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Interactive comment on "The role of mechanical stratigraphy on the refraction of strike-slip faults" *by* Mirko Carlini et al.

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We have much appreciated the review by the second reviewer, Dr. Andrea Billi, who thinks that the paper is clear, well written and scientifically sound. He suggested a few minor changes that we were happy to implement and that we comment on in the following;

The reviewer did not think that the figure with the thin section microphotographs was useful, as it lacked specific details and, perhaps, relevance to the paper.

authors: we have removed the photo. The text describing the mineralogy of the two main lithologies of the Marnoso Arenacea Formation is self-explanatory and we concur that there is no need to document further the lithotypes.

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The reviewer asked for the further documentation of the studied faults.

authors: we have done that by introducing Figure 4, as explained above.

The reviewer asked to further clarify the genetic relationships between the faults and the antiform.

authors: we have partially rephrased the text and added some to better explain exactly this point. Having both reviewers commented on this point made us realize that the original version was not clear enough. We are confident that the revised text is now better and explains clearly this crucial point, that is, that the strike-slip faults are cogenetic with the shortening that also caused folding.

The reviewer's last comment pointed to a lack of "relevance" of our study beyond the sheer mechanical aspects of our proposed model.

authors: to show that our results do bear potential implications on a number of structural and tectonic aspects, we have added the following text at the end of our discussion:

"Moreover, our study highlights the details of possible modes of strike-slip fault initiation and development in a sedimentary sequence characterized by layers of contrasting properties and the dynamic stress conditions prevailing during propagation of the faults, which also results in refracted strikes-slip faults. This might be useful to studies dealing with strike-slip faulting at all scales in sedimentary sequences, including the segmentation of strike-slip faults and the formation and development of step-overs as the faults grow by progressively accumulating slip. Fault segmentation (e.g Manighetti et al. 2009) has great implications on the mechanical behaviour of faults and our model provides important constraints on the seismic hazard assessment of such environments. The formation of dilational step-overs also has implications for fluid flow within faults and adjacent rock volumes and our model may provide indications on the location and characteristics of the potential dilational jogs and areas of enhanced per-

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meability leading to enhanced fluid flow and mineral precipitation."

Although obviously only a short list of possible applications, the text demonstrates that our study offers indeed interesting inputs and connections to a plethora of structural themes.

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