Mineralogy of select outcrops at Eberswalde Crater

Nancy K. McKeown and Melissa S. Rice

MacEwan

Or: A mineralogic traverse at Eberswalde

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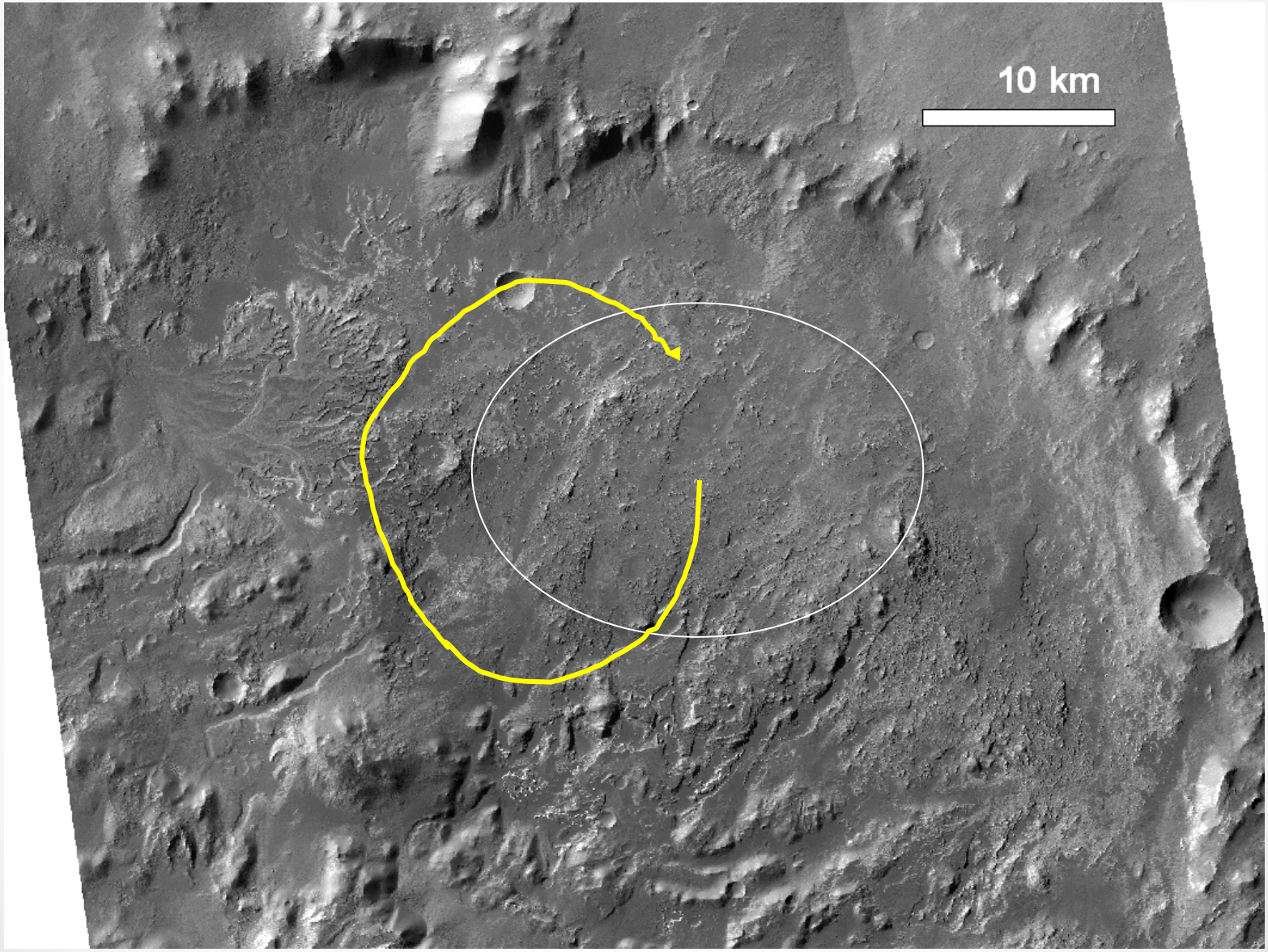
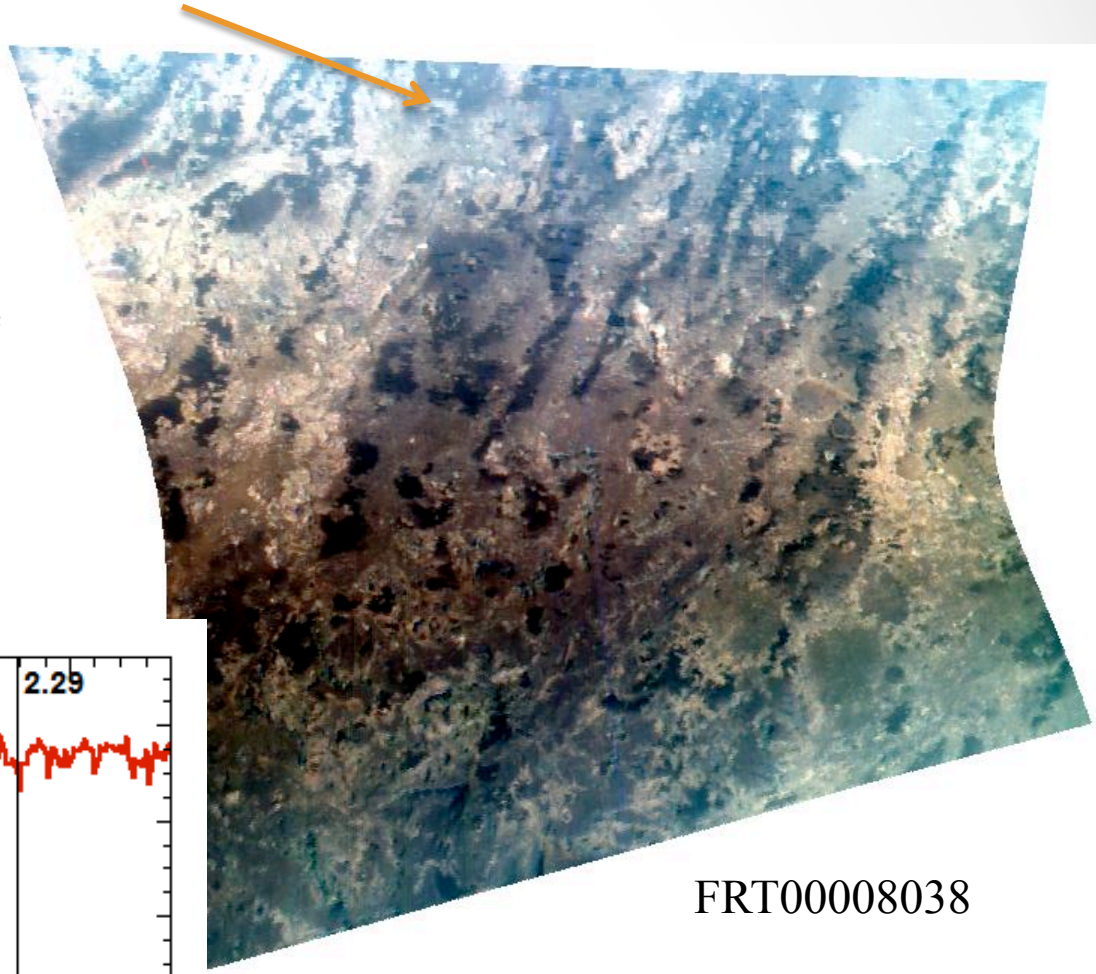
A proposed traverse

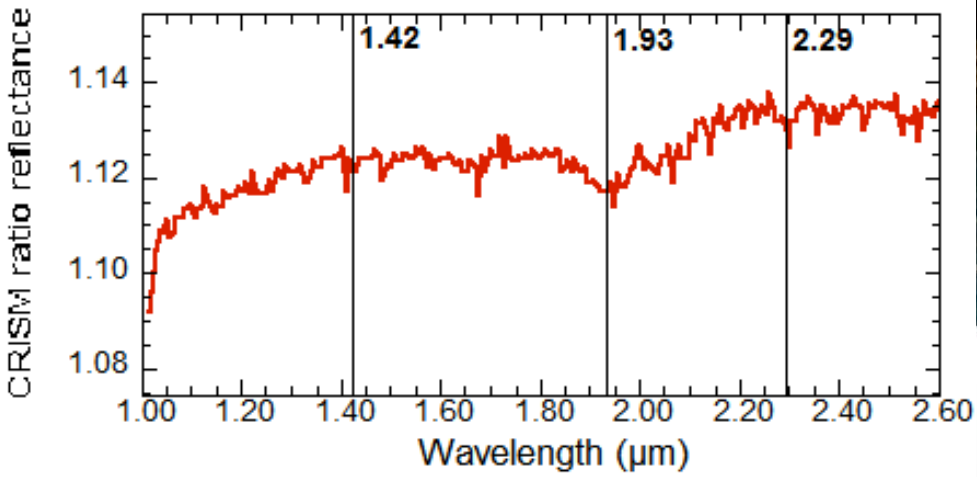


Within ellipse

Light-toned, polygonally fractured material

- Exhibits spectrum of Fe-Mg phyllosilicate
- Absorptions on level with noise
  - Due to mantling pyroxene sand/dust or simply low abundances

