

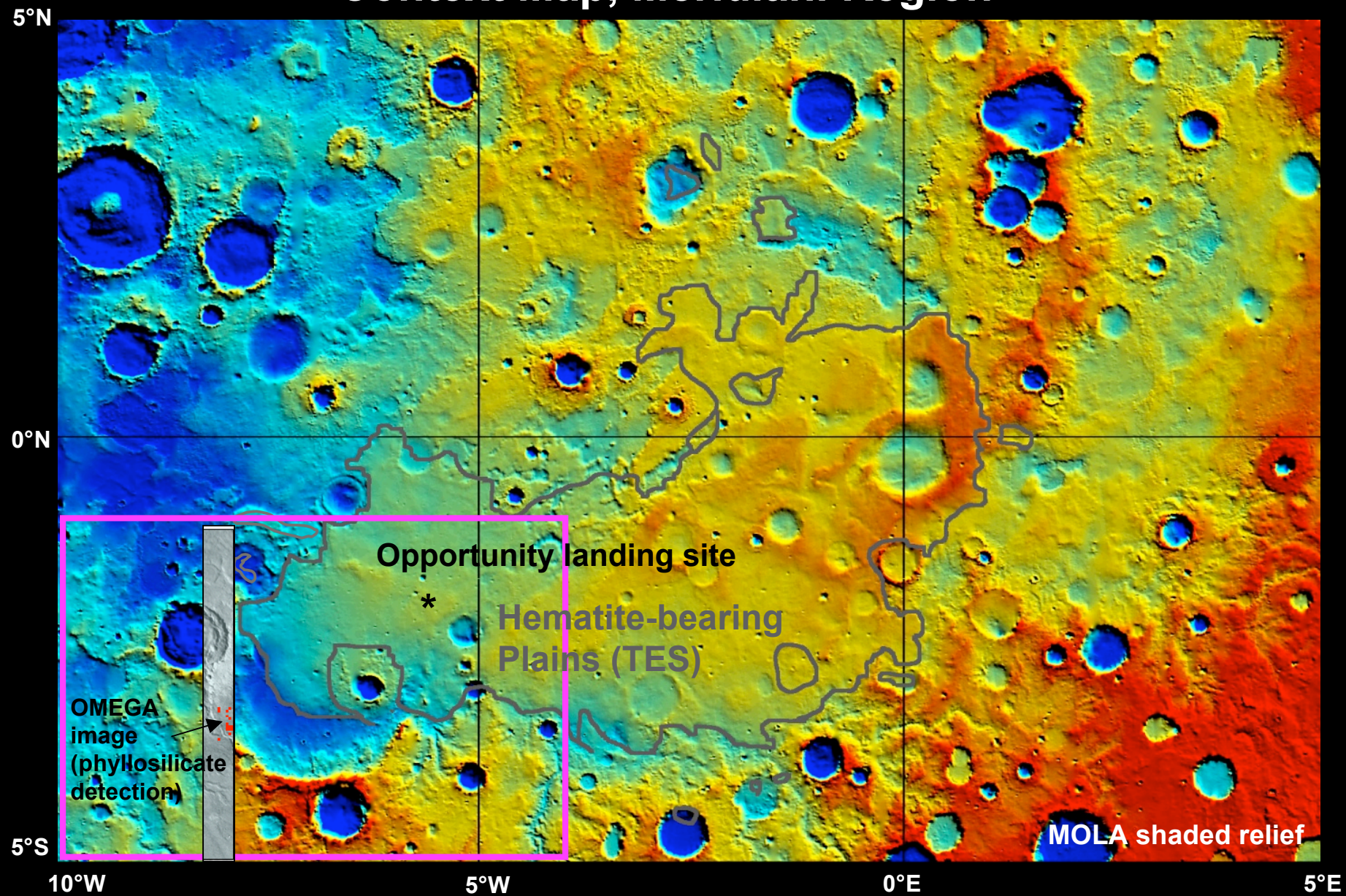
JUXTAPOSITION OF PHYLLOSILICATES AND SULFATES, CENTRAL RUNCORN CRATER (SOUTHERN MERIDIANI CANDIDATE MSL LANDING SITE)

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J. L. Griffes³, S. Murchie⁴, H. E. Newsom⁵, and
the CRISM Science Team.**

