



## **Carbon Dioxide Global Cycle in the Earth System: Theoretical modeling**

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At the present time a studying the global warming phenomenon, global cycle of the carbon dioxide and phenomena is of a great importance. The aim of our work is to develop and realize a new approach to the CO<sub>2</sub> global turnover in system of "atmosphere-ocean". Practically all carried out models are functioning in the average annual regime and accounting for the carbon distribution in biosphere in most general form. Firstly, we present a modified model for the carbon dioxide cycle with reproducing a seasonal dynamics of the carbon turnover in ocean with account of zone ocean structure (up quasi-homogeneous layer, thermocline and deepest layer). Secondly, we present the long-term forecast of adaptation for system of "ocean-atmosphere" at an anthropogenic action with reproducing a seasonal dynamics of carbon cycle with account for the dependence of the 2 transfer through the atmosphere-ocean boundary upon temperature of the water and air, wind velocity, biotical activity contribution. It is obtained a temporal and space distribution for concentration of non-organic carbon in ocean, partial press of dissolute 2 and value of exchange on the border between atmosphere and ocean. It is estimated a role of the wind intermixing of the up ocean layer. The increasing of this effect leads to increasing the plankton mass and further particles, which are transferred by wind, contribute to more quick immersion of microscopic shells and organic material. The master 224 differential equations system, describing a dynamics of the CO<sub>2</sub> cycle, is numerically integrated by the four order Runge-Cutt method under given initial values of valuables till output of solution on periodic regime. We firstly study the possible realization of the chaos scenario in the system. Besides, a direct link between a global cycle of the carbon dioxide and global climate changes is analyzed.