

2015

Spatial analyses on seismo-ionospheric precursors observed by GIM TEC and DEMETER during the 2008 M8.0 Wenchuan earthquake

Jann-Yenq Liu
National Central University

Yuh-Ing Chen
National Central University


Cheng-Chi Huang
National Central University

Michel Parrot
CNRS

Sergey Pulintets
Russian Academy of Sciences

See next page for additional authors

Follow this and additional works at: http://digitalcommons.chapman.edu/scs_articles

 Part of the [Atmospheric Sciences Commons](#), [Biological and Chemical Physics Commons](#), and the [Geophysics and Seismology Commons](#)

Recommended Citation

J.-Y. Liu, Y.-I. Chen, C.-C. Huang, M. Parrot, S. Pulintets, and D. Ouzounov, "Spatial analyses on seismo-ionospheric precursors observed by GIM TEC and DEMETER during the 2008 M8.0 Wenchuan earthquake," *Geophysical Research Abstracts*, 2015, vol. 17.

This Article is brought to you for free and open access by the Science and Technology Faculty Articles and Research at Chapman University Digital Commons. It has been accepted for inclusion in Mathematics, Physics, and Computer Science Faculty Articles and Research by an authorized administrator of Chapman University Digital Commons. For more information, please contact laughtin@chapman.edu.

Spatial analyses on seismo-ionospheric precursors observed by GIM TEC and DEMETER during the 2008 M8.0 Wenchuan earthquake

Comments

This abstract was originally published in *Geophysical Research Abstracts*, volume 17, in 2015.

Creative Commons License



This work is licensed under a [Creative Commons Attribution 3.0 License](https://creativecommons.org/licenses/by/3.0/).

Copyright

The authors

Authors

Jann-Yenq Liu, Yuh-Ing Chen, Cheng-Chi Huang, Michel Parrot, Sergey Pulintets, and Dimitar Ouzounov



Spatial analyses on seismo-ionospheric precursors observed by GIM TEC and DEMETER during the 2008 M8.0 Wenchuan earthquake

Jann-Yenq Liu (1), Yuh-Ing Chen (2), Ching-Chi Huang (1), Michel Parrot (3), Sergey Pulnits (4), and Dimitar Ouzounov (5)

(1) Institute of Space Science, National Central University, Chung-Li, Taiwan (jyliu@jupiter.ss.ncu.edu.tw), (2) Institute of Statistics, National Central University, Chung-Li, Taiwan (ychen@stat.ncu.edu.tw), (3) LPC2E, CNRS, Orléans, France (michel.parrot@cnrs-orleans.fr), (4) Institute of Space Research, Russian Academy of Sciences, Moscow, Russia (pulse1549@gmail.com), (5) Center of Excellence for Earth Systems Science & Observations, Chapman University, CA, USA (ouzounov@chapman.edu)

This paper examines seismo-ionospheric precursors (SIPs) in the total electron content (TEC) of the global ionosphere map (GIM) and observations in the French satellite DEMETER (Detection of Electro-Magnetic Emissions Transmitted from Earthquake Regions) during the 12 May 2008 M8.0 Wenchuan earthquake. The temporal and spatial analyses on the GIM TEC are used to search SIPs of the Wenchuan earthquake. Meanwhile, both daytime and nighttime electron density (Ne), electron temperature (Te), ion density (Ni) and ion temperature (Ti) probed by DEMETER are investigated. A statistical analysis of the box-and-whisker method is utilized to see if the four DEMETER data sets 1-6 days before and after the earthquake are significantly different. The analysis is employed to investigate the epicenter and three reference areas along the same magnetic latitude discriminating the SIPs from global effects. Results show that the nighttime Ne and Ni (daytime Ti) over the epicenter significantly decrease (increase) 1–6 days before the earthquake. The intersections of the global distribution of the significant differences (or anomalous changes) in the nighttime Ne, the nighttime Ni, and the daytime Ti 1-6 days before and after the earthquake specifically appear over the epicenter. The spatial analyses confirm that SIPs of GIM TEC and DEMETER observations appearing 2-6 days before are related to the 2008 M8.0 Wenchuan earthquake.