficult access places, that is, represents an enormous technological and economic effort to acquire and to keep a dense superficial pluviometric stations network and radars, sufficient to cover extensive areas of the globe especially at Tropic regions. Beyond the oceans that are not covered by this type of instrument.

From 1960s decade the first meteorological satellites had been launched allowing the monitoring of the cloudiness on extensive areas in the globe terrestrial. Diverse applications had been developed for the use of the data obtained by these satellites, between them, techniques for precipitation estimate that allow to get rain space-temporal distribution about extensive areas, included on oceans.

The precipitation estimate via remote sensing is based on techniques that use active and passive sensors. The active sensors irradiate energy on targets and measure the amount of backward spread energy for them. The backward spread energy is proportional to the diameter to sixth potency of the hydrometeor distribution illuminated by radar beams. These sensors are known normally as meteorological radars.

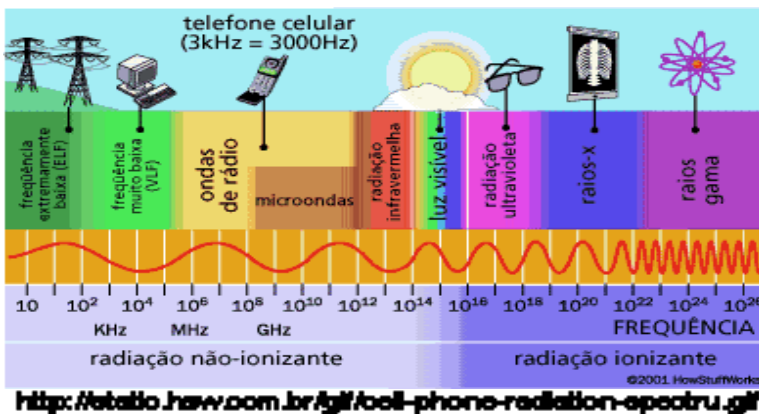
The passive sensors measure energy emitted by Earth-Atmosphere system which is absorbed or spread during its propagation at the atmosphere. As that this energy propagates, interacts with ambient (gases, aerosols and hydrometeors) that is used to infer different properties of the targets, for example: water vapor, ice, precipitation or concentration of gases and particulate material.

The earliest methods utilized visible frequency rang, and later came the use of the infrared range and currently it comes using of microwaves frequencies.

At visible, the radiation observed is the rate between incident energy and reflected one. In this way, it is observed to reflectivity of clouds and surface. The methods of precipitation estimate in the visible one relate to with cloud area of the certain reflectivity and texture with precipitation area. Researcher E. C. BARRET (1970) was pioneer at the development of a method of estimate of the monthly precipitation using visible spectrum, known as cloud indicator. This method defines different precipitation taxes for each type of cloud, being based on a cloud classification and calculating the covering fraction.

The infrared spectrum of the atmospheric window is proportional to temperature of the target to fourth potency, being able to be used to define the convection depth, beyond to allow estimate the precipitation at night. In 1979, P. A. ARKIN developed the estimate precipitation method known as *GOES Precipitation Index (GPI)*. This technique is based on the high correlation between cloud fraction with temperatures less than 235K (~-38°C) and rain area observed via radar in regions of 2.5° x 2.5° throughout the month.

The simultaneous images availability at visible and infrared spectrum, led to the development of the bi-spectral technique. In this method, the clouds which are shining in visible images are more probable to precipitate of what darkest, clouds with low temperatures of brightness in the infrared images, present peak higher of what hot clouds. Soon, the combination of the two canals was used to define rules and to identify clouds that present greater probability to precipitate, that is, cold and shining clouds.



Electromagnetic Spectrum.



The use of the microwaves frequency in the estimate of precipitation was given at the end of 1970s decade from release of the defense satellites data of the United States. The advantage of this canal is that in this frequency range the electromagnetic radiation interacts with hydrometeors, thus allowing one better description of the vertical structure of the precipitation, a time that as much the visible how much infrared observes only characteristic of the cloud top. On the other hand, measured in microwaves is restricted to the orbit satellites low (polar or equatorial), that is, to some measures per day.

