

Review of Kastle et al.

The idea behind this paper is to combine results from surface wave tomography on the one hand and from body wave tomography of the upper mantle beneath the Alps to choose among possible proposed scenarios of tectonic evolution of the region after continental collision, involving the fate of several subducted slabs.

The authors argue that by combining the two types of results, they take advantage of better resolution of surface waves in the shallow layers (<200 km depth), and additional constraints of body waves in the deeper upper mantle layers.

The main issue I have with the paper in its current form is the presentation: the authors start from the idea of combining the results of surface wave and body wave tomography, trusting the surface wave tomography better at shallow depth, but they don't really allow us to easily judge what happens when you do that: the surface wave and body wave models are presented at different scales (in particular in the depth direction) and there is no effort to adjust the color schemes between the two types of models. In particular, if I understand it correctly, the averages at a given depth taken out before plotting are not the same in the surface wave and body wave models: surface wave images as presented with respect to PREM, whereas the body wave models, by construction, are presented with respect to the regional average. It would therefore make sense to remove the regional average from the surface wave models for a comparison with the other ones. This would actually help visualize small perturbations that are currently hidden because the surface wave images are biased to blue colors in this region of convergence.

What would be very helpful is to show composite cross-sections with the surface wave model at the top, truncated at some depth (150 or 200 km?) followed by the respective body wave models (see figure 1 below where I have attempted to illustrate this concept for sections B). - You could also show, separately, comparisons of the surface wave and body wave models in the shallow parts to better visualize the compatible elements of the models. With a little more annotations of specific features in those cross-sections, it would be much easier and faster for the reader to follow the text and therefore judge the proposed interpretation, which I find very hard to do as presented. And it would be consistent with the main idea behind the paper, which is to combine the deep structure from body waves with the shallower structure from surface waves.

details:

page 7 line 24: "eastward increase", do you mean "decrease" ?

page 8 ,lines 19-21: this sentence needs pointing to specific features on one of the figures, otherwise it is hard to evaluate. More generally, better guiding the reader as to which features are discussed on which figures in the Discussion section would be helpful (for example putting more annotations on the cross-sections which would be referred to in the text.

page 8 line 30: "The inferred amount of shortening...". How do you infer that quantitatively (i.e. what rates of slab sinking ?

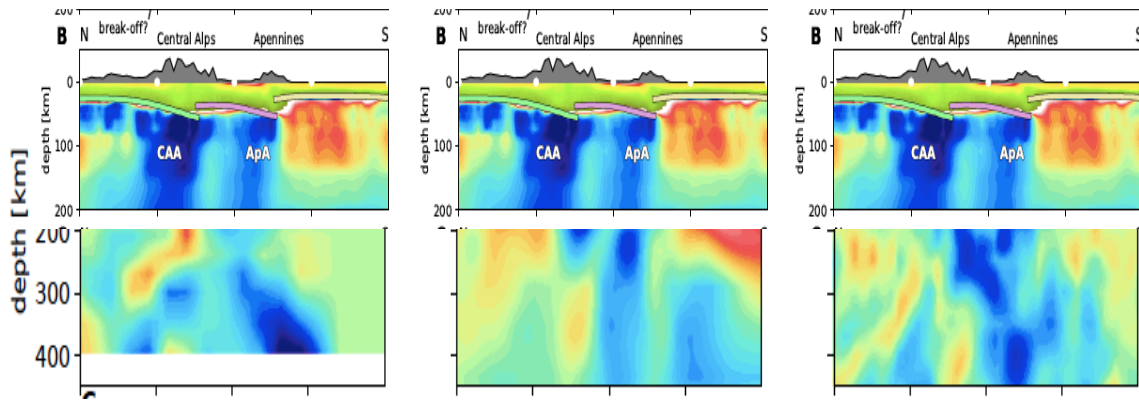


Figure 1.