

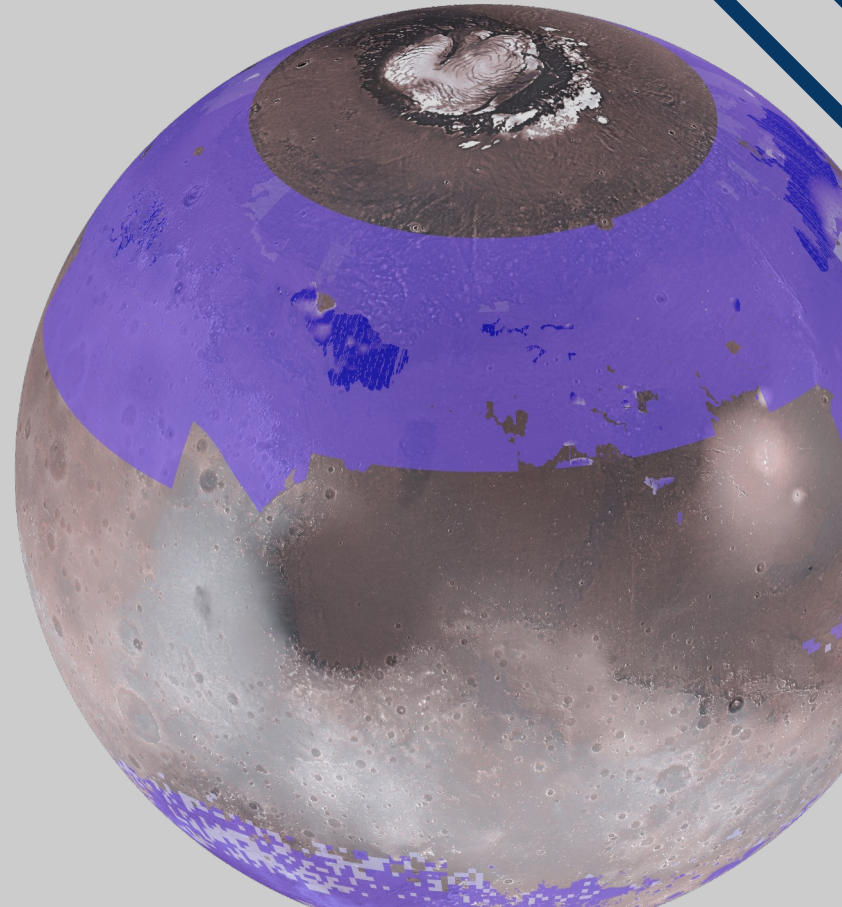
Site Characterization for the RedWater ISRU System

