Solid Earth Discuss., 6, C1280–C1281, 2014
www.solid-earth-discuss.net/6/C1280/2014/

Solid Earth
Discussions
Open Access

Interactive comment on "Variations of the crustal thickness in Nepal Himalayas based on tomographic inversion of regional earthquake data" *by* I. Koulakov et al.

Anonymous Referee #1

Received and published: 11 November 2014

Review 'Variations of the crustal thickness in Nepal Himalayas based on tomographic inversion of regional earthquake data' by Koulakov et al.

This article provides a small-scale depth variation in the Moho beneath Nepa with travel time tomography and discusses spatial correlations among the estimated Moho depth, gravity anomaly, and magnetic anomaly. Although I am not familiar with detailed collision processes in this region, results and interpretations in this paper appear to be reasonable. I have some comments, particularly on the methodology.

P 2871, line 15: I do not understand what 'four different grids with different basic orientations' mean. Please explain it more. A figure showing grid nodes might be helpful.

P2871, lines 21–26: I suggest that the authors show a figure of the reference velocity model because the 1D velocity model plays a crucial role in the determination of the Moho depth.

P2872, line 17: Were random noises with average deviation of 0.5 sec added to both P and S waves? Did the author use different values for P and S waves, depending on picking accuracy? Please clarify this point.

There is no information on the reduction of arrival time residuals during the inversion. Please comment on it.

The authors delineated the Moho by tracing the lower limit of the low-velocity anomaly in many cross sections. Although I know that there is a large ambiguity as discussed in the manuscript, this strategy seems to be somewhat subjective. In lines A1–B1 and A2–B2 in Figure 3, a dashed line is alternative interpretation, but the authors consider that it is less plausible because the crust becomes to be too thick. If so, what is the origin of a low-velocity anomaly below the Moho? Are there any tectonic regions? Is it just due to low resolution of velocity images? I would recommend adding a brief argument, if possible.

In introduction, the author reviewed conventional studies that estimated the Moho depth. I understand that some results provided too smoothed Moho depth and some are too localized. However, it would be worthwhile comparing the present results with the Moho depth derived from receiver function analysis or active seismic survey, to know the differences and agreement among the models. Because receiver function analysis or active seismic survey would provide more reliable Moho depth because of their advantages in determining velocity discontinuities, the comparison with the pre-existing results could support the validity of the present inversion results.

Interactive comment on Solid Earth Discuss., 6, 2867, 2014.