

## **Geoacoustic provinces and physical properties of surface sediments in the southern part of the East Sea, Korea**

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A total of 288 piston and box core samples were collected and analyzed to characterize the physical properties and geoacoustic provinces of surficial sediments in the southern part of the East Sea. Based on in-situ condition sound velocity (converted laboratory sound velocity to in-situ condition sound velocity) and sediment properties (sediment textures and physical properties), the study area was divided into eight provinces (Province IA, IB, IC, II, III, IV, VA, and VB) : (1) Province IA : hemi-pelagic mud partially mixed with intermittent sandy sediments originating from the outer shelf due to slide/slump or mass flows (in-situ condition sound velocity: 1439 m/s, mean grain size: 8.5 $\Phi$ , bulk density: 1.24 g/cm<sup>3</sup>, and porosity: 84%); (2) Province IB : Holocene muddy sediments are dominant, but in some area that is influenced by the surrounding land and coast (in-situ condition sound velocity: 1448 m/s, mean grain size: 8.3 $\Phi$ , bulk density: 1.32 g/cm<sup>3</sup>, and porosity: 79%); (3) Province IC : muddy sediments that were deposited during the Holocene (in-situ condition sound velocity: 1457 m/s, mean grain size: 7.8 $\Phi$ , bulk density: 1.36 g/cm<sup>3</sup>, and porosity: 78%); (4) Province II : mixed recent and relict sediments (in-situ condition sound velocity: 1493 m/s, mean grain size: 5.9 $\Phi$ , bulk density: 1.53 g/cm<sup>3</sup>, and porosity: 68%); (5) Province III (Pohang) : there is a mixture of muddy sediments and sandy sediments and sediments from Hyeongsan River are mostly deposited (in-situ condition sound velocity: 1586 m/s, mean grain size: 4.1 $\Phi$ , bulk density: 1.74 g/cm<sup>3</sup>, and porosity: 57%); (6) Province IV : coarse-grained relict sediments formed during the Pleistocene (in-situ condition sound velocity: 1572 m/s, mean grain size: 4.1 $\Phi$ , bulk density: 1.76 g/cm<sup>3</sup>, and porosity: 55%); (7) Province VA : relict sand with some gravel, show marked differences from the area in which muddy sediments are deposited (in-situ condition sound velocity: 1662 m/s, mean grain size: 3.3 $\Phi$ , bulk density: 1.82 g/cm<sup>3</sup>, and porosity: 51%), and (8) Province VB : similar to but coarser sediments than Province IV (in-situ condition sound velocity: 1667 m/s, mean grain size: 3.2 $\Phi$ , bulk density: 1.87 g/cm<sup>3</sup>, and porosity: 46%). The in-situ condition sound velocity, mean grain size, and bulk density increased from Province IA to Province VB, whereas the porosity and water content decrease. Variability of the physical and acoustic properties tended to follow the general of the mean grain size. The classification of each province using the in-situ condition sound velocity corrected with the temperature and sediment type provides a better reflection of the sediment properties and sedimentary environment.