ICE AS A FERROELECTRIC AND PIEZOELECTRIC ROCK

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The dielectric permittivity, conductivity and loss tangent of ice were measured for different thicknesses of the sample (h=0.1-4 mm). The measurements were carried out from 3.5 to -13.5 C with descending and growing temperature. Two domain Debye resonances were observed. The one at low frequency is interpreted as being associated with transversal mode, and the other, at higher frequency, is associated with longitudinal mode. The resonance frequencies depend on sample size and temperature. The temperature hysteresis of the resonance frequencies was observed. As the temperature grows starting from low temperature, the resonance frequencies move towards each other and finaly the two modes join to form one longitudinal mode. The dielectric constant associated with transversal mode is about 10000. The dielectric constant associated with longitudinal mode is about 100. The dipole dielectric constant vanishes. As temperature grows, the dipole dielectric constant grows too. The experimental data show that ice is a ferroelectric and piezoelectric rock.