



HAL
open science

Worldwide correlation between earthquakes and electromagnetic anomalies from satellites

Matteo Taroni, Angelo de Santis, Dedalo Marchetti, Gianfranco Cianchini,
Michel Parrot, Mei Li

► **To cite this version:**

Matteo Taroni, Angelo de Santis, Dedalo Marchetti, Gianfranco Cianchini, Michel Parrot, et al..
Worldwide correlation between earthquakes and electromagnetic anomalies from satellites. 19th EGU
General Assembly, Apr 2017, Vienne, Austria. pp.10127. insu-03568142

HAL Id: insu-03568142

<https://insu.hal.science/insu-03568142>

Submitted on 13 Feb 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution| 4.0 International License



Worldwide correlation between earthquakes and electromagnetic anomalies from satellites

Matteo Taroni (1), Angelo De Santis (1), Dedalo Marchetti (1), Gianfranco Cianchini (1), Michel Parrot (2), and Mei Li (3)

(1) INGV, Rome, Italy, (2) LPC2E/CNRS, Orléans, France, (3) China Earthquake Networks Center, Beijing, China

A possible coupling between ionosphere and lithosphere has been intensely investigated in the last years. In particular, some studies attempt to use the information about electromagnetic anomalies measured from satellite to increase the performance of the earthquake forecasting models.

Some of these studies are focused on the precursors of few big earthquakes, while other studies try to investigate the problem in a global prospective: in both cases it seems to be a lack of proper statistical testing of the hypothesis of correlation between earthquakes and electromagnetic anomalies.

This study approaches the problem putting the hypothesis of correlation in a testable manner.

We analyze the correlation between earthquakes and electromagnetic (i.e. magnetic and electron density) anomalies from DEMETER and SWARM satellites by counting the number of anomalies that fall inside the Dobrovolsky area (and its fractions) before and/or after the occurrence of M5.5+ earthquakes in the global CMT catalogue.

We do not perform any preselection of earthquakes, and we carefully avoid the problem of double counting of anomalies (e.g. working with a declustered catalogue).

Our final result is that there is a clear statistically significant correlation between earthquakes and electromagnetic anomalies detected from space.