# Transition zone seismic survey using 4C OBC system

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Ocean Bottom Cable (OBC) system is highly effective for the seismic acquisition in areas where hydrophone streamer is hard to be towed, such as oil and/or gas field where production or drilling plants are in operation, or inshore area of heavy traffic and high fisher activity. OBC system is also suitable for deep seismic profiling across transition zone, because stationary array of receiver stations can collect signals from all the land seismic energy sources at the same receiver points and low noise environment at sea floor make it possible to detect very low level signals from source point faraway from the coast line. Unfortunately, data acquired with OBC system are contaminated by receiver ghost effects. Dual sensor technique, that records both water pressure and vertical component of ground velocity by collocating hydrophone sensors and geophone sensors, can overcome this problem (e.g. Abe et al., 2003). In the last few years, dual-sensor-OBC systems using MEMS (Micro Electronics Mechanical System) accelerometers have become available. In these systems, traditional geimble-mounted velocity geophones are replaced with multi-component MEMS accelerometers. By using these systems, we can obtain sea floor 4C data in dense array at economically acceptable costs. In addition to dual-sensor processing, we can apply various multi-component processing, for example, P-S converted wave processing or polarization filtering.

In September 2008, we conducted a 2D test seismic survey using a 4C OBC system with MEMS accelerometers in the inshore area off Nishi-Kanbara, Niigata pref., East coast of Japan. We synchronized the data acquisition with the deep seismic profiling project by ERI, Univ. Tokyo to reveal the geometry of active-seismogenic fault systems across the Niigata basin (Sato et al., 2009, this JPGU Meeting). In addition to online air-gun shots, by simultaneous recording of our test survey and above mentioned seismic profiling, vibroseis shots and explosive shots were recorded at our OBC test line. Consequently, large amount of reflection data from near vertical to wide angle ( over 60km offset distance at maximum) were collected.

In this presentation, we will demonstrate the effectiveness of seismic reflection survey with 4C OBC system, including deghost processing using dual sensor technique and P-S converted wave processing. We also try to examine the advantage of MEMS sensor in deep seismic profiling in terms of broadband linear response down to very low frequency range.