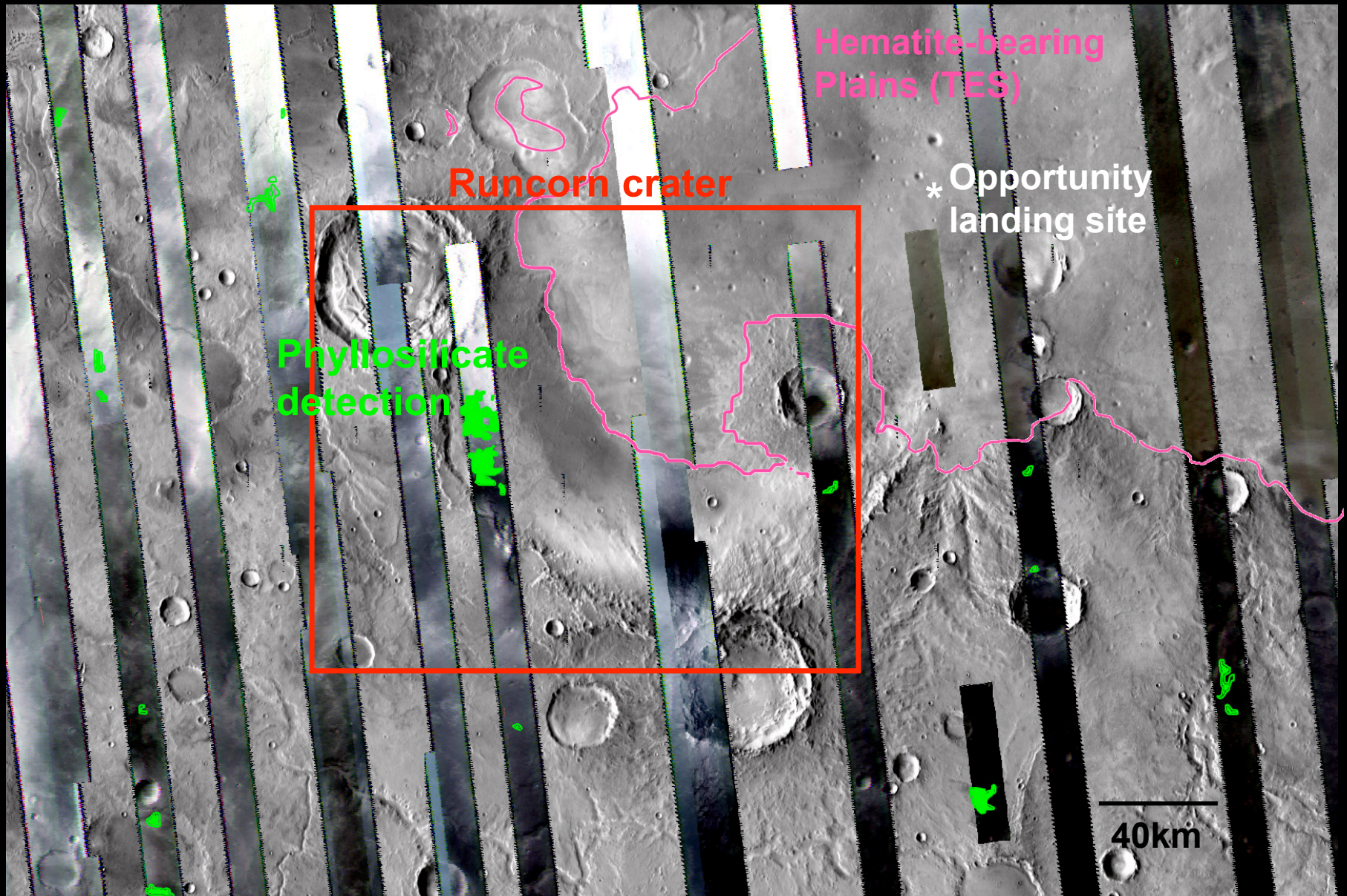
Special thanks to the OMEGA, HiRISE, HRSC, and THEMIS teams.

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Context Map, Meridiani Region

