

IN CLIMATE OF HEALTH



Many of our ailments, such as, for example, headaches, nervousness, fatigue and circulatory disorders, are often attributed to meteorological conditions. But, will weather and climate really affect our health? It was to answer this question that we prepared this matter to demonstrate the Meteorology versatility and open a wide discussion among Meteorology, environment and health, especially for evidence that meteorological science goes beyond the weather forecast stereotype. Therefore is something to be better explored, reported and well-known by all people.

METEOROLOGICAL CONDITIONS AND HEALTH

People have, since ancient times, certain meteorological conditions associated with health. The connection between weather and health is especially clear when the rate of skin lesions increases during heat waves or during periods of extreme cold that put elderly at much high risk of death.

The disease that results from extreme temperature and UV radiation is an obvious effect of the meteorological conditions on health. Not so obvious effects include the influence of weather on our mood, behavior and general welfare.

Researchers perceived that the medical conditions were not enough to explain all diseases, justifying the birth of a new scientific field, the **Biometeorology**. It is a combination of many scientific disciplines, especially Meteorology, Medicine and Biology.

In summary, Biometeorology investigates the direct and indirect influence of atmospheric conditions on humans and other living organisms.

It has several branches, where one has tried to study intensely the change effects that occur in weather and climate on human health, in long and short times, known as Human Biometeorology. The main studies have been published containing results from the 1960's.

According TROMP (1980)¹ is possible to understand some aspects that relate meteorological elements and human health. An atmosphere with low relative humidity is an environment conducive to the development of influenza virus (*flu virus*). Moreover, the increase in humidity and rainfall does grow number of catarrh cases and some types of virus.

¹ TROMP, S.W. Biometeorology: The Impact of the Weather and Climate on Human and Their Environment (Animals and Plants). L.C. Thomas, Heyden & Son, 1980.

SENSITIVITY TO THE WEATHER CONDITION



In one form or another, the weather influence us all, but only rarely perceive. The more harsh goes atmospheric conditions, more attention should be devoted. Some of the more impressive to us are the fall of hail and storms, prolonged droughts and excessive heat waves or intense cold.

Since ancient times believed that the weather changes have a direct influence on human health. In old medical literature mentions is sometimes called as "pain climate". It say, for example, that some people begin to complain of sharp pain and other painful sensations one or two days before the arrival of a cold front (wet weather).

Famous people from past centuries were among the so-called "sensible climate". Philosophers, scientists, statesmen, writers and brilliant artists felt that their creative ability was influenced by weather condition. These include men like Columbus, Dante, Goethe, Humboldt, Leonardo da Vinci, Luther, Mozart, Michelangelo and Napoleon.

Naturally, also the science has focused on this issue, especially Biometeorology, which has been concerned, over all, since last time, on influence of the meteorological conditions in our body.

So far not yet found a satisfactory explanation for the biological influence of the weather. This is related first and foremost with the fact that each individual has its own pattern of reactions, which, moreover, is modified in many cases lifelong. Moreover, it is extremely difficult to separate weather influence of many other environmental influences to which ones we are continually exposed. Factors professional or family may be harmful to our health much more than weather. Furthermore, the influence of weather is not always harmful.

All People React to Weather

Weather alone not causes disease. At most, it can aggravate an indisposition or a disease already latent in the body, especially in frail people. Although everyone reacts to the weather, an organism cannot neutralize certain unpleasant influences of atmospheric phenomena. If this influence is not balanced, not slow to make felt signs of climate sensitivity. It looks climate hypersensitivity when the reaction is so strong that worsen the symptoms of acute or latent diseases.

The sensitivity to meteorological conditions can manifest in the form of various ailments. The most common is headache, often associated with a state of fatigue. But there are other typical manifestations such as irritability, difficulty concentration and even sleep disorders. It also points of agreement that the seasons influence the onset of certain diseases.

The allergists are well aware that bronchial asthma, allergic rhinitis and other diseases of the respiratory system have their high points in the spring and autumn, probably due to greater abundance of allergens – pollen, leaf debris, dust – those times of the year.

However no known allergic causes, such as gastritis and peptic ulcers, and nervous system diseases (such as affective psychoses), with crises of severe depression or euphoria, also have irritation in spring or autumn.