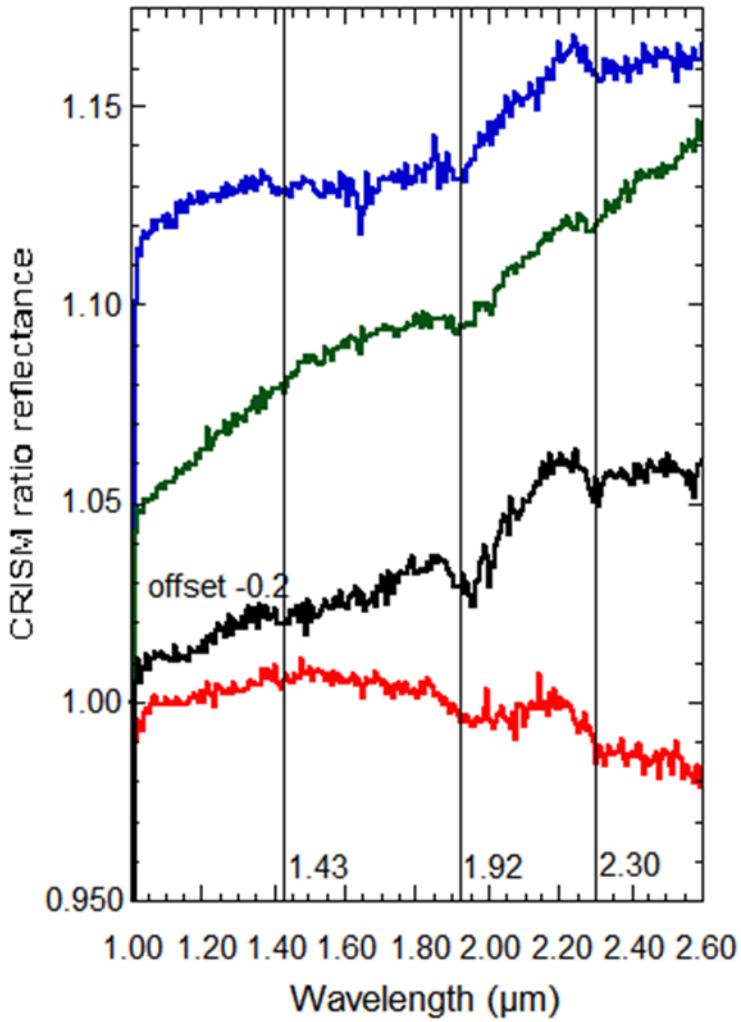


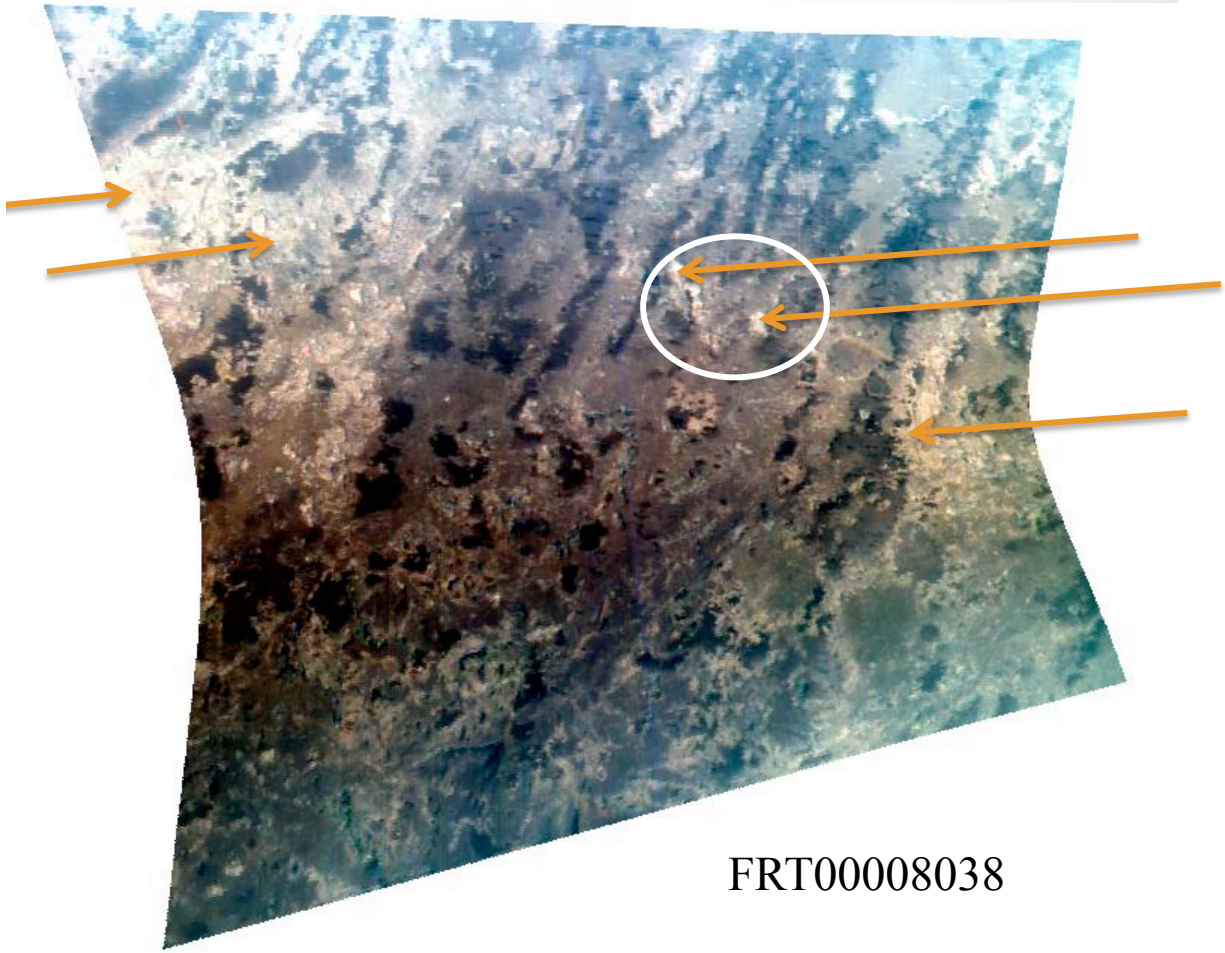


Within ellipse

Light-toned knobs

- Hydrated
- Overlie light-toned material





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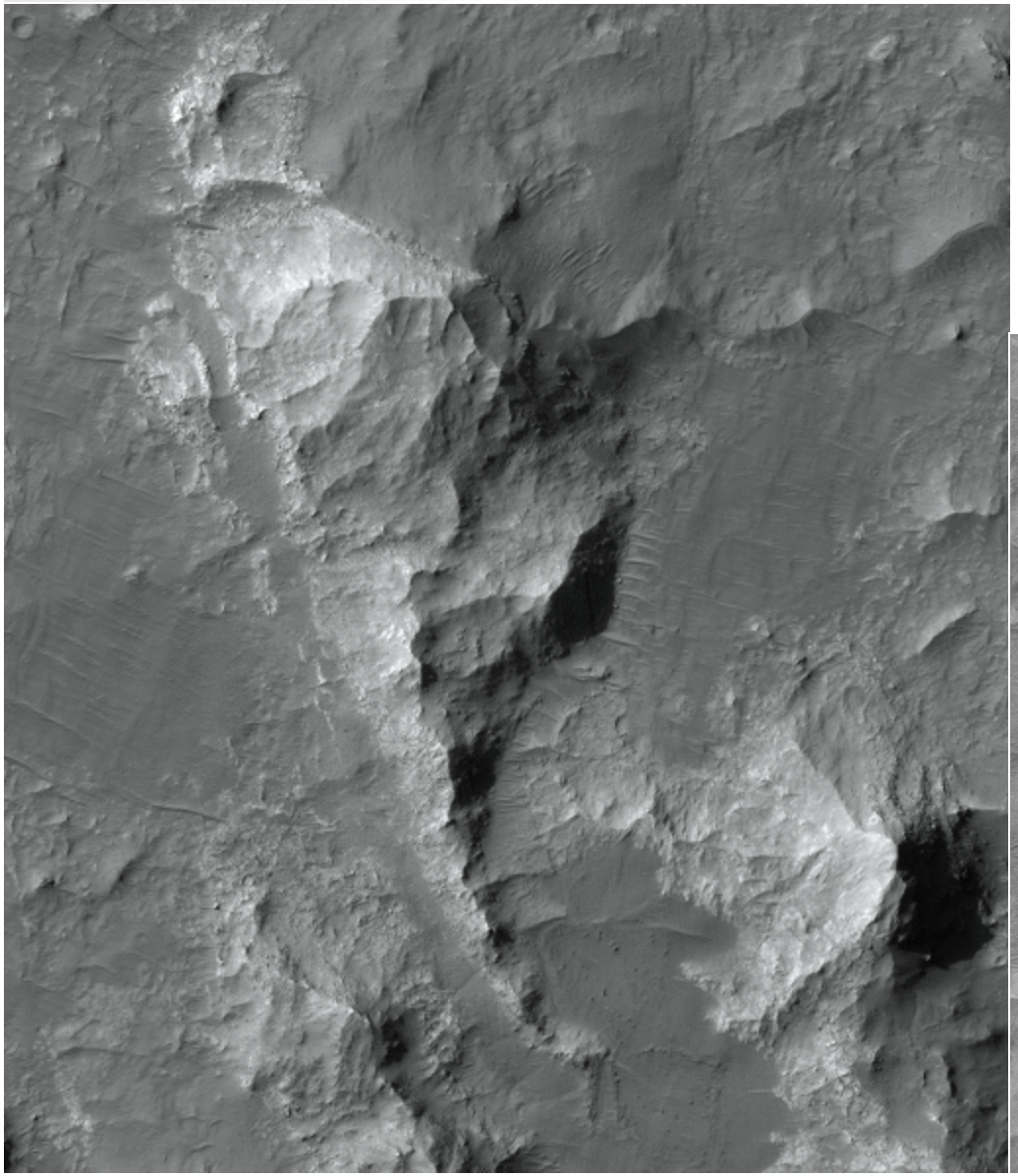
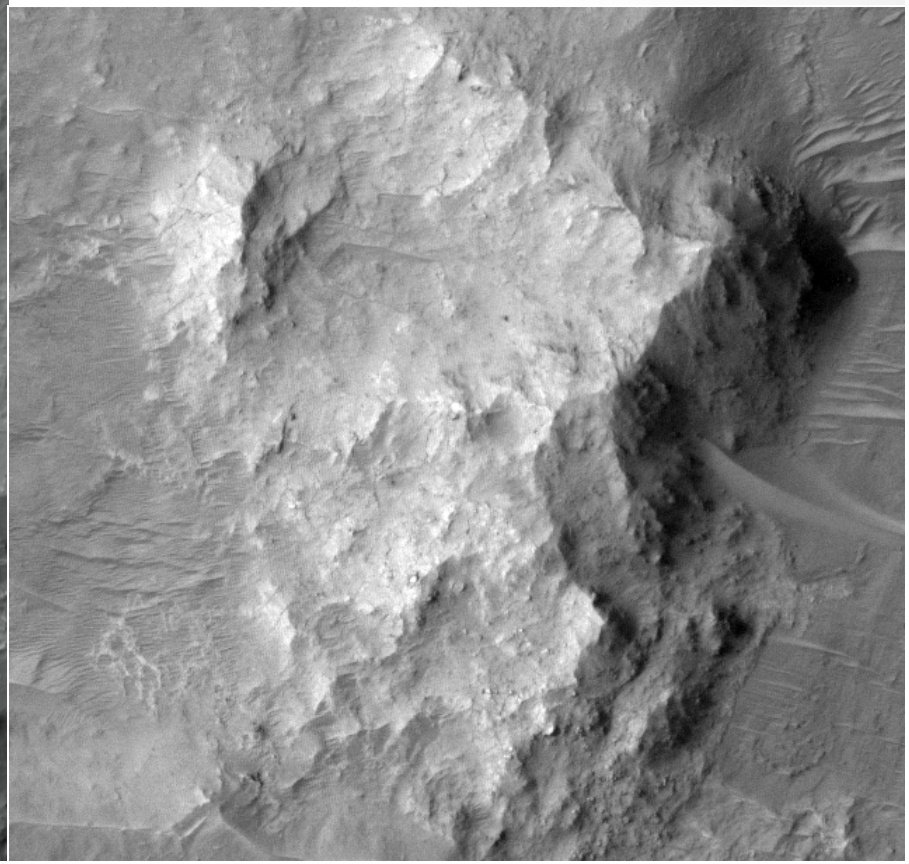
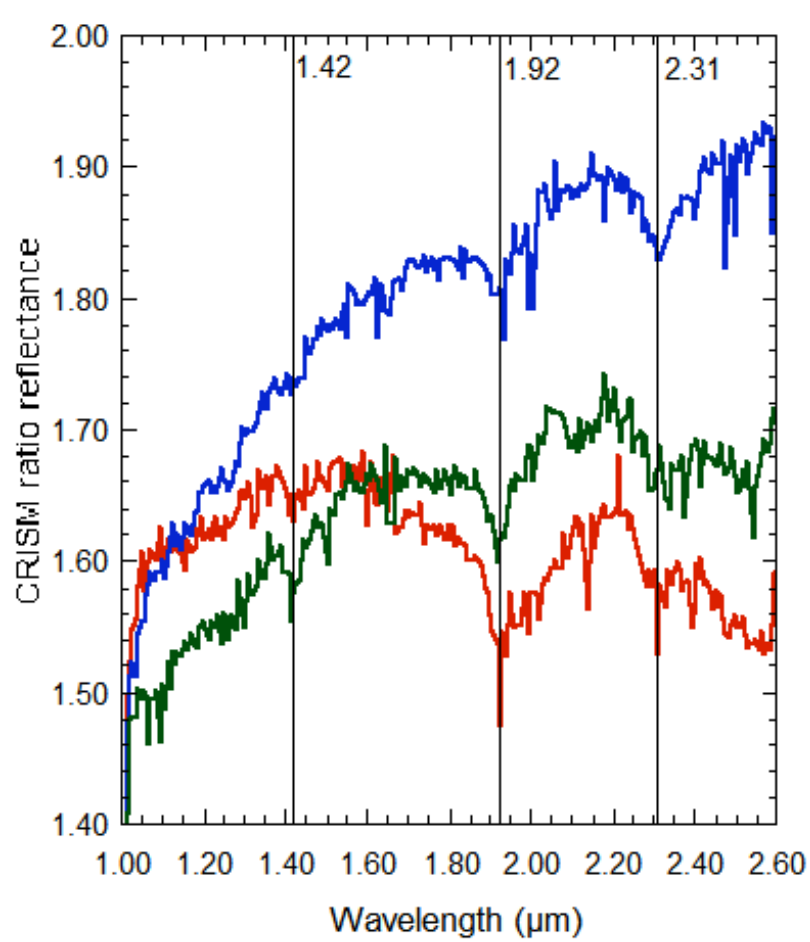


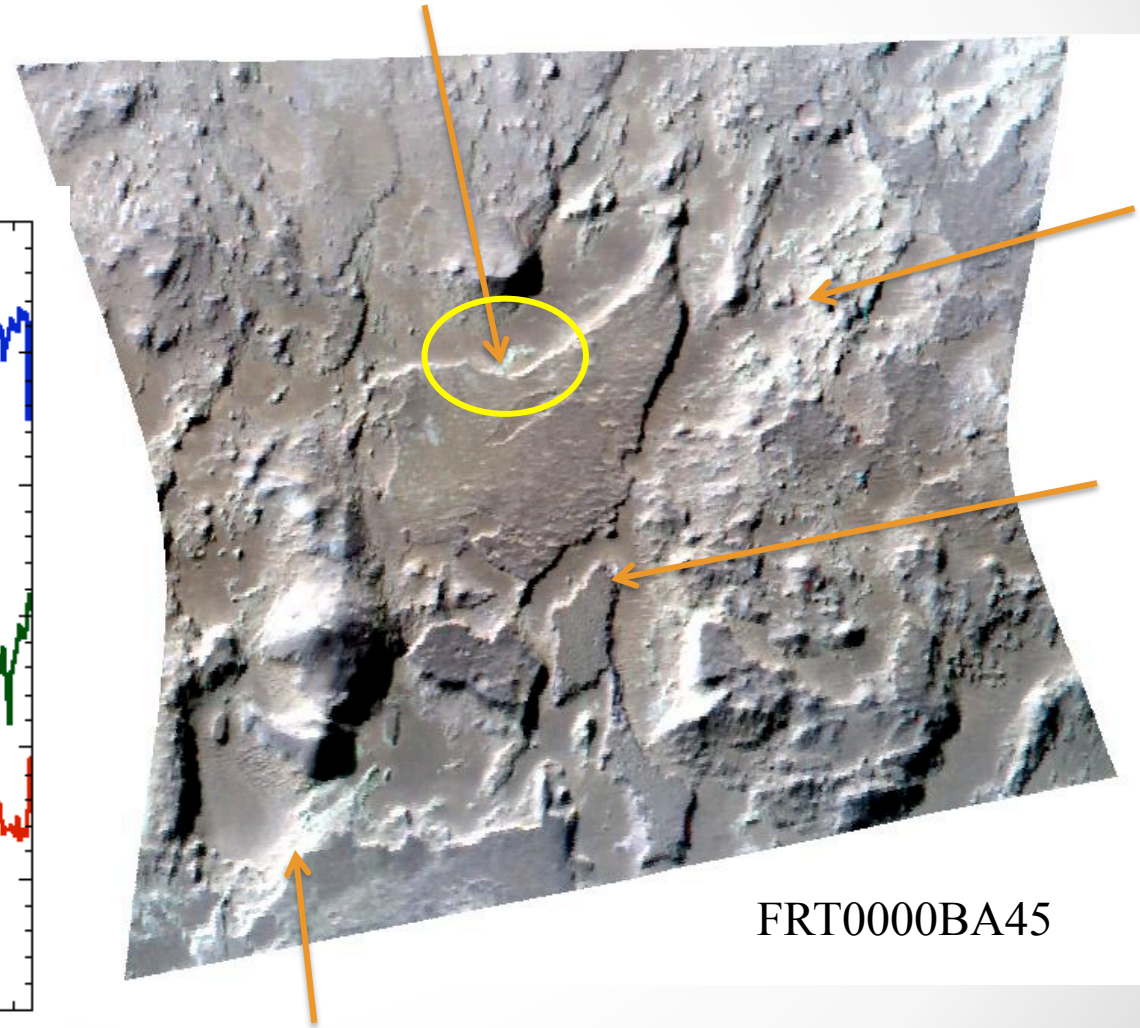
Light-toned bedrock, with a scalloped erosional expression



Just south of ellipse

Hydrated material outcropping from edges of mesas





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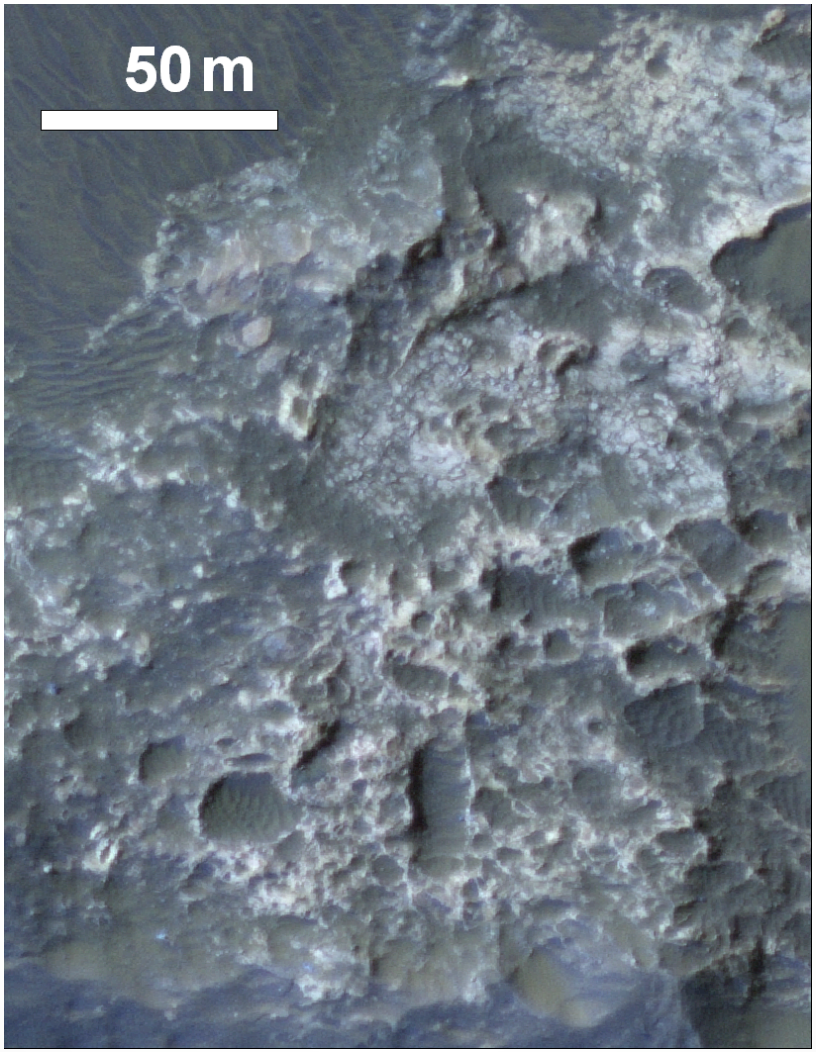
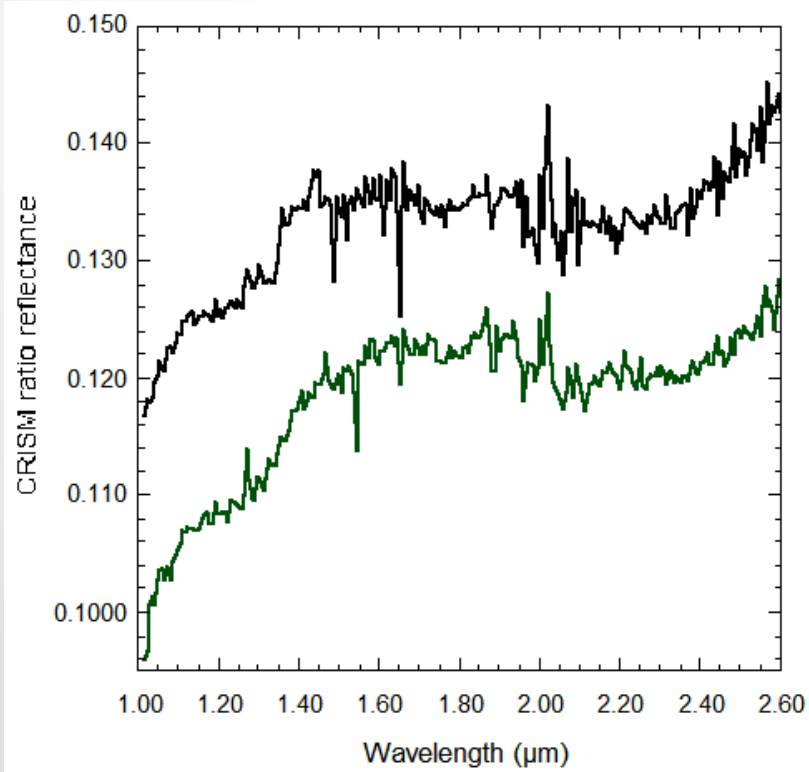
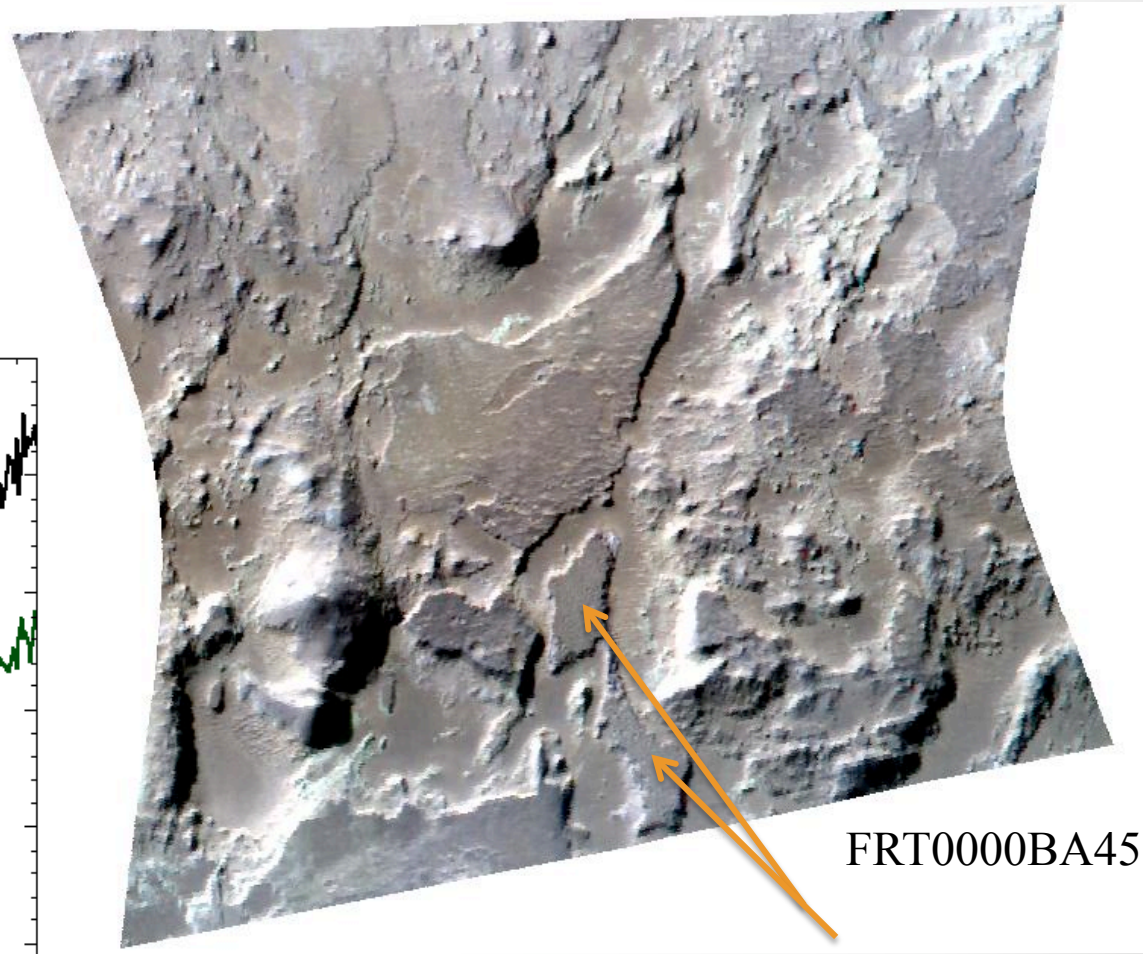


