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Investigation of the seismo-ionospheric effects on the base of GPS/GLONASS measurements

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During last years the monitoring of the ionospheric effects of different origin is carried out mainly with use of Global Navigating Satellite Systems (GPS / GLONASS). By means of measurements of the signals temporal delays it is possible to do the mapping of total electron content (TEC) in a column of unit cross section through the Earth's ionosphere and investigate its temporal evolution depended on the variations of electron concentration (NmF2) in the F2 ionospheric region. In the given report we present results of analysis of spatial-temporal variability of the ionosphere during the earthquake preparation phase for several major earthquakes which took place in Japan. It was revealed that for considered events mainly positive TEC anomalies appeared 1-5 days prior to the earthquake. The enhancement of electron concentration reached the value of 30-70% relative to the quiet geomagnetic conditions. In order to analyze the revealed effects in more details it was additionally involved data of GPS TEC values over GPS stations located at different distances from earthquake epicenters and data of vertical sounding of the ionosphere (NICT database). The hourly values of critical frequency of ionospheric F2 and Es layers were obtained from manually scaled ionograms recorded at Japanese ionospheric sounding stations Wakkanai, Kokubunji and Yamagawa.
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