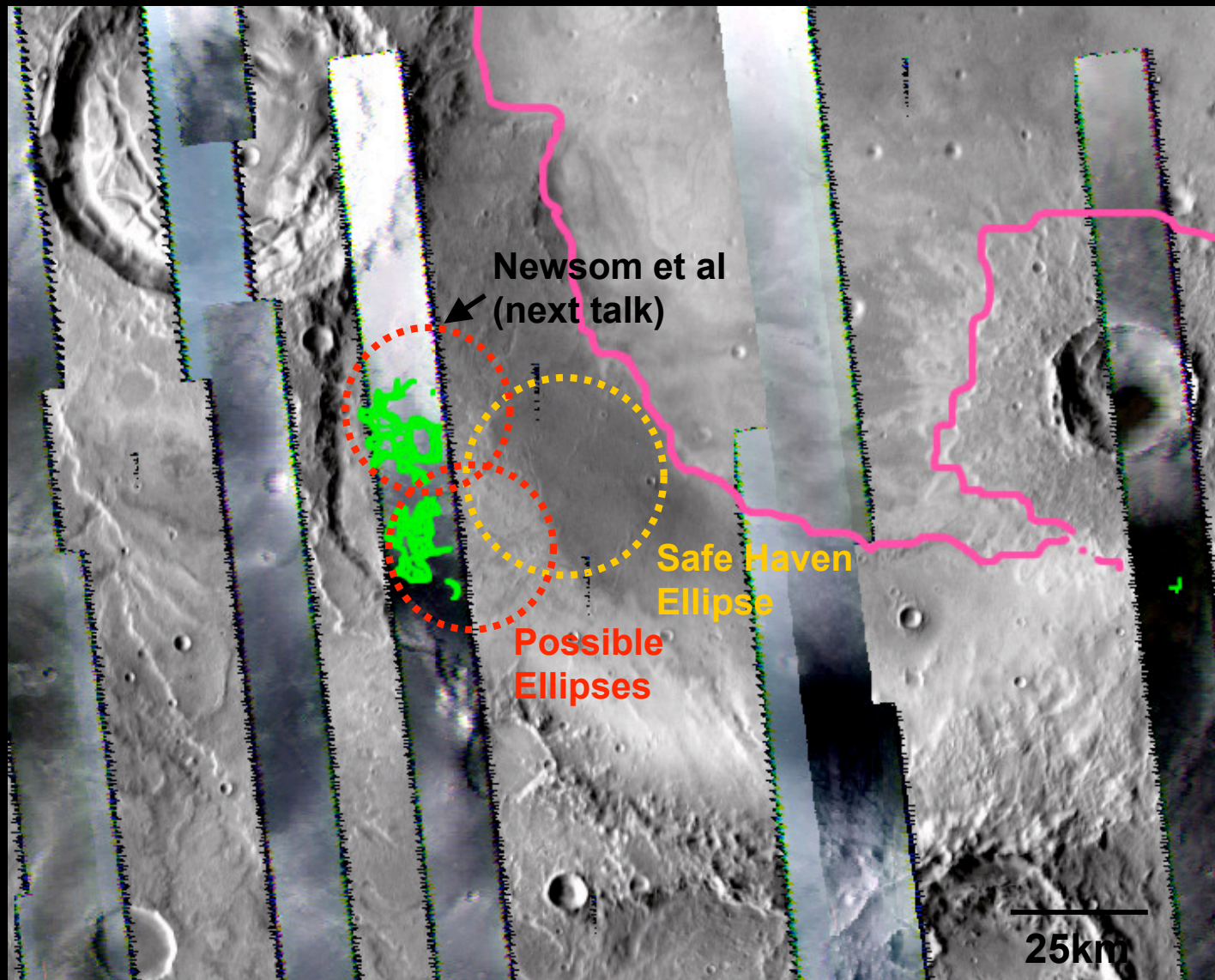


CRISM Multispectral Coverage (200m/pixel) Coverage



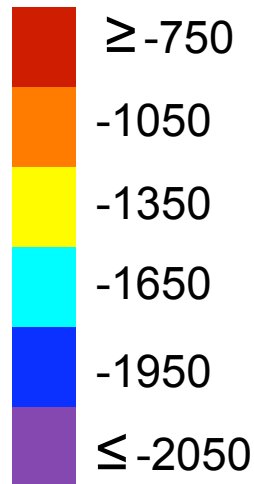
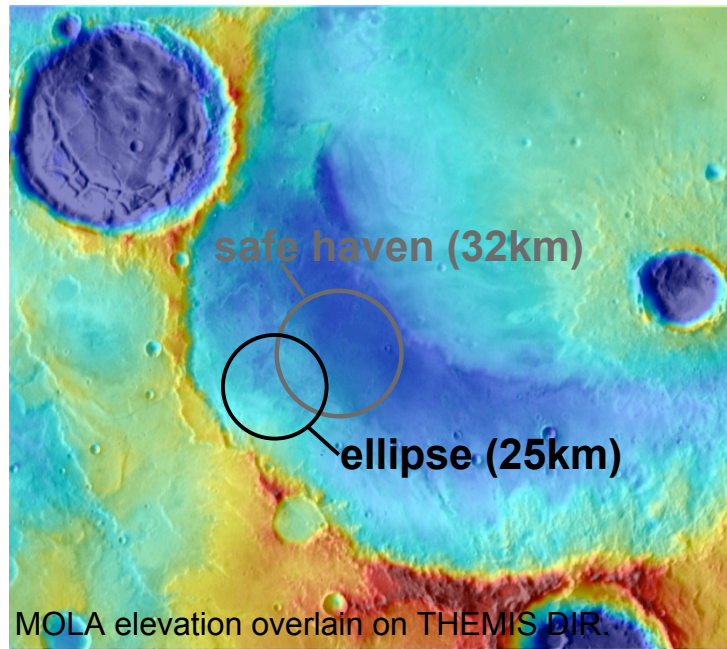
THEMIS Day IR

Mineralogically Interesting Material Within Rover Traverse Range



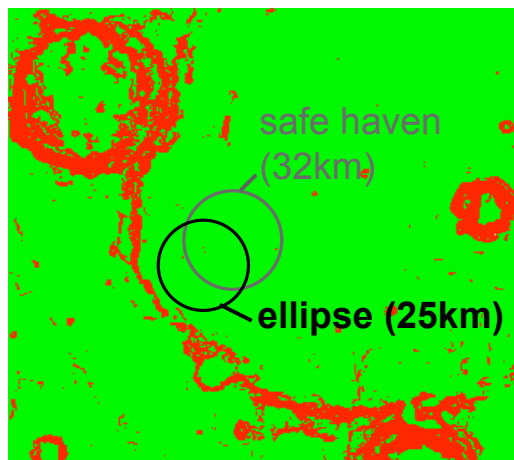
THEMIS Day IR

Landing Site is Safe



- 'Safe Haven' candidate.
- Average elevation of landing ellipse = -1875m .
- Safe at all length scales analyzed (more detailed analysis at 920m needed using MOLA profiles instead of MOLA 128ppd gridded data).