Just south of ellipse

Top of mesas exhibit olivine spectral signature

- No other mesas have this spectral signature, though morphology is the same





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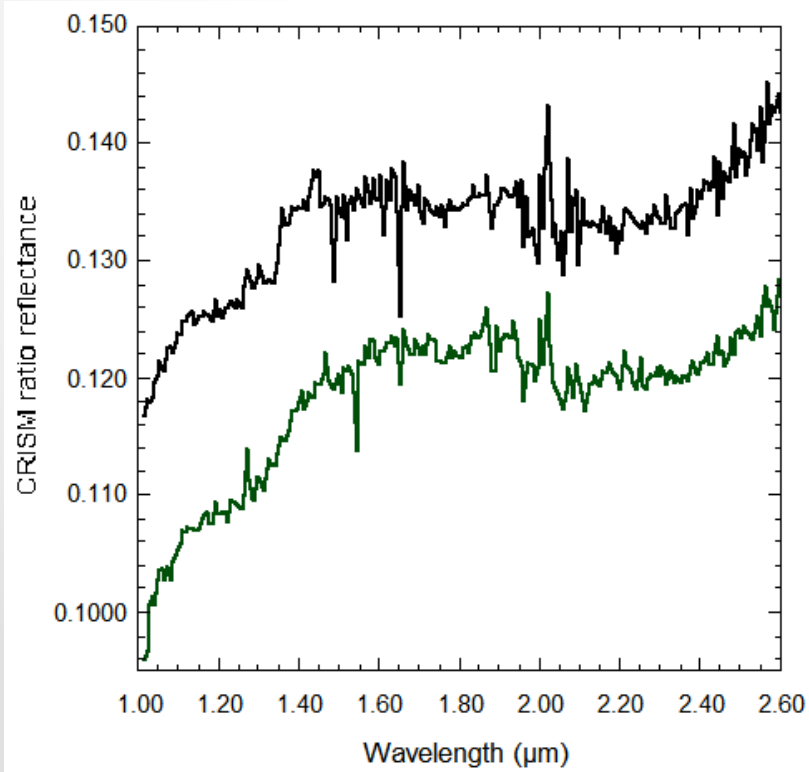
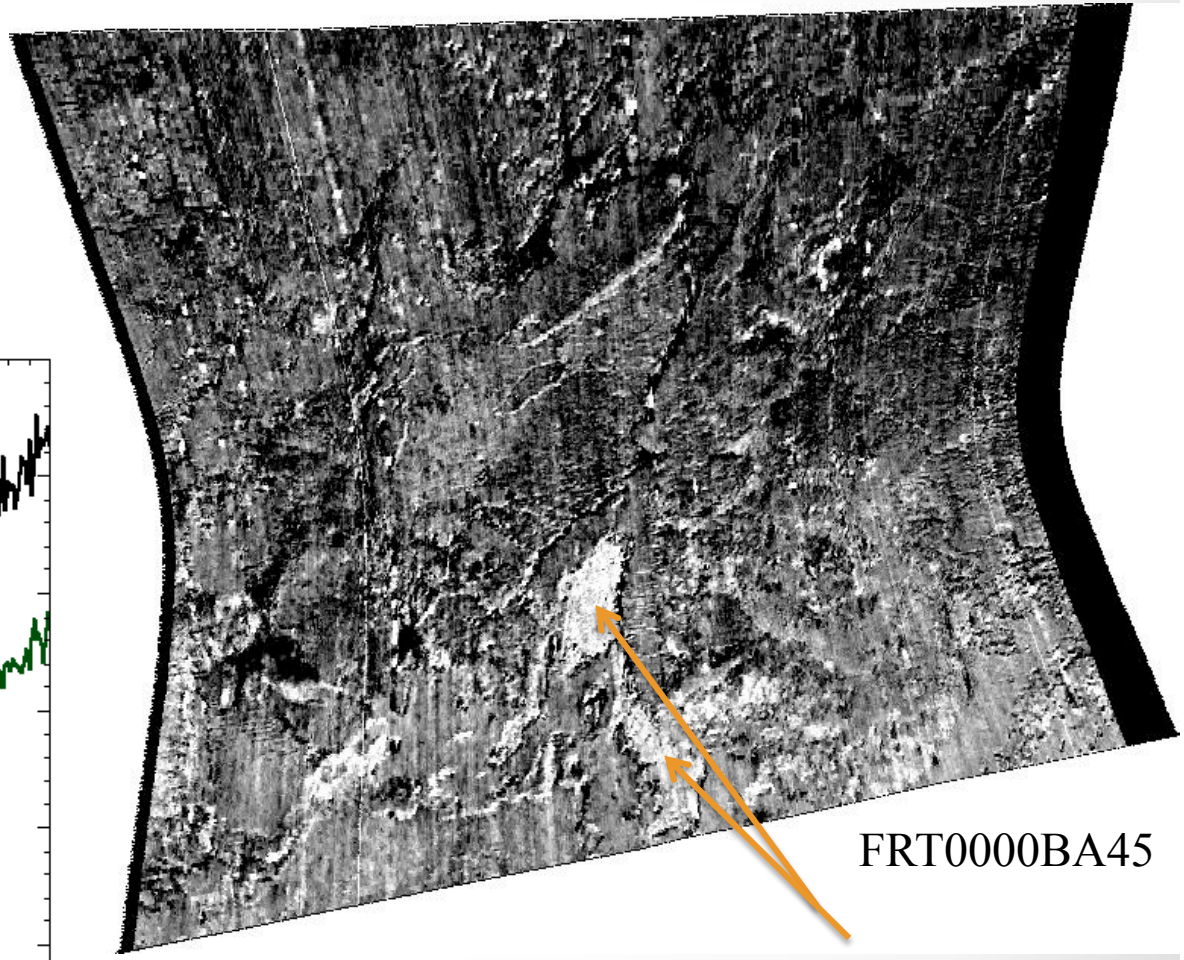
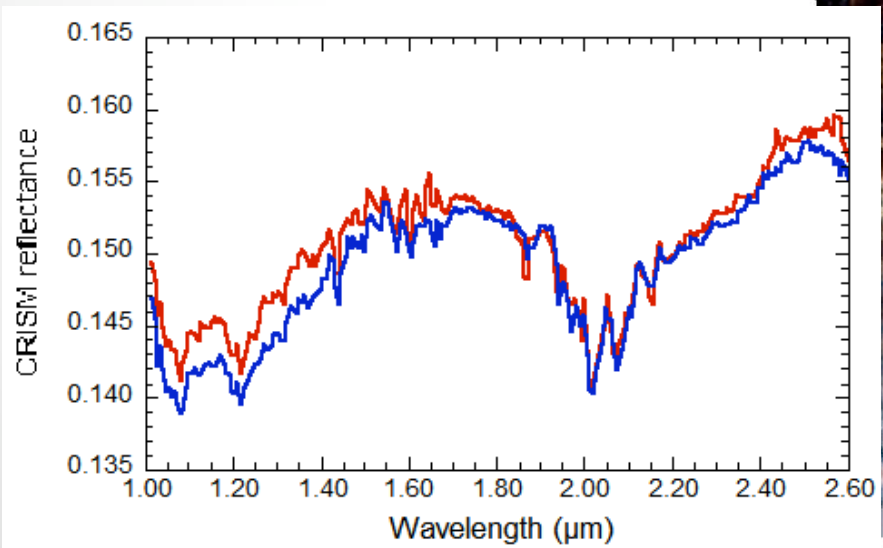


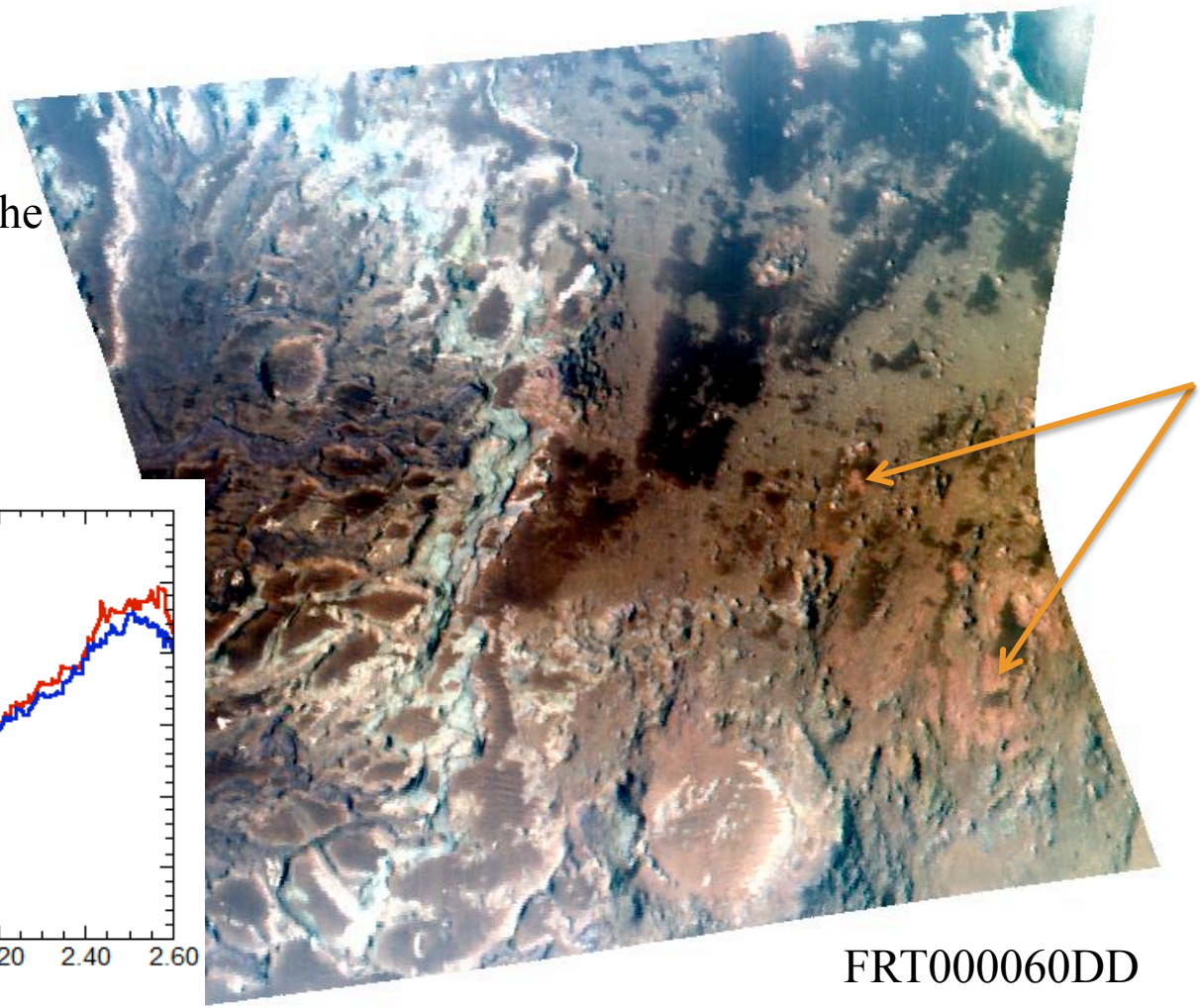


West of ellipse

Olivine-bearing material on Eberswalde crater floor

- Outcrops in most topographically low part of the basin
- Possibly the crystalline bedrock





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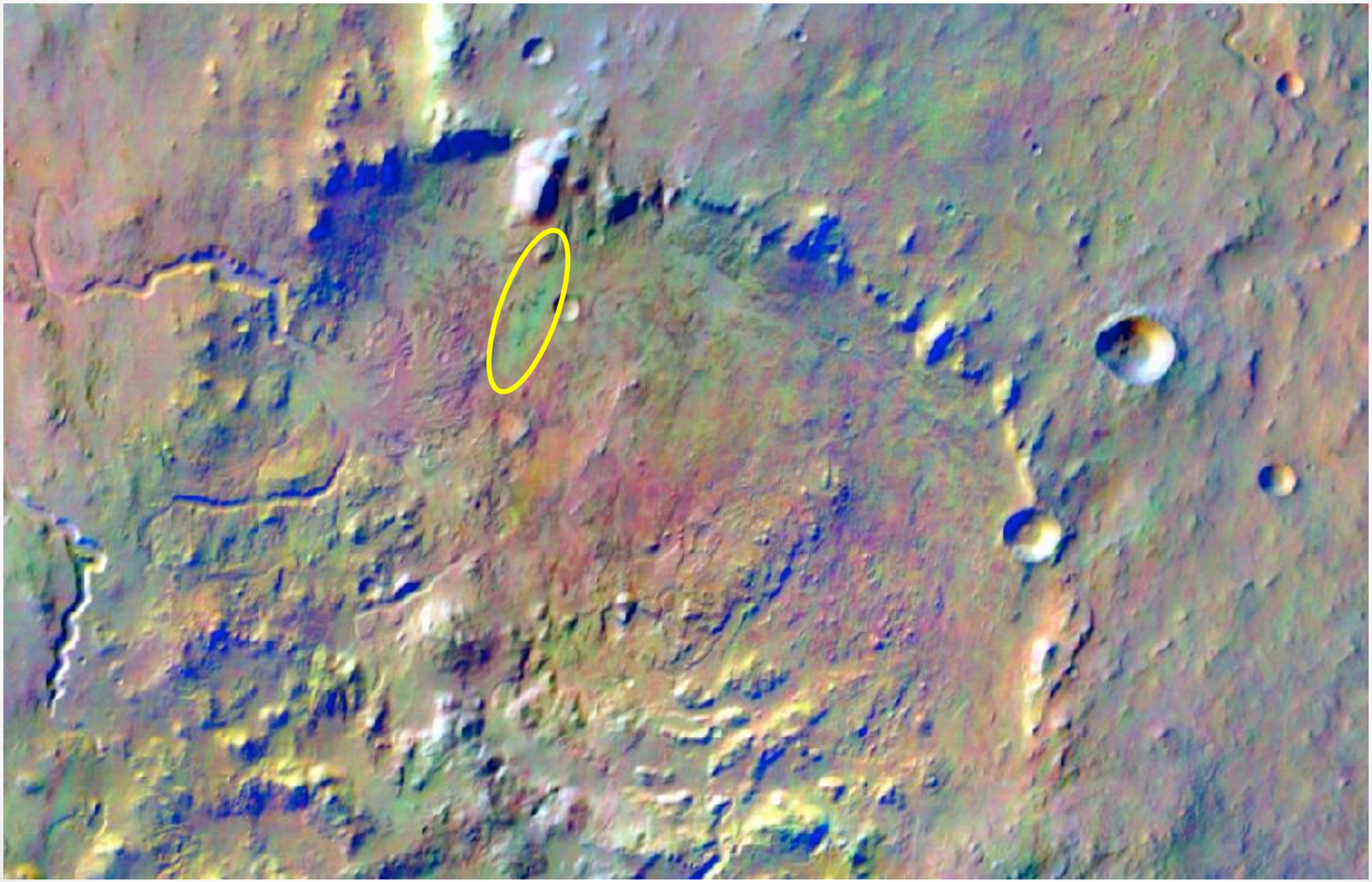
West of ellipse



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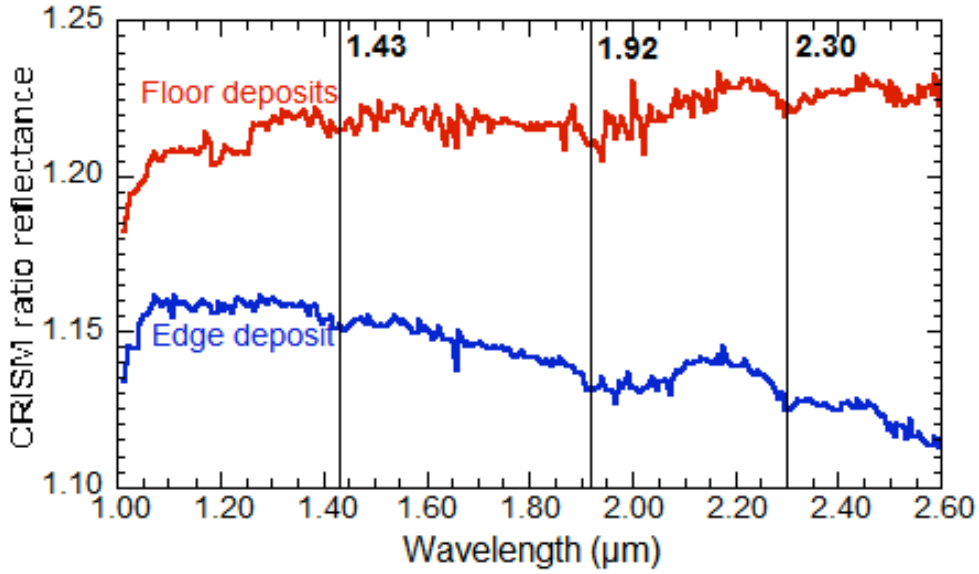
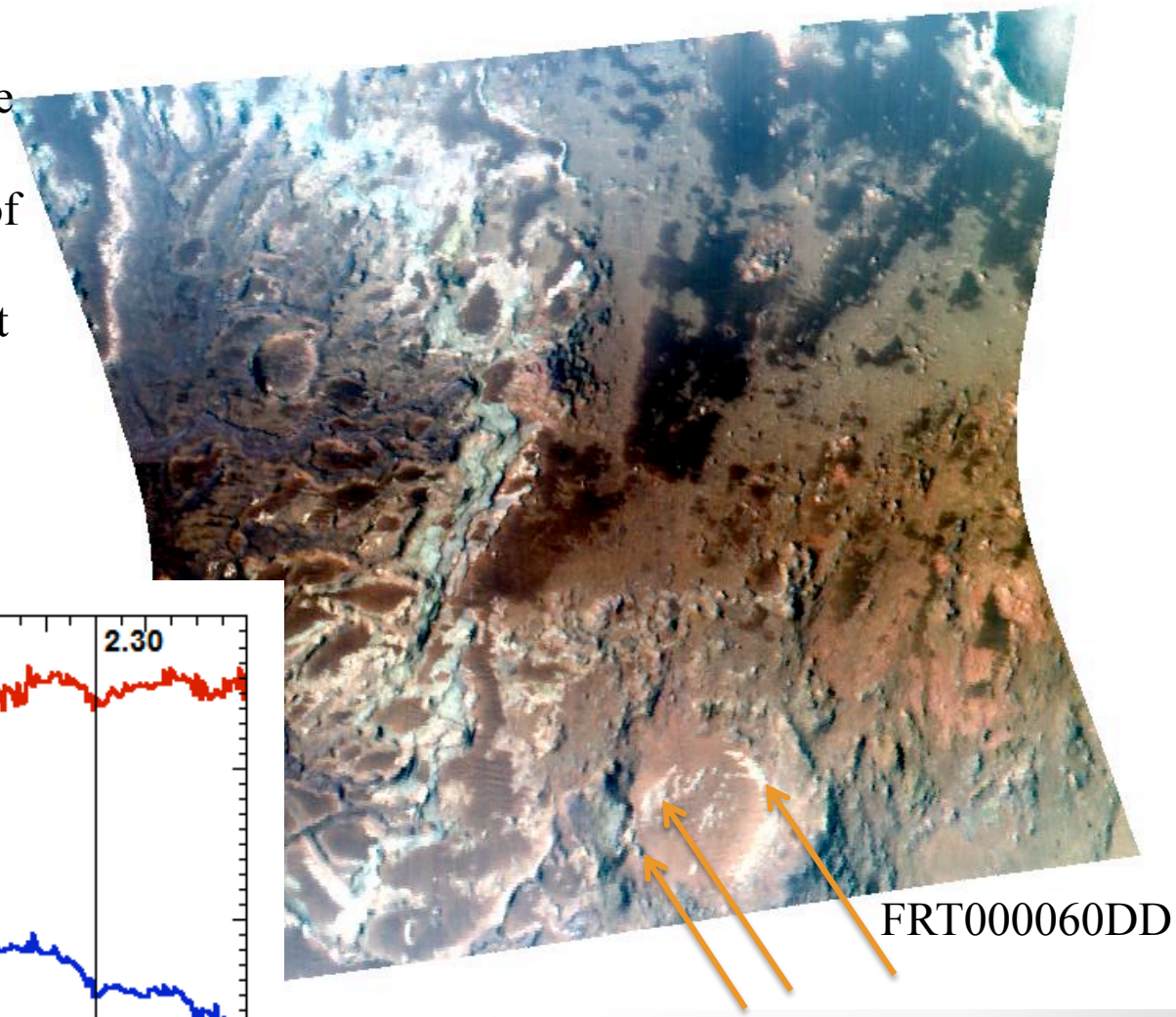
West of ellipse

