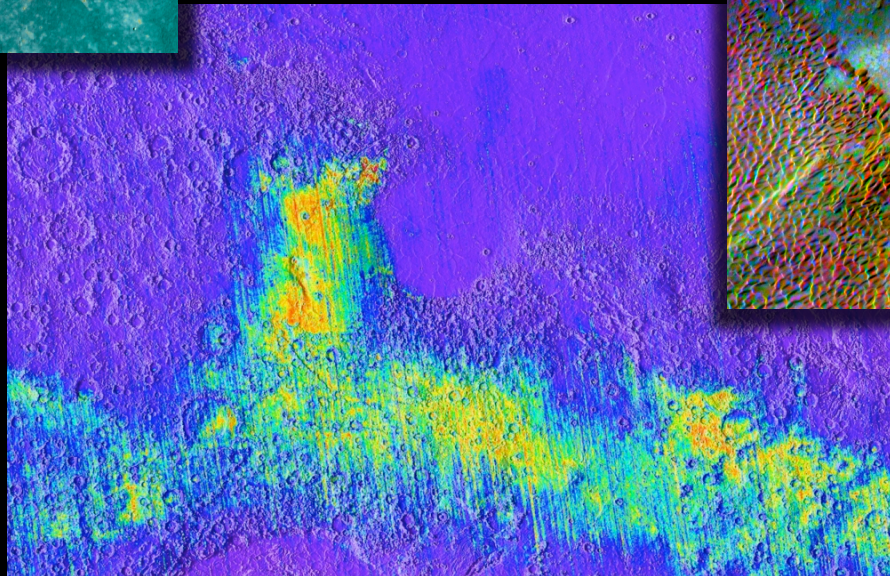
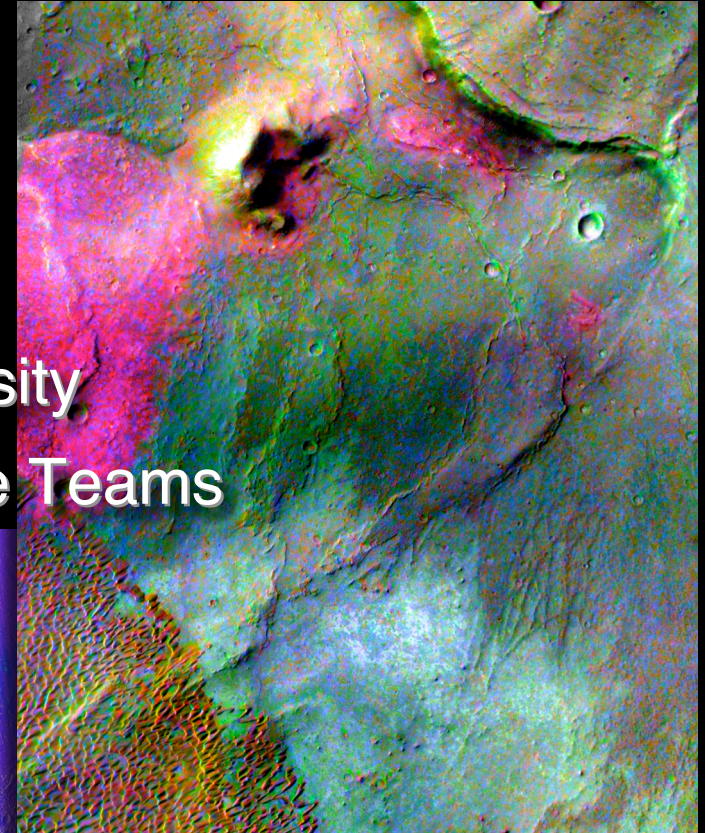
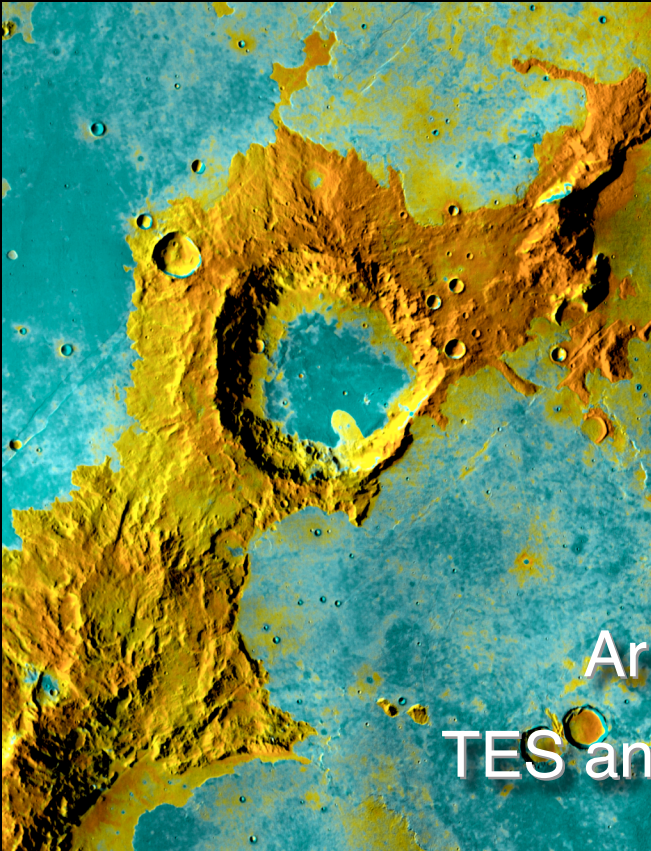


