

Geodynamic models of late Mesozoic intraoceanic subduction offshore NE Asia caused by growing Izanagi plate

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The existence of the Izanagi plate is well established both from magnetic lineations and fracture zones in the western Pacific and from tomographic imaging of the deep mantle underneath East Asia. But its spatial extent, position and motion through time remain poorly known.

A common scenario envisages the Izanagi as a large and long-lived plate extending from central Panthalassa to the eastern margin of Eurasia. In this scenario the Izanagi plate is conjugate to the Farallon and Phoenix plates before the inception of the Pacific plate and it subducts continuously beneath East Asia during the Mesozoic (e.g. Müller et al., 2016).

A conservative choice for the spatial and temporal extent of the Izanagi plate, limiting it to what can be extrapolated using the conjugate Pacific plate, leads to a very different scenario: in this case the Izanagi plate is born together with the Pacific plate around 190 Ma and grows triangular in shape. It overrides preexisting oceanic lithosphere causing extended intraoceanic subduction in western Panthalassa characterized by fast trench retreat towards the Eurasian margin. The tip of the Izanagi plate reaches the Eurasian continental margin near Japan and Sikhote-Alin around 100 Ma.

Here we assimilate these two scenarios in geodynamic models of global mantle convection in the form of time-dependent velocity boundary condition at the Earth's surface. Their implications for the evolution of mantle structure in East Asia during Mesozoic time up to present-day are presented and discussed.

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