Geophysical Research Abstracts, Vol. 8, 03764, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03764

Superficial faulting, landslides and fluvial catchments associated to active structures in the Messina Strait area (Italy)

P. Guarnieri, C. Pirrotta

Department of Geological Sciences, University of Catania, Italy (guarnier@unict.it / Fax: +39 957195712 / Phone: +39 957195739)

The 28 December 1908 Messina Strait earthquake ranks among the most disastrous historical events in the Mediterranean, having caused more than 100,000 fatalities and the nearly total devastation of the cities of Messina and Reggio Calabria.

In recent years the area of the Messina Strait has been subject of numerous studies aimed at a better understanding of its present dynamics. Many of these studies, some of which have been carried out in the framework of the planned construction of a permanent bridge across the Strait, have been primarily focused on the 1908 earthquake.

One of the most debated issues in this context has been the definition of the source of the 1908 earthquake. Numerous studies have dealt with the subject, and given the lack of evidence for surface faulting, the most plausible hypotheses propose a source model with a blind fault, lying within the Messina Strait with an orientation about N-S, capable of fitting into the concepts of rupturing and into the inversion of data derived from historical levelling.

In contrast, the secondary deformation linked to minor structures has never received serious consideration and has been neglected for many years.

This work presents a synthesis of the results of a geological-geomorphological study in a sector lying to the north of the city of Messina on the Sicilian side of the Messina Strait.

The geological study carried out in this area has for the first time revealed the presence of two fault systems, a dip-slip fault system (Ganzirri Fault System), with an orien-

tation about ENE-WSW, and a dextral strike-slip one (Faro Superiore Fault System), with an orientation NNW-SSE.

The geomorphological analysis permitted to define these systems as tectonically active, to which some of the effects of their movement can be attributed: fluvial catchment and landslides. In fact the active structures are capable of modifying not only the hydrographic network of streams but also the morphology of the landscape, triggering landslides.

This analysis was not only carried out to show the recent activity of some of the fault systems recognised in the area, but it has also allowed to define the evolution of the fluvial network that extends, with a drainage towards ENE, since 90-100 ky to subsequently rotate towards SE, following the direction of the present fiumare. Furthermore, the northern portion of the Messina Strait is seen to be controlled by the Ganzirri Fault System and the Faro Superiore Fault System which are responsible for the recent deformation and modification of the present hydrographic network.

This effects are most evident near the village of Faro Superiore, lying in the central part of this sector, which was also totally destroyed during the 28 December 1908 earthquake. Observations made after the earthquake, bes

ides describing the destruction caused by the earthquake, also note landslides and subsidence near to the village.

In conclusion, this work shows for the first time evidences of active tectonics, on the Sicilian side of the Messina Strait, attributed to two fault systems that are probably the secondary effects, as superficial faulting, induced by the 28 December 1908 earthquake. However, the presence of tectonically active faults is of fundamental importance in the evaluation of the geological risk as they are capable of interacting profoundly with the human framework, such as lifelines and population centers.