Light-toned material in crater

- Possible Fe/Mg phyllosilicate signature
- Light-toned outcrop on rim of crater
    - Possible deltaic remnant





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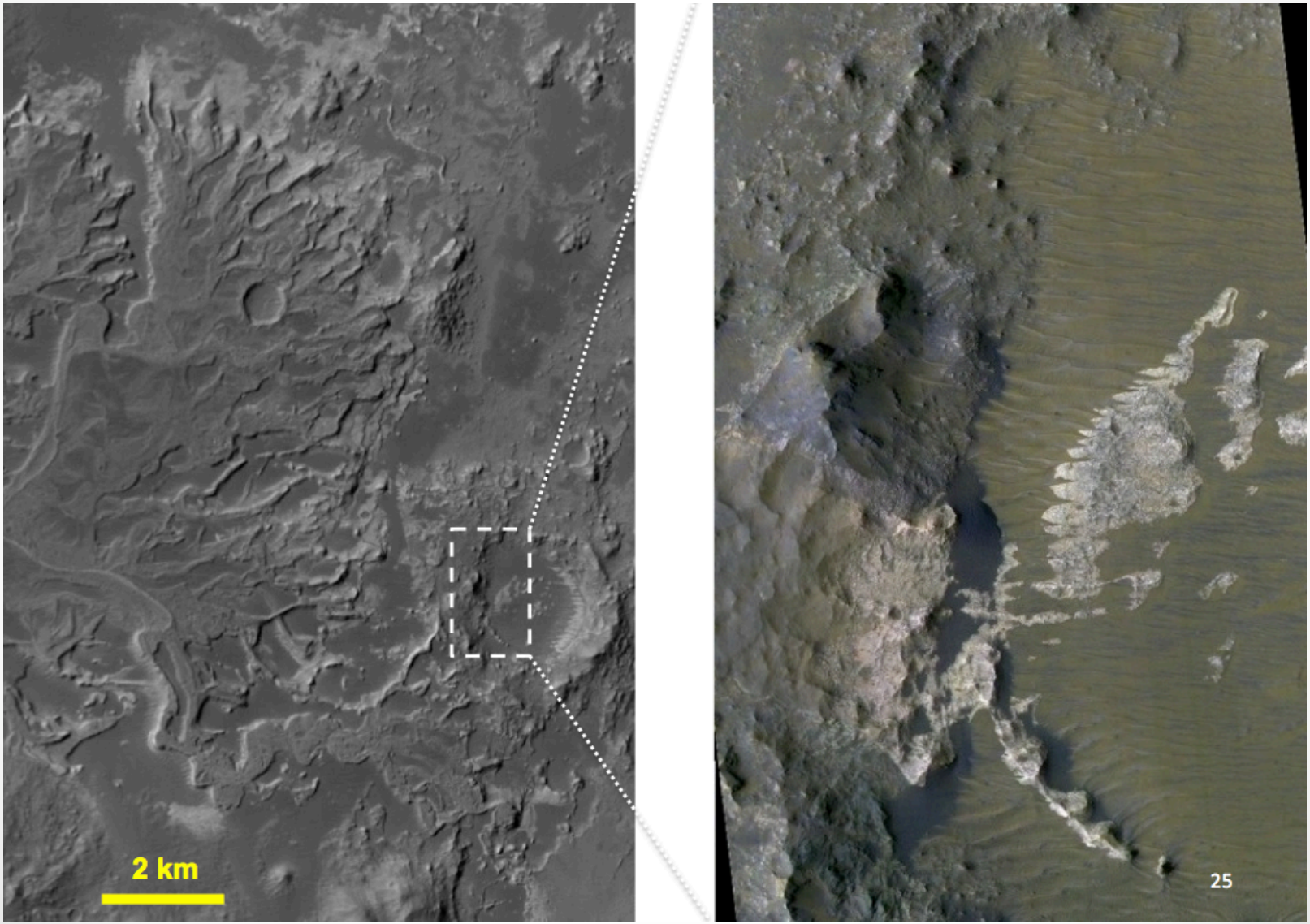
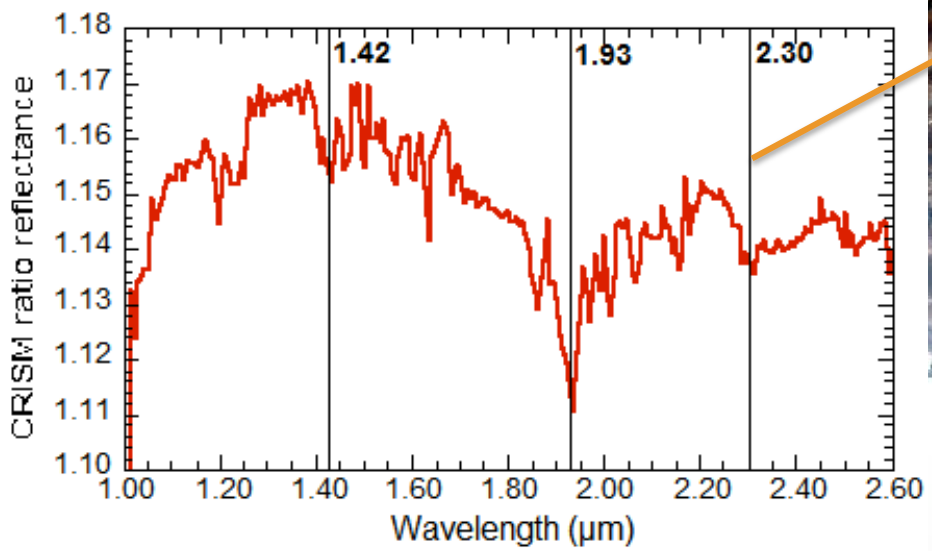
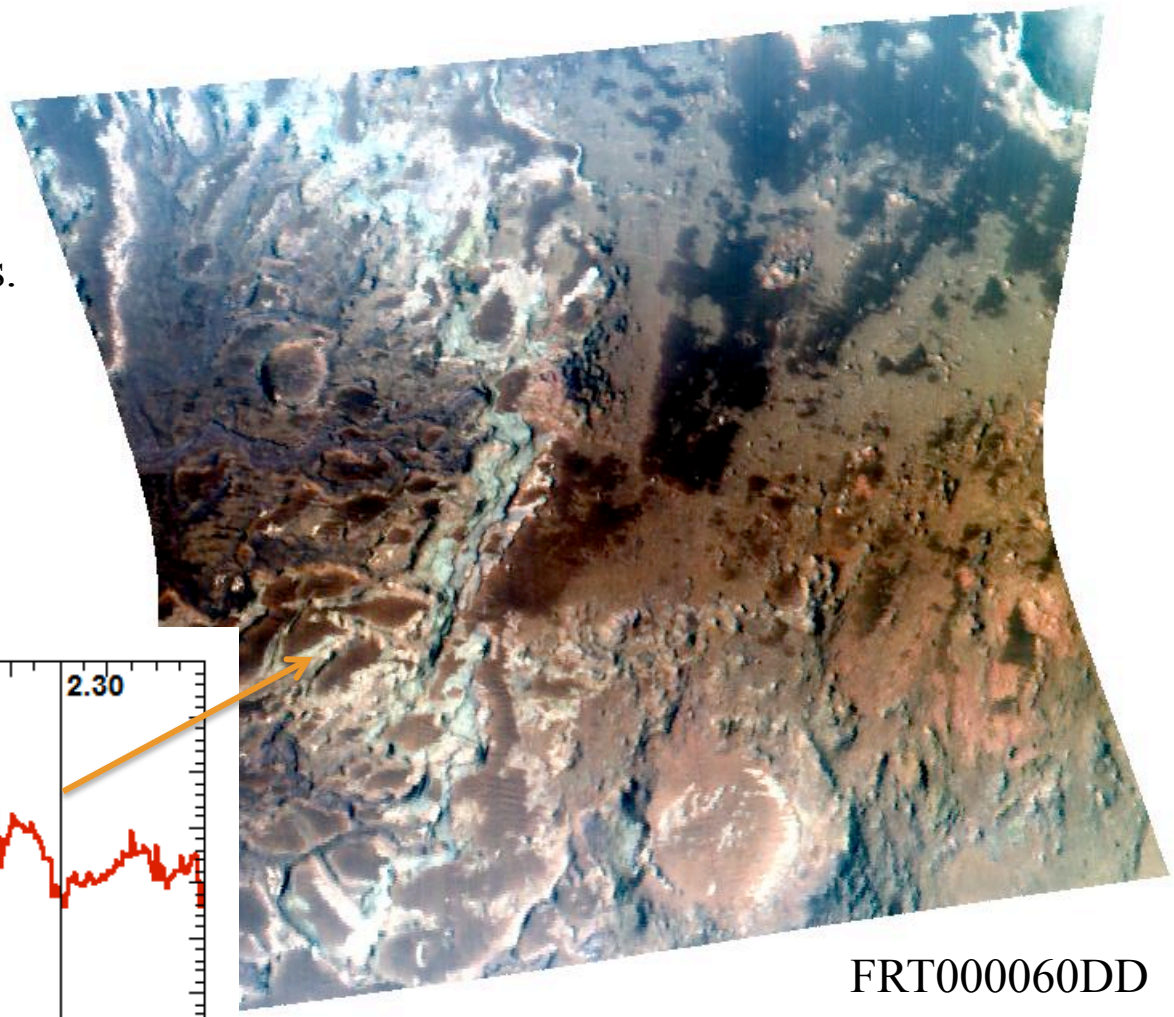


West of ellipse

Light-toned layers within delta

- Strongest phyllosilicate signature in “channel” edge
- Other layers have differing amounts of phyllosilicates vs. pyroxene





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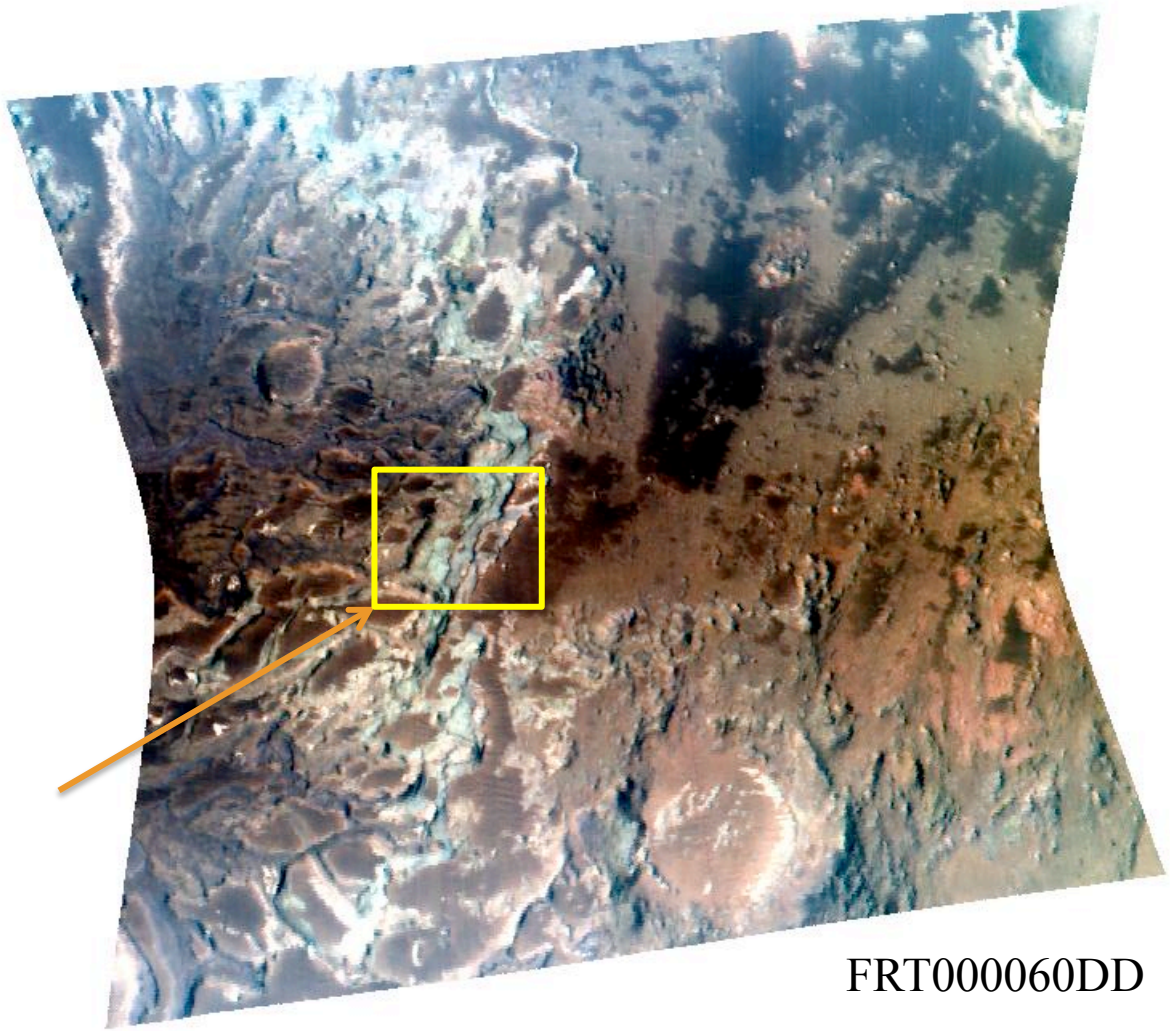
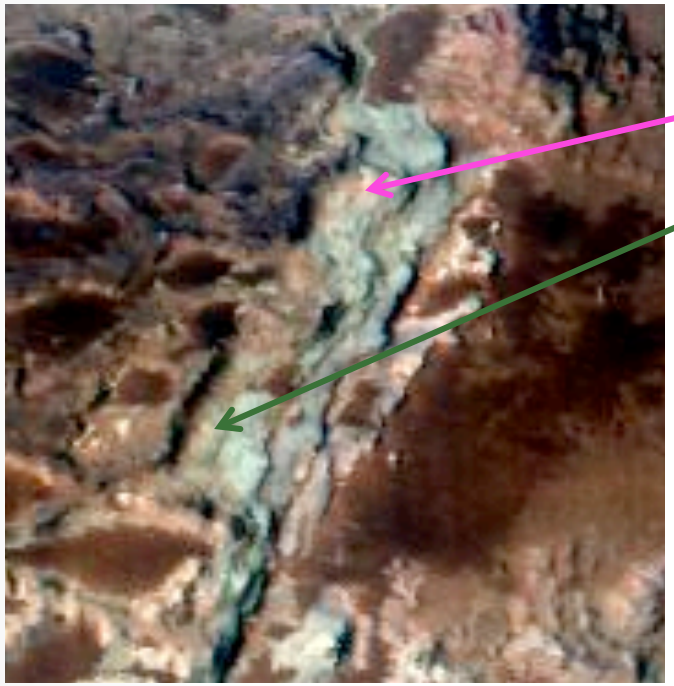
West of ellipse

