



Seismoionospheric coupling and earthquakes forecast probability

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There are numerous experimental facts confirming the influence of Sun on the seismic activity of the Earth. Such an influence “from above” may be realized through the chain “Sun - solar wind - magnetosphere - ionosphere - lithosphere”. The last part - ionosphere-lithosphere coupling, or, in other words, seismoionospheric coupling - is not clear till now as to its physical mechanism. The existence of the seismoionospheric coupling is debated already several tens of years. Probably, the post-seismic reaction of the ionosphere on strong earthquakes is already rather widely accepted and several examples of such evidence are known, but the mechanism of the energy transfer from lithosphere to ionosphere is still under discussion. As to the seismic events precursors in the ionosphere, this is intensely discussed both as to their existence and mechanism. The published results till recently were mostly not complete and their conclusion was greatly dependent on the applied processing technology. The launch of DEMETER satellite and first results of electromagnetic signals processing coming from its board opened a new era in the understanding and evidence of seismoionospheric precursory signals. The present report deals with the study of the seismoionospheric coupling initiated “from below”. It is shown that atmospheric gravity waves (AGW) are the most probable energy carrier from lithosphere to ionosphere both for post- and pre-seismic events. The AGW propagation channel is qualitatively studied and the obtained conclusions found their confirmation using both data mining from former experiments (Atmosphere Explorer) and especially data from recent results of DEMETER mission with its statistically valid observations of more than thousand earthquakes occurring

during its lifetime. The conclusion is made that the seismic event preparatory stage can be monitored from LEO satellites and a possible mechanism of AGW generation during earthquake preparatory stage - is discussed. The planned LEO satellite experiment in frames of Ukrainian space program - IONOSAT - a 3-satellite cluster - is described. This study is supported by STCU grant 3165 and NSAU Contract 1-02/03.