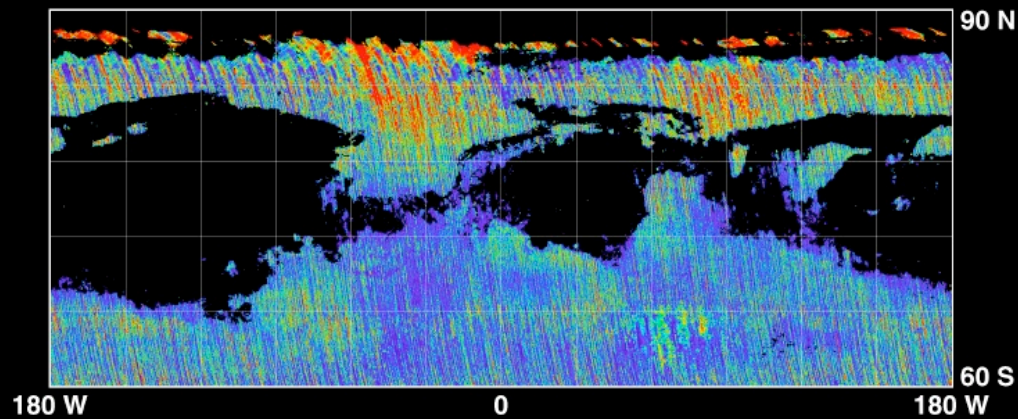
The TES and THEMIS View of Mars

Philip Christensen
Arizona State University
TES and THEMIS Science Teams