Regarding to diseases that can be held in individuals with hypersensitivity meteorological, include, in addition to cardiovascular disorders, thrombosis, strokes and cramps. This also applies to several respiratory diseases, influenza infections and asthmatic diseases.



INCREASE THE NUMBER OF PEOPLE SENSITIVE TO THE WEATHER STATE

After these considerations, you might think that the sensitivity to weather is not as negative as expected. We are reminded, after all, often to the fact that our body to be weakened and lost its disease resistance.

The person affected thereby has the possibility to protect your body from which, of course, modify your lifestyle. In practice, this rarely happens, when there is the considerable increase in sensitivity to weather over the past 50 years. This has become a barometer of ill health of the inhabitants of various countries.

While in 1950, at Europe, only between 10 and 20% of residents complained of ailments associated with the weather, reached up to 30% in 1970. However, in the late 70's almost 50% of the population showed signs of sensitivity to weather conditions. Currently, this sensitivity is increasingly growing due to our habits of life, especially due to environmental pollution.

A study conducted in 1978 at Freiburg, Germany, confirmed the old belief that women at any age, is more susceptible to weather changes than men. While more than half of women surveyed said that was sensitive to atmospheric changes, only a third of the men were believed affected the same way. The study also revealed that, with age also increases the sensitivity to the weather. But there is also that neither the young escape these influences

One way to Unhealthy Lifestyle

The alarming increase of individuals sensitive to weather conditions in all age groups is necessarily the cause. Although not know among the phenomena, our unhealthy way of life is largely responsible for this fact.

One of the main reasons for this increase is our penchant for a sedentary lifestyle. Much of today's population suffers from lack of exercise, mainly due to advances in modern technology, which, with its numerous innovations, has facilitated extraordinary our life.

Medical groups contend that the lack of physical exercise is directly or indirectly, causing about 30% of the diseases. It seems clear that contributes to the influences of the weather is felt as aches or ailments.

The same happens with another consequence of our modern civilization. Whether at home or at work, we are constantly deprived, over the years, of the meteorological influences of nature. The temperature outside is considered unpleasant as soon as we move away from the values of the places where we work or reside. In many of us, the natural thermoregulation of the body is affected, at least in certain periods.

An organism that does not regularly expose to the natural stimuli of heat and cold no longer fits so well to weather influences. In contrast, those people who work outdoors daily, exposing the body to weather, preserves your natural resistance and react only to extreme variations of weather.

High Heat is Debilitating

The new habits acquired by man in recent decades can join different way to design the holiday. Previously, we escaped from the intense summer heat by choosing places that allow a home cool climate. Today, by contrast, people leaving for the beaches along the coast, despite doctors' warnings against the dangers of stifling heat and the dangers of exposure to solar radiation.

Those responsible are not only the seat of a tan in the sun, but also the alteration of individual sensitivity to heat. While old people were content with a temperature of 19 °C in their homes, today many people just feel good with a temperature of 23 to 25 °C. That is, the threshold of welfare rose sharply while lowered our resistance.

Thus, it is perfectly understandable desire to want sun and warmth, while decreases our resistance to the cooling, and other attacks. Add also the fact that is impossible to get the body to adapt to warmer climates in the short time of vacations. So, this change can lead to what is called of *climatic stress*.

Worst Air Quality

An entirely different question from ailments due to weather, or rather, to the characteristics of the environment, lies in the degradation of air quality. This danger must be taken very seriously, although the individual alone can do little or nothing to diminish it: we are forced to breathe the air around us with few or many harmful elements.

The effects of air pollution are felt not only in the vegetation, through acid rain, for example, but also on human health, although the relationship between cause and effect has not yet been satisfactorily explained.

According to a U.S. study, acid rain is responsible not only for the destruction of forests, like the death of approximately 50,000 people annually. Leaving aside these numbers, hardly verifiable, there is no doubt that the worsening air pollution causes an increase in respiratory and cardiovascular diseases.

The most extreme form of pollution is the dreaded *smog* (word consists of the terms *smoke* and *fog*). It is an increasingly visible phenomenon in large urban areas.