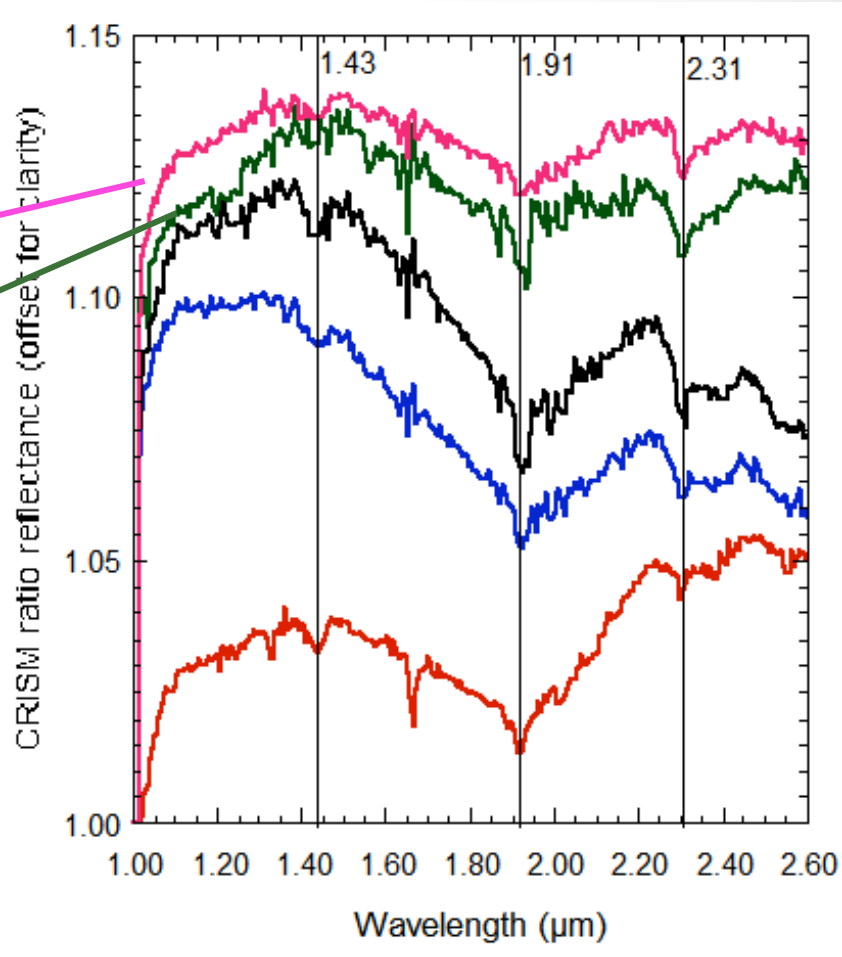
Light-toned layers within/near delta

- Have clear Fe/Mg phyllosilicate signatures



Delta layer mineralogy





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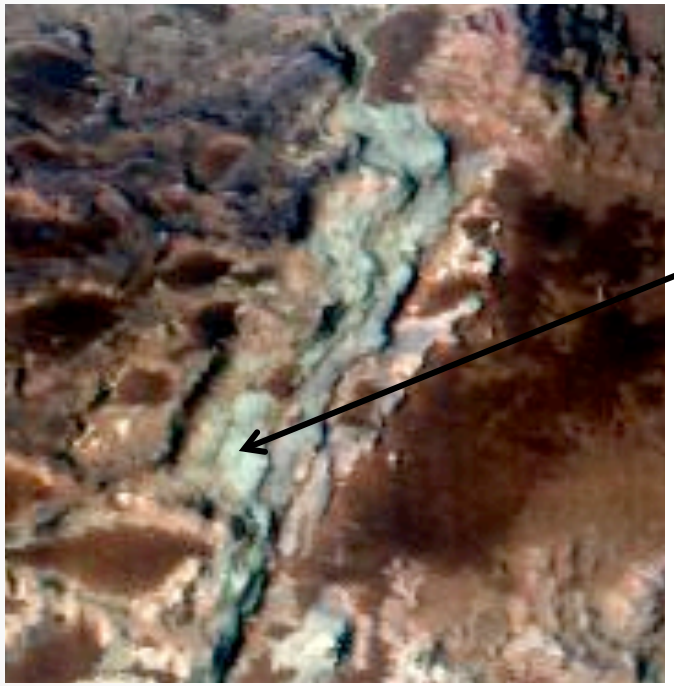

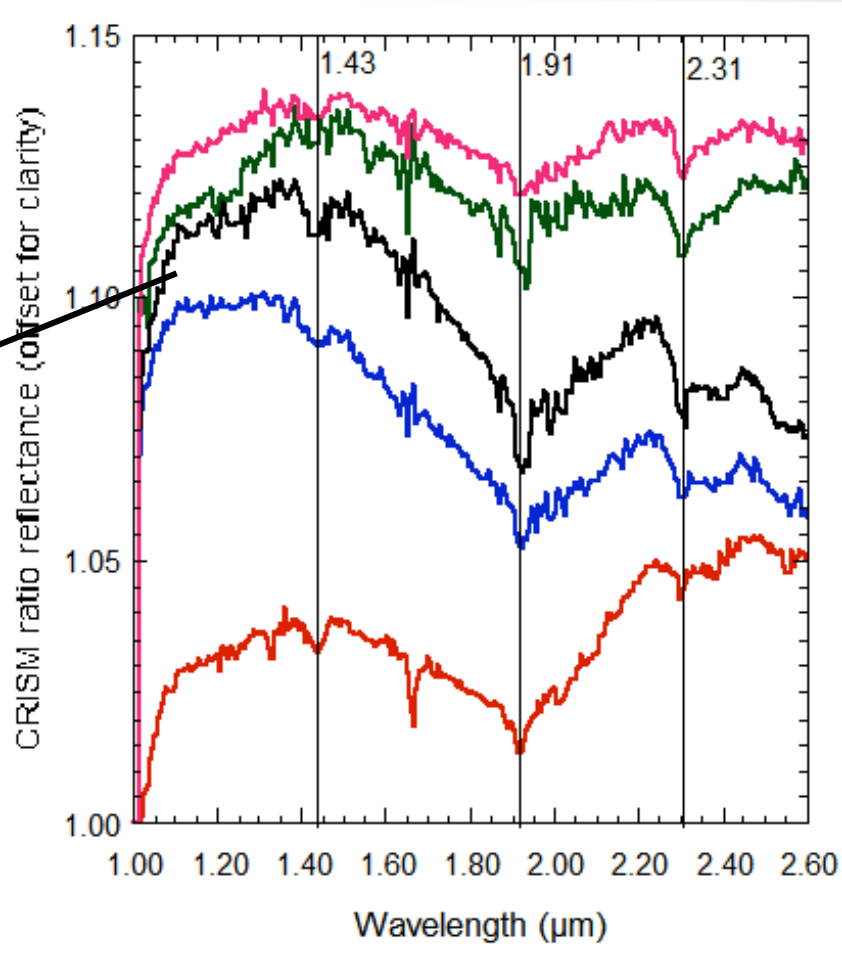

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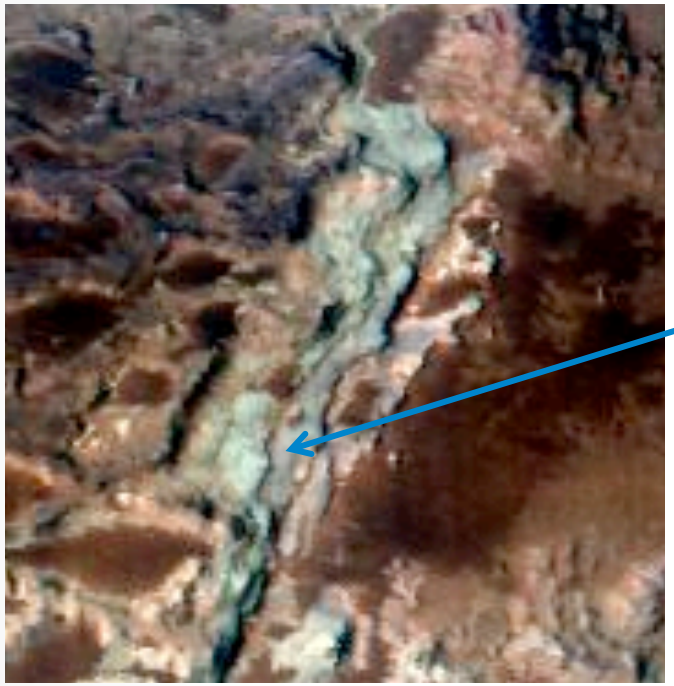

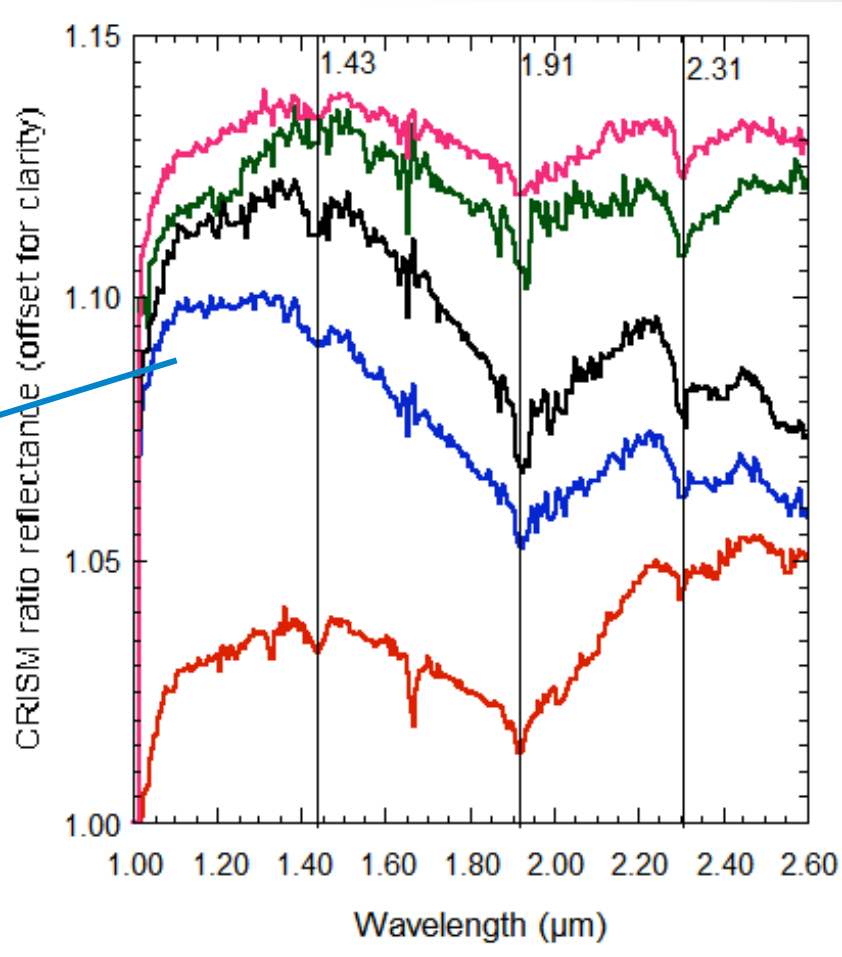

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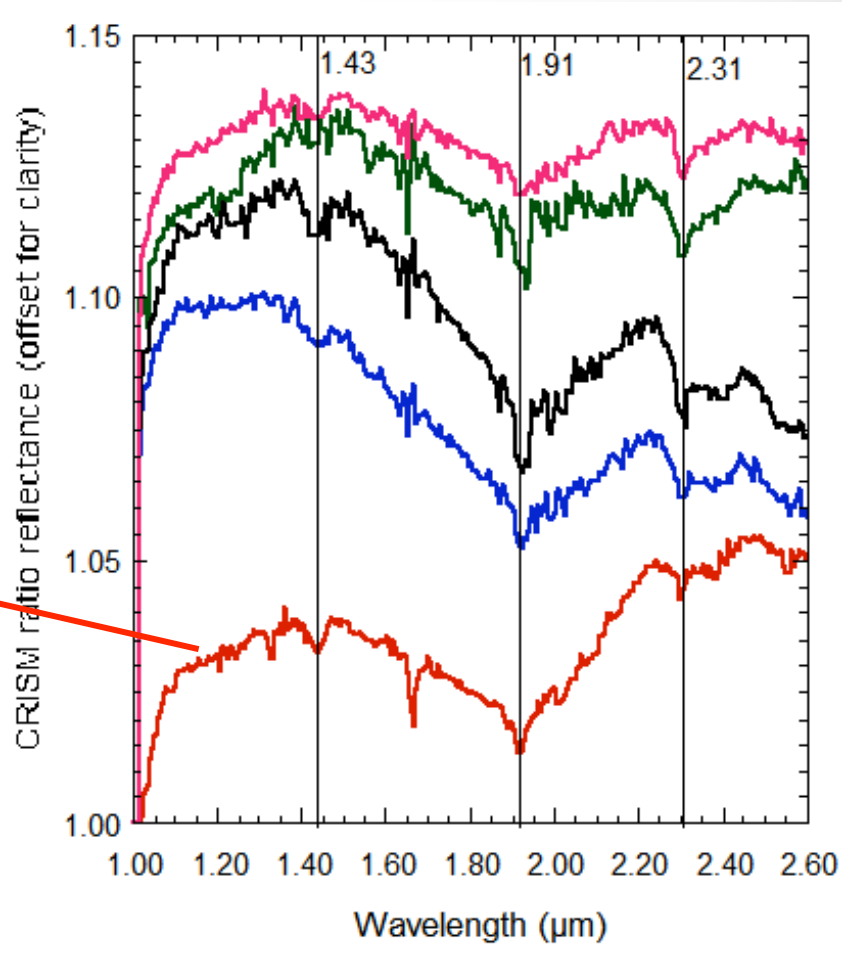

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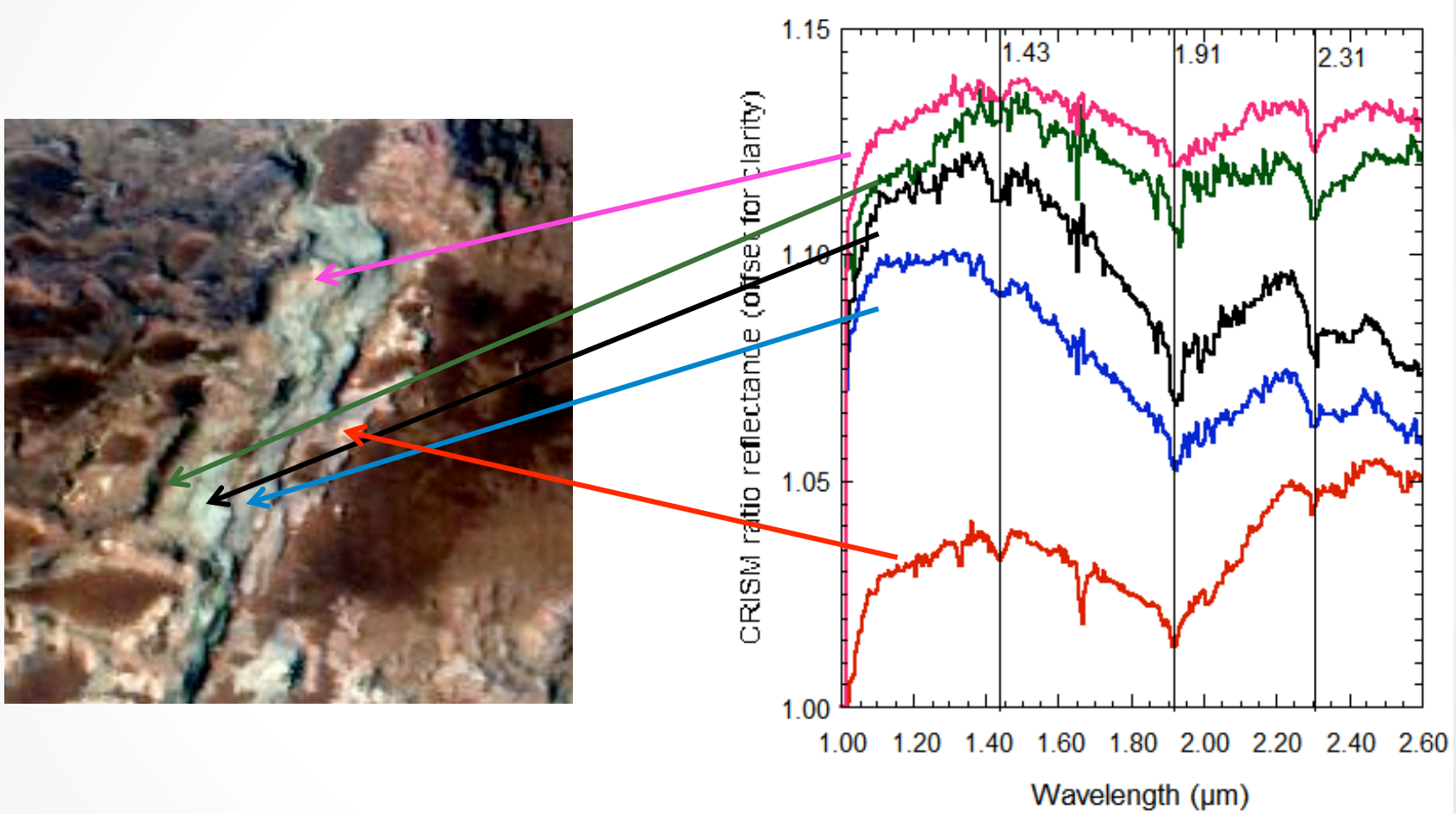
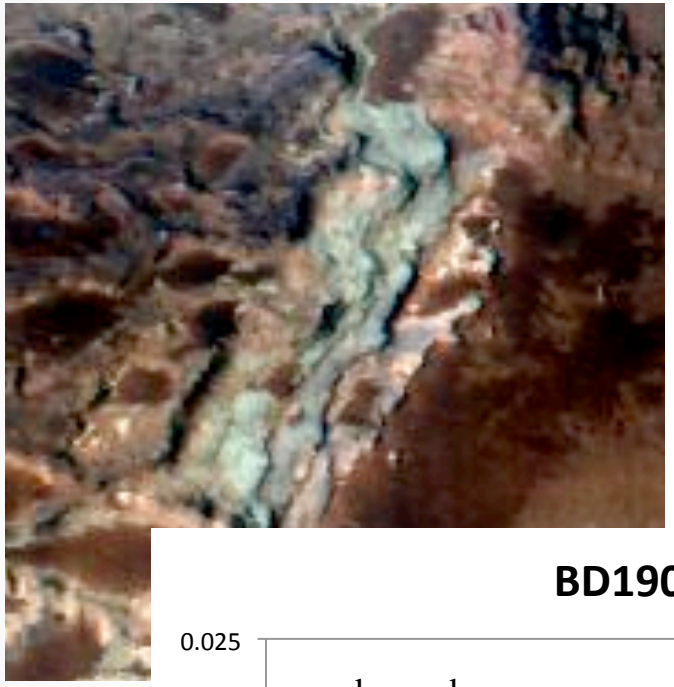
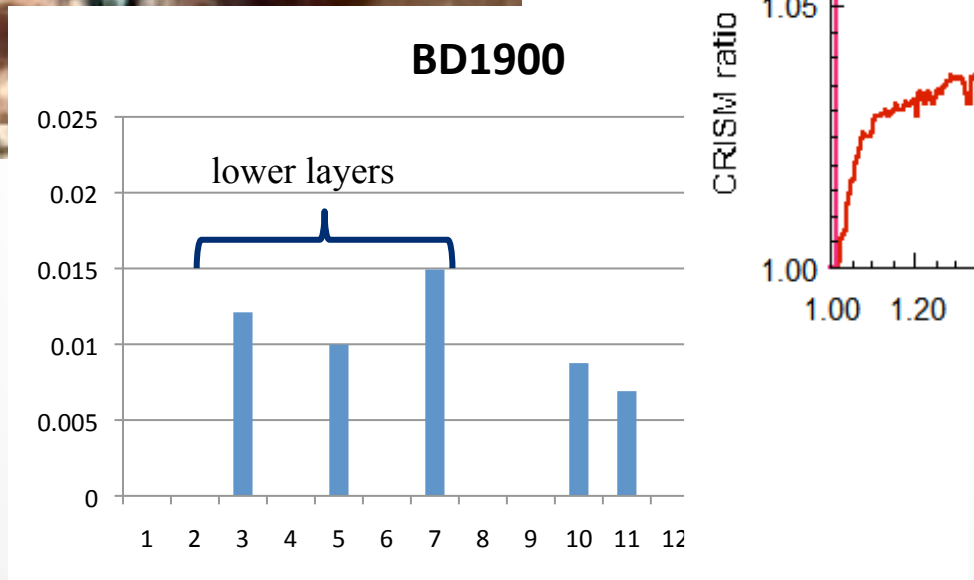
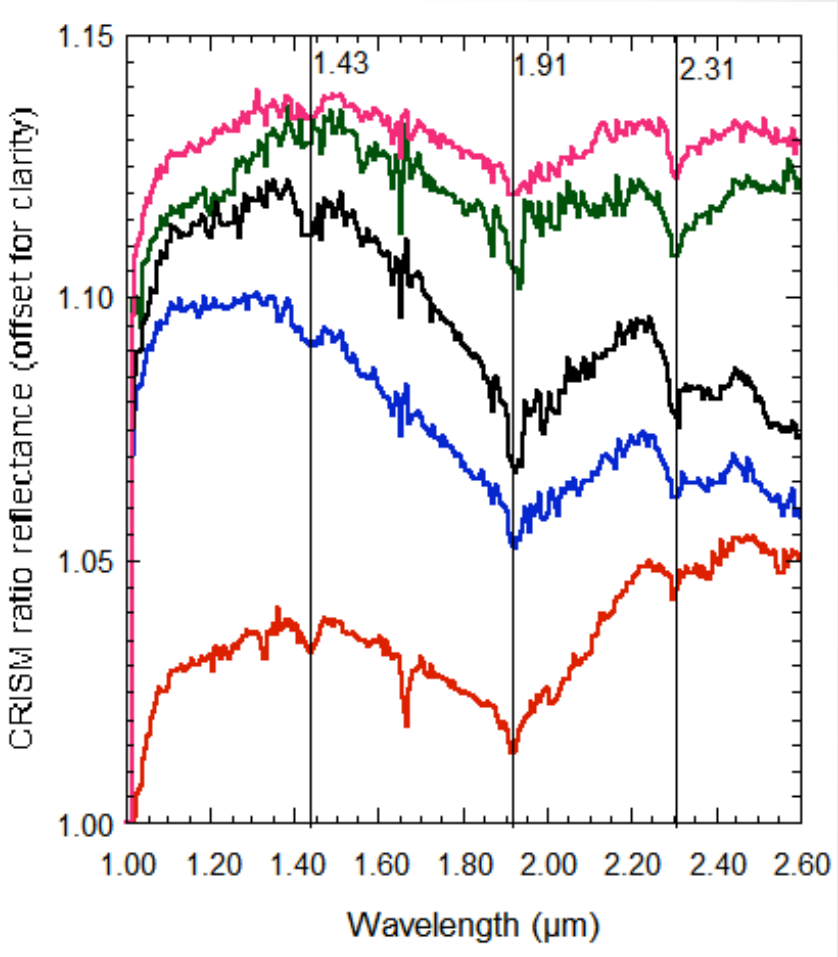


