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Comment

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

**Anonymous Referee #1**

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GENERAL COMMENTS It is a quite interesting work, focused on a detection of the kinematics of the deformation in different deep-seated gravitational slope deformation using paleoseismological techniques in artificial trenches. The manuscript could be published on Natural hazards and Earth System Sciences but needs to be improved. In particular this approach could be useful in non-active DSGSD to dated 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. The discussion regarding the reactivation of the

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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. 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. 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. Another aspect to be investigated would be to clarify how different lithology record deformation due to the DSGSD. The figures are generally good.

SPECIFIC COMMENTS: - Page 4586, Line 11-13: this suggestion is rather obvious. - Page 4587, Line 10: please explain the meaning of medium-to-high deformation rate. - 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 at line 26 in page 4588 and line 1 in page 4589). - 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. - Fig. 4 and 6: please highlight the trench location.

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