



Fig S1. (Top) Record section for geophone data of OBS 40. A linear moveout at 5 km/s has been applied. Distances are measured from the north-northwestern end of the complete model (as in Roberts *et al.* 2009) and offsets are shot-receiver distances. (Middle) Record section with traveltime curves calculated by raytracing through the final velocity model and colour-coded by phases (see Figure 4 for legend). (Bottom) the corresponding ray path diagram with the same colour code as above. Only top basalt and deeper phases are shown for clarity. The seismic section was prestack depth migrated using the same final P-wave velocity model (colourmap) as is used in the raytracing. See text for modelling details. See Figure 8 in main paper for OBS location.