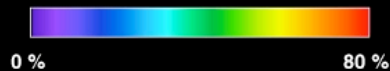
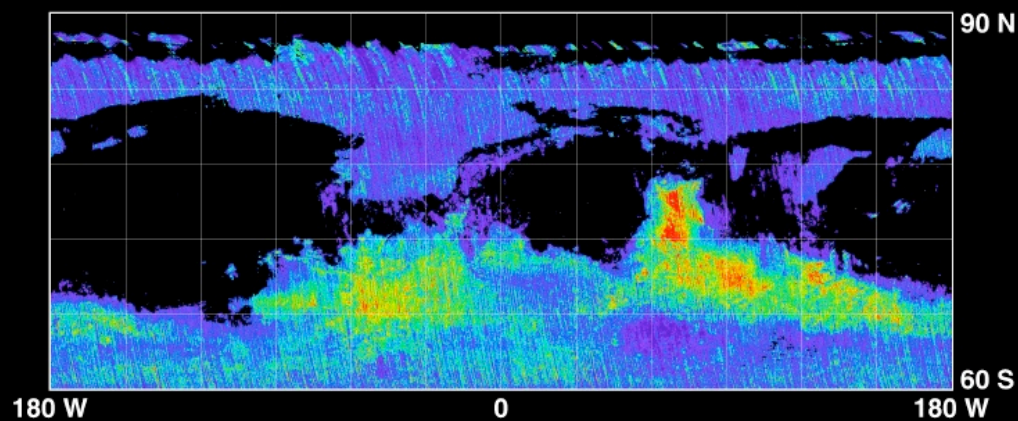


In the beginning there was Type I and Type II