At 1990s perceived that these techniques of estimate of precipitation would be better represented from coupling of measures of wind and relative humidity.

In 1998, the researcher *GILBERTO VICENTE* (NASA/GSFC) developed the method *The Operational GOES Infrared Rainfall Estimation Technique that operationally functions in the National Environmental Satellite Data and Information Service (NESDIS) of the National Oceanic and Atmospheric Administration* (NOAA).

In this technique, the information of wind, precipitable water and relative humidity gotten by numerical forecast model *ETA* (NCEP/NOAA) are incorporated to define rain probabilities and increase or reduction of precipitation modifying the relations between temperature of brightness and precipitation rate. This method was adapted and put in operation by CPTEC/INPE for precipitation estimates in the South America.

In November 1997, satellite *TRMM* (*Tropical Rainfall Measuring Mission*) was launched, and since then had a "revolution" at the knowledge of the precipitation. The satellite was equipped with microwaves sensors of SSMI, and one meteorological radar.

Project TRMM put in real time estimates of precipitation made by models as well as by first meteorological radar in the space. These estimates, in real time, are relatively necessary. On oceanic regions are gotten better resulted, and on continent still an error of the order of -20% is observed.

Due to success of the TRMM, it is tried from Global Precipitation Measurement program (GPM) to extend to the TRMM experience for estimates of global precipitation to each 3 hours.

In this program, GPM visualizes the use of 8 satellites of polar orbit that loading instruments of type SSMI and a satellite mother "similar" to the TRMM. In this way, the satellite mother will be used to calibrate algorithms of precipitation estimates.

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## Saulo Goltinho Technical School, Brasília: Brief History of the Only Meteorology Course in the Central-Western Region



The Meteorology program of the Saulo Goltinho Technical School in Brasília, with emphasis on the Environment field, was the third in its category in Brazil and the first Meteorology program in the Central-Western region. Its creation was motivated by the demand for qualified professionals in Meteorology, a need the country's Meteorology community identified years ago and debated in many Meteorology conferences and in technical meetings with the directors of the National Institute of Meteorology (INMET) in Brasília, Federal District, and further detected by the area of Human Resources of the Brazilian Airport Infra-Structure Company (INFRAERO) in Brasília, Federal District. Even then the course was short lived, having been in existence for only four years, from 2003 to 2007.

### Brasília's Technical School

Brasília's Saulo Goltinho Technical School (ETB) is located in the city of Taguatinga, in the Federal District.

Technical courses in the ETB are free of charge and last on average four semesters. To enroll in one of the courses, candidates must provide proof of conclusion of the basic education cycle or its equivalent.



Façade of the Meteorology Building.

### Characteristics and Capability Building of the Meteorology Course Faculty

The course's pedagogical approach was inspired by constructivist theories of learning where knowledge is influenced by individual experience. The qualifications required for teaching the diverse curricular components allowed for faculty with graduate and undergraduate degrees, as well as technologists and technicians; thus besides formal education, solid professional experience was also valued.

The Secretary of Education's "Program for Training Trainers" and "Program for Workplace Professional Development" provided faculty pedagogical training and development as necessary.

The "Program for Training Trainers" aimed at professional development in the field of Education. It intended to serve the requests and expectations of educators, thus contributing to sharpen competencies of those



who participated in the mission of educating for work and citizenship in ETB, or in businesses or in the community, allowing for the development of managerial, programming, implementation and assessment skills directly or indirectly relevant to the teaching and learning processes.

The program was structured along three pathways: the basic competencies pathway, which aimed at understanding questions related to education and work; the competencies in Education pathway, focusing on understanding educational processes generally speaking, with special attention to professional education; and the management pathway, a modern view of human resource management and business competitiveness.

In June, 2004, examinations took place for hiring professors in Synoptic Meteorology (1 position); Agricultural Meteorology and Environment (1 position); and, Satellite and Radar Meteorology (1 position) for the start of classes in the first semester of 2006.

