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## Ionospheric currents and TEC variations during the March 17, 2015 sudden impulse

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We assess the relationship between ionospheric currents derived by ground magnetometers and Total Electron Content (TEC) derived by GNSS receivers over the European longitudinal sector during the Sudden Impulse (SI) of the 2015 Saint Patrick's day Storm. Since changes in the ionospheric currents are expected to be related to the temporal variation of the TEC in the ionosphere, we compare vertical TEC (vTEC) variations with the relative ionospheric currents corresponding to the Preliminary (PI) and Main Impulses (MI) inferred by the use of Piersanti and Villante SI technique. We apply the Ensemble Empirical Mode Decomposition analysis to vTEC data to discriminate between the diurnal/seasonal and SI-related variations of the electron content over each co-located GNSS receiver-magnetometer couple. We found a linear relationship between the ionospheric current inferred from ground measurements and the temporal fluctuations of vTEC induced by the SI for both the PI and the MI (with a slope of  $\approx 3.0 \cdot 10^{-4} \text{ H}^{-1}$ ). In addition, by using cross-correlation analysis applied to the SI-induced oscillation component of the vTEC measured by 4 GNSS stations, we obtained a propagation velocity of the disturbance equal to  $\approx 1.5 \text{ Km/s}$ .

### Biography

Mirko Piersanti has completed his PhD from University of L'Aquila (Italy) and postdoctoral studies from University of L'Aquila, Department of Physical and Chemical Sciences. He is Research Associate at the University of L'Aquila, Department of Physical and Chemical Sciences. He has published more than 20 papers in reputed journals.

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