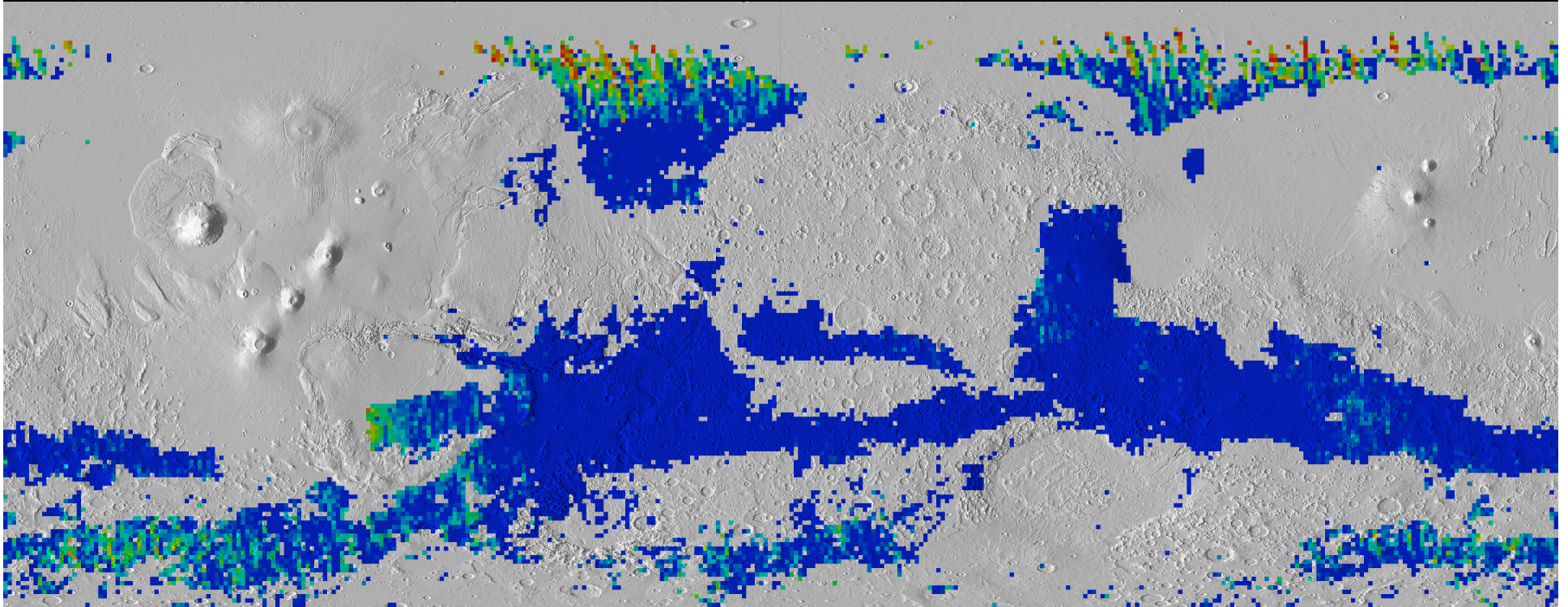
Type 2 – Basaltic Andesite



Type 1 – Basalt

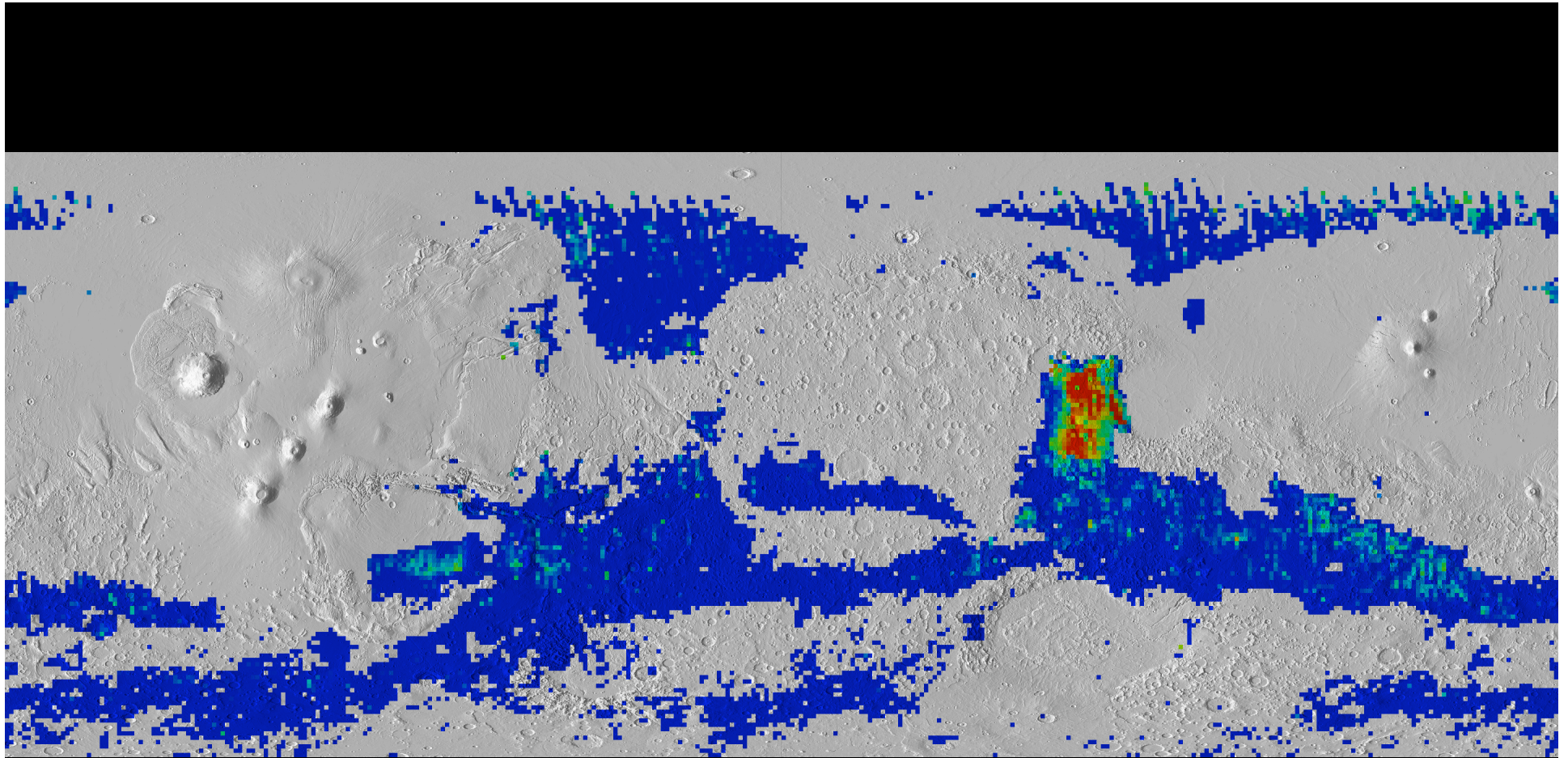


Today ...

