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CLIMATE FACTORS AND THE HUMAN ORGANISM

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ABSTRACT: This article analyzes climatic factors, their characteristics, and how these factors affect the human body.

KEYWORDS: Living organism, biosphere, Sun, wind, air temperature, absolute humidity, relative humidity, diseases, human health.

INTRODUCTION

Is called short -wave radiation, and it lies in the range of 0.1-4.0 µm. The amount of solar energy that reaches the upper limit of the Earth's atmosphere is 1.367 kW/m 2 , which is called the solar constant. Of this amount of energy, 7% (0.1-0.39 µm) belongs to the ultraviolet part of the spectrum, (0.40-0.76 µm)-48% to the visible part, and (0.77-4.0 µm)-45% to the near-infrared part of the spectrum. will come. Photosynthetically active radiation (FFR) with a spectrum of 0.39-0.71 µm is involved in the process of photosynthesis.

The reaching of the solar radiation energy to the Earth's surface depends on a number of conditions: the optical state of the atmosphere, the shape and amount of clouds, the height of the Sun above the horizon, which in turn depends on the time of day, season and geographical latitude. Partial absorption of solar energy (15% of the solar constant on average) and especially stronger scattering in the short-wave part of the visible spectrum by the gas and aerosol constituents of the Earth's atmosphere . As a result of these processes, the spectrum of solar radiation shifts to the long-wave range near the Earth's surface, the contribution of infrared radiation to its composition increases.

Solar radiation energy is not only absorbed by the Earth's surface, but also reflected back. Albedo is the ratio of the sunlight reflected from the Earth's surface to the radiation falling on it . For example, clean snow cover reflects 80-90% of radiation, polluted only 30-40% of radiation, black soil reflects 10-14% of radiation, sand reflects 25-35% of radiation, water surface reflects radiation from 5% to 35% depending on the angle of incidence of sunlight.

The arrival of solar radiation on the Earth's surface and its distribution on the Earth's globe is the main factor that forms the climate. Under its influence, natural geographical landscapes are formed, of which biotopes are an organizational part.

The effect of human anthropogenic activity on climatic factors is absolutely obvious. It is enough to say that the large release of aerosol particles into the atmosphere is a change in the thermal regime of the atmosphere. Deforestation , construction of large water reservoirs, oil pollution of the water environment lead to a change in the global albedo. Many more examples can be given.

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The illumination factor of the Earth's surface is related to the radiant energy of the Sun. First, as a result of the Earth's rotation around its core, there is an alternation of light and dark time of the day. As a result of the dynamics of illumination in plants, animals and humans in the process of evolution, a deep physiological and morphological flexibility has been formed and this is manifested in the circadian (daily) rhythm of activity. Second, for many organisms, seasonal fluctuations in illumination are important. This is manifested in the specific duration of light and dark time (photoperiodism) necessary for life activity.

abiotic factors responsible for all physiological functions of all living organisms . The temperature on the Earth's surface depends on the geographic latitude and altitude of the place, as well as the season . Therefore, it is never constant in the environment around a person, and the organism needs to adapt to its changing conditions.

Human adaptive functions are provided by the main heat and cold receptors of the skin, receptor fields and the central nervous system. Their joint activity is called heat regulation, and in this process, heat is generated in the human body as a result of continuous heat exchange between the body and the external environment, as well as oxidation processes. There is a certain relationship between air temperature and metabolism in the body . For example, when the air temperature decreases, heat formation in the body increases, and when the temperature increases, it slows down. When the ambient temperature increases or decreases, the heat transfer from the body changes in the opposite proportion: when the temperature decreases, the heat transfer decreases, and when the temperature increases, it increases. These interrelated processes are controlled by the activity of the central nervous system, and lead to changes in the activity of a number of other organs of the human body: blood circulation, respiration, increased or decreased metabolism, and through them, the adaptation capabilities of the body are realized.

Adaptation to low temperatures is manifested in a number of changes occurring in the body (tremors of muscles, increased metabolism, formation of heat in abdominal organs such as the liver and kidneys, narrowing of blood vessels, etc.).

Adaptation to the increase in the temperature of the external environment is manifested in the expansion of blood vessels, increased blood circulation, increased heat loss through rapid sweating.

Feeling of temperature is a very individual feeling: someone likes cold and bitter winter, someone likes warm and dry winter. Human health is significantly dependent on weather conditions: people often suffer from colds (flu, angina, etc.) in winter. One of the abiotic factors affecting the human body living in high mountain areas is the change in atmospheric gases, in particular oxygen partial pressure, as well as a decrease in average daily temperature and an increase in solar radiation. Adaptation to such conditions depends on the physiological characteristics and training of the organism . The absence of these features leads to "mountain sickness" and is accompanied by weakness, rapid heart rate, headache , depression, fainting, etc. Special exercises and doctor's advice are necessary for those who plan to organize a trip to the mountain and engage in mountaineering.

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The temperature of the environment affects the life of the human population . The increase or decrease in population density in certain geographical areas depends on the average annual temperature and seasonal changes in temperature.

Biological rhythms or biorhythms are regular quantitative and qualitative changes of vital processes that occur at all levels of life: molecular, cellular, tissue, organ, organism, population and biosphere.

The change of biorhythms is studied by the science of chronobiology (Greek "chronos" - time) . In the process of evolution lasting millions of years, the process of adaptation of living organisms to the periodic alternation of day and night, seasons of the year, related to the main biorhythms of the Earth , took place . As a result, they formed rhythmic processes of life activity - biorhythms.

