Subducted oceanic plate and compositional stratification in the lower mantle

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Recent seismological studies suggest that a seismic discontinuity concerned with locations of subducted slabs was observed at about 900-1100 km depth in the Earth's lower mantle. However, an origin of the discontinuity in the lower mantle is not clear and is disputed. Here we report an experimental study of the phase changes that occur in a oceanic crust composition (MORB) with increasing pressure from 25 to 37 GPa (equivalent to 700-1000 km depth in the mantle). The results demonstrate that a mineral transition and a major phase change was not observed at pressures corresponding to the seismic discontinuity at 900-1100 km depth, leading to the conclusion that the seismic discontinuity represents a change in mantle chemical composition.