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About detecting seismoionospheric variations during geomagnetic perturbations according to GPS data

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The detection from satellites of various seismic effects has stimulated the use of space technology in solving the problems of earthquake forecasting. The process of earthquake preparation takes, as a rule, a considerable period of time and thus requires long-term observations to be carried out above their probable centers. Such data could be obtained only using spacecraft and, in particular, satellite navigation systems.

The process of seismic impulse preparation, realization and post-seismic balance regaining involves not only a separate part of lithosphere, but also hydrosphere (basically its underground part), biosphere, atmosphere and ionosphere. The manifestation of the seismic processes in this or that environment of the Earth may be different and requires normally a long observation.

No earthquake can be considered as a separate, isolated in time and space event and should be regarded as a long process: imbalance and subsequent balance regaining in the environment of the Earth, as well as in the big and lasting activities going on in the environment. The area of the geophysical anomalies (stress fields, deformations, energetic and magnetic fields, gravity fields) and abnormal progress of other activities (hydro-geological and atmospheric ones) by its scale usually extends far beyond the epicenter of the earthquake.

The ionosphere is the good indicator of the processes occurring on the Earth. It is established that the ionosphere above an epicenter tests for stages of the earthquake preparation of a various sort specific variations. Ground methods of measurements, as a rule, do not allow spending long and continuous observations above epicenters

of seismic events. This problem can be solved by means of the navigating satellite systems allowing carry out global monitoring the Earth ionosphere by a radio translucence method on a line the navigating satellite - the ground receiver.

The analysis of potential opportunities of GPS-monitoring of the Earth ionosphere at detecting possible seismic precursors is considered on an example of Hector Mine earthquake on October, 16th, 1999 to California, the USA. The choice of this event has been caused by that during it enough powerful earthquake (magnitude M=7.1) geomagnetic conditions was revolted. The lead analysis has shown that observable variations of electronic concentration of the ionosphere, most likely, are connected with processes of the earthquake precursors.

It is shown that application of radio translucence method based on results of processing data from navigating satellite systems enables carrying out of long monitoring the Earth ionosphere in the seismodangerous period and at presence of geomagnetic storminess.

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