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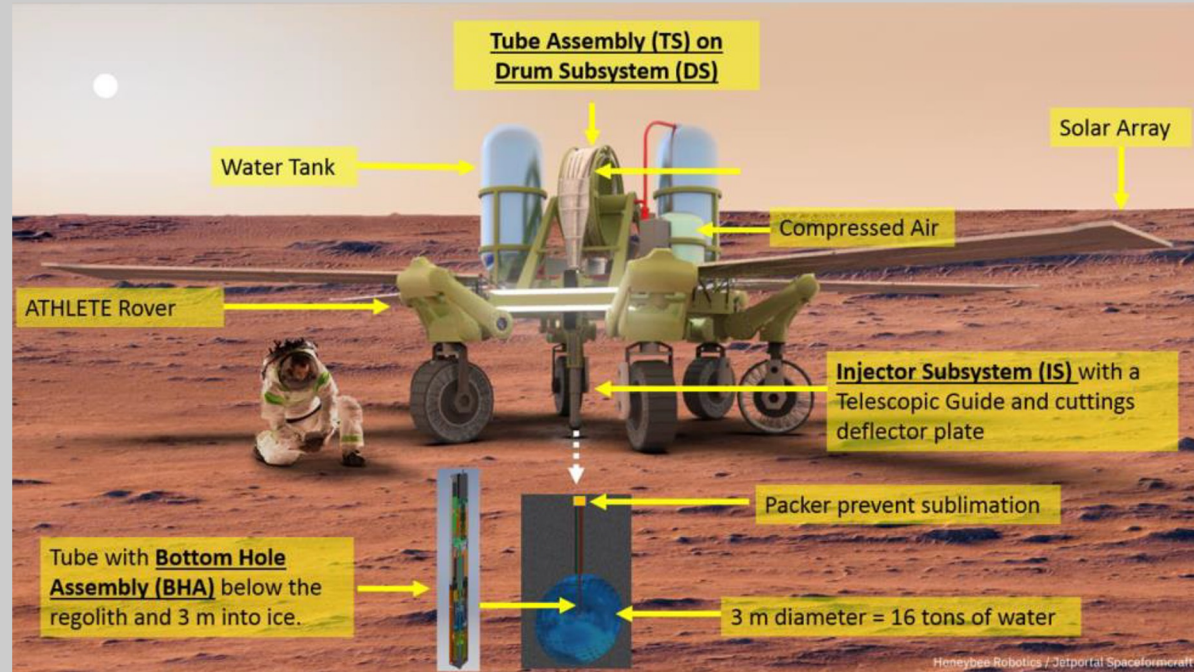


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The RedWater ISRU System

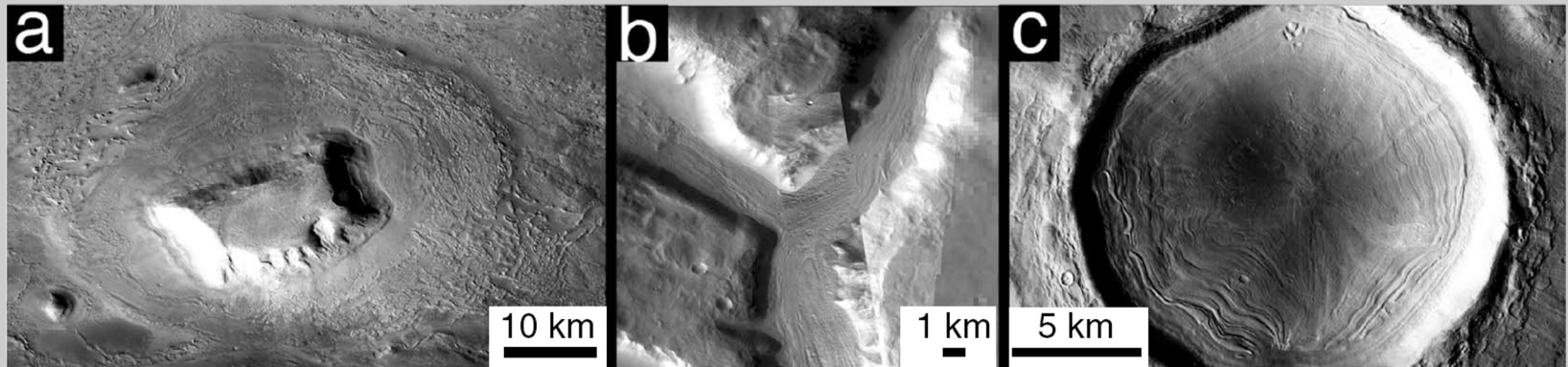
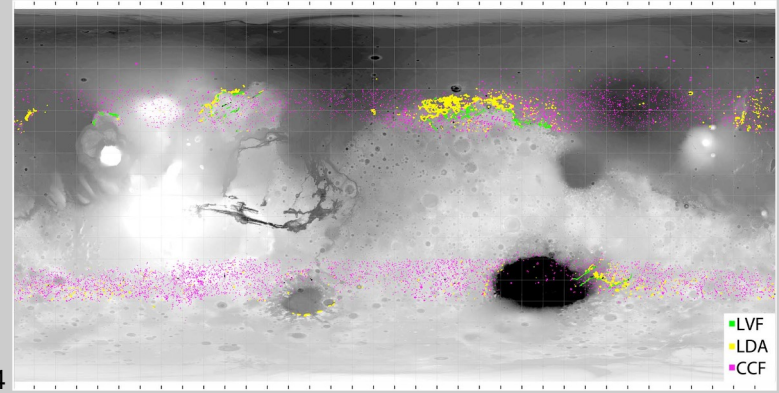
- Need at least 2m Overburden to stabilize ground operations
- Need at least ~30m of massive subsurface ice for extraction operations.
- Latitude & Elevation were constrained to HLS2



