Long-term physical-statistical modelling of Southern Oscillation and climatic parameters in view of solar activity influence on greenhouse effect.

S. Khorozov (1), V. Budovy (1), V. Medvedev (1), I. Martin (2), V. Belogolov (3)

(1) Firm HSoft Ltd, Kaliningrad, Russia, (2) ITA/CTA and University of Taubate, Taubate, Brazil, (3) Murmansk State Technical University, Murmansk, Russia

(hsoft@baltnet.ru. / Phone +7-4012-448526)

The long-term (several decades) forecasts of Southern Oscillation (ENSO) and climatic parameters of some regions of Southern and Central America and Europe are here represented.

The modelling was performed on the basis of physical-statistical model, which is based on a concept of solar activity influence on greenhouse effect through some physical mechanism. There are two reasons in support the existence of such mechanism:

1. firstly, a presence of rather close correlation between an average meanings (intervals of sliding averaging are from several decades up to hundreds years) of solar activity and earth surfaces temperatures variations (actual and reconstructed);

2. and secondly, insufficient change of insolation (for an explanation of existing correlation) connected with solar activity change.

The simple estimate model has shown a possibility of an explanation of recent warming by the natural reasons without using of anthropogenic factors.

The constructed model (in spite of its simplicity) well enough reproduces and explains the basic climatic events of the past millennium (global warming at 19^{th}-20^{th} and 11^{th}-13^{th} centuries, small glacial period at 15^{th}-17^{th} centuries).

The integrated energy parameters of "ocean - atmosphere" system are the arguments of statistical part of the model, and, on the other hand, they are the output of physical part of the model. The analysis of the model has shown, that it can be successfully adapted to the various large-scale (first of all - in time-scale) climatic parameters.

El Niño and La Niña phenomena are used as indicators of regional climatic changes in Pacific basin. Often regional climatic parameters (in particular, precipitation budget) are being defined through correlation connections with ENSO parameters. Therefore in the given work the problem of stability of correlation connections between ENSO

parameters and precipitation budget in some regions of Southern and Central America is discussed.

The comparative analysis of correlation between regional climatic parameters and ENSO parameters in 20^{th} and 21^{st} centuries has allowed finding out a change of interrelations on a boundary of centuries. According to model outcomes this phenomenon can be explained by the beginning change of global energy state of "ocean - atmosphere" system and by appropriate change of circulation modes.

The model has allowed predicting La Niña phenomenon at the end of 2005 - the beginning of 2006 with a lead time about one year. The forecast was presented at the First Alexander von Humboldt International Conference on «The El Niño phenomenon and its global impact» (Guayaquil, Ecuador, May 16-20, 2005). The estimation of a quality of the given forecast is represented.

The model outcomes allow to suggest that the growing carbon dioxide concentration is not the reason of the recent warming, which can be changed to cooling in the near future in spite of concentration of this gas will still be rising during all time.