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**Frequency and grain size dependence of longitudinal wave velocity  
in granular marine sediments**

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Frequency dependence of longitudinal wave velocity in granular marine sediments is important in underwater acoustics. Also, the grain size dependence is significant for the identification of sediments. In this study, the measurements of the velocity of three kinds of sands with different grain sizes are carried out in the frequency ranges from approximately 5 kHz to 500 kHz in the laboratory. The velocity at a low frequency is measured by using an acoustic tube method. Time-of-flight method is used for the measurements of the velocity at higher frequencies. These measured results are compared with the calculated results by using the Biot-Stoll model and a modified gap stiffness model incorporated into the Biot model (BIMGS model). It is shown that the frequency and grain size dependence of velocity can be explained by using the BIMGS model.