Smog is formed normally in situations of thermal inversions. Due to the strong cooling of the soil on cold nights without cloud cover or wind, the air becomes extremely cold near the surface.

In these conditions, the vertical movements of air are practically prevented, since the warm air, less dense, is superimposed on the cold air, heavier, and the concentration of harmful components (SO₂, CO₂, CO, ozone, secondary aerosols) and other particles released by industries and automobile exhausts increase progressively in a thick layer of air near the ground, where the fog is also able to form.

If *smog* is too thick, much of the solar radiation is prevented from reaching the ground, and these conditions may continue for several days.

It is proven that in cities where there is *smog*, inhabitants of the downtowns, as well as older or people with cardiovascular disease are at greater risk. The knowledge gained on weather sensitivity have a common denominator – in end analysis, the causes were due to modern civilization. The progress, if not driven carefully thought out and rational ways, becomes a sort of boomerang to our health. We must now do something to protect ourselves from its harmful effects.

HOW WEATHER AFFECT US?



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The atmosphere, where weather phenomena occur leaving many stimuli that are captured and assimilated by human sensory organs. Even when weather conditions do not suffer major changes, temperature, humidity and atmospheric electricity, as well as wind speed, range, as is known, during the 24-hour day. These oscillations become more evident as unstable weather.

Each meteorological element that changes acts as a stimulus that is transmitted by neurovegetative system. It is for this, according to the intensity and succession of impulses, trigger reactions required when aiming to generate an internal balance.

Our body reacts to cold by constricting the blood vessels in our skin and around the edges of our body. As a result, our heart has to do more work to do to pass through narrow blood vessels. This puts a strain on a weakened or damaged heart.



A significant decrease in pressure causes an expansion of air in isolated body cavities and membranes of fluids. So, are then put on pressure inflamed or injured tissues in joints or muscles causing increasing pain. Some of us have experienced this phenomenon when we travel by airplane and the pressure decreases inside the aircraft during takeoff.

The human body dissipates energy by varying the rate and intensity of blood circulation, losing water through the skin and sweat glands. To cool down, your heart starts pumping more blood, blood vessels dilate to handle the increased flow, and bundles of tiny capillaries toward the upper layers of skin are put into action.

The blood circulates closer to the skin surface, allowing the energy loss as heat to the cooler atmosphere. At the same time, water diffuses through the skin as transpiration. Skin controls ~90% of the energy dissipation function of the body. Sweating, by itself, does not cool the body unless if water is removed by evaporation, and high humidity retard evaporation.

Under conditions of high temperature and relative humidity, the body needs to maintain the temperature inside at 37 °C. The heart is pumping a torrent of blood through dilated blood vessels; sweat glands release fluid, including essential dissolved chemicals, like sodium chloride on skin surface.

When energy intake exceeds the level that body can remove, or when body can not compensate loss of fluids and salts through transpiration, the body internal temperature begins to rise and illnesses related to heat can develop.

Mortality rates can increase markedly as a result of heat waves, with maximum occur 1-2 days after the day on which daily maximum temperature was reached, i.e., there is a delay of 1-2 days between higher temperatures and maximum mortality rate.

The illness (heat stroke, heat exhaustion, etc.) can occur in healthy people exposed to or with hyper-sensitivity to heat. However, much of the excess deaths that occur during heat waves are mainly due to other diseases in which heat stress anticipates death. Children, older and sick people, particularly those with circulatory problems, are main risk groups during excessive heat.

Many of us are sensitive to weather changes and pain that we feel may be caused by irritation of nerve endings as a result of sudden changes in weather conditions. Bones and muscles have different densities and expand or contract unevenly during variations in temperature and humidity can increase the pain that felt in muscles and joints inflamed or injured.

Heat waves² seem to have a greater impact on mortality than cold episodes. For example, at the 2003 summer, 180 people died in Paris (France) in one day as a result of abnormally high temperatures. Thousands of people died during heat wave of this summer worldwide.



Air humidity has a significant impact on mortality. As higher as humid, it is more difficult for our body to lose energy as heat through sweating, and this result in additional warming.

