Some remarks on historical seismology

The Pollino range area is considered a seismic gap zone due to its scarce seismicity, as even confirmed by the Italian seismic catalogue. The historical towns of cities and villages of the area do not display earthquakes occurred before the 1600, neither local nor remote, which could have affected such localities. The January 8, 1693 earthquake is the most ancient documented event in the Pollino range area, firstly quoted by Guidoboni et al. (2007) and then by Camassi et al. (2011). The 1693 earthquake is among those events which have been obscured by other major earthquakes very close in time and space. In fact, on 9th January 1693 started the destructive seismic sequence of Eastern Sicily, that left a huge impression in the collective imagination and affected most of Calabria as well. The closeness of the two events is likely the reason of the delayed identification of the Pollino earthquake.

Main results:
1) the number of localities with useful information grows from seven-eight to fourteen; 2) the maximum MCS intensity drops from 7.5-8 to 7; 3) the macroseismic magnitude of the 1693 earthquake drops to M=5.1-4; we provide a more detailed reconstruction of the time evolution of the sequence, that lasted about one year; 5) the significantly reduced size of the 1693 earthquake makes it fully comparable with the last event occurred in the area, on October 26, 2012 Mw 5.0, I max 6.

Repositories and sources

Giorgio Toscano, maestro orsini resed del Lelos

The research about a XVIII century earthquake mainly concerns archival sources, especially administrative or diplomatic correspondences, or even private letters. The main source of the 1693 earthquake is a local history of Giorgio Toscano who describes in detail the earthquake of which he was eye witness. Most of the documentation belongs to the informative flow of the diplomacy between the different governments of Venice Republic, Grand Duchy of Tuscany, Papal Court in Rome and the kingdom of Naples. Very important is the documentation between the kingdom of Naples and its “motherland” Spain, to which it was Viceroyalty. Other part of the documents is internal to the Catholic Church, through the informative network between the Curia and Nuncios, Dioceses and Parishes. Therefore, the research has been carried out in many archives, like the Archivo Segreto Vaticano, the State Archives of Florence, Venice, Naples and Cosenza, as well in some libraries in Calabria and Rome and in all parish archives of the area. A secondary group of documents are the early journalistic sources and gazettes that, like modern press-agencies, publicized accounts and news from the main European cities.

**HISTORICAL AND ARCHAEOSEISMIC STUDIES IN THE POLLINO AREA**

### Section 1. Reappraisal of the January 8, 1693 Pollino earthquake

(Castellano, Cucci, Rossi, Terrullani)

To investigate on ancient coseismic effects that left traces on human settlements of the Pollino area, we selected several archeological and historical sites, in the following the main results from Parco del Cavallo and Casabianca at the Sibari site are reported.

**Casabianca**

The features occur on structures of the Copia occupational phase (i.e from II-VII century A.D.). The main tectonic elements are mapped and shown in the figure below.

**Main results:** 1) significant elements of tectonic deformation have been recognized on both sites. At Casabianca, these evidences were only in part revealed during recent archaeological excavations, while they were previously undetected at Parco del Cavallo; 2) at both sites: fractures with a consistent ca. NE-SW orientation affecting walls and structures, some with relative displacements, 2) at Casabianca sand filled fractures within the archaeological stratigraphy has been interpreted as paleoliquefaction phenomena; 3) at both sites rotation of walls, complete walls collapse and massive structure toppling; 4) the pervasive earthquake damage is likely to occur at Sibari during the middle of II century A.D. (age inferred by Marino, 2010; Greco and Lupinno, 1999); 5) at Parco del Cavallo, the TL age obtained from the sampled shards (“siggliata africana” of 1273 yr B.P. ± 99) suggests also the occurrence of a vast and important collapse around the VII-VIII A.D., likely associated to seismic shaking. Archaeological data confirm the existence of a second event, although slightly younger in age (first half of the IV cent. A.D., Marino, 2010); 6) subsidence phenomena due to water table problem affect the area and cause damages to the structures, however these are distinguishable from the effects induced by tectonics.

**Main results:** 1) the number of localities with useful information grows from seven-eight to fourteen; 2) the maximum MCS intensity drops from 7.5-8 to 7; 3) the macroseismic magnitude of the 1693 earthquake drops to M=5.1-4; we provide a more detailed reconstruction of the time evolution of the sequence, that lasted about one year; 5) the significantly reduced size of the 1693 earthquake makes it fully comparable with the last event occurred in the area, on October 26, 2012 Mw 5.0, I max 6.

### Section 2. Archaeoseismic field survey

(Alfonsi, Brunori, Cinti, Ventura)

To investigate on ancient coseismic effects that left traces on human settlements of the Pollino area, we selected several archeological and historical sites, in the following the main results from Parco del Cavallo and Casabianca at the Sibari site are reported.

**Parco del Cavallo**

The features occur on structures of the Copia occupational phase (i.e from II-VII century A.D.). The main tectonic elements are mapped and shown in the figure below.

**Main results:** 1) significant elements of tectonic deformation have been recognized on both sites. At Casabianca, these evidences were only in part revealed during recent archaeological excavations, while they were previously undetected at Parco del Cavallo; 2) at both sites: fractures with a consistent ca. NE-SW orientation affecting walls and structures, some with relative displacements, 2) at Casabianca sand filled fractures within the archaeological stratigraphy has been interpreted as paleoliquefaction phenomena; 3) at both sites rotation of walls, complete walls collapse and massive structure toppling; 4) the pervasive earthquake damage is likely to occur at Sibari during the middle of II century A.D. (age inferred by Marino, 2010; Greco and Lupinno, 1999); 5) at Parco del Cavallo, the TL age obtained from the sampled shards (“siggliata africana” of 1273 yr B.P. ± 99) suggests also the occurrence of a vast and important collapse around the VII-VIII A.D., likely associated to seismic shaking. Archaeological data confirm the existence of a second event, although slightly younger in age (first half of the IV cent. A.D., Marino, 2010); 6) subsidence phenomena due to water table problem affect the area and cause damages to the structures, however these are distinguishable from the effects induced by tectonics.