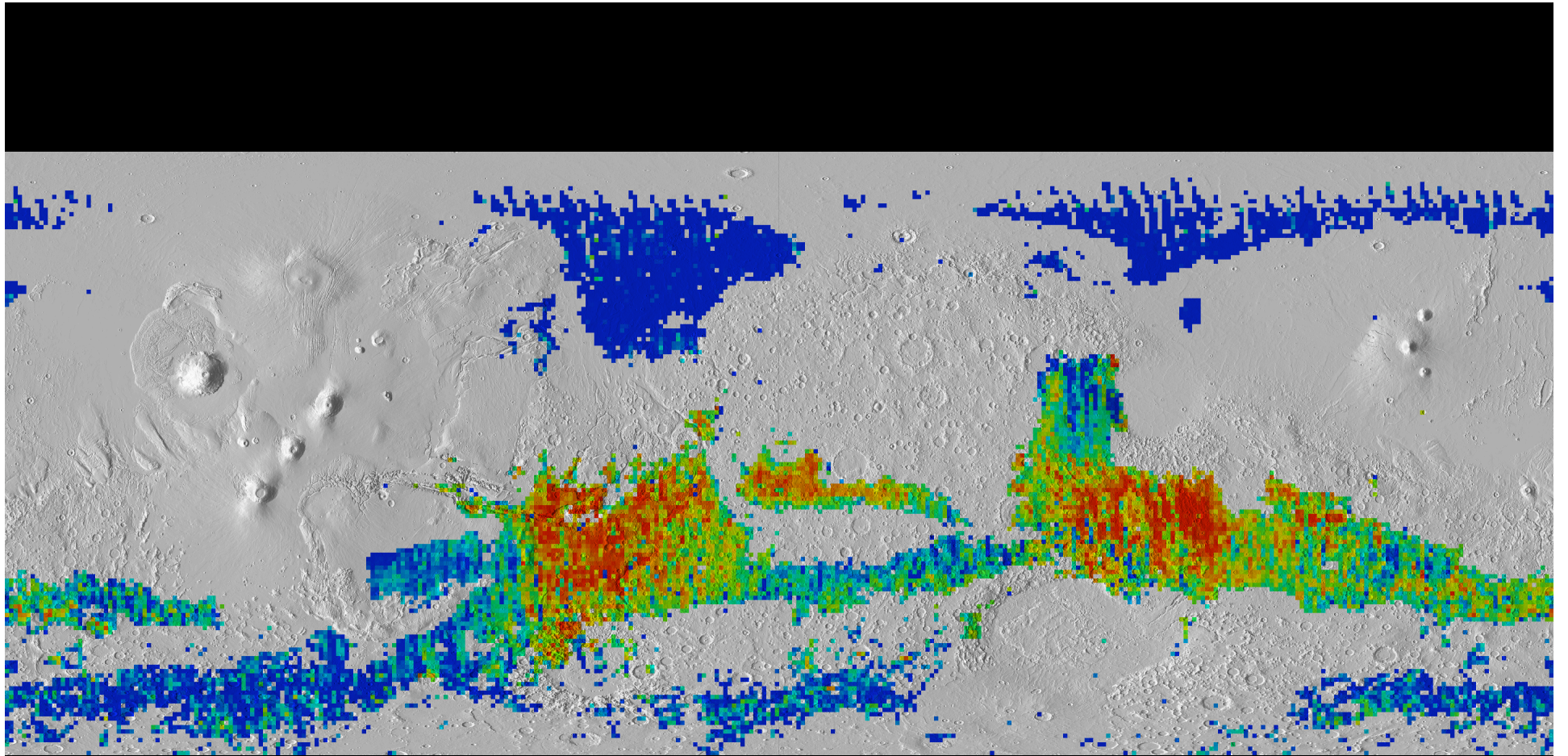


Group 1

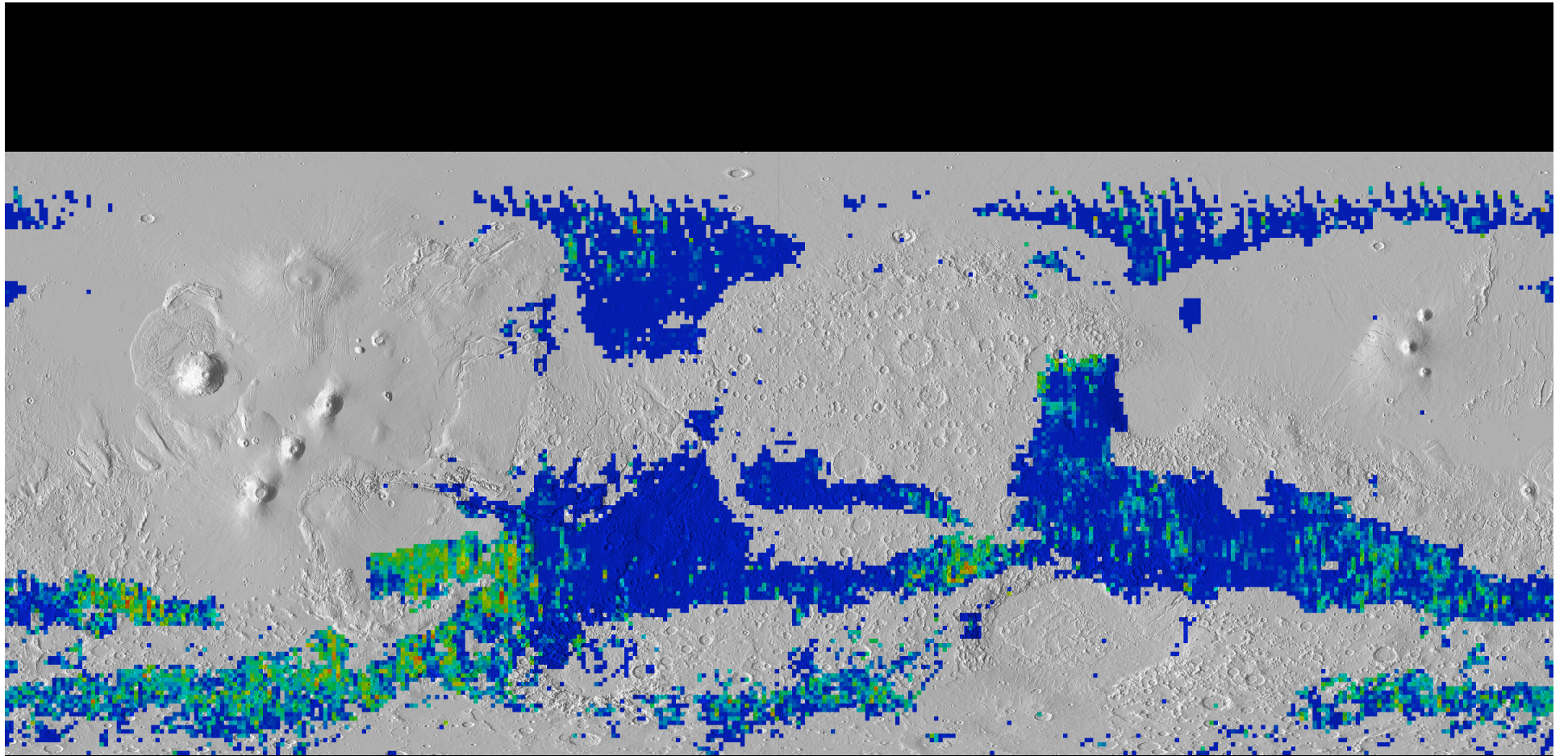
