



LF signal spectrum analysis for strong earthquakes

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We examine spectral singularities of LF subionospheric signal from the NRK transmitter (37.5 kHz) in Iceland received in Bari station (Italy) concern the earthquake that occurred in L'Aquila on April 6th, 2009. In our earlier paper we have reported preseismic nighttime anomalies using observations in three receivers located in Bari, Graz (Austria) and Moscow (Russia). The strongest anomalies in the signal were observed in the NRK-Bari radio path for 5-6 days before the earthquake and during the aftershocks series. They corresponded to the anomalies revealed at the same time in the amplitude of VLF/LF signals in several others seismic paths of the network. Spectral analysis of the filtered LF signal (0.28-15 mHz) shows change in spectra of seismo-disturbed days in comparison with background spectra. Only the spectra of anomalous signal in the seismic path NRK-Bari reveal periods 10-20 min. These periods are absent both in the spectra of undisturbed signals in the control paths and in the spectra of magnetic-induced anomalous signal. The same spectral singularities were observed in analyzing of LF (40 kHz) signal from the JJY transmitter in Japan registered in Petropavlovsk-Kamchatsky (Russia) for three strong earthquakes with $M \geq 7.0$. The results of this study corroborate that the possible mechanism of energy penetration from the earthquake origin through the atmosphere and into the ionosphere is the excitation and upward propagation of internal gravity waves.