

**SSA 2015**

*Session: The Where, When and Why of Uncharacteristic Earthquakes*

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**WHATEVER DOES A M5.8 EARTHQUAKE ON THE LOW ANGLE NORMAL ALTOTIBERINA FAULT (ITALY)?**

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The seismotectonics of the Upper Tiber Valley are dominated by the Altotiberina Fault (ATF), an NE-dipping low-angle normal fault system, and its antithetic W-dipping high-angle normal faults. Although the southern part of the ATF was demonstrated to creep, its capability to generate strong or moderate earthquakes is still under debate.

On April 26, 1917 at 9:35:59 (GMT) a strong earthquake struck the northernmost portion of the Upper Tiber Valley (Tuscany) producing severe damages and about 20 fatalities. The Catalogue of Strong Italian Earthquakes reports this event as the so-called Monterchi earthquake, relating to 134 macroseismic observations, mainly distributed on the western side of the Tiber Valley. The maximum and epicentral intensity was determined as  $I_0=IX-X$  (MCS), corresponding to an equivalent magnitude of  $M_e=6$ , that defines this event as the most important of the area.

A total of 49 historical seismograms from 19 different Euro-Mediterranean observatories are available in the database of the SISMOS Project - INGV. The BAAS bulletin of 1917 reports a list of 21 seismological observatories that recorded the P and S-phases for this earthquake. We included additional arrival-times deriving from further seismic bulletins - and from digitalizing original historical seismograms. We obtain a new, robust and consistent hypocentral solution, coherent with the macroseismic data, in particular by using S-P travel time differences for recordings where the absolute timing is uncertain.

An accurate research on the technical characteristics of the recording historical seismometers (period, damping, gain etc.), allowed to deconvolve the original digitalized seismic traces (i) to determine the main seismic parameters ( $M_0$ ,  $M_w$ , Circular Fault Radius), (ii) to constrain the possible source mechanism, by a combination of first motion analysis and modelling of synthetic seismograms, and (iii) to implement the solution in the framework of the regional tectonic setting.

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**Wednesday, April 22nd / Poster / Exhibit Hall A**