² An episode extreme hot or heat wave is a period when was recorded excessive temperature day or night in association with high moisture content of air to the place or time of year.

Climate Effects in the Health Dry Air

Sensitive people to the weather are often irritated a day or two before a change of the weather and are usually in a miserable state when the arrival of a front. The U.S. hospitals record a greater number of births during this period and an increase in headaches and migraines.

People suffering from rheumatism fear the arrival of cold and wet weather while the dry and dusty wind from interior, before the arrival of a front, causes asthma or exacerbates symptoms and hay fever worse.



The dry winds from interior before arrival of the fronts are called the *Foehn* at the Alpine regions of Central Europe and *Chinook* and *Santa Ana* at the regions of the Rocky Mountains of Canada and USA. Some Swiss courts to allow consider the negative effects of these winds as mitigating factor in some crimes. The University of *Calgary* in Canada conducted studies that corroborate with claims of many migraine sufferers of the *Chinook* would be responsible for this effect.

Weather – A Problem of Nerves?



For a better understanding of the subject, one must recall that the neurovegetative system is composed of two systems. One, the sympathetic nervous system, has an activating action on vital functions that require expenditure of energy in our body; the other, parasympathetic system has a predominant action at home, anabolism, replenishing the energy spent. While the meteorological stimuli do not exceed certain threshold are not dangerous to humans. However, when are exceeded the limits tolerable by organism, its capacity for adjustment, there is suffering.

Healthy people without, any organic disease, feel only a slight indisposition more or less indefinitely. The same is not true for sick people, for example, hypertensive heart disease, chronic bronchitis, renal patients, etc. In these cases the meteorological influences can aggravate the health condition and mention of a genuine *stress* climate with negative consequences.

The path that goes from stimulus to reaction is understandable with the following example. Let us look at what happens when we take a "shower". We ran the taps of warm and cold water as needed to obtain water at the desired temperature. When the installation works well, there is no problem, because it regulates with ease. However, if pipes or faucets are rusty or impregnated with dirt, becomes more difficult to regulate the water temperature.

The same applies to the human body. In fact, sometimes the weather changes suddenly, requiring complex adjustments, controlled by the neurovegetative system in order to keep the internal balance.



For example, during warm weather there is great heat loss through sweating, vasodilation and increase respiratory rate, in order to maintain stable body temperature. This excessive sweating, with major losses of fluids, requires a greater intake of water. Evidently, this rebalancing is much more complex than we have outlined here schematically.

Conversely, in cold weather there is a whole set of complex mechanisms that involve circulation, breathing, cardiac work, renal function, quality of food caloric intake, amount of fluid drunk, etc. so that the body prevents heat loss and find other energy sources to cope in the cold, keeping the body temperature within normal parameters. All this set of adjustment, involving the whole body, is "automatically" controlled by the neurovegetative system.

There are more sensitive people to the meteorological changes, in which the adaptation of the body becomes more difficulty. Something similar happens with the call asthenia³ or fatigue spring. Over a few months, the body has adapted to the climatic conditions in winter: the shorter day length and reduced solar radiation, coupled with long periods of cold and cloudy weather, became scarce moments spent outdoors and put the individual in defensive attitude towards the environment (without access to vitamin D from the Sun). And now that spring has to pull it out of this discouragement. Until the body adapts it will have to endure feelings of tiredness and weakness.



³ It is a term used in medicine to designate an organic weakness, but without real loss of muscle strength.

WARM DAYS AFFECT YOUR BODY

MIGRAINE - Relating to the dry weather and movement of hot air.

Any sudden change in temperature can cause a crisis. Some doctors suggest keeping a diary to anticipate climate change, providing preventive medication type. Migraine sufferers usually is sensitive to glare and intensity of sunlight. Moreover, with increased sweating, there is a decrease in the body of water which can also cause headache.



HEART DISEASES - High temperatures are related to increased mortality from heart disease. Exposed to heat, the body needs to regulate internal temperature. To keep at healthy levels, increases blood flow (to take the heat for the body surface) causing transpiration. However, this heat loss decreases when the temperature/humidity increases. To compensate, the body promotes increased circulation, which requires increased heart rate and blood volume. If this organic ability is impaired by preexisting cardiovascular pathology, there is the possibility of triggering a crisis.

