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SIGNIFICANT VARIATIONS OF CLIMATE, EFFECT OF THE COSMOPHYSICAL FACTORS AND SOLAR SYSTEM DYNAMICS

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Аңдапта

Осы мақалада космофизикалық факторларды есепке ала отырып, климаттың өзгеруін болжаудың қазіргі өзекті мәселелері қарастырылып, Солтүстік Қазақстан жағдайында экстремалды ауа – райының құбылыстарының көрінісі туралы зерттеулер циклын негіздеу қарастырылған.

Түйінді сөздер: күн – жердегі қосылыстар, климаттық сипаттамалары, атмосфералық айналымы, ауа райы, климат, болжамы.

Аннотация

В данной статье рассматривается актуальные проблемы прогнозирования климатических изменений с учетом космофизических факторов, также приведено обоснование постановки цикла исследований проявления экстремальных погодных явлений в условиях Северного Казахстана.

Ключевые слова: солнечно – земные связи, климатические характеристики, атмосферная циркуляция, погода, климат, прогнозы.

Annotation

In this article, the current problems of forecasting climate change taking into account cosmophysical factors are considered, as well as the rationale for establishing a cycle of studies of the manifestation of extreme weather events in the conditions of Northern Kazakhstan.

Key words: solar – terrestrial connections, climatic characteristics, atmospheric circulation, weather, climate, forecasts.

Introduction

Cycles. Processes in the Solar System should be viewed as a complex interdependent dynamic (oscillating) physical system. Naturally, they include the processes on Earth and the Sun as a component. Thus, there must be synchronous changes in these processes under the influence (control signals) that are generated in the Solar System. The best – known indicator of these oscillatory processes is cyclical changes in solar activity [1, 2].

In [3] data on three so – called ages cycles of solar activity, each formed of nine shorter 11–year cycles are presented. The global minimum among the minima of the transitions between the 11 – year cycles of transition from one age – old cycle to the next is taken as the beginning of the next age cycle time. Beginning of the first age cycle refers to 1712, i.e. the previous the age – old cycle (let's call it zero) includes the period from 1620 to the beginning

of the first cycle. This period is characterized by a low number of sunspots, and hence the low level of solar activity, that is why it is called a period of «Maunder's minimum» [4]. During this period climate extremes often took place – severe storms and cold weather across the Northern Hemisphere of the Earth, prolonged drought and the disappearance or reduction of areas with temperate climate, unusual snowfall and unexplained cyclonic activity in Northern and even Southern Hemispheres. Then strong volcanic eruptions took place, for example, eruption of Krakatoa (1680) [4]. During this period cold winters took place in Europe, for which it was called «Little Ice Age.»

Currently the fourth age cycle has began, and it has all the features of zero age cycle analog, except for the fact that the climate began to be affected significantly by the results of human activities that could give it some special features. However, the development of the fourth cycle is very similar to the zero cycle, and indicates a possible recurrence of groups of age cycles, by a factor of four, i.e. with an average period of 400 years. The repetition of the Maunder minimum analogue in this cycle, and accordingly, the recurrence of such extreme weather events, and higher seismic and volcanic activity is possible.

Moreover, time intervals between transitions of 11 – year cycles are important, when rather low level of solar activity is observed. This is reflected in the cyclic variations of significant climate changes [5], up to the existence of such natural disasters as severe winters. In most cases, severe winters in Europe were observed in the neighborhood of the new 11 – year solar activity cycle [6]. This conclusion is confirmed by British scientists at the University of Fading, headed by Professor M. Lockwood: «... winter in continental Europe and the United Kingdom in the coming years will be colder and colder, due to low solar activity.» The researchers found that there is direct relationship between the reducing the number of sunspots and atmospheric phenomena that «block» warm western winds in Europe during the winter months. Data on changes in solar activity and data on changes in air temperature in the United Kingdom were compared for this.