Internal and external biorhythms are distinguished. Biorhythms have different periods, fractions of a second, seconds, minutes, days, months, years and several years. For example, nerve impulses have rhythms determined by fractions of a second - 0.001 s, average cycle - 0.8 s, inhalation-exhalation - 8 s, peristalsis of an empty stomach - 30 min, diurnal (alternation of day and night), menstruation (women's menstrual cycle) annual (birth) etc.

According to the conclusions of the researchers , recurring cycles have an internal (endogenous) nature. In other words, the body has an "internal clock" that somehow controls daily activity. The twenty- four -hour cycle we encounter in our daily lives depends on the body's internal clock being "regulated" by external events, especially the alternation of day and night . Social factors play an important role in regulating the human internal clock, that is, it is adjusted to the work schedule, daily routine, diet, etc.

Daily research results show that the working mechanism of the internal clock - the hypothalamus - is related to the activity of the most important control center of the brain.

Ignorance of daily biorhythms can harm human health. For example, arterial pressure is lower in the morning and increases during the day. If a person goes to the doctor only in the morning, he can consider that his blood pressure is normal. In fact, blood pressure can increase significantly during the day and evening, and he does not receive the necessary treatment.

The results of the study of human biological rhythms have shown that they are of great importance for physical and mental health. The bottom line is that we need to pay close attention to our rhythms, accept the ups and downs associated with them, and seek professional help when our rhythms deviate from the norm.

External biorhythms are related to the position of the Earth in cosmic space, and solar radiation, which is determined by solar activity (the appearance of sunspots, solar flares and flares, increased ultraviolet radiation), is its main factor. Solar activity affects a number of physical and chemical processes on Earth, such as fluctuations in atmospheric pressure, air temperature and humidity. This, in turn, affects a person's cardiovascular system, nervous system, mental and behavioral reactions, disrupts the rhythm of life, reduces work capacity, affects mood, etc.

Natural disasters (earthquakes, volcanic eruptions, movement of glaciers and icebergs, etc.) are also related to the activity of the Sun and its cycle, and directly or indirectly affect human health.

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It is accepted to describe air humidity with a large number of quantitative indicators . The following are often used as environmental indicators: absolute humidity or water vapor elasticity, measured in hectopascals, which indicates the actual amount of water vapor in the air at a given time; relative humidity is the ratio of the actual elasticity to the value of the maximum possible elasticity at this temperature, it is expressed as a percentage. Moisture deficit is the difference between the maximum possible moisture content and the actual moisture content .

Absolute humidity is an important description of the amount of moisture in the air. This ecosystem is important in arid zones, which exist mainly due to this factor.

The moisture deficit is taken into account in the calculation of evaporation and transpiration on the Earth's surface .

Relative humidity is also an important bioclimatic characteristic as an independent quantity and together with temperature and wind speed.

Precipitation is water that falls from clouds in liquid or solid form and falls from the air to the Earth's surface. These precipitations include rain, sleet, snow and sleet, snowflakes, sleet , sleet , and ice needles. Surface precipitation includes dew, rain, liquid and solid coating, sleet. The amount of fat is measured in millimeters of water thickness of the fat .

Oils are an important axis of the water cycle on Earth . Along with air temperature, it is one of the most important characteristics of climate. The level of soil moisture depends on it. Plants are divided into hygrophilic (moist-loving), mesophilic (moderately moisture-loving) and xerophilic (dry-loving) types depending on their water requirements. There is a certain level of tolerance for each type .

The level of pollution of the natural environment is also an important factor, depending on the number of dead animals . For example, sulfur dioxide oxidized to sulfur trioxide due to foggy air . A stable toxic fog is formed under certain conditions . Such substances are washed out of the atmosphere by sediments and deposited on land and oceans . This is rain (snow) contaminated with industrial wastes (SO 2, NO 2, HCI, etc.) called acidic fertilizers . Acid rain pollutes water bodies and soil and causes the death of fish and other aquatic organisms and the reduction of forest growth and even their extinction. Such pollution of the shallow areas of the ocean waters is very dangerous because it becomes impossible to reproduce marine invertebrates in these places. This, in turn, can lead to disruption of the food chain and disturbance of the ecological balance of the world's oceans.

Wind refers to the horizontal movement of air masses. Wind affects environmental factors such as evaporation and plant transpiration over land and sea . Local winds-breeze, mountain-valley winds, wind, etc. have a significant effect on the temperature and humidity regime .

is an important factor in the spread and spread of contaminants released into the atmosphere from thermal energy, transport, and industrial enterprises . Wind strength and direction determine the level of environmental pollution. The calm weather observed simultaneously with the inversion of the Earth's surface is an unfavorable meteorological condition that leads to long-term and strong pollution of the atmospheric air.

Atmospheric pressure is manifested as an environmental factor as follows . First, there is a certain zoning of the biosphere. The upper limit of distribution of chlorophyll plants extends to an altitude

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of about 6000 meters above sea level. The upper limit of human habitation extends to the high mountain pastures, which do not exceed 5,200 meters . This height depends not only on the arrival and spectrum of solar radiation, but also on air temperature and atmospheric pressure . Secondly, in the troposphere layer, baric systems with low pressure in the center (cyclone) and high pressure in the center (anticyclone) are always observed. This creates the circulation of air masses, which in turn causes long-distance migration of contaminants added to the atmosphere (transboundary migration). In addition, certain types of weather are associated with them . Thus, cyclones usually experience unstable weather with large amounts of rainfall. Anticyclones are characterized by calm, stable weather with a temperature inversion. Such conditions are favorable for the stagnation of air masses and the accumulation of mixtures in the air .

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