## Student Body

The program remained active, that is, it opened its selective admissions process for enrollment from the second semester of 2003 through the second semester of 2005, five semesters.

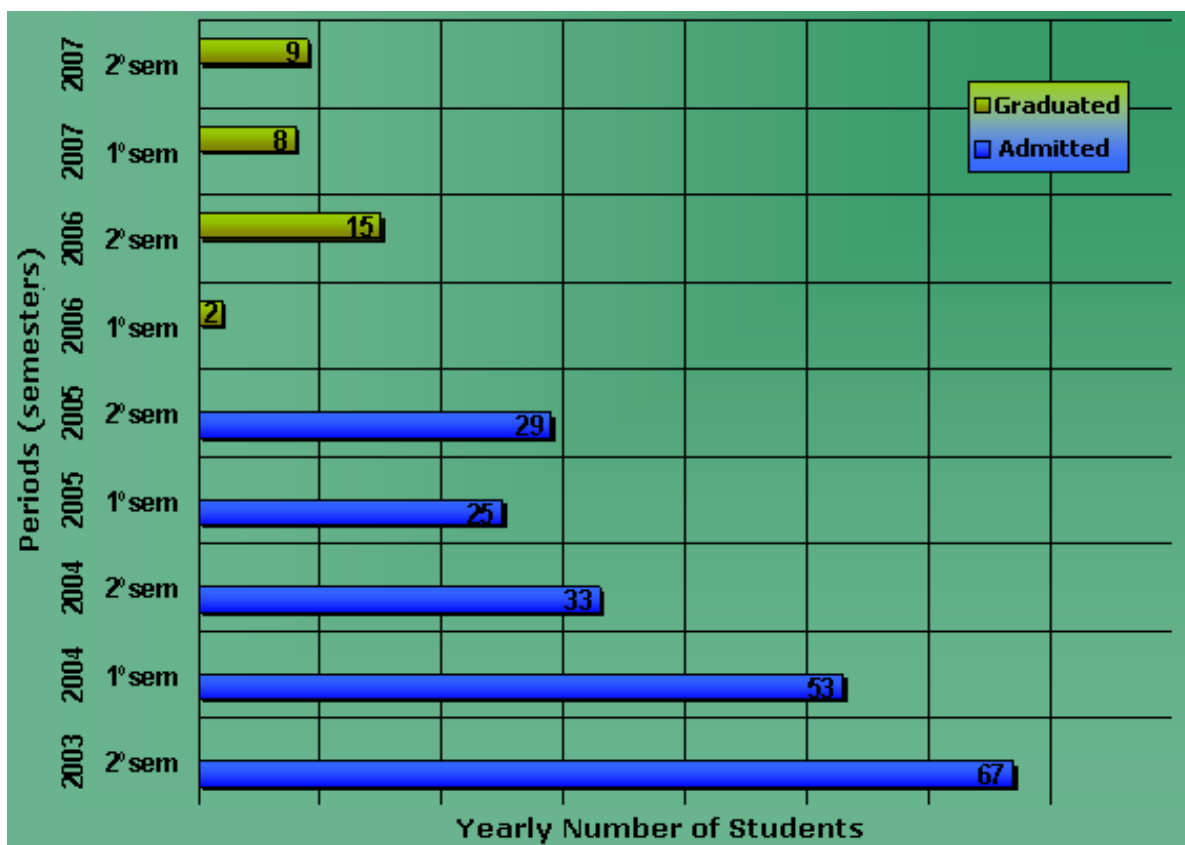
Each period offered 60 placements, 30 in the morning and 30 in the afternoon. During this time, a total of 207 students were tested for admissions.

The program remained opened until all students graduated during the second semester of 2007, a total of 34 professionals.

## Student Development

Among other responsibilities, ETB's Meteorology program aimed at developing technicians capable of operating meteorological stations, undertaking surface observations, and constructing meteorological charts and diagrams.

The program was developed to be taught in three modules along with supervised internships required as a complementary activity, as indicated in the following chart.





Total Number of Students Admitted and Graduated from ETB-DF Meteorology Course.