Rogers and Christensen, JGR 2007



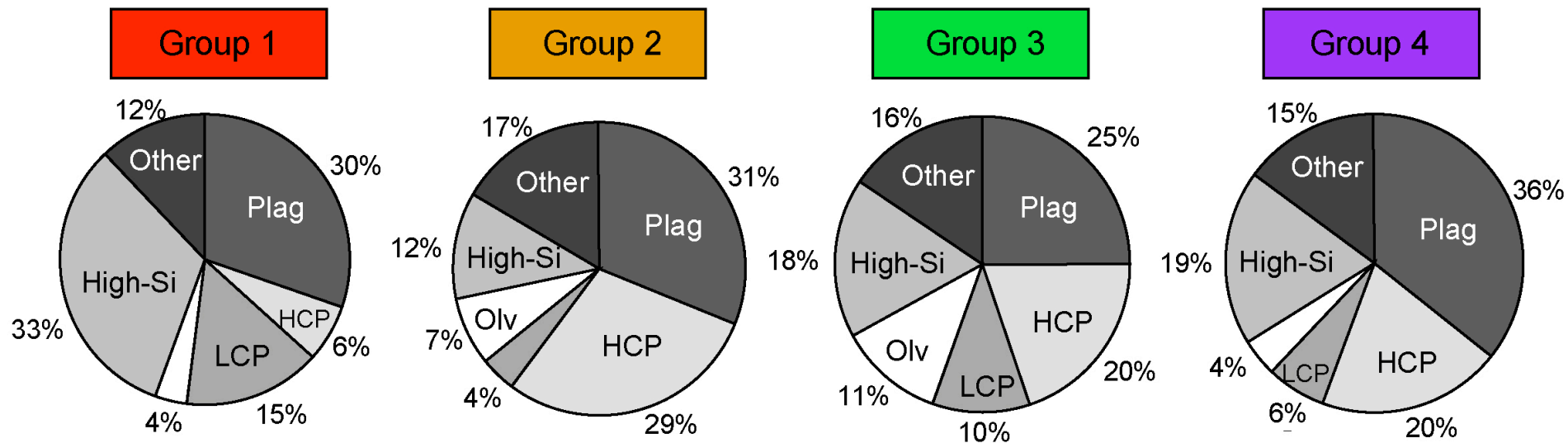