MULTIPLE SCLEROSIS (MS) - The heat and high humidity can aggravate the symptoms of those suffering with multiple sclerosis (loss of coordination, balance, blurred vision, impaired speech and fatigue). Experts believe that this is because the elevation of body temperature decreases the capacity of transmission of impulses which occurs through nerve fibers protected by myelin (membrane surrounding the nerves). Who has MS has also decreased or absent myelin, which aggravates the symptoms of the disease.

BLOOD PRESSURE AND HEAT SYNCOPE - A flaw in the circulation that keeps high blood pressure, with consequent transmission of oxygen to the brain, can lead to heat stroke. When the heart is enabled (e.g. during exercise), increases blood pressure and body temperature can rise, progress to a cardiovascular stress that leads to exhaustion. In such cases, if the activity is not disrupted, the body temperature can reach above 40 ° C, damaging cell structures and the system of thermoregulation at high risk of mortality. This usually happens with people who keep exercising, even if they do not feel so well.

(Text Extracted from Viva Saude Magazine, Issue 68, 2008).

Consequences of Weather State

The causes of weather influences on body are far from being totally understood. However, one thing is certain: There is a relationship between different meteorological situations and the emergence of certain diseases.

To understand what we mean by this, we need to take a bit of Meteorology. In periods of anticyclonic weather warm and humid succeed, for example, frontal depressions. Since the fronts, regions of contact between air masses of different thermal and hygrometric characteristics (relating to air humidity), the changes of weather state are frequent and sudden, as its effects on individual welfare.



When air warm flows over colder air these clouds appear, called Cirrus, announcing a weather change. It is then that people, more sensitive feel the first discomforts.

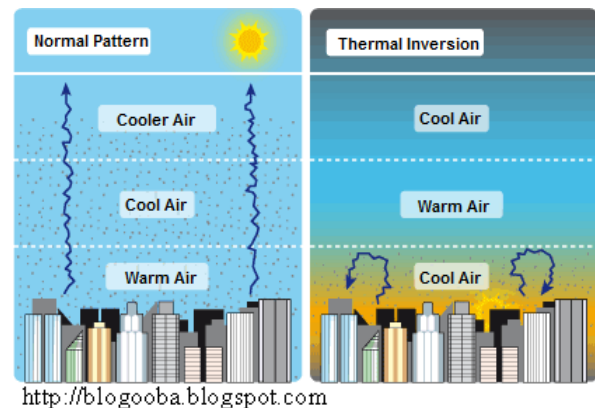
The biological load (biotropism) stronger lies with arrival of warm front, when the first high clouds appear, a sign that a air mass of warm and moist approaches. The cold front is followed by cold weather. Although the number of ailments and diseases area lower as compared to the previous case, sensitive people also do not appreciate the much cold weather, often with much cold and with downpours. At this stage, the diseases most prevalent are the spastics⁴ such as cramping and angina pectoris.

Rheumatic also suffer under these meteorological conditions because is proven to have a lower capacity of thermal regulation. In contract, for healthy people the arrival of the masses of fresh air has an invigorating and stimulating effect.

⁴ Medical term "spastic" is used to describe cerebral palsy and more recently gastrointestinal disorders and heart diseases.

The most pleasing meteorological conditions resulting from the combination of the following factors: Situations anticyclone (high pressure), no wind, little humidity and high temperature pleasant.

However, it may happen that during anticyclone periods there are bioclimatic conditions unpleasant in valley bottoms or in closed depressions; those translate into highest summer temperatures summer or thermal inversions (image below) contribute to the formation of mist and fog and an abnormal concentration of pollutants (*smog*). These attack the mucous membranes, causing irritation and catarrh.



This phenomenon because its characteristic of make potent air pollution, affects directly human health. Diseases linked to pollution, like asthma and bronchitis affects mostly children. Bronchi and alveoli, angered by pollution, become more suscetible to others diseases of the respiratory system. The eye irritation is also common in ambient highly polluted due to thermal inversion.