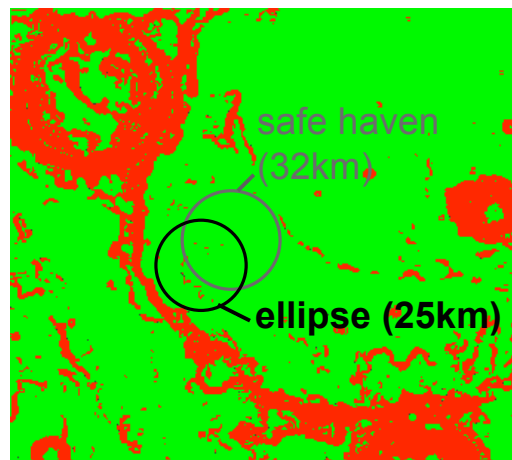
Slopes at length scale 460m



■ < 5.3 ■ > 5.3



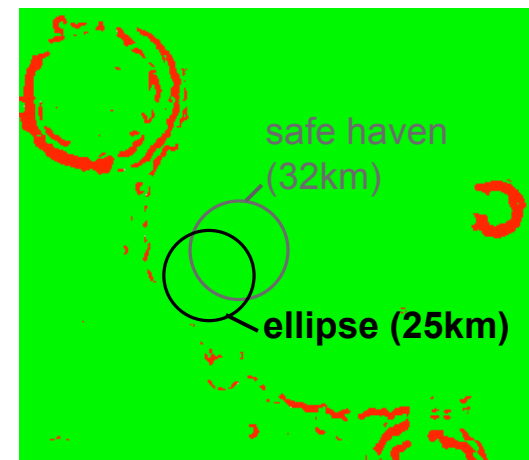
Slopes at length scale 920m



■ < 2.7 ■ > 2.7



Slopes at length scale 1380m



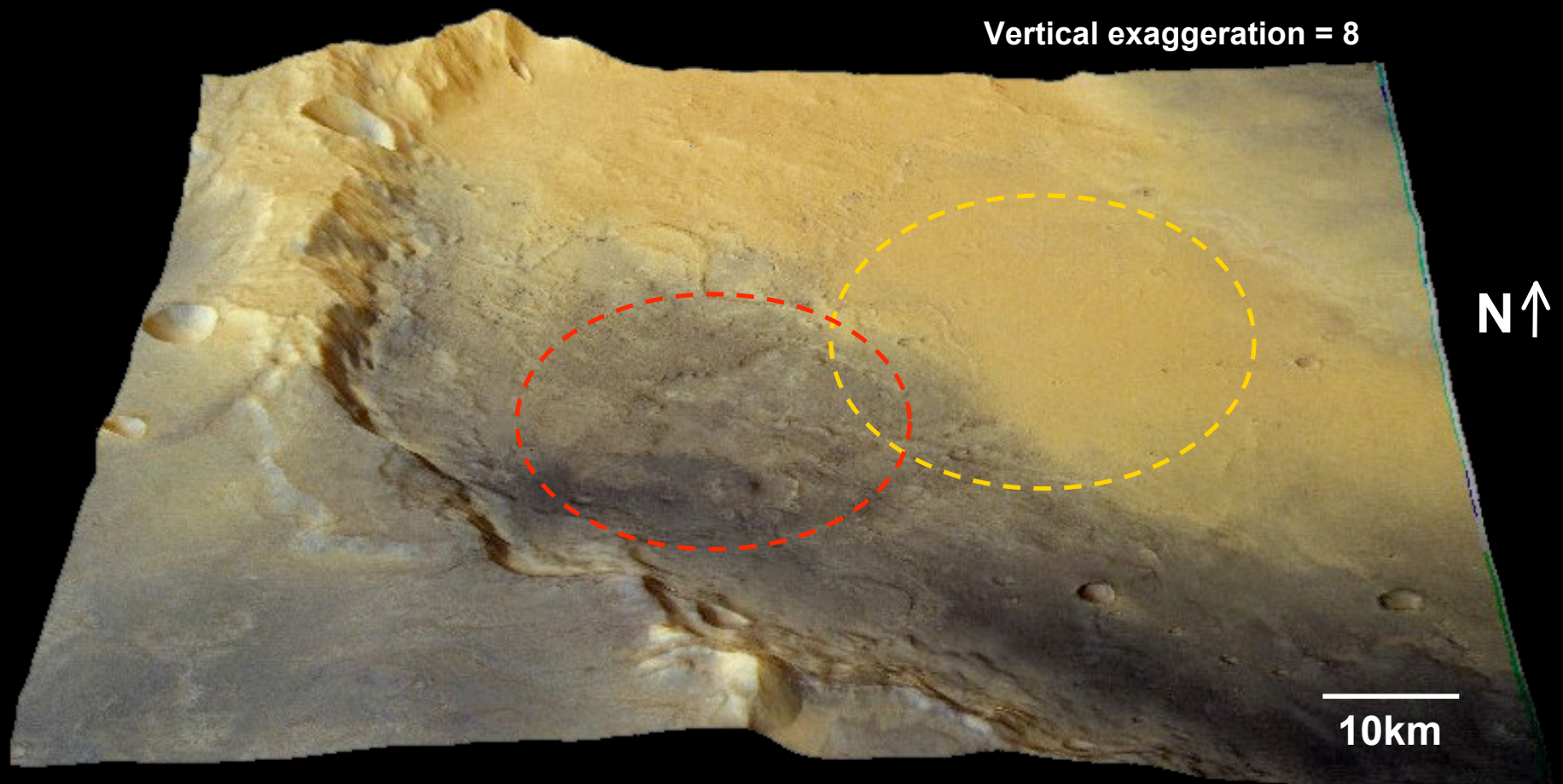
■ < 10.9 ■ > 10.9