Dynamics. It is important to emphasize that at low solar activity, it would seem that Sun is not able to form a powerful influence on the space around the Sun, in particular on the Earth's climate. It is natural to assume that there is a significant influence of some third force, which affects both the activity of the Sun, and on climate on the Earth. This third force might be attributed to the influences due to the peculiarities of motion (or dynamics) of planets and the Sun, that is, the Solar System as a whole, as well as asteroids and comets in nearby areas of its space, such as the Kuiper Belt and Oort cloud. The main fundamental feature of the dynamics of the planets is their circulation around the Sun in closed orbits close to ellipsoidal (parameters of orbital ellipses change slowly) and their (and Sun) rotation around their own axes. Well known laws of Kepler describe the basic laws of such treatment. «Evolutionary mature systems are inevitably resonance» – states A.M. Molchanov, principle of resonance [7], which hypothesized the full resonance Solar System. He found that for the nine known major planets of the Solar System, their frequency of rotation (mean motion) around the Sun (i =$\overline{1.9}$) with sufficient accuracy satisfies resonance relations $\sum(n_i\omega_i) = 0(\mathrm{i} = \overline{1.9})$, where n_i – integers. Deviations of the true frequency of the resonance do not exceed 1.5% in the worst case [7]. A.M. Molchanov discovered similar resonances for the treatment of some of the planetary satellites frequency.

Waves. We can assume that there is an interaction spanning at these resonances, and that it is the same, which was supposed by Chizhevskii [8], Takata, Moriyama (because «nature does not luxuriate causes of phenomena» – pointed out famous Newton). There is an analogy between the motion of space Solar System and artificial spacecraft (SC), which supports its orientation in this space with the system of wheels spinning existing on it,

creating moments of forces to rotate the SC about certain axes passing through its center of mass. After all, the Solar System and each of its planets is not «somersault» in outer space, but take a definite position in it. The Solar System resembles some of the mechanical design, which maintains its integrity not at the expense of direct connections between the material details of its parts, including rotating, but due to the forces of gravitational fields (in general non – central) to each component of the system.

As pointed out in [9], changes in configuration of the planets during their motion in their orbits around the Sun affects the processes in the Solar System and, hence, on terrestrial processes, in particular, on climate change. So – called spin – orbit hypothesis was stated according to which the orbital angular momentum of the planets can affect the activity of the solar and geophysical processes. It was shown that the trajectory of the center of mass of the Solar System in different time periods have some peculiarities. Thus, during the Maunder period amplitudes of these trajectories increased, and during this time the center of mass of the Solar System significantly deviated from its position at the previous variations. Since the total angular momentum of the Solar System should remain almost unchanged (if changes in the external forces from the Kuiper belt, the Oort cloud and the entire Galaxy are not taken into account), then all of the variations of moments of the rotational motion of its selected components should be either mutually compensated, which is almost impossible, or redistributed. So there must be a mechanism to transfer a certain amount of time the rotational motion to the selected components through a certain carrier. Namely, there is a significant effect of angular rotational movement of the planets, both on the activity of the Sun and climate on the Earth, due to an unknown hypothetical agent, which has a wave nature [10] (considering the «elasticity» between components Solar System). It is natural to assume, that it is the unknown wave component of the gravitational field. That is apart from the usual «Newtonian» gravitational effect similar to the inverse square law for electrostatic interaction (Coulomb's law), assumes the existence of other components associated with the mass as well as the moments of the rotational motion of bodies. Both components together generate waves of gravitational field, and on the other hand, the flow of particles – gravitons that reach the surface and the depths of the Earth.

Interactions. The assumption of the wave nature of the transfer of angular rotational motion implies the wave interaction at long distances, since the amplitude of the waves decreases less due to the distance (the relationship in this case is different than under the law of inverse squares), and more due to the interaction with the area of their expansion. Despite the fact that, under certain configurations of the Solar System planets closer to the Kuiper belt, but its interaction with the bodies in the Kuiper belt, and even more so in a Oort cloud, under the law of gravity is not sufficient to cause noticeable effects. But we can assume that due to the presence of wave interaction mechanism, the planets affect (outraged) the motion of bodies in the Kuiper belt (this disturbance can be transmitted even before a Oort cloud), and on the other hand, their (these objects) reverse effect is actively involved in forming of characteristics of planets motion and penetrate further, until the influence on the solar activity. For example, during the Maunder minimum there were many comets with large orbital inclination angles to the plane of the ecliptic, in particular, from 1652 to 1707 at least 20 of these comets were observed [11]. Most likely, the Oort cloud might be a repository of comets with large orbital inclination angles. If the assumption of the wave interaction is true [10], the perturbation produced by planetary system in the Kuiper belt during the Maunder minimum was transferred up to the Oort cloud. It’s caused a disturbance in the orbits of comets, so that some of them reached the Solar System.