BIOTROPIC FACTOR



By today yet not fully clarified what are the meteorological factors that influence our health indeed. There is a relationship confirmed, for example, between atmospheric pollution and respiratory diseases and from stifling heat and circulatory disorders. These correlations are verifiable, especially because is possible to accomplish comparative studies on "climate chamber" closed.



In some people the ailments manifest sometimes before the weather change, being this "pre-sensitivity" one of the fundamental problems of Biometeorology. And the term "pre-sensitivity" cannot tell that is entirely appropriate, because the truth is that just feel changes in status health when occurs a change in atmosphere. That this weather change be or not perceptible, is of minor importance.

The Search for Susceptibility Agents

The influences, which this case are being felt on individuals, are undoubtedly related to atmospheric phenomena that precede the changes of weather. Also, enter our homes without modification because the pre-sensitivity manifests both within and abroad.

Thus, there are only two influences that may act as triggers of the sensitivity to the weather state:

- (i) Variations of electromagnetic field,
- (ii) Abrupt fluctuations in atmospheric pressure.

Among the most enduring electric meteorological influences, there are electromagnetic radiations of great wavelength originating in lightning and other electric discharges in the atmosphere. These radiations can be felt, especially when passage of a cold front (sometimes associated with thunderstorms), but has low importance in air mass subsidence (e.g. *Föhn*).



These radiations trigger biological reactions that are likely to influence the metabolism and cell membranes and can cause variations in pulsation, blood pressure, composition and time of blood coagulation.

BIOMETEOROLOGICAL COMFORT INDEX



The human beings react differently to the weather and climate extreme conditions. Their ability to adapt to adverse local depends on skill, seeking the most appropriated places for their survival.

For this reason, several biometeorological indexes were developed with the aim to classify the environmental comfort felt by all living beings (plants, animals and humans). The calculation of these indexes involves daily meteorological variables observed at meteorological stations which ones, in long time, featuring local climate, evidencing the daily changes of weather that has an influence on human behavior.

Thus, the variables that most contribute to the physiological, behavioral and biological changes are air temperature, relative humidity, wind speed and solar radiation.

The development of empiric formulas, which express in numeric term the sensation of environmental comfort, shows how some meteorological elements can change or influence the hormonal or chemical balance, according to the seasons.

Study by ASSIS and CAMARGO (2002)⁵ mentioned the sensation matter of the environmental comfort in Pelotas (Rio Grande do Sul State) using a formulation for biometeorological index which took into account the air temperature and dew point. To evaluate the results were used technique of the quantiles and seasonal analysis of that index.

⁵ ASSIS, S.V.; CAMARGO, C. G., 2002. Avaliação Bioclimática da Cidade de Pelotas, RS. Revista de estudos ambientais, Blumenau, V. 4, N. 2-3, Maio/Dez. 2002.

The seasonality showed that major discomfort is felt in the warm season (December to February), where 10 to 50% of the population felt uncomfortable, but the opposite in the cold season (June, July and August), when discomfort index did not pass 17°C. In cold temperate seasons (March, April and May) and warm (September, October and November) was not very great the discomfort, the indisposition was felt by 10% of the population, only in March.

The technique of quantile confirms what was presented in the seasonal analysis, which in warmer months, in 50% of the years studied (17 years) revealed that 10% of the population felt uncomfortable and in the colder months this feeling was low. In general, Pelotas city has a pleasing climate satisfactorily, with respect to high temperatures accompanied by high relative humidity in most of the year.

CLIMATE CHANGE AND HUMAN BIOMETEOROLOGY



The Climatology, through human bioclimatology, is a field study of public health concern. This interest became more important in the context of current discussions of global climate change. Some experts say that if they occur, could cause considerable health impacts of major portions of mankind, but quite distinct focus on Earth's surface.

In the tropical zone and the changes are less dramatic than those that occur in middle and high latitudes. In the tropics, it is believed that the parasitic diseases and find better conditions for its expansion, which will constitute a high risk compared to the vulnerability of the majority

Diseases like malaria and dengue, among others, may have expanded their space in latitude and altitude, involving a fairly high number of victims in the near future.