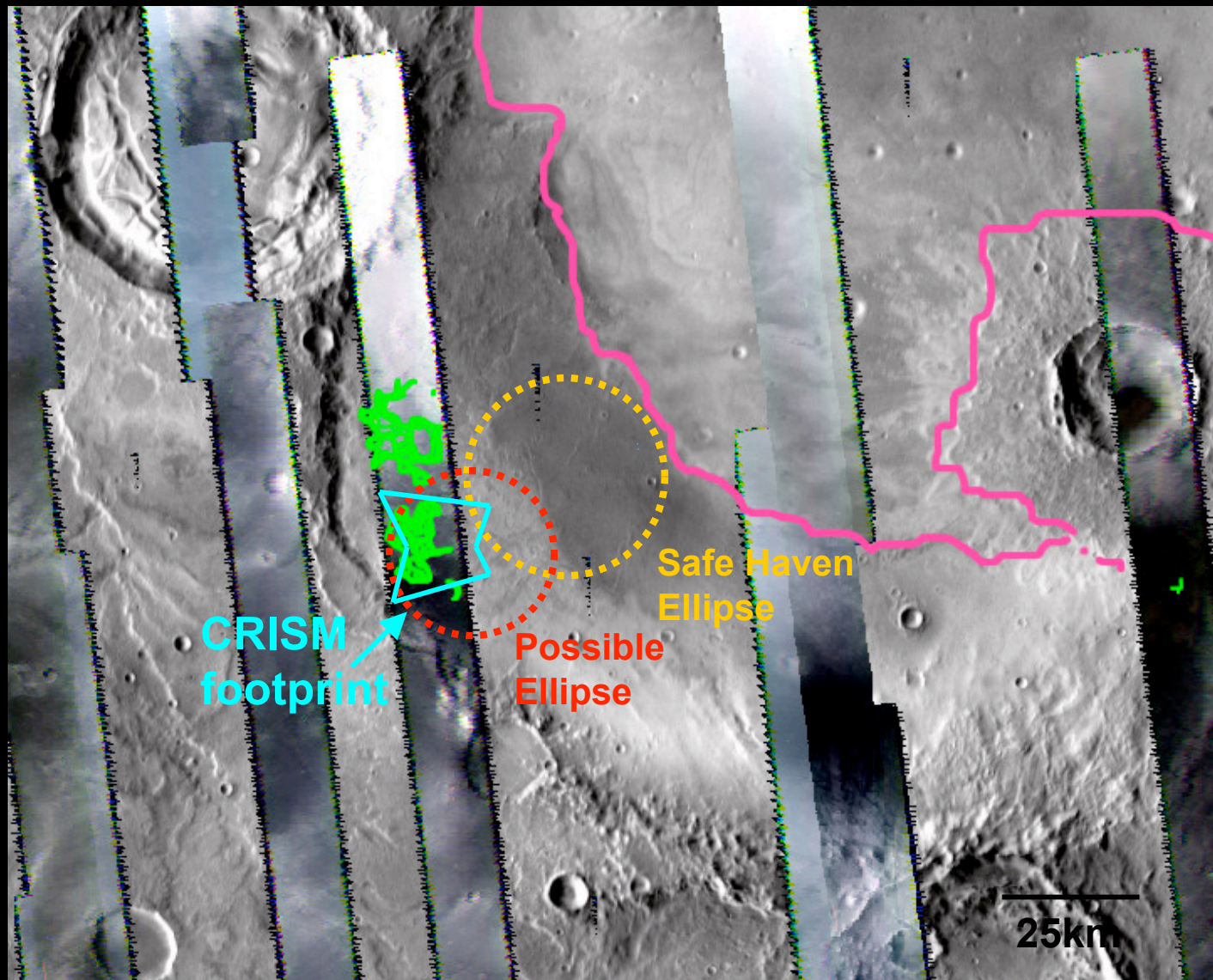
HRSC Prospective View of Runcorn Crater

***Proposed Landing ellipse is very smooth**


Vertical exaggeration = 8



CRISM High Resolution Footprint

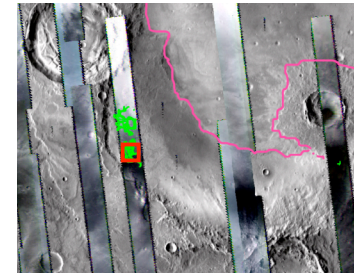
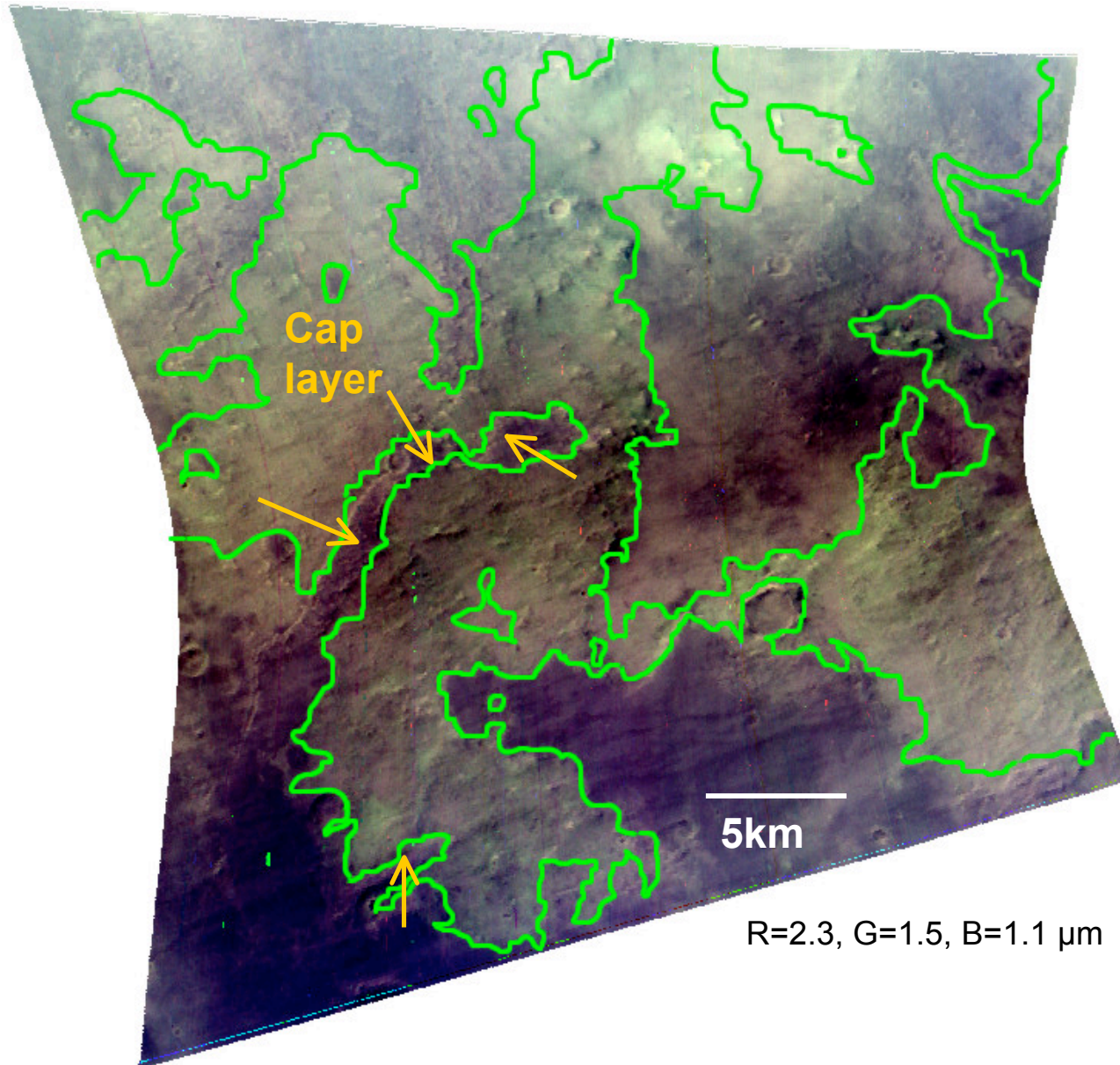



