[EE] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

# [S-CG56]Asian Earthquakes, Volcanoes and Tectonics

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The geological structures and tectonics are complex in the Asian region. Many orogenic belts and active faults exist within the Asian continent, and active subductions occur in its surrounding regions. In the east, the Pacific and Philippine Sea plates are subducting beneath East Asia, causing the development of trench-arc-backarc systems. In the southwest, the Indian plate is subducting beneath the Eurasian plate, forming major topographic features, such as the Himalayan mountain chain and the Tibetan Plateau. Due to the intense interactions among the four tectonic plates, large earthquakes take place frequently, such as the 2008 Wenchuan earthquake (M 8.0), the 2011 Tohoku-oki earthquake (M 9.0), the 2015 Nepal earthquake (M 7.9), and the 2016 Kumamoto earthquake (M 7.3). In addition to many arc volcanoes caused by plate subductions, some active intraplate volcanoes exist in Asia, but their origin and relationship with the intraplate tectonics are still not very clear. In this session, we welcome original or review presentations from fields of geology, geophysics, petrology and geochemistry addressing issues of geological structures, seismotectonics, volcanism and geodynamics of the Asia region.

# [SCG56-P01]Seismic anisotropy structure of the 2011 Mw 9.0 Tohoku-oki earthquake area

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The great 2011 Tohoku-oki earthquake (Mw 9.0) took place in the megathrust zone beneath the Tohoku forearc from the Japan Trench to the Pacific coast. To clarify the generating mechanism of this great event, it is necessary to investigate the detailed structure of the megathrust zone using various approaches. Seismic anisotropy tomography is a new but powerful method, because it can determine both 3-D isotropic velocity variations and seismic anisotropy, providing geodynamic information such as stress regime and/or mantle flow (e.g., *Zhao et al*. 2016). Recently, we developed a new method to determine anisotropic tomography using both P and S wave arrival-time data (*Liu &Zhao* 2016). In this work, we apply this new method to obtain a detailed 3-D model of azimuthal anisotropy tomography of the Tohoku subduction zone from the Japan Trench outer-rise to the back-arc area, using a large number of high-quality P and S wave arrival-time data of local earthquakes recorded by the dense seismic network on the Japan Islands. Depth-varying seismic azimuthal anisotropy is revealed in the Tohoku subduction channel. The shallow portion of the Tohoku megathrust zone (< 30 km depth) generally exhibits trench-normal fast-velocity directions (FVDs) except for the source area of the 2011 Tohoku-oki earthquake (Mw 9.0) where the FVD is nearly trench-parallel, whereas the deeper portion of the megathrust zone (at depths of ~30-50 km) mainly exhibits trench-parallel FVDs. Trench-normal FVDs are revealed in the mantle wedge beneath the volcanic front and the back-arc. The Pacific plate mainly exhibits trench-parallel FVDs, except for the top portion of the subducting Pacific slab where visible trench-normal FVDs are revealed. A qualitative tectonic model is proposed to interpret such anisotropic features, suggesting transposition of earlier fabrics in the oceanic lithosphere into subduction-induced new structures in the subduction channel (*Liu &Zhao* 2017).

## References

Liu, X., D. Zhao (2016) Seismic velocity azimuthal anisotropy of the Japan subduction zone: Constraints from P and S wave traveltimes. *J. Geophys. Res*. 121, 5086-5115.
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