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Correction of sound velocity depending on the temperature for unconsolidated marine sediment

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Laboratory sound velocity measurements with systematic temperature change on unconsolidated marine sediment have been performed to establish the precise correction curves between temperature and the sound velocity. Piston and box core samples recovered from the East Sea and the South Sea of Korea were used for the measurement. The core samples were cooled (at temperature of nearly 0[U+2103]) and the temperature was gradually increased (from 0[U+2103] to 30[U+2103]) to measure sound velocity depending on the changes in temperature. The sediment texture and physical properties (porosity, water content, and bulk density) were measured separately at the same depth. The rate of velocity increase for muddy, silty, and sandy sediment are about 2.63 m/s/[U+2103], 2.74 m/s/[U+2103], and 2.96 m/s/[U+2103], respectively. This is similar to the velocity change rate, 2.97 m/s/[U+2103] presented by Del Grosso (1952). The samples used in this research, however, have relatively higher porosity than those of Del Grosso (1952). Thus, the possibility of discrepancy is differences in water content which affect the sound velocity and measurement system. We used recently developed digital velocity measurement system using PXI based on LabVIEW. We suggest to employ this correction for the accurate in situ geoacoustic property from laboratory data particularly for the deep cold water sample such as the East Sea sediment that has very low bottom water temperature about 0[U+2103].

Keywords : in situ geoacoustic property, temperature correction, East Sea

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