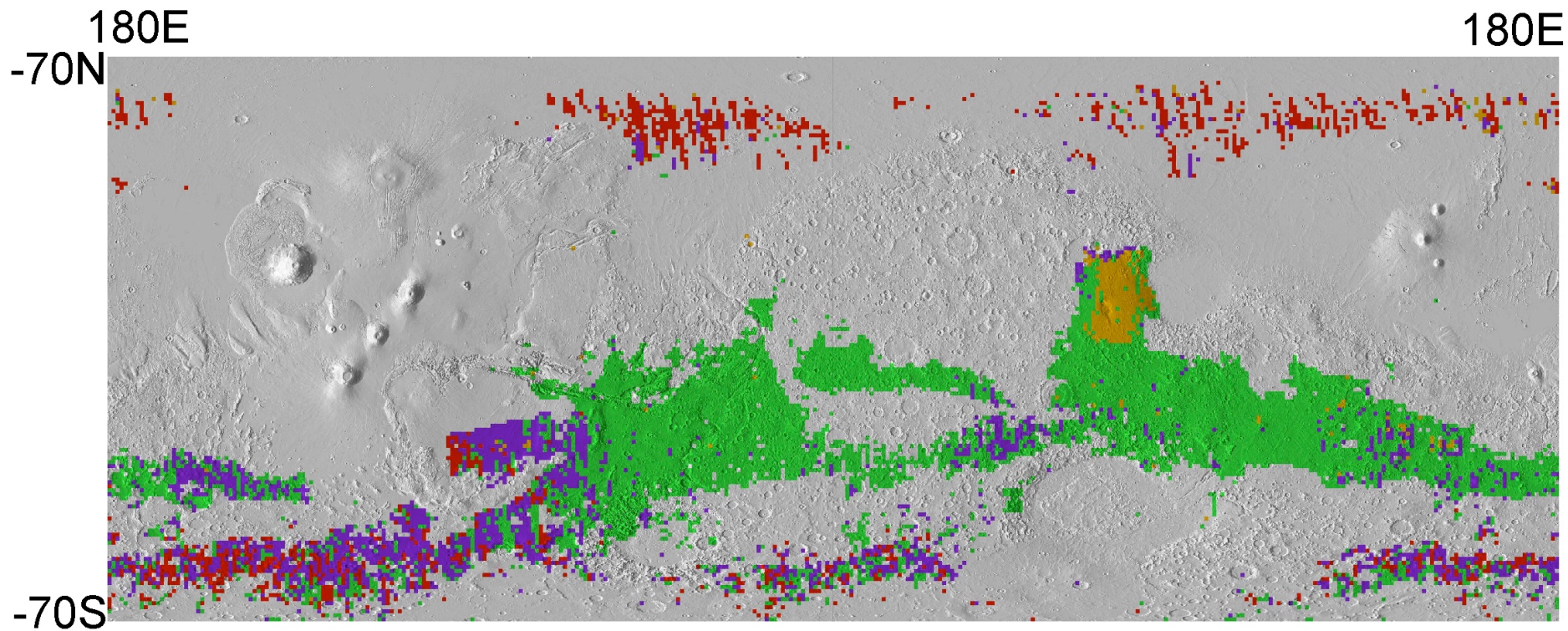
Group 2



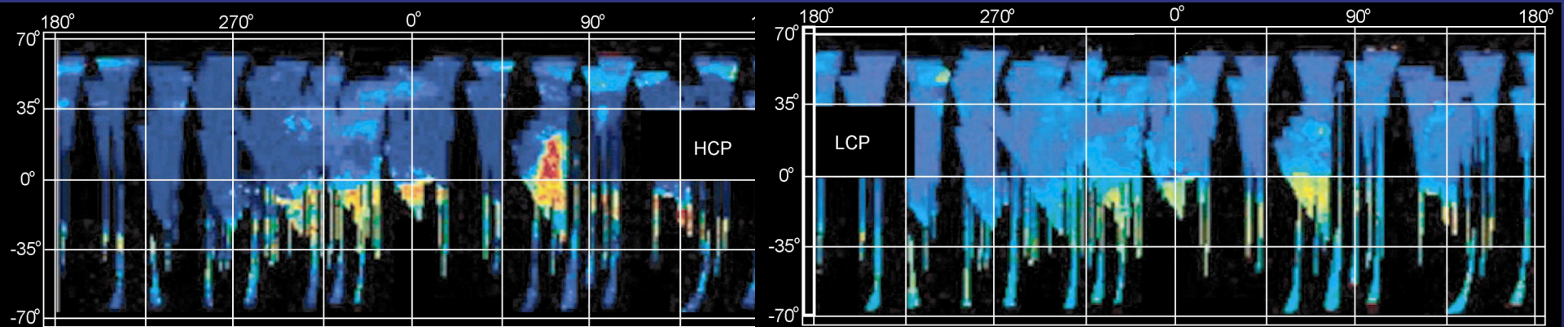
