

## Marine Multicomponent Seismic Survey

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Multicomponent seismic technology has been improved significantly with higher fidelity acquisition systems and more advanced data analysis methods. Especially in marine seismic, 4-Component Ocean Bottom Cable (OBC) is practically applied for reservoir characterization and exploration at the water depth of more than 1000km.

Converted wave processing and interpretation is a fairly new topic and there is a lack of data and expertise around the world. Until now, the most common converted wave data has been essentially 1-D, VSP and OBS (Ocean Bottom Seismometer) records. Recently there is an increasing use of multi-component OBC 2-D and 3-D surveys. They are especially applied to evaluate reservoirs, because it has been revealed that P-S converted waves can give valuable additional lithological information. They also give clear reflections where the P-wave reflections are poor due to a very small acoustic impedance contrast. It is worthwhile that we introduce the actual processing of the 4-C line to discuss on P-S converted wave processing and later to develop new tools and techniques in this rapidly evolving field. Since multicomponent seismic survey has not been carried out yet in Japan, we use a 4-Component OBC (4C OBC) 2-D line, acquired by PGS Norway in 1998.

The data was purchased by JNOC/TRC in 2002, as a part of the methane hydrate research program, to evaluate the use of P-S converted wave data in determining the properties of the hydrate layer and the BSR. The 4C line was acquired along the track of a previous conventional streamer line which showed a BSR. The location is in the Norwegian Sea, just up-dip of a major sedimentary slide, known as the 'Storegga Slide'.

The results of the first investigation of the 4C data were published by Andreassen et al(2001). They presented a very significant difference between the P-wave and the PS converted wave sections in the hydrate layer and around the BSR. In fact, the BSR was not visible on the PS-wave section. The result shows that a lot of additional information is contained in the converted waves. We reprocessed the 4C data and discussed the specific problems.

We just started the multicomponent data acquisition/processing project with NSC, OCC and KCS supported by JOGMEC/TRC. The first multicomponent reflection seismic data will be acquired in March, 2006. The preliminary results will be shown in the presentation.