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3-D wide-angle seismic tomography offshore southwestern Taiwan area

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Interest in natural gas hydrates has grown in recent years with the recognition of the gas-hydrate bearing sediments offshore of the southwestern Taiwan. Several oceanographic cruises were conducted and the collected reflection and refraction seismic data are extensively used to map and interpret the gas hydrate zones between the Hengchun Ridge deformation front, accretionnary wedge of the eastern subducting Maniala subduction zone, and the passive China continental Margin. Among them, a wide angle seismic experiment consisted of 24 recovered Ocean Bottom Seismometers (OBSs) were acquired along 4 in-line transects offshore southwestern Taiwan in November 2004 and several off-lines and cross-lines data were recorded simultaneously. In this study, we perform a 3-D acoustic inversion velocity analysis of the first arrivals records of the OBS by using all the in-lines, off-lines and cross-lines information. By using the inverted 3-D dimentional Vp models, we estimate the density and the thickness of the marine sediments and crust. The pressure calculated by these parameters and the geothermal data obtained by the previous studies are then used for the examination of the temperature and pressure conditions for the presence of the gas-hydrate in the offshore area of southwestern Taiwan. Besides, the amount of the difference between the velocity models is calculated for the gas hydrate quantification.