Delta layer mineralogy







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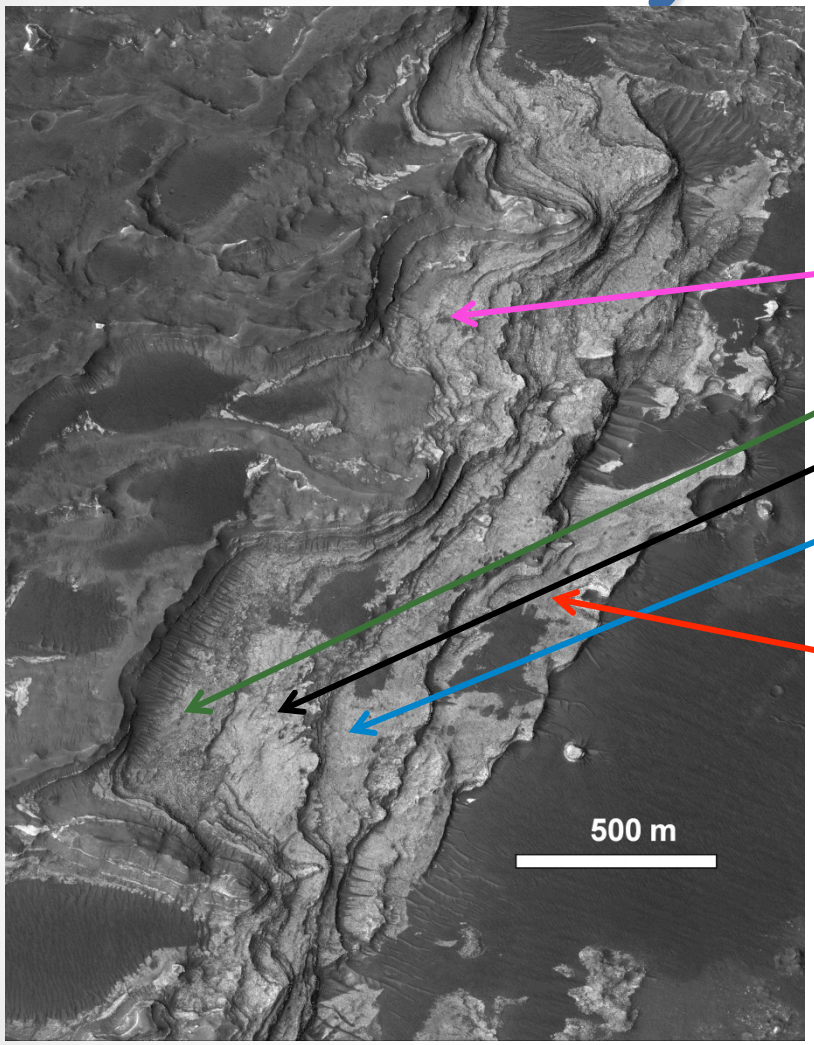
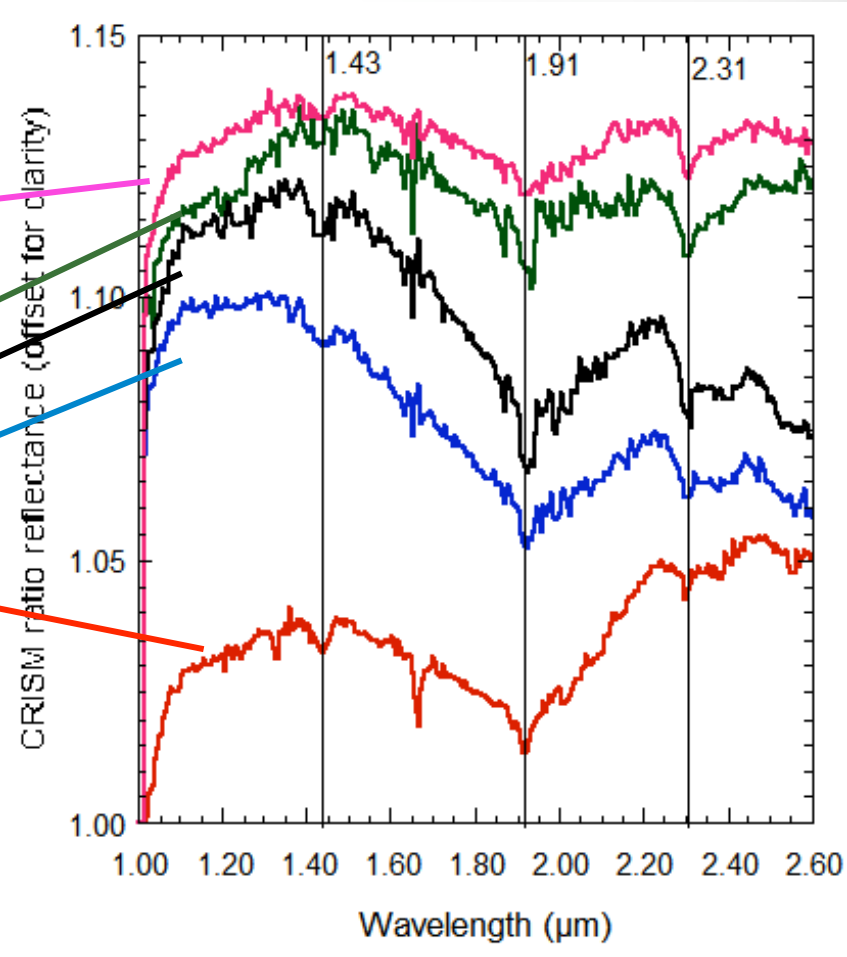
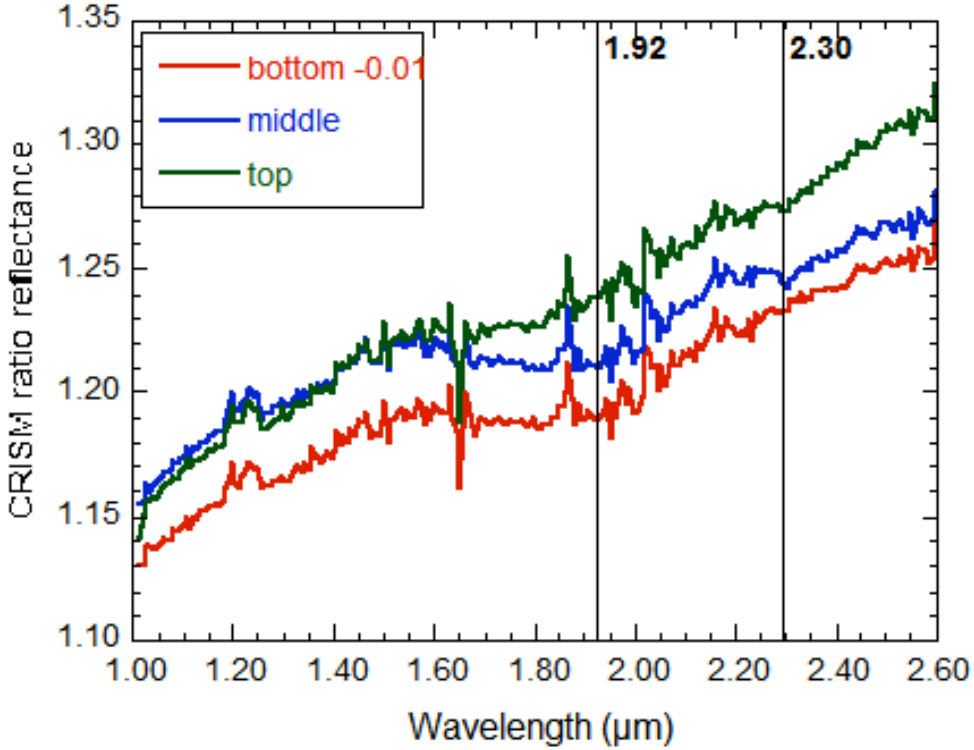


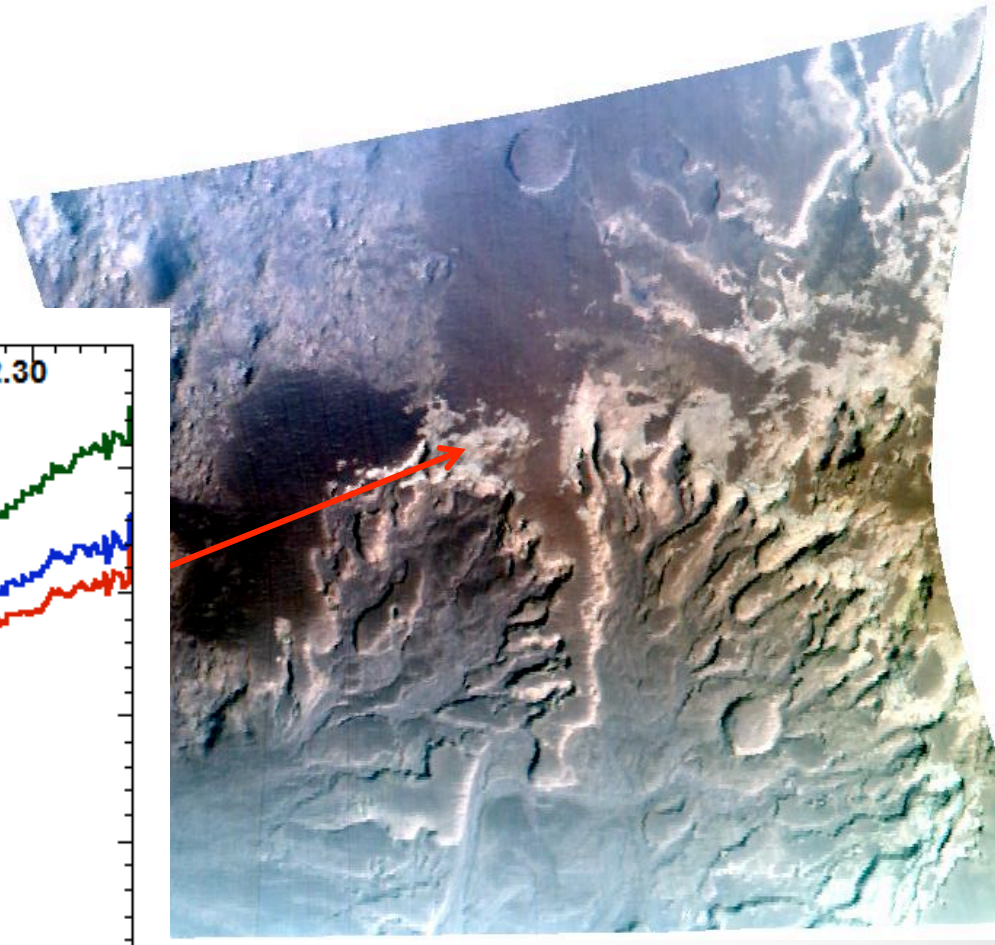


West of ellipse

Layers within northern lobe have very weak phyllosilicate signatures

- Much stronger pyroxene signature





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West of ellipse

Layers within northern lobe have very weak phyllosilicate signatures

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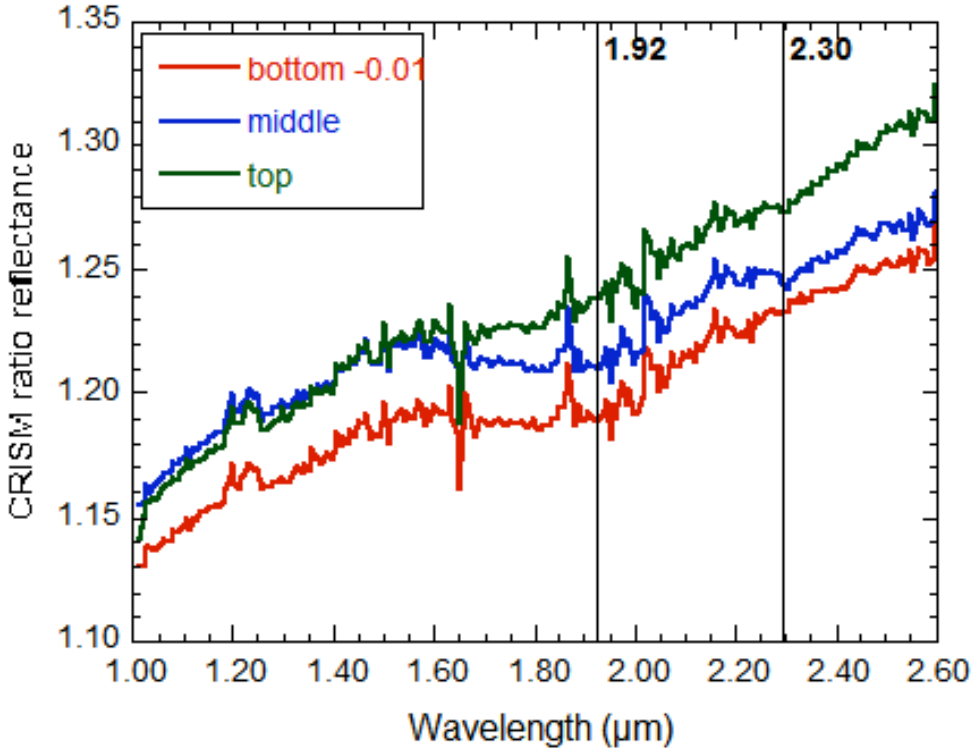

