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# Constraints on Free Gas and Gas Hydrate Bearing Sediments from Multi-Channel Seismic Data, Offshore Southwestern Taiwan

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## ABSTRACT

In this study, we analyze several seismic profiles Offshore southern Taiwan and present the results along 2 perpendicular multi-channel seismic profiles located in the northwestern portion of the Manila accretionary wedge where the highest concentration of BSR is observed. In this area, rapid deposited terrigenous sediments derived mainly from the Chinese continental margin, then accreted, may have relatively high amounts of organic carbon, thereby providing a source for the methane. MCS579-03 runs downslope across the acretionary wedge and shows a prominant BSR. The seismic signature of the sediments above and bellow the BSR varies considerably depending on the water depth and structural context. Seismic whitening is generally observed between the sea-floor and the BSR, while at numerous locations, high amplitude and low frequent reflectors underneath the BSR strongly suggest the presence of free gas within the pore space. MCS367-23 runs in the axis of the upper-slope of the accretionary wedge. In order to providing an assessment of the amount and distribution of free gas and gas hydrates in southwestern Taiwan, we conduct a detailed velocity analysis of the pre-stack time migrated records. Compressional velocity are relatively constant in the strata above the BSR with a mean value of 1880 m/s. Dramatic decrease in the instantaneous interval velocity is mapped within several zones located at and bellow the BSR, that confirms the presence of free gas in the pore space. These results are compared to theoretical elastic properties for the 3-phase matrix of gas hydrates and free gas saturated sediments. Finally, reflection strength and frequency attenuation, gathered in an attribute analysis further constrain our estimates.

## INTRODUCTION

Bottom-parallel or Bottom-simulating seismic Reflector (BSR) have widely been observed in various continental margin environments. The BSR is commonly interpreted as marking the base of the stability field for gas hydrate (e.g. Miller et al., 1991; Hyndman and Davis, 1992; Bangs et al., 1993; Dillon et al., 1996). Gas