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High-resolution gas-chimney structures over a marine gas hydrate field off Joetsu, eastern margin of Japan Sea.

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Active marine gas hydrate systems and related phenomena on and near seafloor are identified off Joetsu, southern part of the eastern margin of Japan Sea (Matsumoto et al., 2005, 2009). In this area, large pockmarks and mounds, 200 to 500 m in diameter and 20m to 40 deep or high, have been observed on a two ridges, Umitaka Spur and Joetsu Knoll, at water depth of 900-1000m, associated with fault systems. High resolution 2-D single channel seismic surveys were conducted for the last six years to obtain high resolution and high density seismic records on this area. Based on these seismic data, 'Gas chimney structures' that indicate fluid migration from deeper zone up to seafloor are recognized below pockmarks, mounds, and seafloor methane seepage and shallow natural gas hydrate locations, in both Umitaka Spur and Joetsu Knoll. BSRs are recognized at 0.2-0.25 sec TWT below seafloor in both Umitaka Spur and Joetsu Knoll. Umitaka Spur and Joetsu Knoll are characterized by asymmetric structure related to the thrust faults at the western margin of the Spur and the southeast margin of the Knoll. The Joetsu Knoll is considered to be younger than the Umitaka Spur as revealed by transect seismic survey lines through the two ridges. Ultra-high resolution sub-bottom profiling data, multi-beam bathymetric data, and Side Scan Sonar (SSS) image obtained with AUV 'URASHIMA' seem to indicate that 'Gas chimney structures' continued up to the mounds.

Keywords: methane hydrate, gas-chimney, BSR, pockmark, mound, Japan Sea