Natural Hazards and Earth System Sciences Discussions

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
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Comment on nhess-2020-408

Yunmeng Cao (Referee)

Referee comment on "Three-dimensional deformation field analysis of the 2016 Kumamoto Mw 7.1 earthquake" by Qingyun Zhang et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2020-408-RC1, 2021

The authors used regular InSAR and MAI results from ALOS-2, GPS, and the strong earthquake data to estimate the 3D coseismic deformation field of the 2016 Kumamoto earthquake, and compared with using InSAR results (InSAR + MAI) only, the authors found they can improve the 3D displacements field by fusing external GPS and strong earthquake data, which will be helpful for studying the source models of the earthquake. Technically, the presented methodology has been widely used in the previous researches, so the authors need to weaken their words about the description of â□□innovationâ□□. Several other comments: (1) About equation 7, the authors should clarify how they calculate the weights. Only by modeling the decorrelation noise based on the coherence? But decorrelation noise is not the major error source of InSAR in many cases. (2) About equation 11, did the authors want to fit the variance? To my understand, the obit errors can be modeled in space, but not for their variances. (3) About equation (12), how to estimate the variance of MAI observations? Please clarify it. (4) Line 350-355: â□□The study finds that the quality of the 3D deformation field obtained after adding GPS and strong earthquake data constraints is significantly improvedâ□□. It would be good to present solid evidence about the â□□significant improvementâ□□.

Please also note the supplement to this comment:
https://nhess.copernicus.org/preprints/nhess-2020-408/nhess-2020-408-RC1-supplement.pdf