

## ***Interactive comment on “Modeling ground deformation associated with the destructive earthquakes occurring on Mt. Etna’s southeastern flank in 1984” by Flavio Cannavò et al.***

**Anonymous Referee #2**

Received and published: 16 February 2016

The Authors use a geodetic dataset based on ground deformation data collected by a geodimeter trilateration network for assessing the co-seismic and aseismic slip along one of the most active fault of Mt. Etna, in a period including a strong earthquake. I think the topics could be suitable for the journal after revisions providing some elements of broader interest for the readers. For example it is necessary to frame the aseismic slip in process of gravitational sliding involving the eastern flank of Mt. Etna. In particular, the Authors assert that “in the May 1980-October 1984 period, the Fiandaca Fault was affected by a strike slip and normal dip slip of about 27 and 23cm. This result is in fairly good accord with field observations of the co-seismic ground ruptures along the fault but it’s notably large compared to displacements estimated by seismicity, then

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suggesting that most of the slip over the fault plane was aseismic”. The problem is that, according to the Authors, the ground ruptures immediately after the main event seem to be in accord with the geodetic measurement: so, the displacement should be largely coseismic. . . . Conversely, the Authors conclude that “only a part (from 5% to a maximum of 30%) of the stick-slip obtained by modeling is related to the co-seismic effects of the earthquakes recorded along the FF, suggesting that most of the slip over the fault must be aseismic.” This inconsistency could be due to the scarcity of geodetic data, acquired in a limited number of campaigns from 1977 to 1980, and again only after the earthquakes in 1984, or to a mistake in data comparing. This issue could be easily addressed calculating the resulting S vector that should be larger than the measured ground rupture. Moreover, it is not clear which is the role of the similar ground rupture that affected the southeastern part of FF on occasion of the VIII EMS event of June 19 1984. Finally, in the Chapter Discussion and conclusions the last paragraph “These considerations again confirm the high level of seismic risk, in particular ground rupture hazard of the Fiandaca Fault and generally of the Timpe Fault System, for the several towns and villages located on these structures” should be deleted, since the authors have asserted before that most of the displacement is aseismic.

Other comments: 1) there are references from other research groups missing (see the attached pdf file); 2) the regional framework should be updated (see suggestions in the attached pdf file); 3) the formula of line 192 seems to be wrong, probably due to misprint; 4) computation of lines 296-297 should be extended; 5) the June 19 1984 event is rated as VIII EMS at line 145 and as VII EMS at line 308. 6) the straight dashed lines shown in fig. 4 are forced, being the eastern flank of Mt. Etna subject to episodic motion related to volcanic dynamics and gravitational motion; Other comments are listed in the attached pdf file.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2015-312/nhess-2015-312-RC2.pdf>

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