



***Interactive comment on “Effect of glacial-interglacial sea-level changes on the displacement and stress field in the forearc and along the plate interface of subduction zones” by T. Li and A. Hampel***

**Anonymous Referee #1**

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I have enjoyed reading this paper, which illustrates in a simple but very convincing way that glacial-interglacial sea level variations can be responsible for significant stress variations within the tectonic plates. The study, which is fully based on numerical models, is particularly well organized and constitutes a remarkable step forward with respect to previous investigations on this same topic. I have only a major point, which in my opinion should be addressed before the paper can be considered for publication. I am, in particular, rather disappointed to see that these computations have been made without considering the rheological stratification of the mantle beneath the lithosphere. Since

C620

the Maxwell relaxation time of the mantle is of the order of a few kilo–years (see e.g. Schubert\_etal\_2004, Mantle convection in the Earth and Planets), this could be perhaps appropriate during the phase of ice accretion (ca 100 kylo years long). However, during the relatively fast melting phase, neglecting rheology is a too crude approximation, as we know from the study of glacial isostatic adjustment. From the literature, there is evidence that in areas subject to cycles of glacial loading/unloading, seismicity is sensitive to rheology. Taking the rheological factor into account, may open scenarios that could differ significantly from those proposed in this paper. I do not have purely technical corrections to suggest. Indeed, this is an example of how a paper should be presented/structured and the authors should be commended for this.

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Interactive comment on Solid Earth Discuss., 3, 1001, 2011.

C621