

Interactive comment on “Subduction or delamination beneath Apennines? Evidences from regional tomography” by I. Koulakov et al.

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Received and published: 17 April 2015

The paper presents new tomographic imaging of The Apennine region. While the images are similar to what has been shown in previous publications cited by the authors, the interpretation is significantly different to what has been proposed in the past. Their interpretation accounts for the Alpine-Tethys subduction without attributing it to the fast anomaly beneath the Calabrian arc. Instead, they propose that this is delaminated mantle lithosphere from Adria, which is an intriguing idea. This interpretation seems to be adequately supported by their observations, and is well developed and explained in the paper.

In my opinion, the tectonic history that they propose is plausible and consistent with available data. My only concern is that the detachment of the delaminated lithosphere

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from ‘undeformed’ or ‘stable’ Adria to the Northeast does not receive enough attention. The authors do discuss the tearing of this detached mantle lithosphere on the Alpine side, but it must have been initially continuous along its whole length with the mantle lithosphere beneath undeformed Adria (i.e. the part that has not lost its mantle lithosphere or been accreted onto the wedge). There must have been a long detachment or tear running NW-SE that would allow the ‘sausage’ to separate and sink into the mantle, instead of dangling there like a curtain. I would like to see the authors’ thoughts on this process more clearly laid out in the manuscript.

Technical comments: It seems like the tomography was divided into three circles shown in Fig. 2. How were these inversions merged? And how did you deal with the overlaps? I will echo Lap Boschi’s comments about being a bit more explicit about “damping”.

Details: P860-L6: I don’t think “behaves” is the right word here. Perhaps “has the appearance of”. “Behaves” implies to me that it has a sausage-like rheology or something. P863-L10: Beneath the central Mediterranean. P863-L13: use of a large amount of data. P863-L18: Prior to using. P864-L7: One of the key inversion parameters. P864-L28: 2 by 2 and 4 by 4. P866-L2: Earth. P866-L9: For. P867-L2: Perhaps add references to the different models that you judge to be inconsistent. P867-L9: extends down. P867-L25: conveyor. P868: Not sure what you mean by dipping attitude. P868-L18: by approximately P868-L26: active mountain building. P868-L27: I don’t think you can attribute the formation of the Apennine crust to this process, perhaps the modification, deformation or accretion. P868-L28, 29: The high P velocity anomaly observed in our tomography model. L870-L10, 11. I don’t understand what you mean by the phrase: “Vertical sinking of the “Calabrian sausage” causes the breaking of the oceanic lithosphere in the African side”. How exactly would this happen?

Interactive comment on Solid Earth Discuss., 7, 859, 2015.