[EE] Evening Poster | S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Tectonophysics

[S-IT23]New perspectives on the geodynamics of East Asia

convener:Timothy B Byrne (University of Connecticut), Asuka Yamaguchi(Atomosphere and Ocean Research Institute, The University of Tokyo), Jonny Wu(共同), Kyoko Okino(Atmosphere and Ocean Research Institute, The University of Tokyo)

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The Pacific, Indo-Australia and Eurasian plates converge around the Philippine Sea plates in south and East Asia, resulting in one of the most tectonically active regions on earth. The area is also geologically and tectonically complex with numerous active tectonic environments, ranging from subduction to collision, and a long history of plate boundary interactions. The last decade has yielded a wide range of new observations, including detailed geologic data and high resolution crustal to mantle imaging. Here we seek oral and poster presentations that bear on the geologic history and geophysical character of modern and ancient plates in East Asia and their interactions since the Mesozoic. We also invite geodynamic models that integrate these diverse datasets into a more holistic view of this dynamic environment.

[SIT23-P01]Imaged and predicted mantle structure of the subducted Izanagi-Pacific ridge under East Asia

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The intersection between a subduction zone and a spreading mid-oceanic ridge leads to a distinct gap or ‘slab window’ within a subducting slab. Seismic tomographic imaging of such gaps offers potential first-order constraints for convergent margin plate reconstructions, as contrasting plate tectonic models often show first-order differences in the reconstructed location and configuration of ridge-trench intersections.

Along East Asia it has been proposed that the Izanagi-Pacific ridge subducted either: (1) sub-parallel (at low angle) to the entire Eurasian margin from 55 to 60 Ma, (2) at a high angle across South China and Japan in Cretaceous times, or (3) offshore along an intra-oceanic subduction zone and never subducted under Eurasia. We mapped a 4000 km-long, laterally-continuous and NE-SW trending slow tomographic ‘slab gap’ at ~750 km to 1200 km depth within the well-imaged East Asian mantle under present northern Sakhalin to central China. We used mantle flow models (Flament et al., 2017) to show that this mapped slab gap is the tomographic signature of the subducted Izanagi-Pacific ridge. The geometry of the slab gap and the subduction time inferred from slab unfolding both support subduction of the Izanagi ridge at low-angle between 60 and 55 Ma. Conversion of S-wave peturbations to temperatures using standard equations indicates the slab gap is 100°C to 300°C hotter than the surrounding Izanagi and Pacific slab lithosphere, which is in the range of the mantle flow model temperature field predictions.

Our study shows that slab gaps from ancient ridge subduction events can be identified in seismic tomography models, and can persist within the mantle for at least 40 Ma. The mapping of this slab gap in tomography models could be used as a template to reconstruct other convergent margin.

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