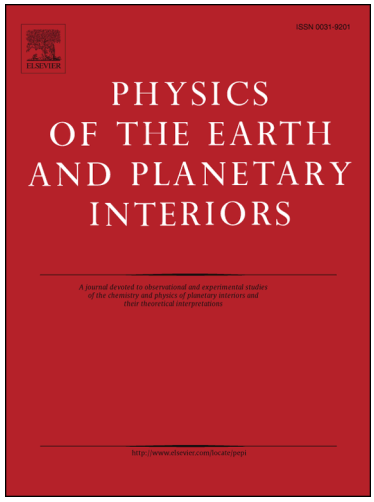
Accepted Manuscript



Pattern recognition approach to the subsequent event of damaging earthquakes in Italy

S. Gentili, R. Di Giovambattista

PII: S0031-9201(16)30280-1
DOI: http://dx.doi.org/10.1016/j.pepi.2017.02.011
Reference: PEPI 6011

To appear in: *Physics of the Earth and Planetary Interiors*

Received Date: 17 November 2016
Revised Date: 8 February 2017
Accepted Date: 22 February 2017

Please cite this article as: Gentili, S., Di Giovambattista, R., Pattern recognition approach to the subsequent event of damaging earthquakes in Italy, *Physics of the Earth and Planetary Interiors* (2017), doi: http://dx.doi.org/10.1016/j.pepi.2017.02.011

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Pattern recognition approach to the subsequent event of damaging earthquakes in Italy

S. Gentili[a] and R. Di Giovambattista[b]

[a] Istituto Nazionale di Oceanografia e di Geofisica Sperimentale- Centro Ricerche Sismologiche, Udine, Italy

[b] Istituto Nazionale di Geofisica e Vulcanologia, Via di Vigna Murata 605, 00143 Roma, Italy

Abstract

In this study, we investigate the occurrence of large aftershocks following the most significant earthquakes that occurred in Italy after 1980. In accordance with previous studies (Vorobieva et al., 1993, Vorobieva, 1999), we group clusters associated with mainshocks into two categories: "type A" if, given a main shock of magnitude *M*, the subsequent strongest earthquake in the cluster has magnitude $\geq M$-1 or type B otherwise.

In this paper, we apply a pattern recognition approach using statistical features to foresee the class of the analysed clusters. The classification of the two categories is based on some features of the time, space, and magnitude distribution of the aftershocks.

Specifically, we analyse the temporal evolution of the radiated energy at different elapsed times after the mainshock, the spatio-temporal evolution of the aftershocks occurring within a few days, and the probability of a strong earthquake.

An attempt is made to classify the studied region into smaller seismic zones with a prevalence of type A and B clusters. We demonstrate that the two types of clusters have distinct preferred geographic locations inside the Italian territory that likely reflected key properties of the deforming regions, different crustal domains and faulting style. We use decision trees as classifiers of single features to characterize the features depending on the cluster type. The performance of the classification is tested by the Leave-One-Out method. The analysis is performed on different time-spans after the mainshock to simulate the dependence of the accuracy on the information available as data increased over a longer period with increasing time after the mainshock.

ACCEPTED MANUSCRIPT

Download English Version:

https://daneshyari.com/en/article/5787321

Download Persian Version:

https://daneshyari.com/article/5787321

Daneshyari.com