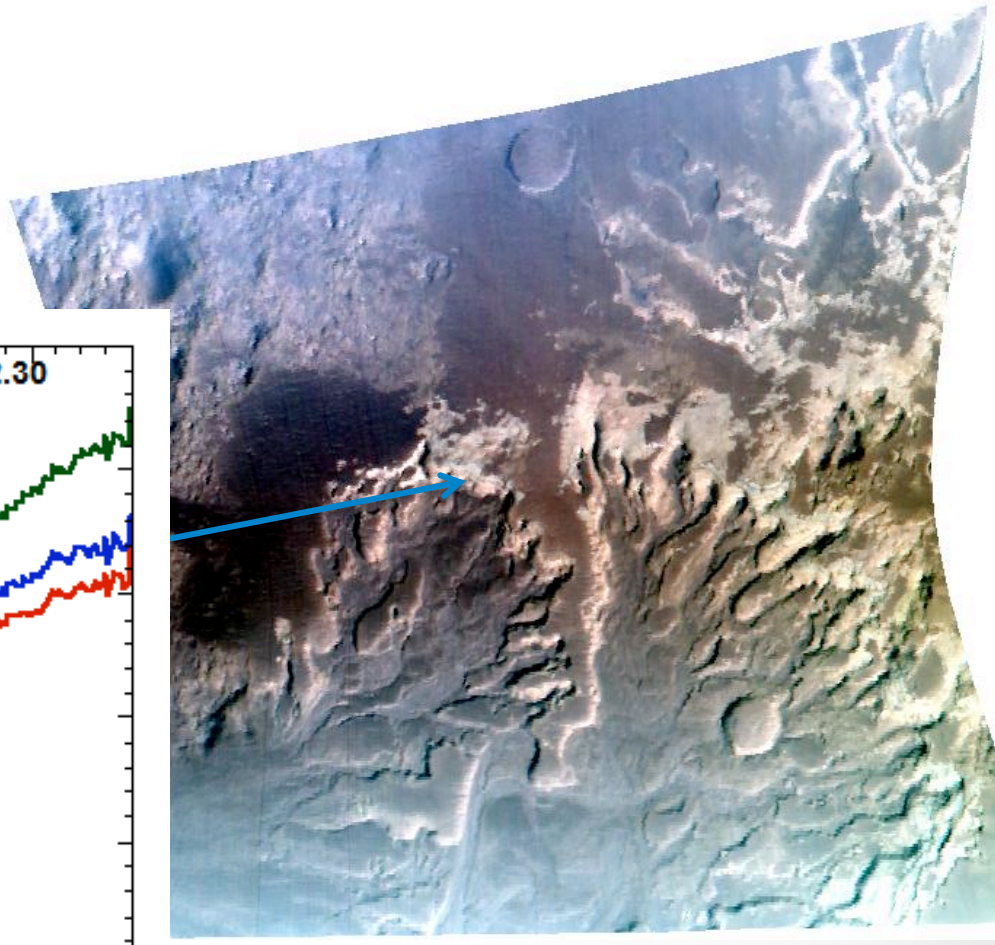

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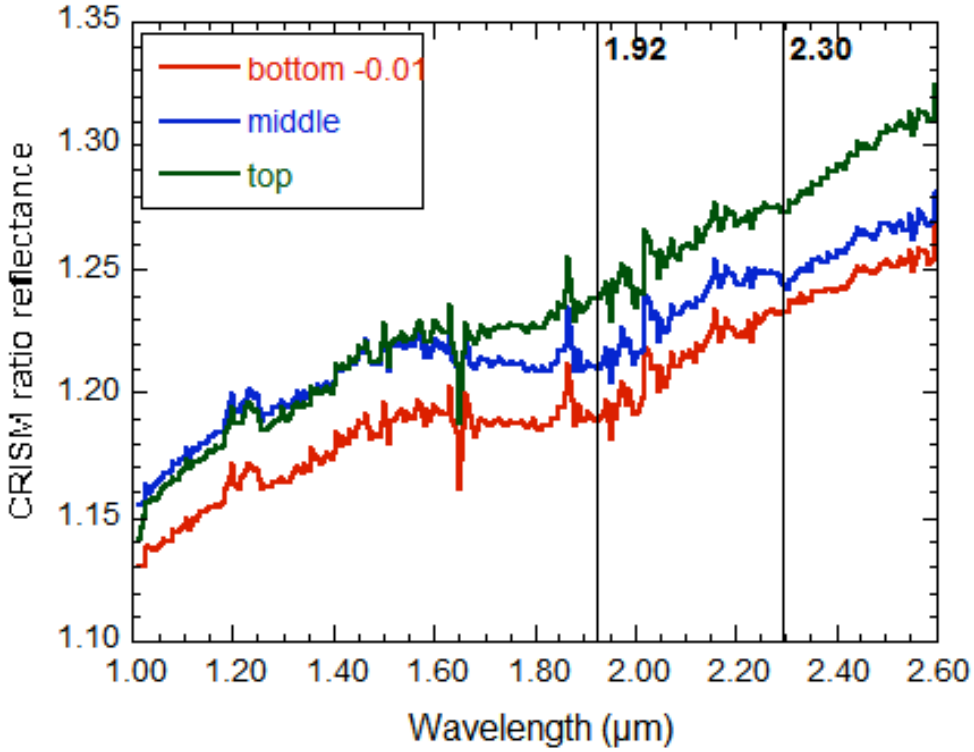
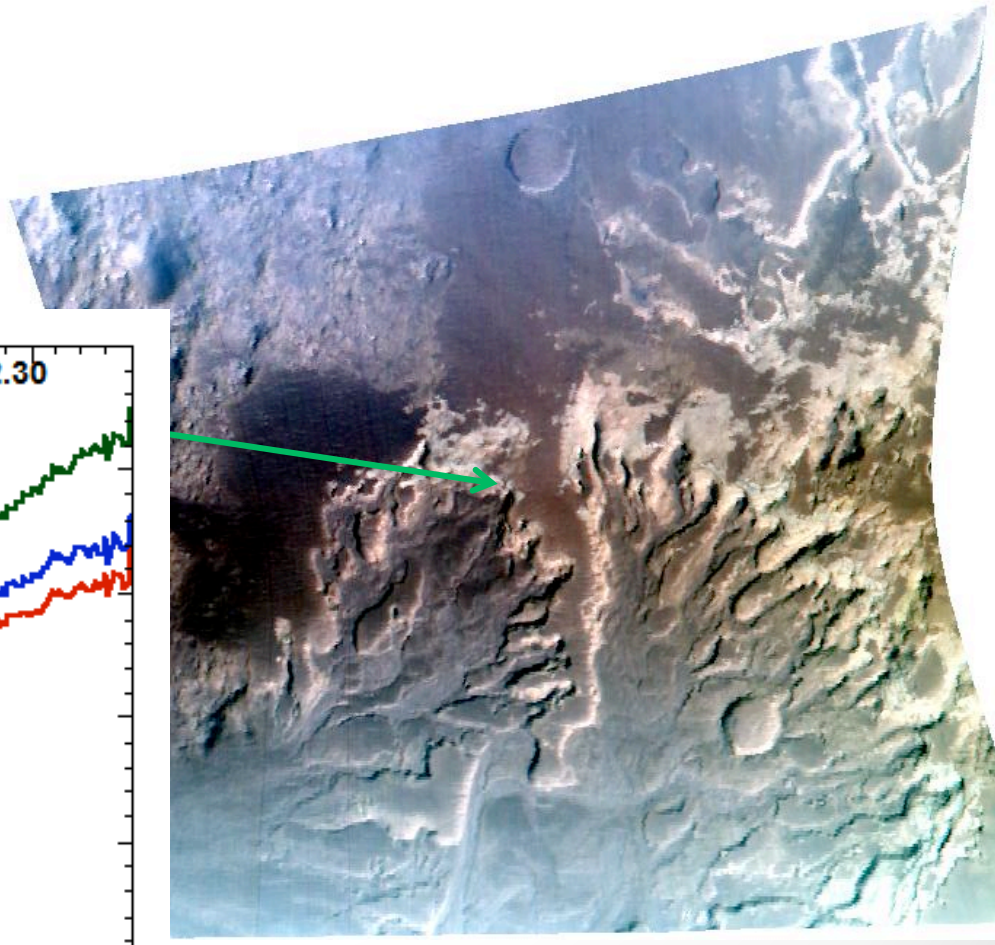
West of ellipse

Layers within northern lobe have very weak 2.3 um feature

- Much stronger pyroxene signature





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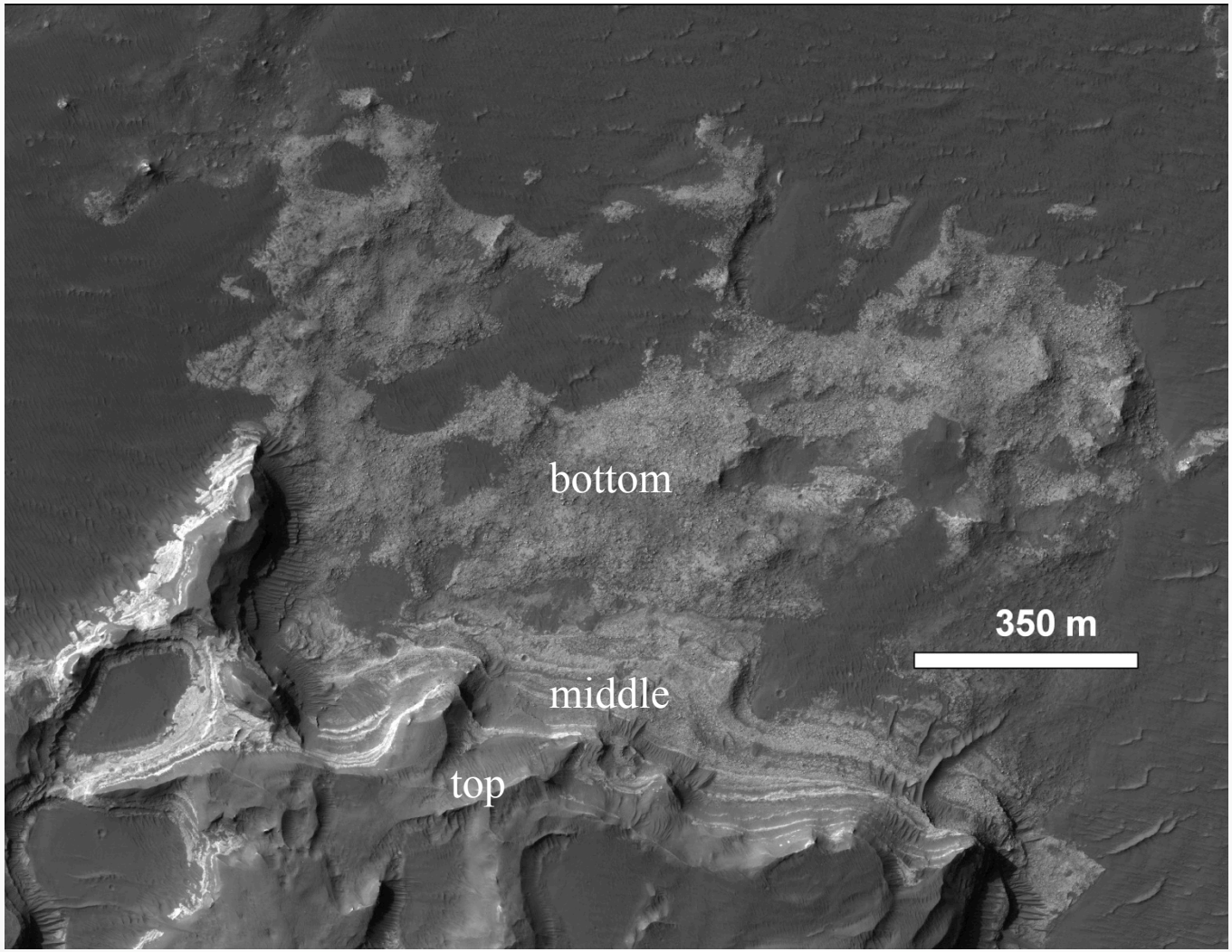
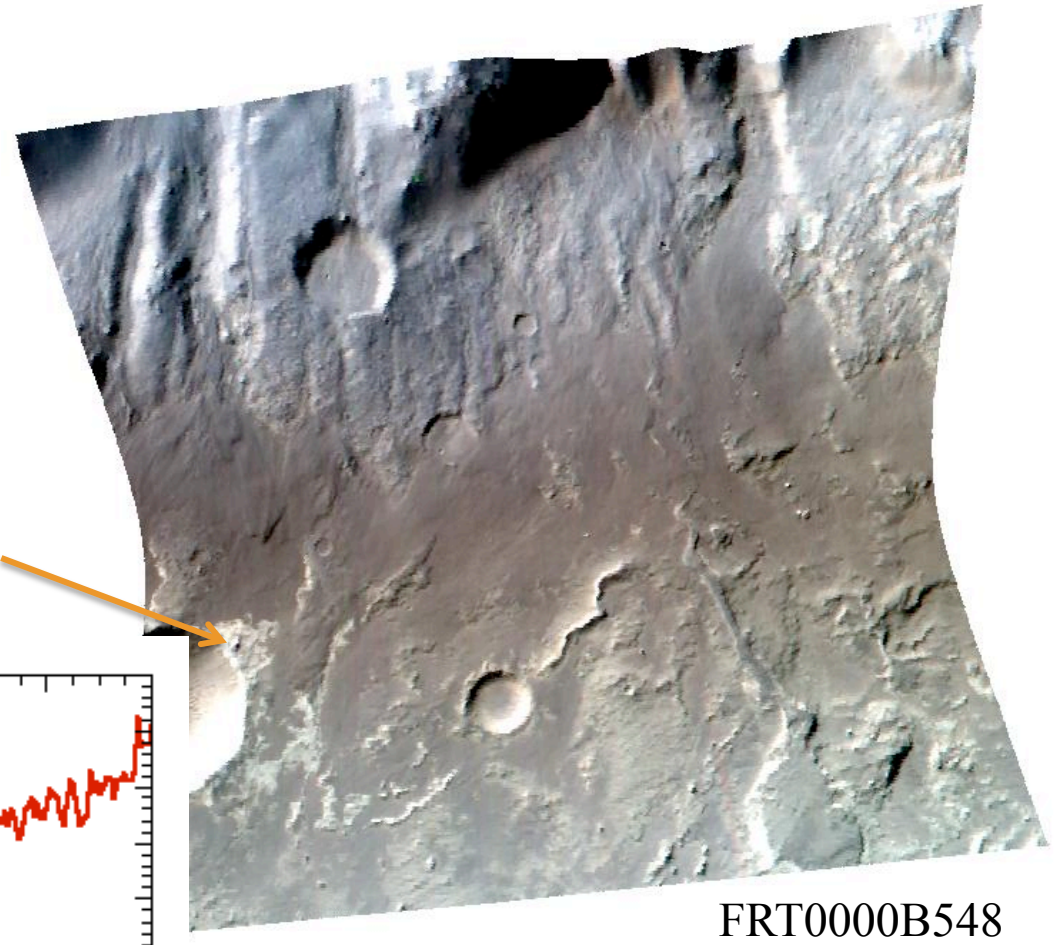
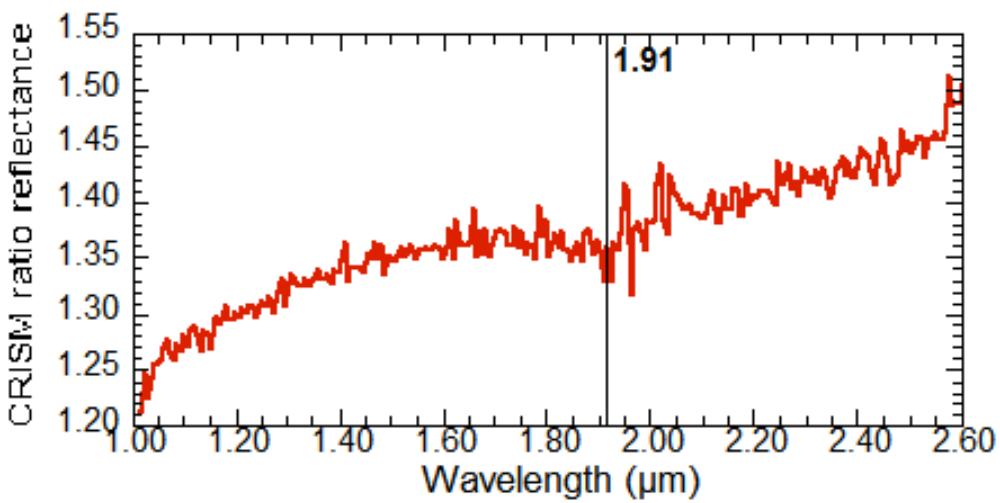


North of ellipse

Hydrated material around small crater

- Light-toned deposits
- Exhibit strongest 3 micron water band in the crater (Milliken, 3rd Landing Site Workshop)





