

## ***Interactive comment on “GB-InSAR monitoring and observational method for landslide emergency management: the Montaguto earthflow (AV, Italy)” by F. Ferrigno et al.***

### **Anonymous Referee #3**

Received and published: 5 February 2016

#### Summary:

This study uses ground based radar interferometry (GB-InSAR) to monitor the deformation of the Montaguto earthflow over a 4-year period following a major reactivation event. First, the authors briefly describe the landslide reactivation event and provide a description of the GB-InSAR instrument and technique. Next they analyze the GB-InSAR data and discuss their results in the context of the “Observational Method”. The main point of the manuscript is to show that GB-InSAR is a viable technique for monitoring landslide activity in real-time and that GB-InSAR can be used help mitigate hazards.

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#### Recommendation:

This study will be of interest to remote sensing scientists and landslide scientists, as well as policy makers trying to mitigate the socio-economic impact caused by landslides. However, in its current form, the manuscript suffers from MAJOR deficiencies that must be addressed before publication. In addition, there are numerous grammatical errors that make it difficult to read. Therefore, I feel that this work is not ready for publication and requires MAJOR REVISION. To help this process I have attached a heavily annotated PDF with suggestions on how to improve the grammar and sentence structure in the manuscript. There are also minor comments and suggestions included in the annotated PDF. Please view these comments using Adobe Reader. I think with reworking of the text and a more clear interpretation of the landslide behavior, this study will be ready for publication.

#### General Comments:

1) In Section 2, the Authors incorrectly describe the mechanisms that control the landslide motion. The Authors state that “the main acceleration of the landslide occurs when the source slide becomes unstable: due to saturation, which causes increased driving forces caused by temporary increases in pore pressure and the weight of the slide mass”. The statement about the pore pressure increase is incorrect. Increased pore pressure does not increase the driving forces, it decreases the resisting forces (or frictional strength) by reducing the grain-to-grain contact of the landslide material. Also, how significant is the increased weight due to the saturation of the slide? Does this really play a major role in causing acceleration at this landslide? Its also important to include more references in this section since the Authors do not show most of the described data.

2) The Authors state “ A kinematic wave propagates through the soil mass to advance the toe into the stream”. What does this statement mean? Are the Authors referring to the propagation of pore pressure through the slide body?

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3) In Section 2, the Authors state that structural, lithologic, and hydrologic controls cause the earthflow to “move slowly and intermittently”, but do not explain how these factors conspire to govern landslide motion. Please elaborate.

4) The GB-InSAR data starts in May 2010, two months after the major ‘surge’ occurred. Are there other forms of data from March 2010? It would be instructive to show the entire ‘surge’ period from start to finish.

5) In Section 3, the Authors state that the GB-InSAR provides a 2D deformation field. However, I thought GB-InSAR provides only line-of-sight (i.e. 1D) deformation. Are you referring to line-of-sight and time? Please clarify.

6) There is no discussion of error in the data. How do you quantify the error in the GB-InSAR data?

7) Figure 10: The periods of acceleration and deceleration do not seem correct. Acceleration is the second derivative of the displacement time series. There are inflection points along the displacement time series that mark the change between positive and negative curvature.

Specific comments/technical corrections:

Please see the annotated PDF for NUMEROUS suggestions and comments.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/3/C3183/2016/nhessd-3-C3183-2016-supplement.pdf>

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 7247, 2015.