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ABOUT THE AUTHORS

Pierfrancesco Burrato
Istituto Nazionale di Geofisica

e
Vulcanologia,
Sezione
Roma 1,
Roma
Italy

*Paola
Vannoli*
Istituto
Nazionale
di
Geofisica
e
Vulcanologia,
Sezione
Roma 1,
Roma
Italy

*Umberto
Fracassi*
Istituto
Nazionale
di
Geofisica
e
Vulcanologia,
Sezione
Roma 1,
Roma
Italy

*Roberto
Basili*
Istituto
Nazionale

di
Geofisica
e
Vulcanologia,
Sezione
Roma 1,
Roma
Italy

*Gianluca
Valensise*
Istituto
Nazionale
di
Geofisica
e
Vulcanologia,
Sezione
Roma 1,
Roma
Italy

KEYWORDS

Earthquake
GPS
Historical
seismology
Ionosphere
Irpinia
earthquake
Italy Mt.
Etna
Seismic
hazard

Seismic hazard assessment
UN/IDNDR
earthquake
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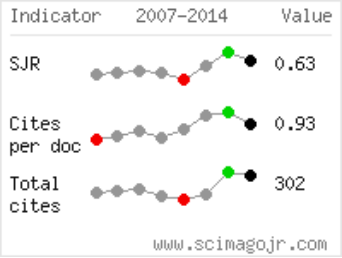

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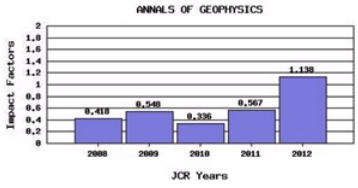

NOTIFICATIONS

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Fast Track

Is blind faulting truly invisible? Tectonic-controlled drainage evolution in the epicentral area of the May 2012, Emilia-Romagna earthquake sequence (northern Italy)

Pierfrancesco Burrato, Paola Vannoli, Umberto Fracassi, Roberto Basili, Gianluca Valensise

Abstract

For decades, alluvial plains have been the areas of the fastest population growth over most of the globe. Modern societies demand growing extensions of flat and easily accessible land to accommodate the swelling urban areas, booming industrial districts, large power plants, and multi-runway airports. But how can we tell if such flat areas hide large active faults? How can we assign a significant pre-instrumental earthquake to its causative source? In other words, how can modern societies deal with buried, that is to say, 'invisible' faults, and with the elusiveness of the hazards they can pose? The issue of blind faulting became widely debated in the Earth sciences community in 1989, following the publication of a summary on a sequence of 'hidden earthquakes' that hit central and southern California, USA, between 1983 and 1987, and following the

October 17, 1989, Loma Prieta, California, earthquake (Mw 6.9). These earthquakes shattered the accepted belief that large earthquakes are associated with large topographic contrasts; i.e., that they usually take place in mountainous terrains, and that their causative faults are expressed at the surface. Stein and Yeats [1989] spelled out clearly that "...large earthquakes can take place not only on faults that cut the Earth's surface, but also on 'blind' faults under folded terrain". Due to the growing concentrations of population and infrastructures in low topography areas, although such earthquakes might pose comparable hazards, they can come with substantially greater risk than earthquakes that occur in hilly or mountainous terrains. [...]

Keywords

Blind faulting; Tectonic geomorphology; Seismogenic source; 2012 Emilia-Romagna earthquake sequence; Po Plain

Full Text - Views: 1200

PDF

Identifiers

- DOI: 10.4401/ag-6182

Published by INGV, Istituto Nazionale di Geofisica e Vulcanologia -

ISSN: 2037-416X