## CURRICULUM STRUCTURE

The program was planned for three modules to certify professionals in two categories according to the classification of the World Meteorological Organization (WMO). At the end of the first module, Water Module, students were certified to take positions as *Meteorology Technician Assistant Class IV* of the WMO. To be certified as Meteorology Technician, the completion of the second module, Soil Module, was required, for a total of 1,020 hours in three semesters. Both titles, with emphasis on the Environment, were valid throughout the country and Technicians had the right to be registered at the Regional Council of Engineering and Architecture (CREA).

Basic Module/Air Module 340 credit hours General Meteorology Electricity I Digital Electronics Applied Informatics Technical English Laboratory I	
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Module I/Water Module 340 credit hours Certification: Meteorology Technician Assistant Class IV –World Meteorological Organization Climatology and Statistics Linear Electronics Hydrometeorology and Environment Physical and Dynamic Meteorology Observational Meteorology and Instrumental I Organization and Norms/ Professional Ethics	
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Module II/Soil Module 340 credit hours Certification: Meteorology Technician Class III – World Meteorological Organization Agrometeorology and Environment Aeronautical Meteorology Observational Meteorology and Instrumental II Satellite and Radar Meteorology Numerical Weather Prediction Synoptic Meteorology	
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Beyond course requirements, students were expected to complete 360 hours of supervised internship, with the objectives of consolidating knowledge and skills acquired, and of understanding the utility and value of theoretical and practical concepts learned in school as applied to the real world of work.

Internships were offered from Module I on, and supervised by a group of internship coordinators and Meteorology-certified instructors. It is important to stress that it was clear to program planners that professional internship and practice were not to be regarded as just a situation or a distant moment in the curriculum but as an integral part of a teaching methodology aimed at contextualizing and putting into action the learning process.

## Assessment Methods

Teaching and learning assessment, understood as a continuous and systematic process of obtaining information about, analyzing, and interpreting educational activities, must aid the practice of all involved, and aim at improving performance.

The assessment process was grounded on student performance through observations and reporting on individual students by faculty; the presentation of individual portfolios; solving problems elaborated by faculty or by students themselves; and individual business, pedagogical or community-based projects emphasizing the autonomy of the learners.

Moreover, the participation of students in events such as lectures, science fairs, congresses, conferences or symposia previously defined by faculty, was also part of the assessment process, complementing the development of the learner.



A student was considered a graduate when at the end of each qualifying module he or she had acquired the defined fundamental competencies and had attended at least 75% or more of the classes in each module or of the course total.

Faculty monitored attendance systematically to alert students of gaps in learning due to absence. These needed to be filled so that ultimately students could achieve educational success.



## Final Considerations

The elements of ETB's Meteorology program planning demonstrate a solid curricular structure capable of qualifying professionals not only in questions related to the understanding of physical processes of the atmosphere and the handling and operation of meteorological instruments, but also those capable of demonstrating a holistic and integrated view of the environment.

This demonstrates that there existed serious preoccupation and commitment on the part of curriculum developers to structure a Meteorology program according to new market perspectives. At the very least it is distressing that such a valuable and innovative educational project did not receive the needed support for its continuation.

### We are thankful for the special collaboration:

- Meteorologist Marcos Alberto Andrade, Manager of Aeronautic Meteorology of INFRAERO, founder y first coordinator of the Course.
- Professor Raimundo Nonato Alves Pamplona, Vice-Director of the ETB-DF.
- Francimeire Bezerra de Castro, Education Assistant of the Secretary of Technical Courses of the ETB-DF.

## In Honor to one Fighting Untiring of the Meteorological Science in Brazil



Florivan (Left) participating of the Seminar “Morning of Education, Science, Technology and Innovation” accomplished in August, 2007, for reactivation of SBPC Regional of Alagoas, which had support of UNEMET.

A deeply lamentable notice the death of our friend, in 05 of June at 08h30min in São José dos Campos/SP, fighting untiring **Florivan Pugliesi da Silva**, been born in March 16, 1948, at Maceió city, Alagoas, Brazil.

