

Characteristics of Gas Hydrate and Free Gas Offshore Southwestern Taiwan: Preliminary Results from a Combined Seismic Reflection/Refraction Analysis.

P. SCHNURLE¹, T.-H. HSIUAN¹, T.-K. WANG², K. MACINTOSH³,
C.-S. LIU⁴, D. REED⁵, AND Y. NAKAMURA³

ABSTRACT

In 1995, an US-R.O.C. collaborative deep seismic imaging experiment was conducted offshore the Taiwan Island. Thus across the northern part of the Manila Trench, 6 OBS stations were deployed and an east-west combined seismic reflection-refraction profile, 180 km in length, was acquired. In this study, we present the preliminary results of the seismic reflection and the 4 component wide-angle data analysis at the 3 ocean-ward OBS stations, with respect to the presence of gas hydrates and free gas within the accretionary wedge sediments. Estimates of the compressional velocities along Ew9509-33 seismic reflection profile are provided by a series of pre-stack depth migrations in a layer stripping streamlined Deregowski loop. A strong BSR is imaged over most of the reflection profile while low velocity zones are imaged bellow the BSR at several locations. Ray tracing of the acoustic arrivals with a model derived from the migration velocities generally fits the 3 OBS vertical and hydrophone records. In order to estimate the Poisson Ratios in the shallow sediments at the vicinity of the OBSs, we analyze the mode-converted arrivals in the wide-angle horizontal component. P-S reflections and P-S transmission at the sea floor, then S reflected, are observed, while P-S transmissions across the BSR are not clearly identified. Given the complexity of the structures bellow OBS 44 and 45, our velocity models poorly account for the significant asymmetry present in the wide-angle seismic data. Furthermore, discrepancies between P-S and S-S reflection travel-

¹ Exploration & Development Research Institute, Chinese Petroleum Corporation.

² Institute of Applied Geophysics, National Taiwan Ocean University, Keelung 20224, Taiwan.

³ Institute for Geophysics, University of Texas, Austin TX 78759-8500, U.S.A.

⁴ Institute of Oceanography, National Taiwan University, Taipei, Taiwan, R.O.C.

⁵ Department of Geology, San Jose State University, San Jose, CA 95192, U.S.A.