Hematite-
bearing plains
(TES)


Phyllosilicate
detection
(CRISM &
OMEGA)

THEMIS Day IR

CRISM FRT 7B8B (20m/pixel)



- Cap layer eroded back to expose underlying phyllosilicate-bearing deposits ('greenish' material).
- Aeolian material obscures outcrop
→ small exposures of an extensive phyllosilicate deposit.

R=2.3, G=1.5, B=1.1 μm

CRISM FRT 7B8B (20m/pixel)

R=2.3, G=1.5, B=1.1 μm

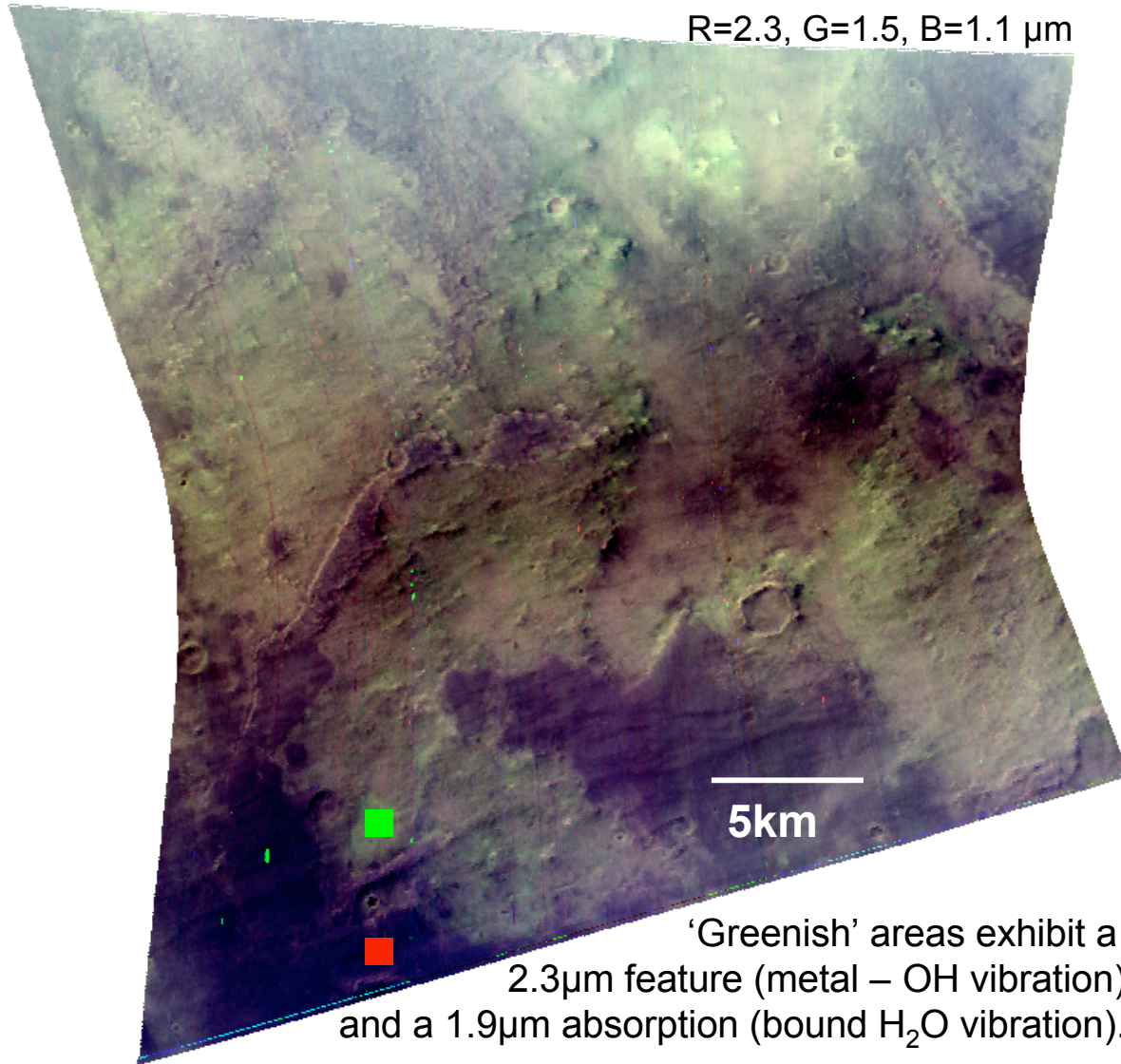
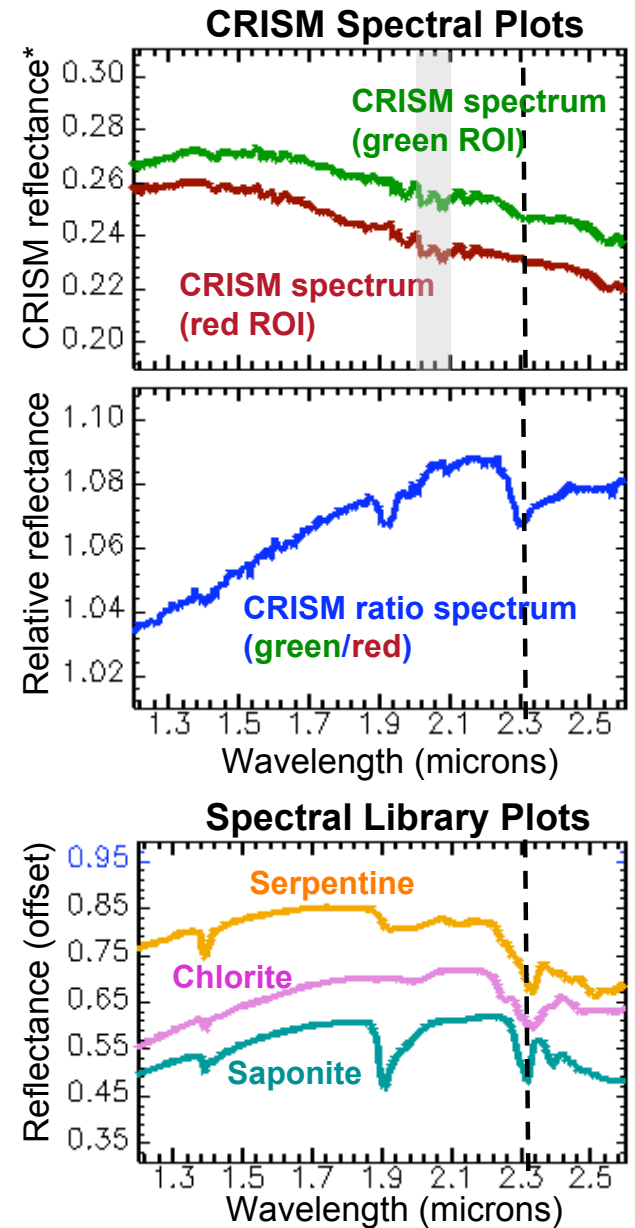