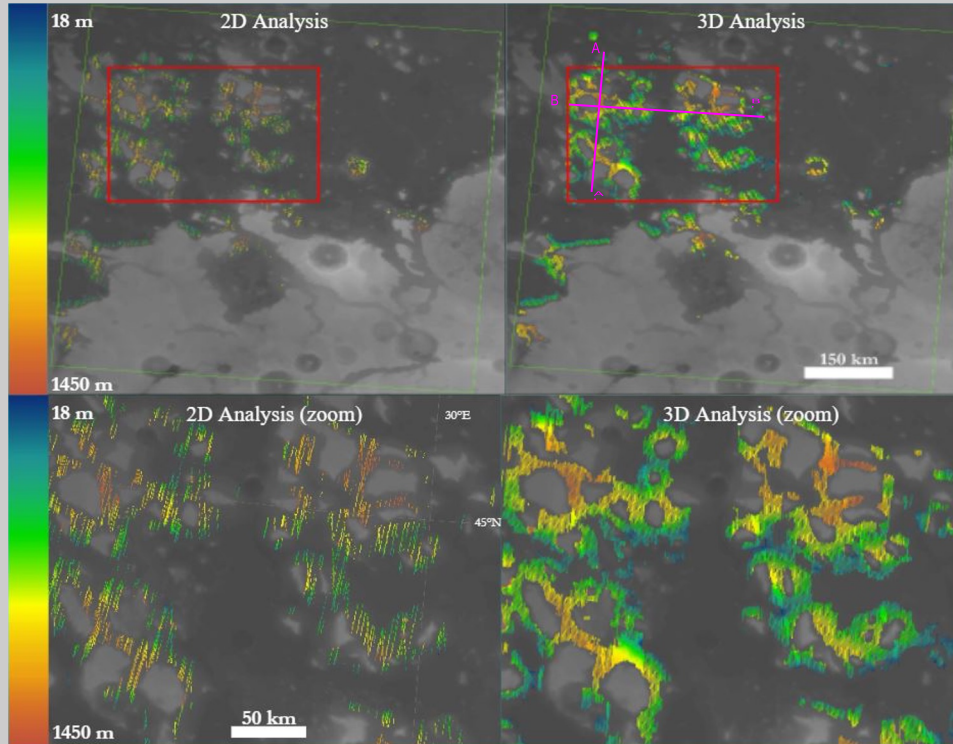
Massive Subsurface Ice on Mars

- Previously identified and termed by morphology.
 - Lobate Debris Aprons (LDA)
 - Lineated Valley Fill (LVF)
 - Concentric Crater Fill (CCF)

