Supplementary materials

Thirteen Winters (2012–2025) of Penetration-Aware Arctic Sea-Ice Emissivity and Emission Temperature from AMSR2

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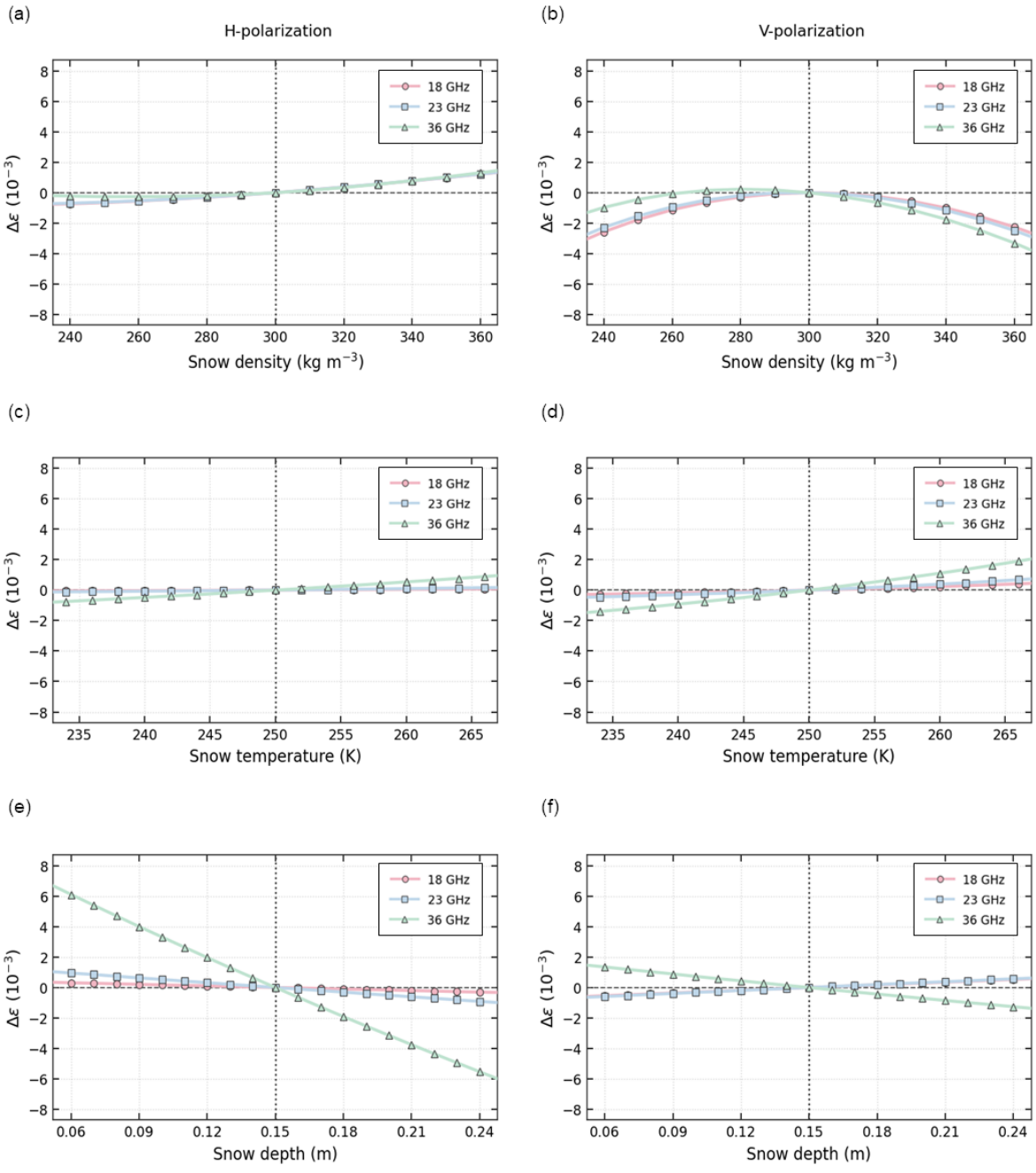

Figure S1. Sensitivity of forward-modelled penetration-aware sea-ice emissivity to idealized snowpack perturbations, shown on emissivity changes (Δε) relative to a reference snowpack with depth = 0.15 m, density = 300 kg m^{-3}, and temperature = 250 K. (a) Snow density, (b) temperature, and (c) depth were perturbed independently while the other two variables were held fixed. Left and right columns denote horizontal (H) and vertical (V) polarizations, respectively, and colors indicate the 18, 23, and 36 GHz channels.

