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MEASUREMENTS OF THE THICKNESS OF MODEL SEA ICE BY UHF WAVES (ABSTRACT)

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It is indispensable to know the dielectric constant of model sea ice in order to detect the ice thickness by radar. The authors measured the dielectric constsnt of model sea ice by the space reflection method using UHF waves. A UHF signal is swept from 200 MHz to 1000 MHz and is transmitted from an antenna toward the model sea ice set on a metal sheet. The transmitting antenna is a conical log spiral antenna for a right circular polarized wave. The receiving antenna is an inverse type antenna so the reflected signal is inverted to a left circular polarized wave when the signal is reflected from the ice surface. The amplitude and phase of the received signal are measured by a vector network analyzer and are referred to the reflection data of the metal sheet which is set at 1 m distance from the antennae. The dielectric constant of model ice is calculated from the relation between the ice thikness and the signal phase change in the ice. The results are summarized as follows.

Though the calculated dielectric constant of model sea ice is the mean value of the total ice sheet, the measurement procedure is simple and the resolution of the data is enough for practical use.

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