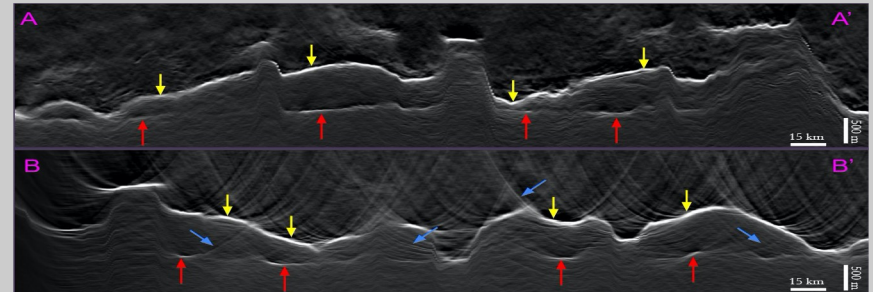
From: Levy et al., 2014



State-of-the-Art Radargrams



- Deuteronilus Mensae 3D radargram (DM3D) represents the highest fidelity product of deep subsurface ice.
- Ice detectability increases greatly when compared with standard 2D radar analysis.



Modified From:
Russell et al., 2021

Introduction

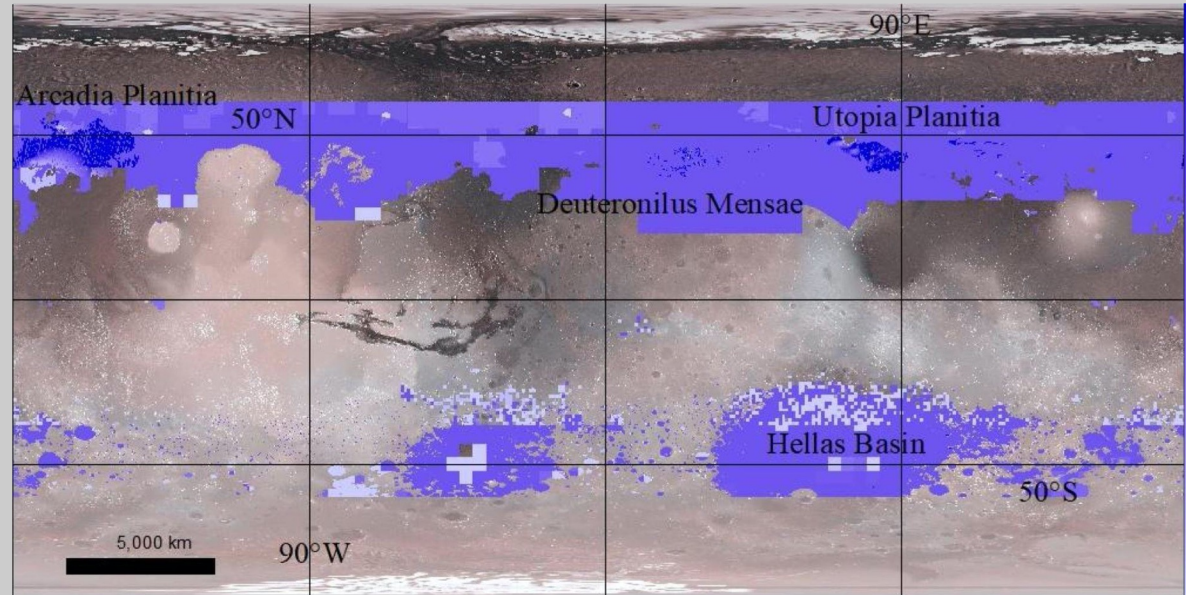
Methods

Discussion

Conclusion

