

Abstract

The detection of ionospheric disturbances associated with seismic activity is one of the main purposes of the Detection of Electromagnetic Emissions Transmitted from Earthquake Regions (DEMETER) micro-satellite. In this view, this study attempts to analyze the problem of detecting these disturbances before an earthquake occurrence and to discuss the Chile earthquake case study. Using ultralow frequency (ULF) measurements of Instrument Champ Electrique (ICE) experiments on board the DEMETER satellite, possible irregularities in this electric component have been investigated in the vicinity of Chile (27 February 2010) earthquake region. The data used in this paper cover the period from 10 to 26 February 2010. The anomalous variations in the calculated ULF electric component in the direction Z of satellite were clearly observed on the 17th, 11th, and 1st days preceding the earthquake. It is noted that the electric component obviously strongly decreased prior to the earthquake. These unusual variations have also been observed in the variation of several plasma parameters recorded by DEMETER directly above the epicenter during the whole period. Hence, the detected anomalies resulting from the ICE ULF waveforms in quiet geomagnetic conditions could be regarded as seismo-ionospheric precursors.