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SUPPLEMENTARY INFORMATION
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Deep and methane-rich lakes on Titan

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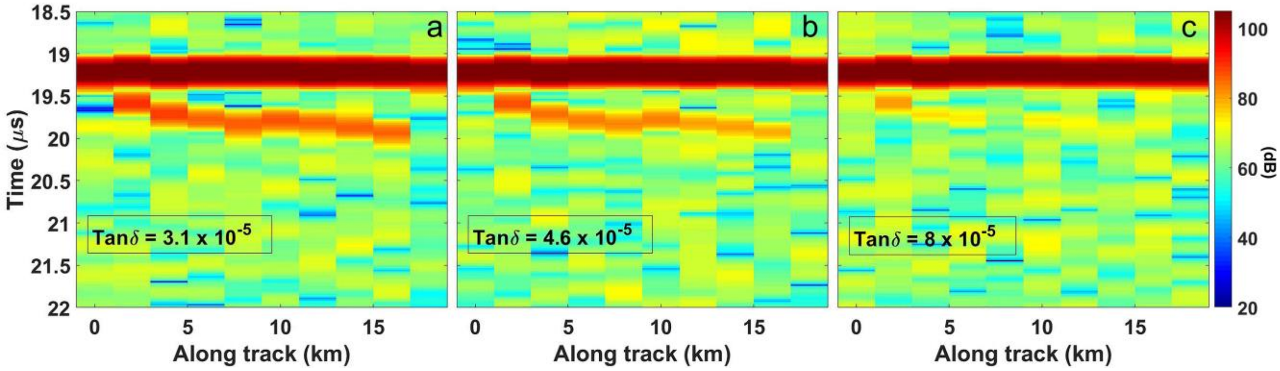
Supplementary Figure 1: Simulated radargrams obtained using three different values of loss tangent equal to 3.3 x 10^{-5}, 4.6 x 10^{-5}, and 8 x 10^{-5} and depths estimated from T126 flyby over Winnipeg Lacus. A dielectric constant of 1.7 for the liquid and 2 for the solid lake-floor has been adopted. Note that for values of loss tangent corresponding to an ethane content in the mixture that approaches to 50% subsurface return starts to be suppressed by liquid attenuation. The dielectric property of the subsurface is arbitrary and could not match the actual values. However our intent here is to show the variation of backscattering as a function of increasing depth. This variation is related to the ethane content of the liquid rather than the subsurface dielectric properties.

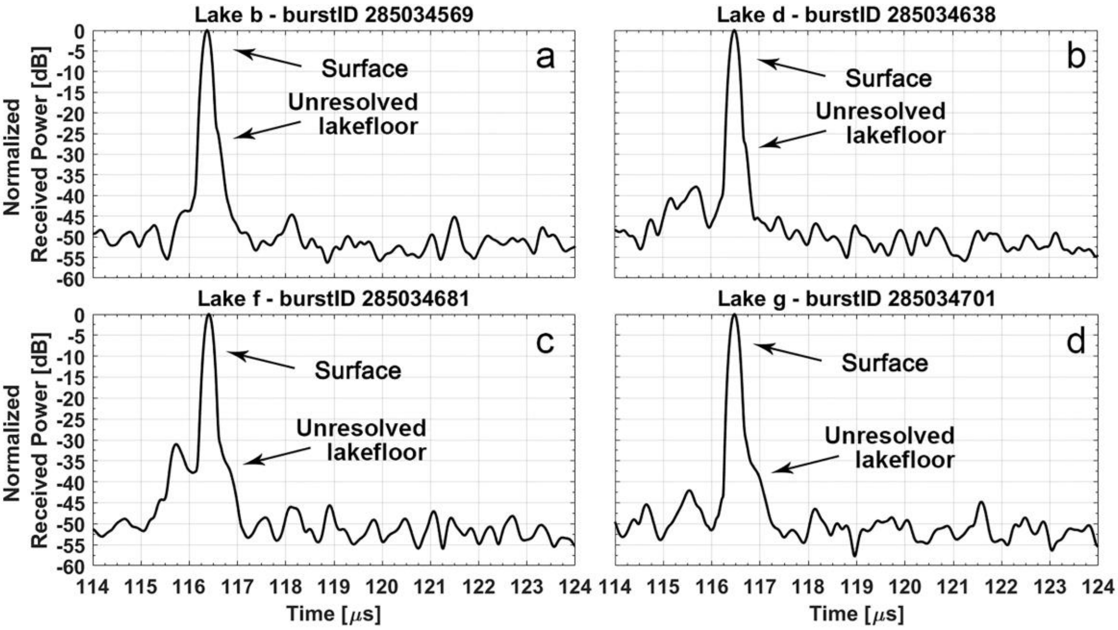
Supplementary Figure 2: Waveforms acquired over shallow lakes. Panel (a), (b),(c) and (d) show a waveform acquired over lakes 'b', 'd', 'f' and 'g' respectively. Note that waveforms show unresolved peak from shallow subsurface making radar measurements challenging. In some cases (e.g. panel c) antenna footprint intercepted both liquid and solid surface close to the shoreline of the lake (see waveform in panel (c) that show an echo anticipated in time respect to the surface return).

Supplementary Table 1: Values in decibels of backscattering measured over lakes observed on flyby T126. Errors are referred to 1-sigma standard deviation.

Supplementary Figure 1



Supplementary Figure 2



Supplementary Table1.

TABLE 1

BACKSCATTERING MEASUREMENTS OVER LAKES

Lake	Mean [dB]	σ [dB]
a	33.2	0.6
b	33.2	0.3
c	33.5	0.5
d	33.4	0.6
e	33.5	0.5
f	33.3	0.2
g	33.6	0.3