

Interactive comment on “Seismic structure of the lithosphere beneath the ocean islands near the mid-oceanic ridges” by C. Haldar et al.

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General comments:

I think that the authors addressed a very interesting question and that the presented study might actually have a high potential. Unfortunately, the present version of the manuscript is by far not acceptable for publication. I think that in parts the presented data are over interpreted. Many of the references are not appropriate, the structure is not clear, and results and discussion should undergo a major revision. Furthermore, I recommend a better constrained modelling. Actually, I was close to ask for resubmission.

Specific comments/questions:

C682

Please clearly separate introduction, data, results and discussion.

How your results compare to published results, including wide-angle seismic studies? Provide adequate references.

Up to now it is not clear to me, what are effects of the MORs and of the plumes assumed beneath the ocean islands.

How your results compare to other seismological studies on ocean islands?

Please discuss also from a petrological point of view, if your models presented in figure 3 make any sense? How these models compare to other models globally?

How relevant are the results (especially for the mantle transition zone) away from the islands?

How did you estimate your uncertainties? Are they realistic?

Technical corrections/questions:

page 1642, lines 17-19, sentence not clear to me

line 20, better "oceanic lithosphere"?

line 24, please correct reference (name)

page 1643, lines 5-6, sentence not clear, what you want to say?

line 8, what kind of tomography, what is about the second reference?

line 9, what means a "few seismic ... studies", please provide appropriate references! correct names

line 28, "the deeper structure ..." - why?

page 1644, line 8, $M_b > 5.5$, did you really use events with that low magnitudes? why then only that few events are listed in Table 1

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line 15, 5° is quite low for deviations in incidence angle, it could strongly deviate because of shallow seismic structure of the ocean islands

page 1645, lines 1-2, what is about multiples???

line 10, "other studies" - what are the references? How your results compare to these studies?

lines 11-12, What is the basaltic layer? I think there are better references, which should be used!

lines 14-15, where is the "low velocity layer" for station PSCM?

lines 17-23, introduction?

lines 24 ff, what are uncertainties, where do they come from?

page 1646, lines 3-4, references?

lines 11-12, reference? What are the differences to the other islands?

line 19, "correspond to an oceanic LAB" - what else?

page 1647, lines 3-4, reference?

lines 7-10, argumentation is too short, even it might be true could you support your assumptions with modelling or references?

line 21, "Low Velocity Layer" - where?

line 22, there is not only "an additional negativ phase", but for most stations more of them. However, the questions is, if these phases are significant?

lines 24-25, are these studies appropriate for your region?

page 1648, lines 1-4, to me it is not clear how you discriminate between effects from plumes and MORs. Maybe a station far distant from any MOR might help to compare

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lines 5ff, discussion presently not clear to me, which plumes you mean?

line 16, why not "7 km"?

line 19, what is expected following Stein & Stein, 1992

line 23, 67 s is not delayed!

lines 25-26, how far away are the piercing points (show them on a map)

page 1649, lines 1-2, The sentence is not clear to me. Why plumes should be close to MOR?

Table 1, Please give references for ages. What are the coordinates and elevation of stations? (what is depth of surrounding seafloor?) Number of totally analysed events? Time period of observations analysed in this study.

Figure 1, please add local maps showing the distribution of piercing points.

Figure 2, Are all amplitudes the same? Why you did interprete some phases and did not others? What are significant amplitudes? Where are multiple phases? When you expect them from the models? Station PSCM is extremely noisy, looking at negativ delay times. Why you think your phase identification is valid?

Figures 2/3 - How the shallow structure is constrained? Please also show L traces to get an impression on quality of the receiver functions. Please provide models also in table form.

I am sorry that my review could not be more positive, but I hope that my comments will help to improve your manuscript.

Good luck & best regards Wolfram Geissler

Interactive comment on Solid Earth Discuss., 5, 1641, 2013.

C685