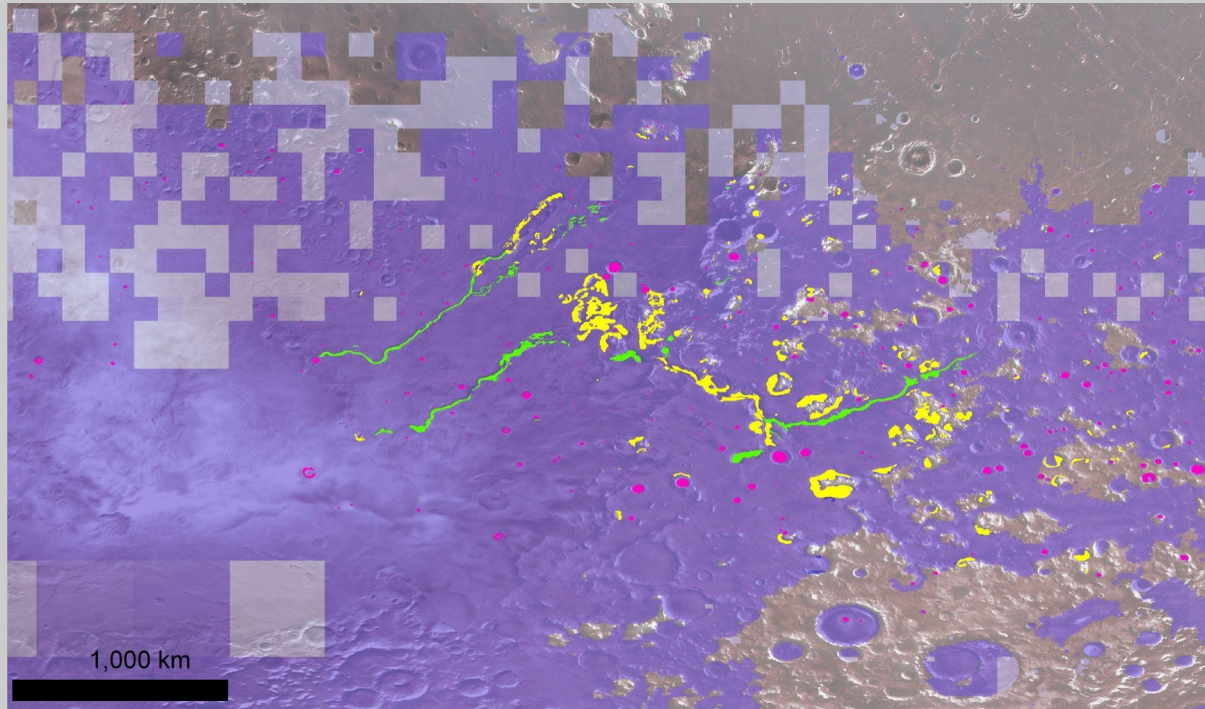
SWIM 2.0 Deep Ice

- Mars Subsurface Water Ice Mapping (SWIM) ice consistency maps
- Integrated ice signatures from various datasets at various depths
 - 0 - 1m depth
 - 1 -5m depth
 - > 5m depth
- Used ice consistency > 0
 - Based on geomorphology & radar dielectric at > 5m



Colorbar shows ice consistency values greater than 0 at depths greater than 5m, with darker blues representing higher values up to 1.0