All circulating and rotating bodies in the Solar System create moments of forces, each of which tends to rotate it around some axis, but the resulting (as the sum of vector forces) moment currently supports its orientation in space in a dynamic equilibrium. On the other hand, a constant angular rotational movement of the Solar System is maintained, which under the laws of mechanics can only be changed under the influence of external forces on the system. This value is the sum of the moments of the orbital motion of planets and small Solar System bodies (for circular orbits, this moment is the product of body mass on the velocity and radius of circulation), as well as moments of the rotational motion of the Sun. However, due to the large radius of the orbital motion of the planets its corresponding angular moments are much larger than the moments of their rotational motion. Only the angular rotational movement of the Sun is comparable to the moments of the orbital motion of the planets due to its large mass (99.866% of the total mass of the solar system) and large size. It is about 2% of the total angular momentum of the rotational motion of the Solar System. There is a clear disproportion. We can assume that a certain amount of rotational movement of individual components (including Earth) is transmitted through the dynamics of changes in the gravitational field in the system, i.e. through its efforts to change the rotation of individual bodies in hypothetical waves of gravity [10]. These waves cause a change in the angular velocity of the rotation of the Earth around its axis, changing its angular rotational momentum. On the other hand, due to the motion of the planets in an ellipsoidal (rather than circular) orbits, parameters of which are also changing (albeit slowly), as well as variations in the orientation of their axes of rotation, the total angular rotational moment of the individual planets are changed.

Experiments

Assumptions of the wave nature of the transfer of angular rotational motion through space can be justified by the results of a number of experimental observations. Thus, in the XX century, a number of studies on the torsion pendulum took place, which clearly recorded the effect on them through free space. First of all, this is the observations of French Professor Maurice Allais in the 50s of the last century, of the Foucault pendulum – type parakonic behavior during a solar shade, and his discovery of the so – called Allais effect. It should be noted scrutiny and confirmation of this effect by American scientists Sax and Allen. To monitor the effects of the eclipse English professor Latham has developed an automated system in which gyroscope was the sensitive element, perceiving gravity variations. Allais effect could be verified. This indicates the great promise of this direction. Thus, nowadays, a group of Russian researchers proposed an electromechanical device, which is based on a fairly massive disk (weighing 265 g), which rotates at a certain frequency [12]. For example, in studies of solar eclipse, the frequency of 65 Hz was used. It was found that the motion features of distant massive objects can affect the speed of rotation the mentioned disk as a relatively short period of change in this rotation frequency.

Conclusion

To test the dependence of the Earth's climate on the dynamics of motion of the individual components of the Solar System ground – space experiment should be conducted to fix the uneven synchronous rotation of the sensitive gyroscopes on Earth and in Space.

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ВИДОВОЕ РАЗНООБРАЗИЕ ОТРЯДА ЧЕШУЕКРЫЛЫХ ЕСИЛЬКОГО РАЙОНА СЕВЕРО – КАЗАХСТАНСКОЙ ОБЛАСТИ

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Аңдатпа

Осы ғылыми мақалада 2014 – 2016 жж. Аралығындағы Солтүстік Қазақстан облысы Есіл ауданындағы қабыршаққанаттылардың алуантүрлігі көрсетілген. Әдебиет көздері талданданып, оның көмегімен көбелектердің түр құрамы анықталды. Осы зерттеудің негізінде автор зерттеу аймағында табылған Lepidoptera тізімін, сондай – ақ олардың түрлерінің алуын түрлілігінің құрылымын ұсынады.

Түйінді сөздер: көбелек, алуантүрлілік, қатқылқынаттылар, жәндіктер, мониторинг.

Аннотация

В данной статье рассмотрены проблемы видового разнообразия чешуекрылых в Северо – Казахстанской области Есильского района за 2014 – 2016 годы. Проанализированы литературные источники, и с его помощью определен видовой состав бабочек. На основе данного исследования автором, дается список чешуекрылых встречаемых в исследуемом районе, а также их структура видового разнообразия.

Ключевые слова: бабочки, разнообразие, чешуекрылые, насекомые, мониторинг.

Annotation

In this article, problems of the species diversity of Lepidoptera in the North – Kazakhstan region of the Esilsky District for 2014 – 2016 are considered.Literature sources have been analyzed, and with its help the species composition of butterflies is determined. Based on this study, the author gives a list of Lepidoptera found in the study area, as well as their structure of species diversity.

Key words: butterflies, variety, lepidopterans, insects, monitoring.

Введение

Бабочки вредители одни из слабоизученных объектов животного мира в Северо – Казахстанской области (СКО). В тоже время, часть из них являются вредителями сельского хозяйства, нанося ущерб зерновым и другим культурам. В связи с этим изучение состояния их популяций и вопросов биологии является актуальным.