



## **Explaining the dielectric properties of firn as a density- and conductivity mixed permittivity (DECOMP) for geophysical applications**

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The relative dielectric permittivity (RP) of mixtures can be calculated to good approximation by composing its constituents' cubic roots of RP by volume fraction (VF). This is even true for RP's complex continuation, which also treats the conductivity of the material. Firn is a mixture of ice and air, and geophysical measurements in firn and ice crucially depend on the physical properties of this mixture. The DECOMP formula links the RP of the ice and its VF, with the RP of the firn. The inversion of the formula is, for most practical applications, possible; the density of firn as well as the ice's RP can then be determined with high spatial resolution from dielectric profiling measurements (DEP) alone. If the ice phase's density and the real component of RP are a constant material property the inversion is feasible. This presentation gives an example for numerical inversion of complex-valued dielectric mixing formulae for some known material properties, which is applicable to other composites as well.