PREVENTION TO METEOROLOGICAL SENSITIVITY



The meteorological sensitivity translates into many people for a reduced capacity for adaptation to various environmental stimuli. We must attack the evil by root, determining the various modes of individual behavior that led to this state of affairs. In most cases, these are habits of many years that are not consistent with a healthy lifestyle and weaken the body in relation to meteorological stimuli.

One of the most important causes is the absolute lack of exercise. Whether a sport or gymnastics practice that, whether it's a foot race, each one choose what suits you, is important because, ultimately, to exercise the body.

It is also clear that an integral part of healthy living to reduce the consumption of alcohol and tobacco and a reasonable diet. People with excess weight naturally suffer more ailments caused by meteorological influences that people of normal weight.

The house should not be exaggerated heated, and the divisions - especially the bedrooms - should be kept cooler for the body to feel the temperature changes necessary for its thermoregulation. And in all circumstances the daily walk is one of the best preventive measures against the weather sensitivity.



Who lives in a big city with a particularly oppressive climate should at least on days of smog, haze or stifling heat, absent from the place of residence or work. Even if only for a weekend, a ride in the mountains or the seaside already provides relief. When planning vacation, the choice of climate should be made at the convenience of each. Especially the elderly and weak and susceptible should pay more attention to bioclimatic conditions.

In fact, a favorable bioclimate is important to their well-being, as taught in the climatotherapy. But you must have patience because the therapeutic effects of climate in general show only after weeks or even months. It follows that we can tackle just about weather sensitivity with our own weapons. In short, the weather did not suppress sensitivity to miracle cures, but with a consciously healthy lifestyle.

VACATION AND CLIMATOTHERAPY CONDITIONS

Who thinks about relaxing vacation should choose a suitable location, taking into account their climatotherapy conditions (exposure to climate conditions). The vacation can give a tired or sick person the opportunity to exchange, at least for some time, polluted climate of their place of residence or work, the other more healthy.

This situation does not happen, but when summer is in full holiday regions are even warmer. Rather, it is always advisable to stay in a massif or mountain, called regions with good air.

If a person lives in a place where winter is severe, there is a danger that, when he returned, the body does not adapt to the cold and humidity, and the consequences are colds and flu. Rather, who moves to a country in winter colder than you also run the risk of disease caused, directly or indirectly, by low temperature.

A Progressive Acclimatization



The person who travels by plane to a region with a completely different climate exposes himself to a severe test.

The success of relaxed vacation depends not only of the place climate where are past but also the greater or less difference between this and climate where you live. Climate change may raise some illnesses, particularly in the early days of vacation. The most typical symptoms are headaches and sleep disturbances.

Just like a climatotherapy also on vacation should start with to stay calm and relaxation, and only gradually shift to the practice of dosed physical exercises. For this reason, the holiday period should not be too short because recovery extends through several phases, and the process of adaptation of the body hardly lasts less than two weeks.

In addition, the ideal vacation spot should be chosen taking into account the seasons, which in most cases, impossible. As we know, there are at all latitudes, except for certain areas intertropical (always warm and humid) seasons with the climatic characteristics of their own. This means that almost all places can offer this or that time of year, weather conditions that constitute an assault to the body.

Therefore, the set of meteorological phenomena is an inherent part of our daily lives and adjust to the demand for decisions, regardless of the type of society. It is necessary that society increasingly aware of the potential benefits and applications of meteorology. It is this connection with everyday life that made us develop and discuss this important issue that blends meteorological elements, health and quality of urban life.



GLOBAL CLIMATE CHANGE AND HEALTH

There are several ways in which global climate change can affect the health of the human community. Generally is thought, immediately, that "global warming" - main mechanism of climate change - will have direct effects on body physiology and human welfare because of increased temperature. While this is correct, it is assumed that this is not the main aspect of climate change in importance at public health: a series of social and environmental processes, resulting from global warming and its consequences for the climate may affect disease incidence and patterns of mortality in many parts of the world.

