

Interactive comment on “Tectonic evolution and high-pressure rock exhumation in the Qiangtang Terrane, Central Tibet” by Z. Zhao et al.

Anonymous Referee #1

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This paper, which deals with the tectonic evolution of a Paleozoic suture in Central Tibet, China, provides new structural, geological and lithostratigraphic data on this suture zone and associated lithologies and provides a geodynamic reconstruction for its evolution from Permian to Jurassic times. This study is important because it addresses the question of the former existence of an ancient oceanic realm followed by its closure and subsequent continental collision. This work also has some implications for regional paleogeographic reconstructions in late Paleozoic and early Mesozoic times. This paper is nicely written, well organized and the English quality is good. The overall model and geodynamic reconstruction seem reasonable and for a large part supported by lithostratigraphic and geological data provided by the authors. In particular, this paper proposes that the exhumation of HP rocks, now sandwiched in a nappe stack visible within this suture zone, may be related to an extensional event associated with a

C24

“break-off-like” / or “asthenospheric upwelling” event, based on regional sedimentary record arguments. However, when reading this interesting manuscript, I felt a bit frustrated because of the absence of petrological and micro-structural description of the rocks lining the boundaries between the different “slices” identified in the field. This information from samples collected along these shear zones would be capital to assess the depth of tectonic juxtaposition and the thermal regime associated. In which tectonic environment did this juxtaposition take place? If there has been an ocean there, one should expect remnants from an accretionary wedge there. Do you have any evidence for this? Can we interpret the “sedimentary mélange” reported here as part of an accretionary system? I have another concern: an asthenospheric upwelling like the one illustrated in figure 6d should not only lead to some magmatic production (as reported here) but also leave a very diagnostic –high-temperature- petrological and microstructural imprint in the rock fabric. And this is not mentioned here –neither in the literature- which makes me suspicious with this specific part of the final geodynamic model. Could slab roll-back could also be considered as a possibility to explain blueschist exhumation in a convergent setting (e.g. Egean domain)? As a conclusion, I would recommend before acceptance of this manuscript for publication to better document the P-T conditions of deformation along the shear zones within this slice stack and to provide further arguments supporting the “asthenospheric upwelling model”. I would also recommend asking another reviewer with a deeper knowledge of local geology to provide an additional opinion regarding this manuscript. For me, this paper can be accepted for publication once these moderate revisions are satisfactorily performed and once the model is supported by this additional information.

Interactive comment on Solid Earth Discuss., 7, 329, 2015.

C25