

IONOSPHERIC ANOMALIES DETECTED OF SHIRAZ EARTHQUAKE USING WAVELET TRANSFORM

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Prior to major earthquakes many variations in the environment have been occurred. These changes are observed at the land surface in water, in the air and in the ionosphere. On 19 April 2013 at 02:11 LT(UTC=LT-4:30), an earthquake happened in SW Iran, SHIRAZ region with a magnitude of $M_w=5.0$.

This paper analyses the ionospheric total electron content(TEC) obtained by GPS station of SHIRAZ and variations in TEC during two months (March to April) using BERNESE Software.

The ionospheric anomalies before and after earthquakes has been able to represent that relationships between Seismics and ionospheric disturbances.

In this paper, the geomagnetic and solar activities in detecting earthquake-associated TEC anomalies have been considered ($K_p < 2.5$, $D_{st} > -20$ nt, $A_p < 25$ and $F10.7 < 130$) (Akhoondzadeh, 2013; Akhoondzadeh, 2012; Kon, et al., 2011). Figure 1 shows variations of geomagnetic and solar indices during elected period (1 March to 31 April 2013).

Then, the continuous wavelet transform (cwt) is used to detect and diagnose the ionospheric anomalies related to seismic activities (He et al., 2014). In Figure 2, detected anomalies during several days before earthquake with considering geomagnetic activities might be related to approaching earthquake (Akhoondzadeh, 2012; He et al., 2014). High levels of the geomagnetic and solar activities are seen in Figure 1, therefore there are several peaks before the earthquake (Figure 2).

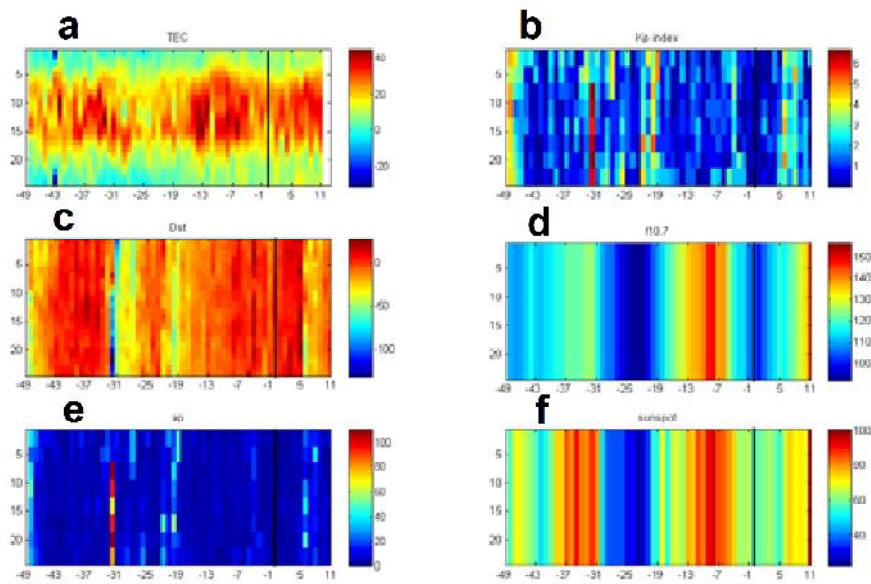


Figure 1. a, b show respectively the variations of TEC, Kp, Dst, F10.7, Ap and sunspot indices of time interval between 1st March to 31 April 2013

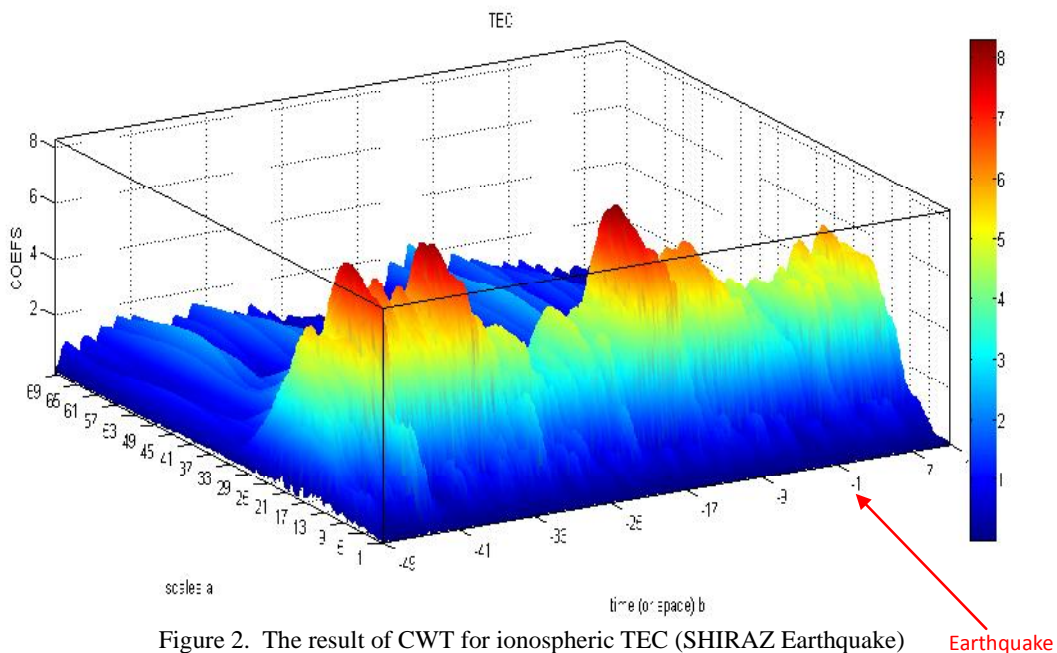


Figure 2. The result of CWT for ionospheric TEC (SHIRAZ Earthquake)

Earthquake

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