

## **3-D Analogue Experiment and Its Synthetic Seismic Profiles of an Accretionary Prism**

Yamada, Yasuhiro, Kazuya Shiraishi, and Toshifumi Matsuoka, Kyoto University, Kyoto, Japan

Scaled physical experiments using analogue materials (analogue models) are an excellent technique to model development processes of geologic structures and examine their complex geometry, thus they have been widely used as templates to interpret seismic profiles in petroleum exploration industry. Since the structural geometry on a particular profile of such an experiment is sometimes complex, we have to understand its seismic expression. This can be achieved with a seismic modeling technique.

In this study, we combine the analogue and seismic modeling techniques to acquire the seismic responses of a complex geological structure at a subduction margin. First of all, a sand-box-type experiment is conducted to produce subsurface deformation geometry, then the model is sequentially sliced to record the deformation geometry on each profile. Its 3-D geophysical model including reflection boundaries and velocity structure is then constructed from the serial model sections. The seismic modeling technique is applied to this geophysical model to obtain the pseudo-3-D stacked data finally. This becomes the key data-set to produce 2-D migration profiles and their depth images.

The model results show typical structural features of an accretionary prism. These features are of exclusively simplified accretionary prism and do not include any variety due to heterogeneity of local geology. Thus their difference from seismic profiles of natural geological structures can be interpreted as the characteristic feature of the real structure. For instance, the Nankai prism shows that the decollement horizon has an extraordinary physical property and the deformation behaviour of the sedimentary sequences is less brittle.