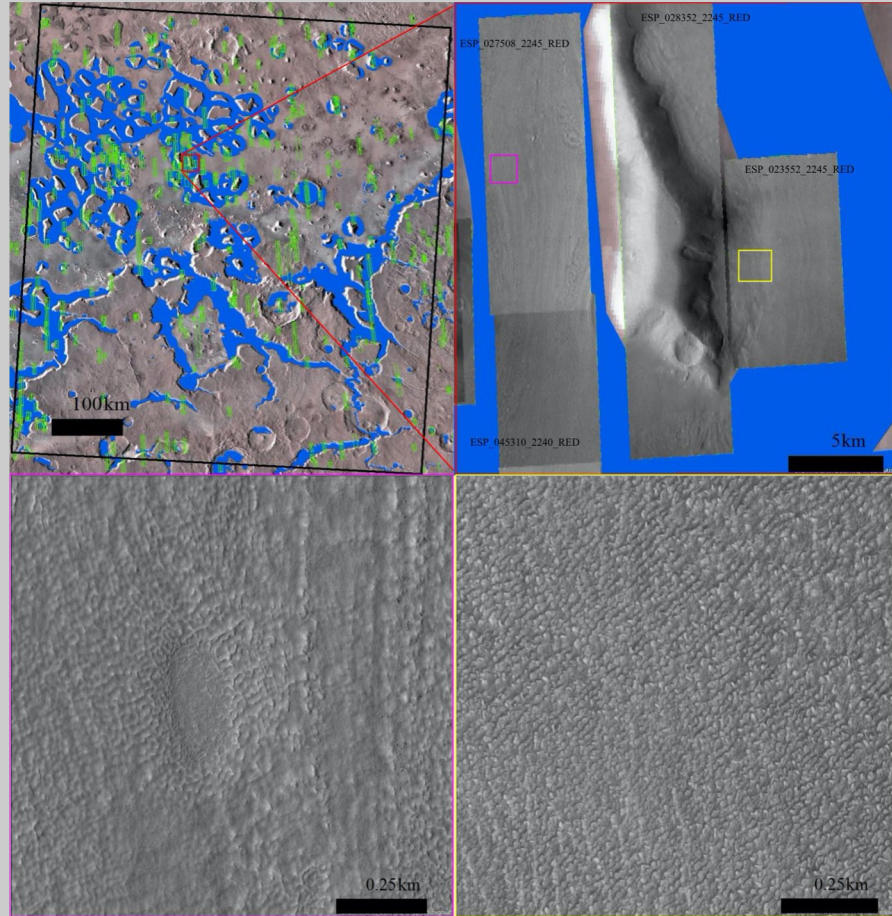
Eastern Hellas



- Signatures of subsurface ice. However, not the most extensive
- Previous and current radar studies indicate 100's m of high ice purity ($> 80\%$) and consistency.
- Possible Target for RedWater