We can distinguish in this respect, some basic mechanisms, namely:

- i) Direct effects caused by altered patterns of climate variability, especially so-called "extreme events": hurricanes, storms, floods, droughts and heat waves. Can affect health directly, causing physical and psychological trauma, and serious economic losses.
- ii) Indirect effects associated to environmental changes resulting from climate change, causing water shortages, decline in food production, worsening air pollution and migration of "environmental refugees". All these processes have important impacts on health.
- iii) Effects of climate oscillations (variations in temperature, rainfall etc.) on agents and vectors of endemic infectious diseases such as dengue fever, malaria, leishmaniasis, diarrhea and other infectious diseases. Climatic factors can accelerate the infectious cycle and to facilitate spatial dispersal of microbial agents and their transmitters.

Recent weather events have come to show that all countries and regions of the world, even the developed countries, can be considered more or less vulnerable to the consequences of extreme weather events that may occur with greater intensity, as a result of global climate change. Deaths caused by Hurricane Katrina, U.S. in 2005, and heat wave that struck Europe at the 2003 summer, killing 30,000 people, are good examples.

We can say that Brazil is a country very vulnerable to the effects of weather, for several reasons, including:

- 1) Due to its vast territory, it has a particularly sensitive area such as semi-arid region, occupying already limited by drought. Any increases in average temperature and/or reduction of rainfall and humidity will make living even more difficult if not impossible. Biomes relatively well preserved, as Amazon rainforest and the Pantanal, contain natural foci of infectious diseases with animal hosts, which may be important changes in its dynamics and distribution.
- 2) Presents a great population with little access to basic goods and services, including health. It is known that the populations most vulnerable to the effects of climate are those who, for reasons of social and environmental, are more exposed to climate hazards, and have less capacity to protect themselves and respond to adverse impacts.
- 3) The existence, in its territory, of several endemic infectious diseases sensitive to climate. They may have changed their cycles, encouraging both increased as decrease of its implications for variations in temperature and humidity, among other factors. There is also the possibility of spatial redistribution, as consequence of the regional demographic phenomena. This was the case of outbreaks of kala-azar (visceral leishmaniasis) observed at Northeast cities, beginning in the 1980s and 1990s, consequent to massive rural-urban migration, driven by prolonged droughts.
- 4) High concentration of population in urban areas vulnerable to climate risks, such as floods, landslides and worsening air pollution. They are well known morbidity and mortality associated with summer rains in several Brazilian cities, phenomena that can repeat, most dramatically, by global warming.

A study involving the analysis of current vulnerability of the population to health impacts of climate was developed at the national level. With the combination of economic indicators, indicators related to the incidence of endemic diseases sensitive to climate and also climatic indicators, were obtained vulnerability indices for all Brazil. The States that showed highest levels of vulnerability are located in the North and Northeast, especially. This was due to a combination of low socioeconomic indicators (income, infant mortality, education, etc.), with existence of high levels of endemic diseases in a geographic substrate characterized by semi-aridity and recurrent droughts.

To reduce these negative impacts is necessary for the State and society to prepare properly. In addition to the social improvements required and expected - regardless of climate change - such as increased employment and income, expansion of infrastructure, sanitation and access to good education and also a better effectiveness of medical care and disease control in general, some specific adaptive measures may be needed. (Paper of *Ulisses E. C. Confalonieri*, published at *ComCiência Magazine/SBPC*, 2007/03/10).



You are Sensitive to Weather – Yes or No?

Who is not safe to join the group sensitive to the weather can check by answering the questions in this test. The answers should be given spontaneously, in the end, add up the points.

Question	Yes	No
1. You often feel tired for no apparent reason?	3	1
2. You feel sometimes pain that manifest themselves suddenly and disappear within a few hours?	3	1
3. Do you suffer from sudden and inexplicable mood swings?	2	0
4. You sense a weather change with 6 to 18 hours in advance?	5	0
5. You sense a weather change over two days in advance?	0	4
6. Do you suffer with the stifling warm?	2	1
7. And with the fog extended?	2	1
8. You have low blood pressure?	3	1
9. You sit negatively influenced in his state of health when goes through quickly by car or funicular regions at different altitudes?	2	1
10. You sit relaxed after summer vacation on a beach?	0	2
11. There are seasons in which you feel worse?	2	1
12. You usually hear or read the weather report?	2	1

Test Result:

8 - 14	No signs of climate sensitivity.
15 - 21	The weather affects your health. Also their willingness and ability to work suffer with climate oscillations.

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