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Interactive comment on "Inversion kinematics at deep-seated gravity slope deformations: a paleoseismological perspective" *by* F. Pasquarè Mariotto and A. Tibaldi

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Dear Reviewer,

we appreciated your insightful comments. We inserted all your suggestions in the hereby-attached, new version of the paper. Hereunder we provide a detailed explanation of how we incorporated your comments in the revised version of our work:

1) In particular this approach could be useful in non-active DSGSD to date the movements and to reconstruct the kinematics and understand the strain accommodation. Indeed, for active DSGSD, I suggest to use in-situ instrumentation and interferometric

techniques that, using appropriate data acquisition methods, are able to detect also very slow and extremely slow movement.

We explained better this concept for in-situ instrumentation, although we believe that interferometric techniques have serious limitations in the case of extremely slow movements. We also think that sometime it is difficult to tell if a DSGSD is active; therefore, trenching methods might prove useful also to understand if there have been pre-historic recent movements that might indicate a potential for reactivation for those DSGSDs that move by sudden increments of motions interleaved by phases of inactivity.

2) The discussion regarding the reactivation of the listric planes in reverse kinematics are persuasive and it is notable that reverse kinematic has been detected in different parts of DSGSD; nevertheless the described data are not completely exhaustive to clarify the kinematics of the whole DSGSD.

We included some sentences describing the kinematics of other parts of the studied DSGSDs.

3) Furthermore the comparison between recorded deformation along trenches and the analogue models built (and scaled) to reproduce extensional fault systems could not be entirely suitable since the scaled parameters could not reproduce accurately the natural prototype. I suggest to better highlight this “limitation” during the comparison.

We agree on that and we highlighted the limitation as requested.

3) The approach used in this paper is interesting but I suggest to use the result obtained in more trench located in different part of the same DSGSD. In this way the kinematics reconstruction of the DSGSD results more accurate giving an idea about its evolution during time.

We added a statement as requested; nevertheless, we need to point out that trenching is quite complicated on mountain slopes, as well as time and money-consuming. We would be happy to dig more trenches located in different parts of a single DSGSD in

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the future, but until today we have been able to open “just” the trenches here illustrated.

4) Another aspect to be investigated would be to clarify how different lithology record deformation due to the DSGSD.

We inserted this in the new version of the paper.

We inserted also all the SPECIFIC COMMENTS as specified below: Page 4586, Line 11-13: this suggestion is rather obvious.

We clarified it.

Page 4587, Line 10: please explain the meaning of medium-to-high deformation rate.

Done.

- Page 4588, Line 16: the trench is located along the northern part of right boundary of the DSGSD. Considering its location is quite normal detect a transpressional kinematics with right-lateral component (as stated al line 26 in page 4588 and line 1 in page 4589).

We clarified better that the right-lateral component is obvious, whereas the reverse one is not common.

- Page 4597 to 4598: Please explain the limitation due to the comparison between Analogue models, developed and scaled to reproduce extensional fault systems, and the evolution of DSGSD.

Done.

- Fig. 4 and 6: please highlight the trench location.

In reality the trench location was already provided in the original figures.

Please also note the supplement to this comment:
http://www.nat-hazards-earth-syst-sci-discuss.net/3/C2264/2015/nhessd-3-C2264-

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2015-supplement.pdf

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 4585, 2015.