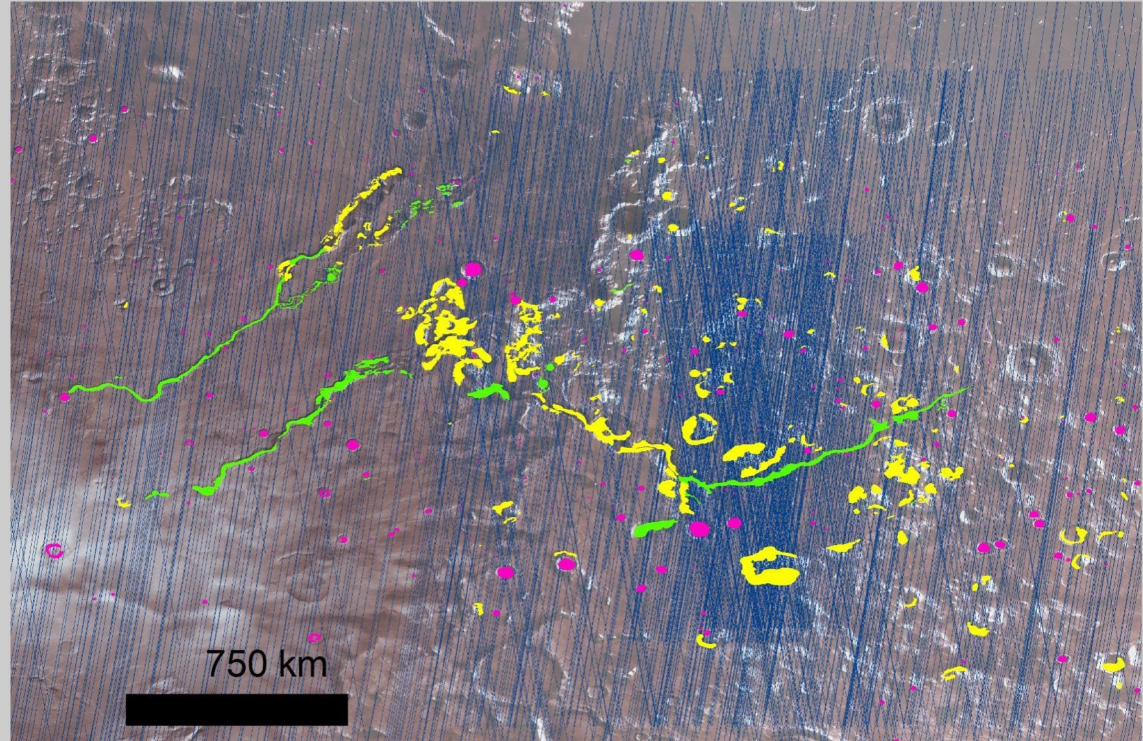
Deuteronilus Mensae

- Most extensive midlatitude subsurface ice
- High purity ($> 80\%$) and 100s of m thick with areas of up to $\sim 1,450\text{m}$
- Extensively targeted by HiRISE at the periphery, and likely rougher than interior



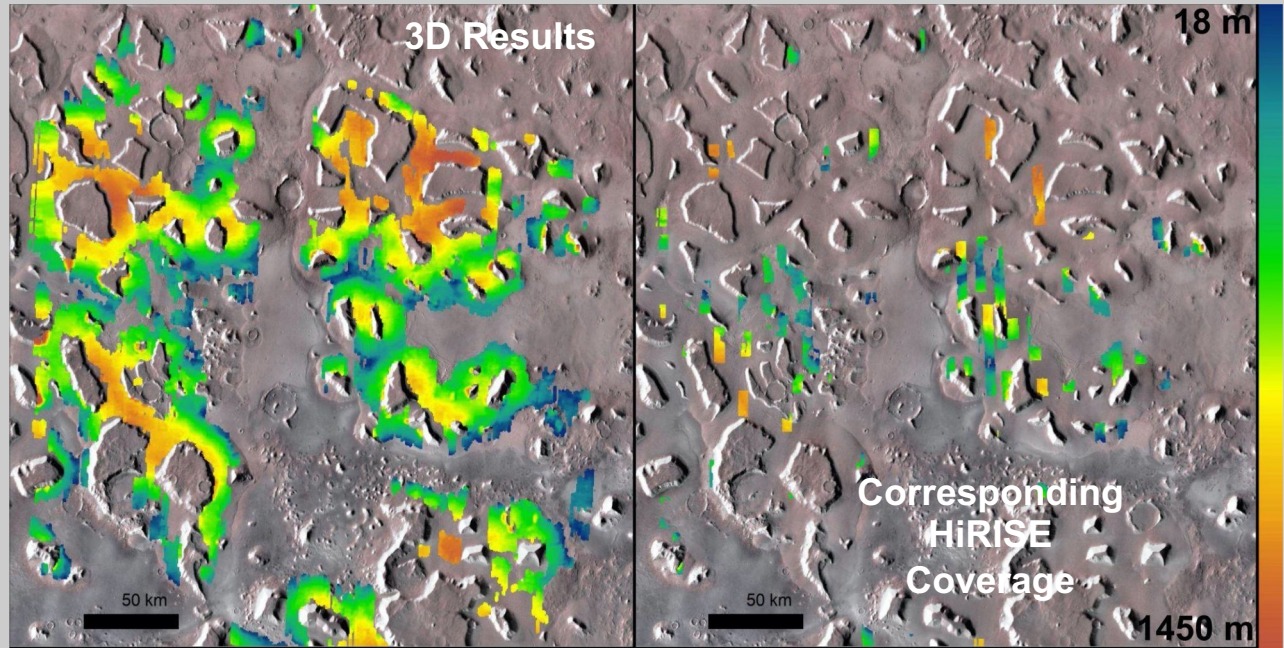
3D Radargram Production

- Eastern Hellas has been extensively targeted by SHARAD
- Prime target for 3D radar processing. This would increase the confidence in the volume and structure of ice present



Targeting Campaign

- Targeting LDA areas midway between the central massifs and the periphery for HiRISE and Stereo pairs (use in DTM)
- Continued targeting of glacial landforms by SHARAD (use in 3D processing)





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Do you have questions?

