

Structural-morphological and sedimentary features of forearc slope off Miyagi, NE Japan: implications for development of forearc basins and plumbing systems

*Jih-Hsin Chang¹, Jin-Oh Park², Tzu-Ting Chen³, Asuka Yamaguchi², Tetsuro Tsuru⁴, Yuji Sano², Ho-Han Hsu³, Kotaro Shirai², Takanori Kagoshima², Kentaro Tanaka², Chiori Tamura²

1. Geological Survey of Japan, National Institute of Advanced Industrial and Science Technology., 2. Atmosphere and Ocean Research Institute, The University of Tokyo., 3. Institute of Oceanography, National Taiwan University., 4. Tokyo University of Marine Science and Technology.

Multibeam (MB) and subbottom profile (SBP) data along the forearc slope off Miyagi, Japan, are combined to investigate structural-morphological and sedimentary structures along the forearc slope of the Japan Trench subduction zone. In addition to dip-oriented slope gullies, the MB data image a nearly dip-perpendicular slope trough bounded by a fault scarp landward of the trench-slope break. Seaward of the trench-slope break, the subbottom mostly contains normal faults that dip in opposite directions. The SBP data show not only unconformity and sliding surfaces, but also underfilled (forearc trough) and filled structures that may reflect the most recent forearc subsidence and basin filling. We propose these forearc trough and associated filling structures may indicate the earliest developments of modern isolated basins. Thus, a model of forearc basin development from slope gully to slope trough, isolated basins and forearc basin, transferred by active structures, could be proposed. Observed seafloor liquefaction in the SBP data may represent a near-surface seep structure of a plumbing system that enables hydrosphere-mantle fluid migration plausibly activated by earthquake cycles.

Keywords: forearc slope, isolated basin, forearc trough, liquefaction