Image was acquired during moderate dust opacity conditions.



* CRISM I/F volcano scan and cos(i) corrected

overage on CRISM FRT 7B8B

**Phyllosilicate-bearing
bedrock?**

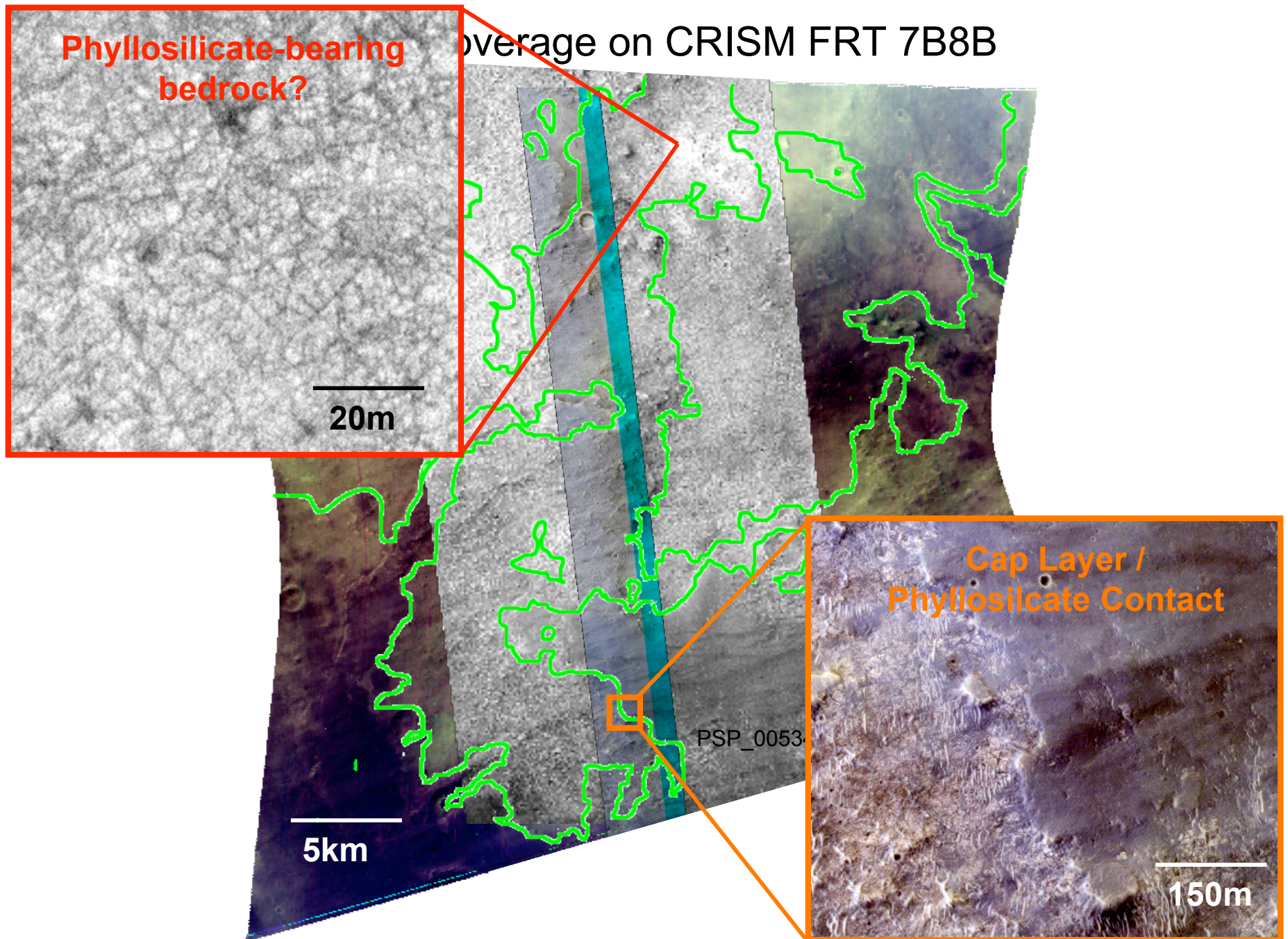
20m

5km

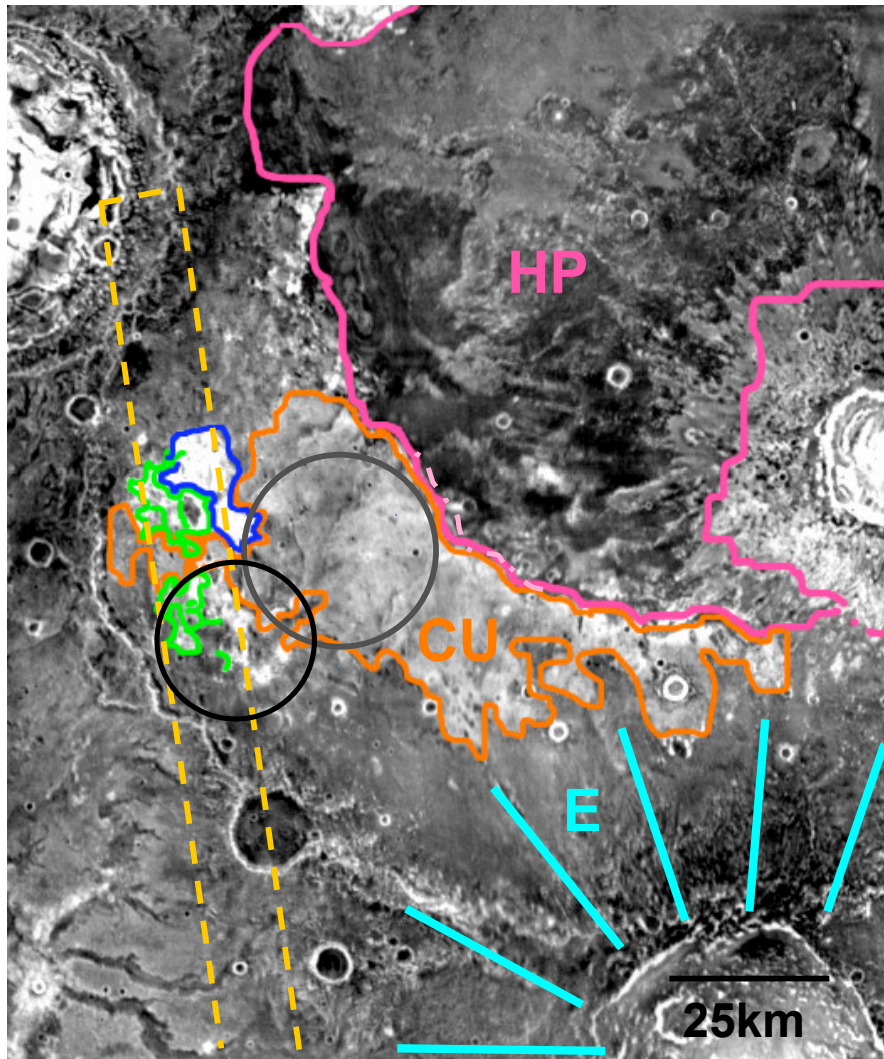
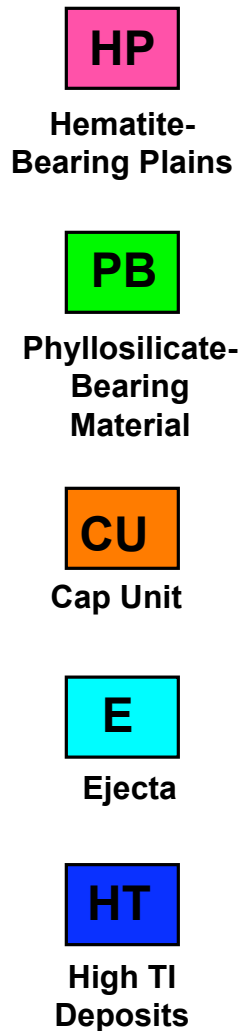
PSP_0053

**Cap Layer /
Phyllosilicate Contact**

150m



Geologic Map of Runcorn Crater



Possible Geologic History

- Excavation of Runcorn crater
→ exposure of phyllosilicates
→ deposition of phyllosilicates
- Deposition/cementation of Cap Unit
- Change in geochemical conditions → Formation of sulfate rich layered terrain underlying the Hematite Plains.
- Partial cover by Ejecta
- Erosion of Cap Unit → Exposure of Phyllosilicate-Bearing Material
- ??? High TI Deposits (chloride bearing?)

Phyllosilicate-Bearing Material is likely an extensive unit and may underlie the Cap Unit in several places (need more hires CRISM images!)

RUNCORN CRATER LANDING SITE ASSESSMENT

- Access to **PHYLLOSILICATES** and likely sulfate deposits (edge of the layered stack explored by the Opportunity rover ~150km to the northeast) + chloride bearing material (Newsom et al., next talk)
 - Explore transition in environmental conditions
 - **GEOLOGY and GEOCHEMISTRY**
- Phyllosilicates → H₂O or OH bearing minerals
 - These minerals may have recorded environmental conditions during deposition and/or biomarkers
 - **BIOLOGICAL POTENTIAL / PAST HABITABILITY**
- Potential '**SAFE HAVEN**'