

Reviewer #1 (Laurent Jolivet)

This paper is a welcome complement to the current knowledge of the nature of the crust in the Mediterranean back-arc basins. A debate has been active for many years on the nature of the crust and the existence or not of true oceanic crust. Recent investigations in the Tyrrhenian Sea suggest that a large part of what was previously interpreted as oceanic crust would in fact be exhumed continental mantle. This new paper addresses this question on the example of the Ligurian Basin, the north-easternmost part of the Liguro-Provençal Basin. If oceanic crust was so far supposed to be present in the center of the basin, it was always described as atypical with large volcanic intrusions instead of a well-organized mid-ocean ridge. This new contribution shows clearly that along the entire profile, no oceanic crust is present and that exhumed mantle is found in the southern part. Whether there is or not true oceanic crust further south will remain debated but, at least for the Ligurian portion, the debate should now be closed. The paper is well written and easy to read. Although I am not a specialist of seismics I could understand the methodology and the discussion and the whole makes a convincing manuscript.

The only suggestion I have to address to the authors is to open the discussion to the more general point of back-arc rifting in the Mediterranean context. The findings described here have important consequences in terms of rifting dynamics. Why does true oceanic crust does not emplace in this sort of back-arc environment is an important question.

Indeed, a discussion on the back-arc rifting in the broader Mediterranean context would be interesting and worthwhile. We feel that we can provide only limited input on the raised question regarding the lack of oceanic crust in other back-arc environments in the Mediterranean solely based on the seismic profile P02 presented here. In fact, it is not known whether other back-arc environments show a similar structure as the Ligurian Basin. However, the presented new findings for the Ligurian Basin are of general interest in themselves and merit a presentation in a focussed way.

We added a more general introducing section to chapter 5.4 to show possible driving limits to the opening of the Ligurian back-arc basin:

“The opening of the Ligurian Basin in a back-arc position during late Oligocene and early Miocene that was driven by the south-east retreating Apennines-Calabria-Maghrebides subduction zone (e.g. Doglioni et al., 1997; Faccenna et al., 1997; Carminati et al. 1998; Rehault et al., 1984). The shift of active expansion from the Ligurian basin to the Tyrrhenian Sea is considered as a result of the Alpine collision that locked the Corsica-Sardinia drift towards the east and slab break-offs along the northern African margin and along the Apennines (Carminati et al., 1998). Thus, the opening of the Ligurian Basin was limited in time and space.”