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Soil dielectric characterization during freeze–thaw transitions using L-band coaxial and soil moisture probes

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Table S1: Temperature offsets of the thawing and freezing transitions for the real permittivity. The soil temperature offsets were evaluated at maximum transition rate. The average temperature offset is given along with the range of values. $\Delta T_{offset} = T_{offset}(HP) - T_{offset}(OECP)$.

Soil type	Thawing			Freezing		
	OECP °C	HP °C	ΔT_{offset} °C	OECP °C	HP °C	ΔT_{offset} °C
Organic	3.43 [3.4 – 3.5]	3.82 [3.1 – 4.4]	+0.39	-2.5 -[2.6 – 2.4]	-2.66 -[3.6 – 2.0]	-0.16
Sandy Loam	2.05 [2 – 2.1]	2.65 [2.5 – 2.8]	+0.60	-2.75 -[2.8 – 2.7]	-2.83 -[2.9 – 2.8]	-0.08
Loamy Sand	2.00 [1.9 – 2.2]	2.10 [2.1 – 2.1]	+0.10	-1.80 -[2.1 – 1.5]	-2.20 -[2.3 – 2.1]	-0.30
Clay Loam	2.90 [2.8 – 3.0]	3.10 [3.0 – 3.2]	+0.20	-1.50 -[1.5 – 1.5]	-1.77 -[1.8 – 1.7]	-0.27

Table S2: Same as Table S1 but for imaginary permittivity

Soil type	Thawing			Freezing		
	OECP °C	HP °C	ΔT_{offset} °C	OECP °C	HP °C	ΔT_{offset} °C
Organic	3.43 [3.4 – 3.5]	4.26 [3.7 – 4.8]	+0.83	-2.50 -[2.6 – 2.4]	-2.70 -[3.6 – 2.0]	-0.20
Sandy Loam	2.00 [2.0 – 2.0]	2.75 [2.7 – 2.8]	+0.75	-2.75 -[2.8 – 2.7]	-2.75 -[2.8 – 2.7]	0
Loamy Sand	2.00 [1.9 – 2.2]	2.10 [2.1 – 2.1]	+0.10	-1.80 -[2.1 – 1.5]	-2.80 -[2.6 – 2.3]	-1.00
Clay Loam	2.90 [2.8 – 3.0]	3.17 [3.1 – 3.2]	+0.27	-1.50 -[1.5 – 1.5]	-1.43 -[1.5 – 1.3]	+0.07