

Abstract:

We propose a next generation large-scale array experiment in the ocean called Pacific Array. Recent advances in ocean bottom broadband seismometry (e.g., Suetsugu & Shiobara, 2014, Annual Review EPS), together with advances in the seismic analysis methodology, have now enabled us to resolve the regional 1-D structure of the entire lithosphere/asthenosphere system, including seismic anisotropy (both radial and azimuthal), with deployments of ~10-15 broadband ocean bottom seismometers (BBOBSs) (Takeo et al., 2013, JGR; Takeo, 2014, Ph.D. Thesis; Takeo et al., 2014, this meeting). Having ~15 BBOBSs as an array unit for 2-year deployment, and repeating such deployments in a leap-frog way for a decade or so would enable us to cover a large portion of the Pacific basin that would help us to elucidate regional 1-D structures of the lithosphere/asthenosphere system, as well as the history of the Pacific ocean via large scale waveform tomography; how plate tectonics operated in the past 150 My might become approachable. International collaboration may be sought.

References:

- Takeo, A. (2014), Seismic anisotropy of the oceanic lithosphere/asthenosphere system elucidated by the array analysis of surface waves, Ph.D. thesis, University of Tokyo.
- Takeo, A., K. Nishida, T. Isse, H. Kawakatsu, H. Shiobara, H. Sugioka, and T. Kanazawa (2013), Radially anisotropic structure beneath the Shikoku Basin from broadband surface wave analysis of ocean bottom seismometer records, *J. Geophys. Res.*, 118 (6), 2878-2892, doi: 10.1002/jgrb.50219.
- Suetsugu D. and H. Shiobara (2014), Broadband Ocean-Bottom Seismology, *Annu. Rev. Earth Planet. Sci.* 2014, 42:27-43



Broadband Ocean Bottom Seismology

- 1D S-wave anisotropic (RA/AA) structure of the entire lithosphere/asthenosphere system (including model uncertainty) can be estimated by deploying ~10 broadband OBSs
- elucidation of lithosphere/asthenosphere system
 - LID/LVZ
 - intensity of AA -> mantle viscosity?
 - fastest azimuth in LID -> flow @ spreading?
 - AA vs RA -> deformation mechanism?
- data/constraint for global tomography

