

## Shear wave structure of the upper mantle beneath the Ontong Java Plateau

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Ontong Java Plateau (OJP) is the vastest Large Igneous Provinces (LIPs) in the oceanic region of the Earth. The OJP was emplaced at 122 and 90 Ma by massive volcanism, but the origin of this volcanism is still under discussion.

Richardson et al. (2000) obtained a large low-velocity root of the OJP extending as deep as 300km, though its existence and cause are still in debating.

One reason for poor understanding of the OJP is the insufficient information about the crust and mantle structure beneath the OJP because of the lack of long-term seafloor observation. Between 2014 and 2017, we conducted the first seismological and electromagnetic observations on the seafloor and islands in the OJP, named "OJP array", to clarify the origin of the OJP.

Using the broadband data from the OJP array as well as those from stations on land and seafloor in the western Pacific Ocean, we constructed three-dimensional shear wave speed structure beneath the OJP by surface wave tomography. using phase speed dispersions of Love and Rayleigh waves up to the 4th higher modes. Checkerboard resolution tests suggests that the spatial resolution of the obtained model is ~300km, which is higher than previous studies.

Obtained shear wave speed structure down to the depth of 300 km shows the following new features:

- (1) In the center of the OJP at depths between 70–150 km, about 2% fast anomalies exists;
- (2) No strong slow anomaly is found beneath the OJP at depths down to 300 km;
- (3) Beneath the Caroline Islands, in the north of the OJP, 2 % slow anomalies exist, which may be associated with the Caroline hotspot activity.

These newly found features suggest that further investigation to reveal the origin of the OJP is necessary.

Keywords: upper mantle structure, Ontong Java, surface wave tomography, BBOBS