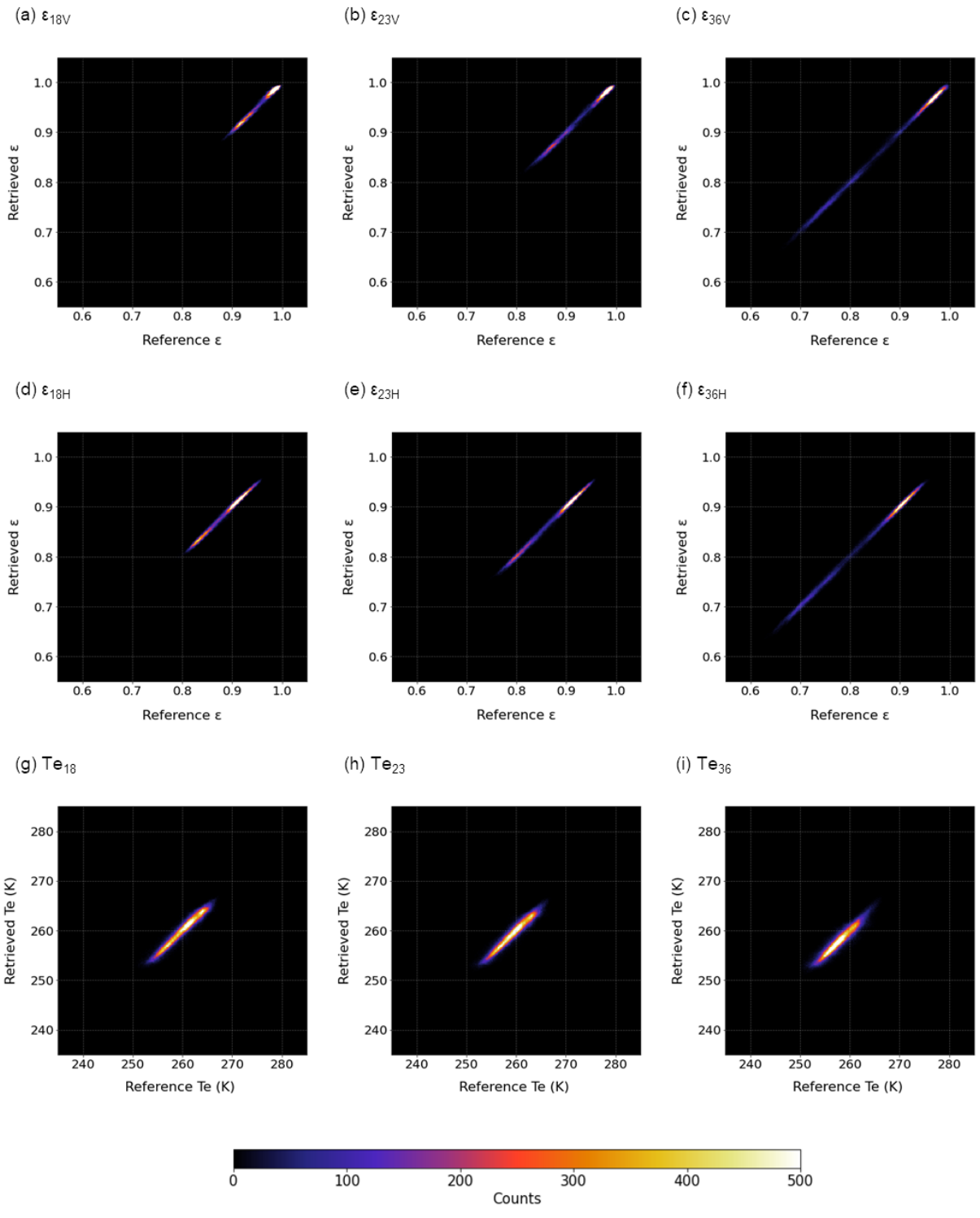

Figure S2. Scatterplots of retrieved versus reference channel-wise (a–f) emissivity (ε) and (g–i) emission temperature (T_e) for independent test subset.

