**Natural Hazards
and Earth System
Sciences**

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Discussions

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comment

Interactive comment on "Brief Communication Co-seismic displacement on October 26 and 30, 2016 (M$_w$ 5.9 and 6.5) – earthquakes in central Italy from the analysis of discrete GNSS network" *by* Giorgio De Guidi et al.

Giorgio De Guidi et al.

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General comments: a) The authors need to provide more details on GNSS data processing. They report that they used a commercial software but this is not enough. In addi-tion, the results are not clearly presented. So I suggest to redo Table 1 with re-sults: N-S displacement, E-W displacement, Up displacement, N-S uncertainty, E-W uncertainty Up uncertainty. Also, please report the sampling interval of the geodetic observations and the cut-off angle of observations. See articles such as http://www.annalsofgeophysics.eu/index.php/annals/article/view/6418/6508 for data

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processing of local GNSS networks.

Reply: we created a new table with your suggest

b) the authors neglect recent Italian literature on the 2016 seismic sequence http://www.annalsofgeophysics.eu/index.php/annals/issue/view/515

Reply: we revised the bibliography (line 236-237)

c) The comparison with SAR interferometry results shows notable differences in the horizontal component (compare red colour extent in fig. 4A with vectors of stations VTW3 etc.). What is the exact day/hour of the pair of Sentinel images, is it after the Oct. 26, 2016 event or before? So the dInSAR image shows the deformation of 1 or 2 events?

Reply: We have simplified the discussions relating the displacement data explaining geological significance, sea also new shapes of the Figure 1. Furthermore we have reorganised the paper's figures. removing the Figure 5 which represented a qualitative indicator that must be supported by new data, and splitting the Figure 3. This difference are explained with the difference type of data. The GNSS data are punctual measuring while DInSAR are areal measuring so it is probably that there are some difference between these data. The DInSAR image shows the deformation before and after the two events (line 175-176).

d) The authors report cumulative GNSS results from 2 earthquakes, October 26 and October 30, 2016. This needs to be very clear and should be included in abstract, conclusions.

Reply: Of course we have rewrite the abstract and conclusion considering this suggestion

e) the addition of horizontal and vertical displacements along the fault is wrong as the GNSS measurements are point measurements and are valid for the particular site only.

Reply: We compute again the displacements including new data in the table and conclusion

f) The discussion in Fig. 5 is vague. The authors should expand more on what they believe is worthy for more investigation. Also report more on the data presented in the east-west transect.

Reply: Figure 5 has been removed

g) The manuscript figures need re-organisation so the material is clearly presented.

Fig.1: increase size of map (1A). remove empty (white space) in fig. 1B. It is uncertain to put the hypocentre of the M6.5 event on this cross-section given a) the depth - location uncertainty and b) the lack of association with surface faulting in this section. So make 1A larger and put 1b below. Also. in 1B show seismic faults with red lines. In fig. 1A show the GNSS points which you refer in this paper. In addition, the concentric circles indicate seismic wave propagation? I suggest that this also be left out as this is not the focus of this paper.

Fig. 2: insert a box in 2A showing the extent of 2C.

Fig. 3: indicate which GNSS station (e.g. VTE1? VTE2? etc.) is shown in the field photographs. I suggest to insert a new figure expanding the material of Fig.3 (lower right) showing better station baselines, faults, epicentres of October 26 and October 30, 2016 earthquakes and co-seismic ruptures. This will be a key figure to help readers to understand the relation between GNSS station location, earthquake effects etc.

Fig.4; there are five grey stars in this figure. Please leave only the 3 mainshocks and represent them with red colour. Clarify that InSAR scale bar is in cm.

Specific comments: line 3: replace discrete with campaign line 17: please indicate which agency provided moment magnitude estimation line 19: please indicate which agency provided moment magnitude estimation line 34: replace doy with DOY line 136: replace registrations with recordings

C3

Reply: All the figures were reorganized according to your guidelines

Please also note the supplement to this comment:
http://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-130/nhess-2017-130-AC2-supplement.pdf

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2017-130, 2017.