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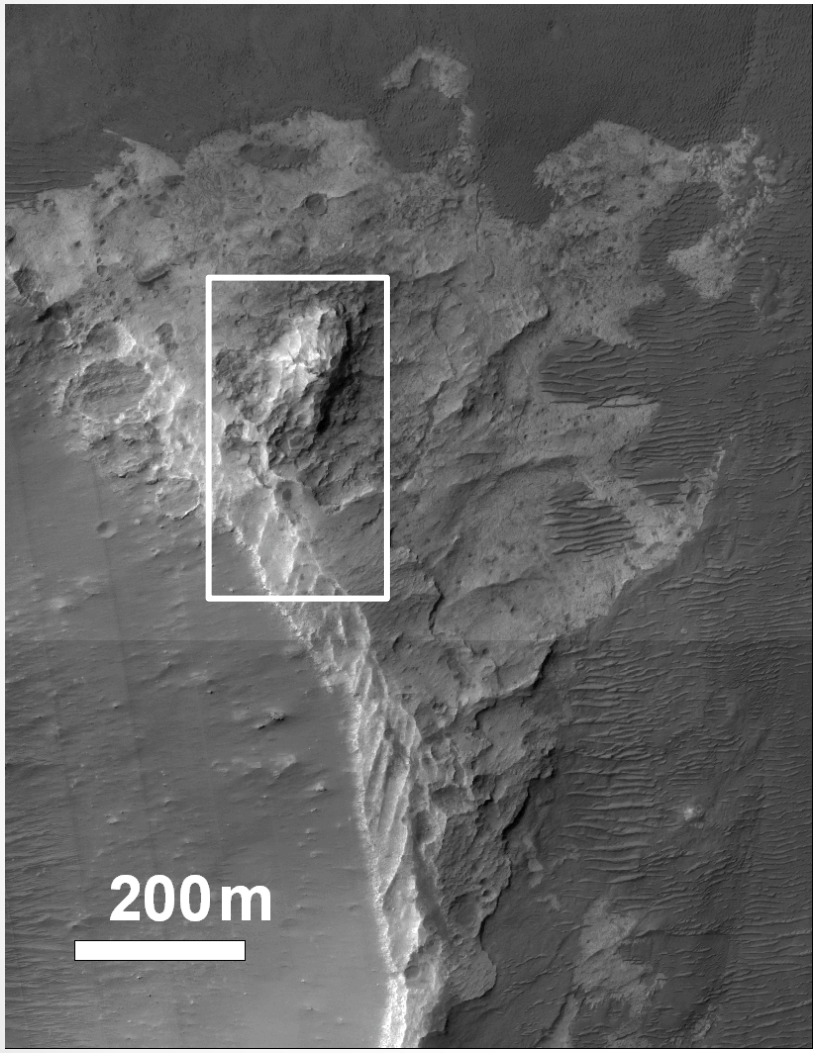
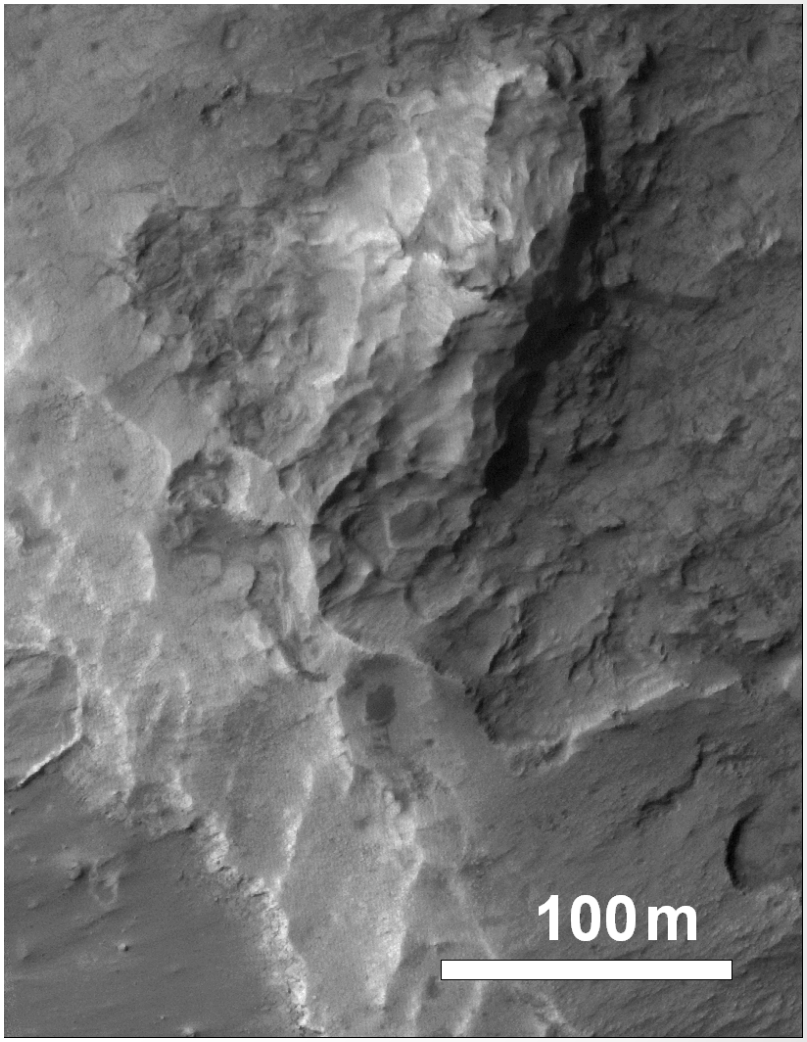
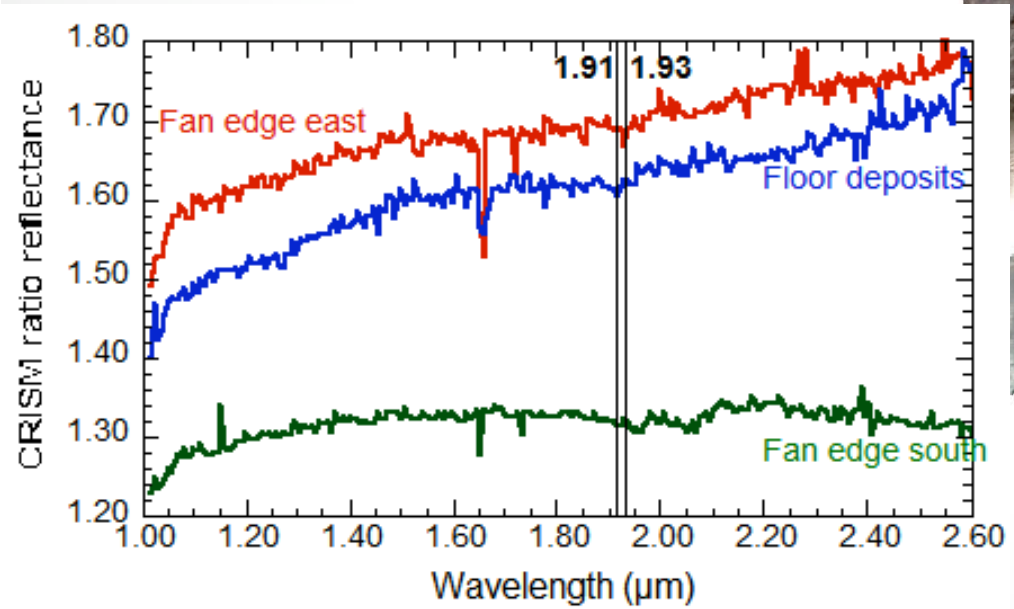
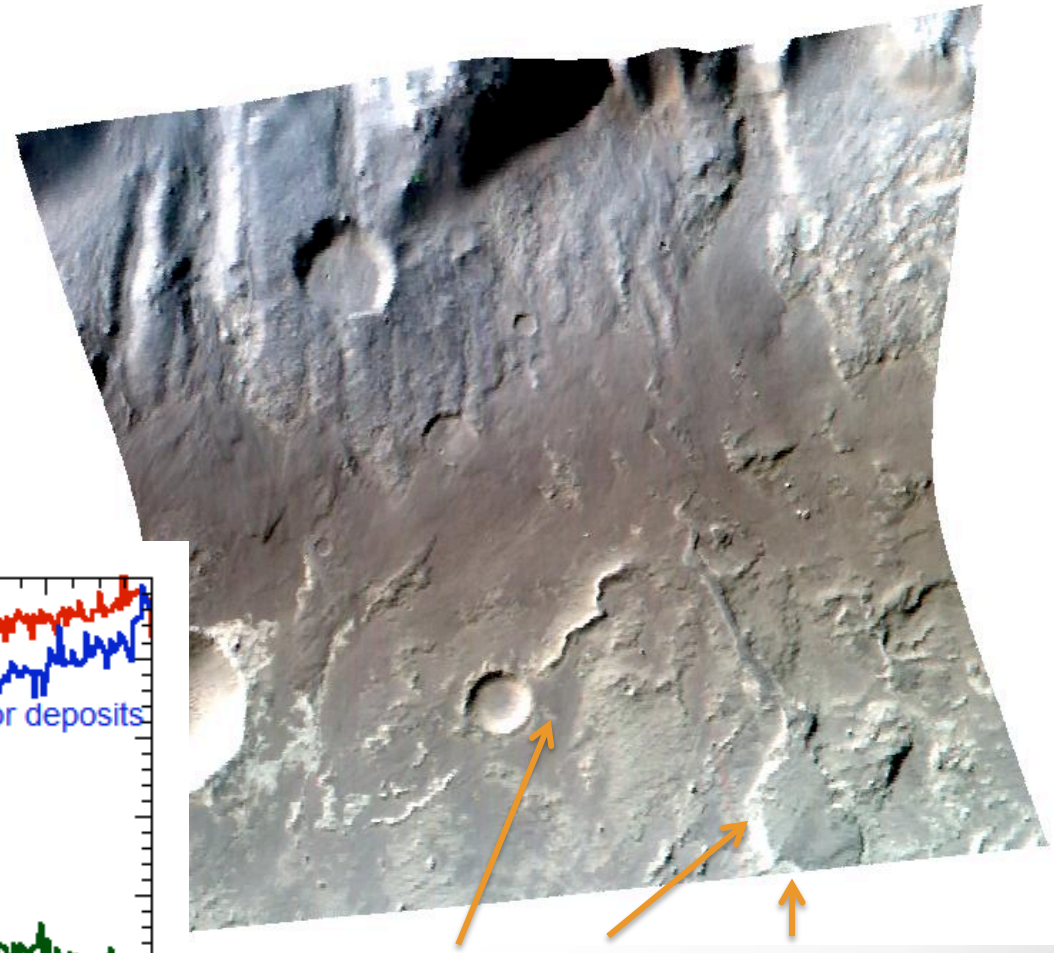




North of ellipse

Hydrated outcrops on basin floor
Hydrated outcrops in fan feature
- Light-toned deposits





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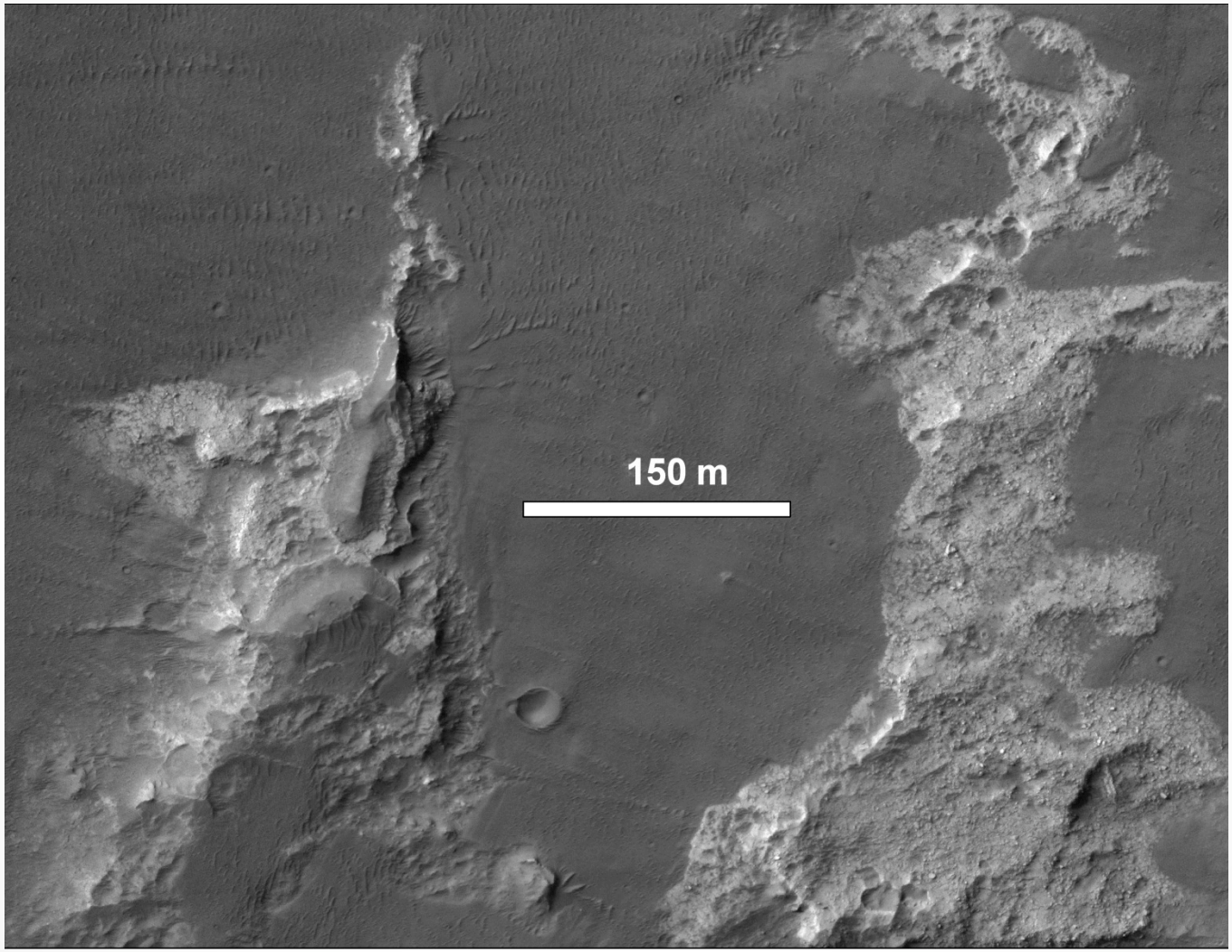
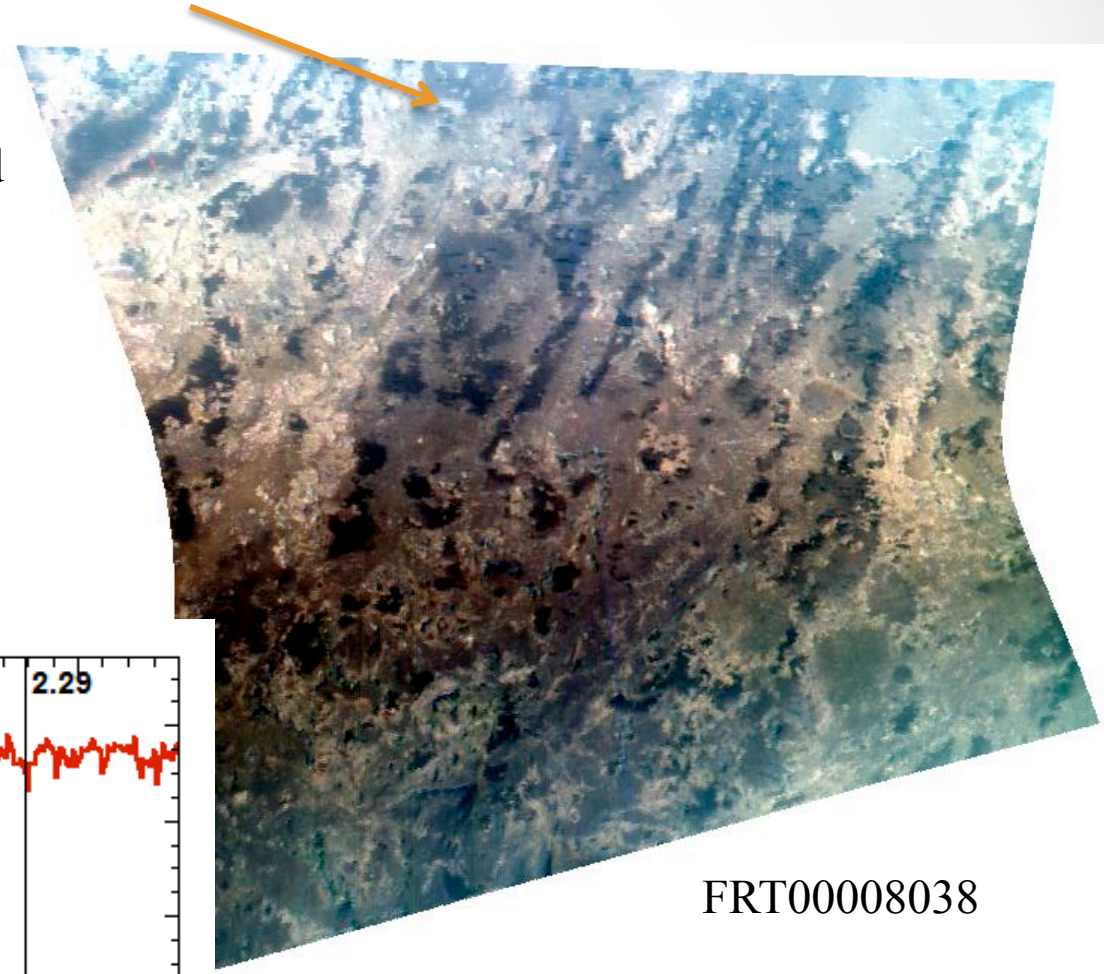
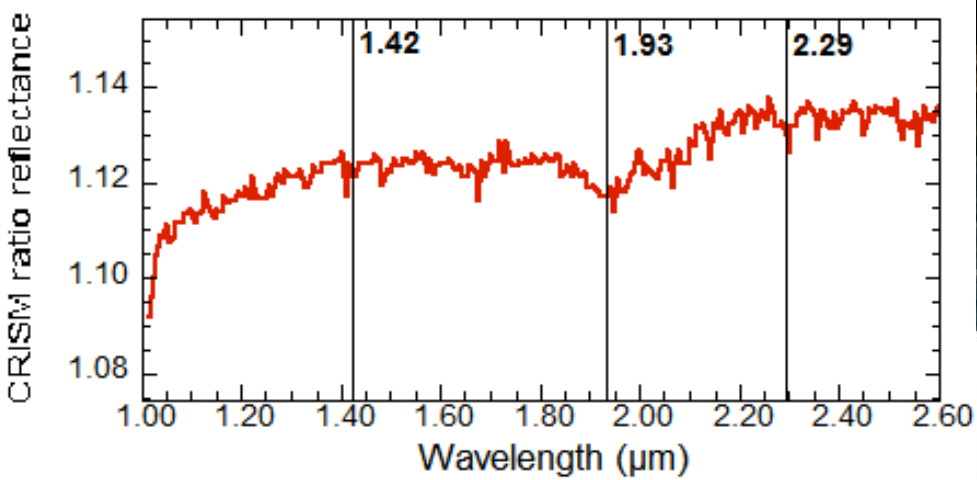


Within ellipse

Light-toned, polygonally fractured material

- Exhibits spectrum of Fe-Mg phyllosilicate





Within ellipse

- Many outcrops with interesting morphology and no clear spectral signature
  - Possible Holden megabreccia
  - Typical basin floor material
  - Isolated patches of light-toned material
  - Inverted ridges
  - Possible breccia injection dike
  - Possible faults

Conclusions

- Several hydrated or phyllosilicate-bearing outcrops within Eberswalde in addition to the deltaic sediments.
- Spectral features are weak, possibly due to the mantling dust or low abundances
- These materials are found throughout Eberswalde, but mainly in the south, north, and west.
  - Many opportunities to sample the stratigraphy of Eberswalde Crater.