

Error evaluation for seafloor geodetic observation due to transducer dimension

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Institute of Industrial Science, University of Tokyo, and Hydrographic and Oceanographic Department, Japan Coast Guard, have been developing seafloor geodetic observation system and conducting observations using the system. Fourteen seafloor geodetic reference stations with the system have been distributed on the forearc areas of Japan island arc. Subsea crustal deformation due to subducting two oceanic plates of the Pacific and the Philippine sea can be monitored by using the seafloor reference stations. The robust system, that we are aiming at, for centimeter level seafloor geodesy cannot be achieved without solving small issues on the system. One of such issues to be solved is shape of the transducer.

Coded sinusoidal acoustic wave with 15cm wave length is used as the ranging signal. This wave length is comparable to the dimension of the cylindrical transducers employed both on the ship-board system and on the seafloor transponder. Transducer can not be regarded as a point considering the wave length of the ranging signal. This implies possible ranging error is caused depending on the incident angle of the acoustic signal to the transducer. We have been conducting water tank experiment to understand the relation between the incident angle and the ranging error. Analyses are now going on and we will show the result.