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

[S-CG59]Structure and evolution of Japanese islands - Formation of island arc systems and earthquake cycles

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Subduction processes such as accretion, back-arc-spreading, and arc-arc collisions have shaped the Japanese island arc. Recent advances in seismic imaging, both passive and controlled source, have produced new images of the crust-mantle structure under Japan and surrounding regions. Through the influence of pre-existing faults and rheological structures, these crust and mantle structures are exerting strong control on active tectonic processes like seismic activity and crustal deformation in the overriding plate. We seek contributions that document and/or model the deformation of the Japanese islands over a variety of time scales from the earthquake cycle to the tectonic evolution of the Japanese island arc, and from a range of research fields including seismology, geology, geochemistry, tectonic geomorphology, and geodynamics. Multidisciplinary studies are encouraged. We also welcome contributions in numerical or analogue geodynamical modeling that explore deformation processes.

[SCG59-P06]2017 Deep seismic reflection profiling across the western part of the Hidaka collision zone and Ishikari foreland basin, Hokkaido, Japan

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Integrated research project on the tsunami and earthquakes in the Sea of Japan aims to reveal the geometry of seisogenic and tsunamigenic source faults. For the sake of direct imaging of source faults, deep seismic reflection profiling has been performed across the western part of the Hidaka collision zone and Ishikari foreland basin. Beneath the Ishikari basin, active fault-related fold has been described, however, the deep geometry of faults is poorly understood. Geometry of source faults and velocity structure are significant for better esttmation of strong ground motions.

We collected deep seismic reflection data late June to middle July. A 68.5-km-long seismic line located across the western part of the Hidaka collision zone and extend along the Ishikari River. Seismic source was four vibroseis truck.Receiver system consist of off-line recorders (GSX and GSR, Geospace Inc.).Sampling rate was 4 msec. Receiver interval is 50 m and total fiexd 1358 channel is used. Shot interval was 50 m in the western half and 100m in the eastern part of the seismic line. Sweep frequency is 3 to 40 Hz. Number of sweep is 3 in the western part and 8 in the eastern part. To obtain deep image, Standard 50 sweeps was made every 4 km along the seismic line. A dynamite shot (100 kg of dynamite)

was performed in the eastern end and 850 sweeps were made at the western end of the seismic line. Air-gun signals along the offshore extension of the seismic line were also recorded. Obtained seismic data were processed by CMP-method and MDRS method. P-wave velocity profile was analyzed by refraction tomography analysis.

Processed seismic section portrays the structural image down to 4.5 sec TWT (10 km in depth), reflection image is obtained down to 6 km in the eastern part of seismic section. In the western part of the Hidaka collision zone, crustal structure is marked by large amount of crustal shortening, including west-vergence thrust system. In the P-wave velocity profile, the western part of the Hidaka collision zone is characterized by thick low velocity rock units and top of Vp 5.5 km/s is located in 8-km-depth. On the contrary, beneath the Ishikari basin, Vp 5.5 km/s is located at 6 km in depth. In the Ishikari basin, deeper extension of fault, which forms the Nopporo anticline, is imaged down to 8 km in depth as eastward dipping thrust. This fault is located west of the eastern boundary fault of Ishikari lowland, forming an independent east dipping source fault.