This great friend was Licentiate and Bachelor in Physics by FFCLSS/PUCSP and Master Degree in Aeronautical Engineering by Aeronautical Technological Institute (ITA in Portuguese). He was researcher of the Nuclear Sciences Center, Nuclear

Energy Brazilian Commission; in Physics of the Rapid Neutrons of the PELLETRON/USP; at areas of Aerodynamics, Structures and Development at Rockets, from Institute of Space Activities CTA/IAE; in Experimental Aerodynamics, tri-sonic Tunnel from “DFVLR” Köln Research Center in Germany; in Satellites Aerodynamics at National Institute of Research Space INPE/DMC, where also developed Administrative and Planning activities in Science and Technology.



Moreover, he was Coordinator of the Science and Technology Pluriannual Plan established for Ministry of Aeronautic, as official from INPE; Consultant, joined to the State Secretary of Science, Technology and Economic Development from São Paulo, by conception of the **Meteorology System of Sao Paulo** and creation of the State Advice from area, as official from INPE.

Also he was researcher, joined to *Laboratoire des Materiaux et des Structures du Génie Civil du Laboratoire Central des Ponts et Chaussées (LCPC)*, like CNPq/RHAE Scholarship, for prerequisite to obtain Doctor Degree by *Université Pierre et Marie Curie - Paris-VI*.

He was Consultant in the State Planning Secretary form Alagoas Government, to implant of UNIARID Project and Alagoas Scientific and Technological System, like INPE official.

One of his last activities was as one of the responsible professionals by Thermal Modeling of WFI Chamber which is one of the main sensors that compose Remote Sensing CBERS Satellites (China-Brazil Earth Resources Satellite) and that will be installed in III and IV CBERS.

He was retired from INPE, however, even facing a cancer, continued battling in favor of Brazilian science, especially at Meteorology and Spatial Area, giving to unconditional support SBPC due his great friendship of long date with Dr. Marco Antonio Raupp, current president of the SBPC.

According to Robério José, great alagoano and his friend, said excited that *"Florivan was a darling person and always idealized a favorable situation to ways of Brazilian science, especially Alagoas, his native land. I suggest that the future space of the SBPC/AL receives his name, by description of fights in INPE, his academic work with Satellites and Aerodynamics of Rockets, his work joined to the Dr. Raupp in all moments and basically for life lesson that his leaves to all us, as an idealistic alagoano whom always imagined a science opened, free of idiosyncrasies of the opportunists of the science from*

*Brazil and mainly a science that answers to the people cravings and truly strategical interests of the nation".*

In addition he emphasized that *"Florivan suffered in peel the dark period from military dictatorship and paid a high price to his positions, clairvoyance with relation between science, politics and people. He will be in our remembrance and memory like somebody that dreamed and fought by a different Alagoas, where science, philosophy and good public politics are instruments essential for Alagoas to leave of the "sewage" secular where it threaded".*

Therefore, UNEMET team endorses words of the Professor Robério José and we believe that FLORIVAN PUGLIESI DA Silva SBPC-AL Space will be a form to keep him alive and warrior in our conscience, captaining our actions, be there in which parte of that universe he can be now. Lamentably our society delays to recognize men really valorous of our time.

We, his friends, despite distant, are all in mourning and we lament deeply death him, but we will honor death his memory and legacy

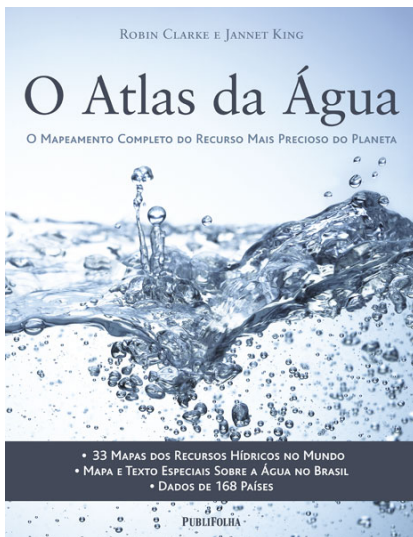
**UNEMET Team**

**IN  
MOURNING**

## Enlarging your knowledge!

### THE WATER ATLAS

Published by Publifolha  
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Signed by Robin Clark in partnership with researcher Jannet King, who worked during many years in edition and research of environmental, politicians and historical atlas, this book congregates information of 168 countries and 33 maps of the water resources distribution worldwide.