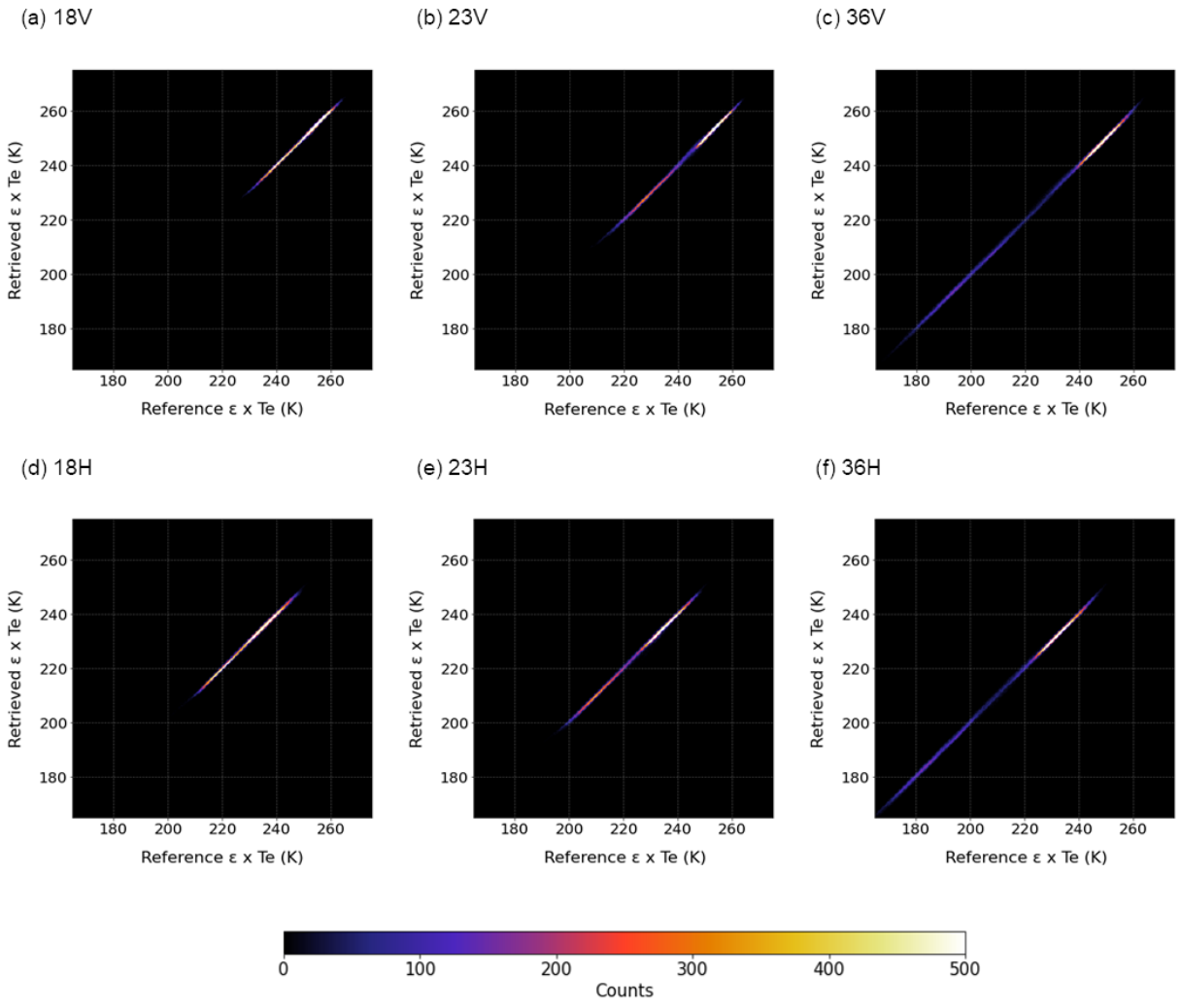

Figure S3. Scatterplots of retrieved versus reference channel-wise surface emission ($\varepsilon \cdot T_e$) for independent test subset.