With exclusive maps on Brazilian panorama, this book shows tables which detail uses and abuses, necessities and resources.

"The Water Atlases" also approach themes like scarcity, energy, exploration of underground waters, droughts and floodings, commercial conflicts, contamination and diseases, basic sanitation and wastefulness, among others.

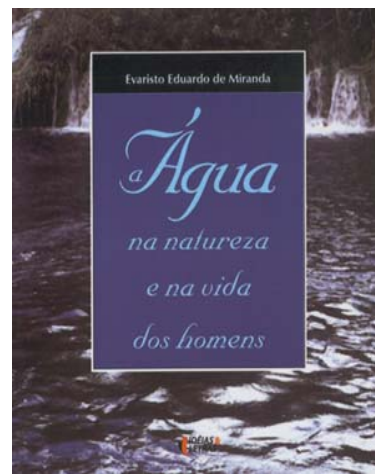
Therefore, this book is a reference to all peoples that want to enlarge your knowledge on this good so valuable for life.

The book possess 128 pages and price is R\$ 39.90.

Further information at  
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### WATER IN THE NATURE AND IN THE MAN'S LIFE

Published by Idéias & Letras  
Evaristo Eduardo de Miranda



All creatures need water. However, this book shows a great truth: it does not have water for everything, nor for all. The ecosystems are great needy of the present. Without them will not at least have "adequate production" of water by human beings. It is good close the faucet when we brush teeth, perhaps as symbolic attitude, but this cannot in deviating them from great problems of the water resources management. Water management put challenges in other platforms.

The merit of this book, written by a better expert of the subject, is to help the reader to look for ecosystems in one another perspective. When unmasking some myths and historical untruths, this book develops a new to look at water. Much beyond numbers, tables and technologies, the destination of water basins and its preservation asks by attention spiritual, historical memory, cultural understanding and social and democratic participation.

This book has 141 pages and price R\$ 21.00.

More information at:  
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# 8<sup>th</sup> INTERNATIONAL CONFERENCE ON COMPUTER-AIDED LEARNING (CAL) AND DISTANCE LEARNING IN METEOROLOGY AND HYDROLOGY - CALMET VIII, 2009



**Announcing CALMET VIII, 2009**  
29 June - 4 July, Saint Petersburg, Russia  
Hosted by the Russian State  
Hydrometeorological University (RSHU)

## The CALMet Conference

Since 1993, the purpose of CALMet has been to offer forums to share experiences, expectations, and new ideas for applying emerging technologies and strategies in meteorology and hydrology education and training. CALMet conferences have served to build international working relationships that continue to have a large, worldwide impact.



## Conference Themes



Proposals will be sought on topics of innovative learning activities for students and professionals, technologies for education and training delivery, educational resource collections and libraries, competency-based training, training program management, the evolving training and education needs of professionals, and learning and instructional theory for meteorology and hydrology education and training. Proposed session types include paper presentations, posters, workshops, panels, and roundtable discussions. International collaboration on presentations is encouraged, as are active and innovative approaches to conference sessions. Pre-conference workshops are also planned.

## About RSHU

Russian State Hydrometeorological University (<http://www.rshu.ru/eng/>) offers courses at all levels of higher professional training leading to BA, MA, Specialist, Candidate (equivalent to PhD) and Doctor of Sciences degrees in the area of environmental studies. RSHU is also a Regional Training Center component of the World Meteorological Organization, and supports many active research programmes. The university has been an innovator in introducing new education and training approaches and curricula, and has hosted regional and international workshops on innovations in education and training.

**The Call for Papers will be open of October, 2008, with online submission available at the CALMet Website (<http://calmet.comet.ucar.edu/>), through January 31, 2009.**



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