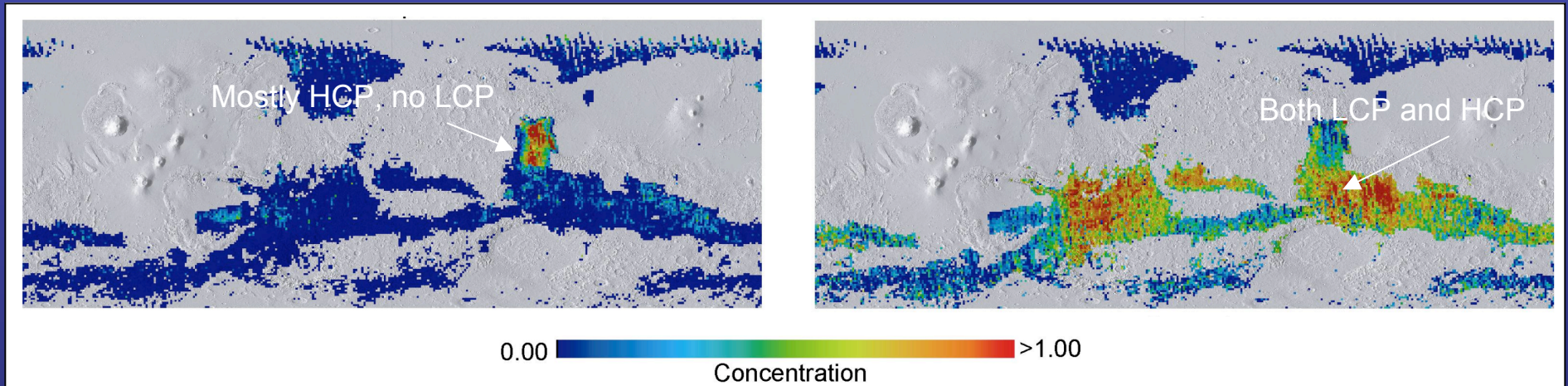
Group 3



Group 4

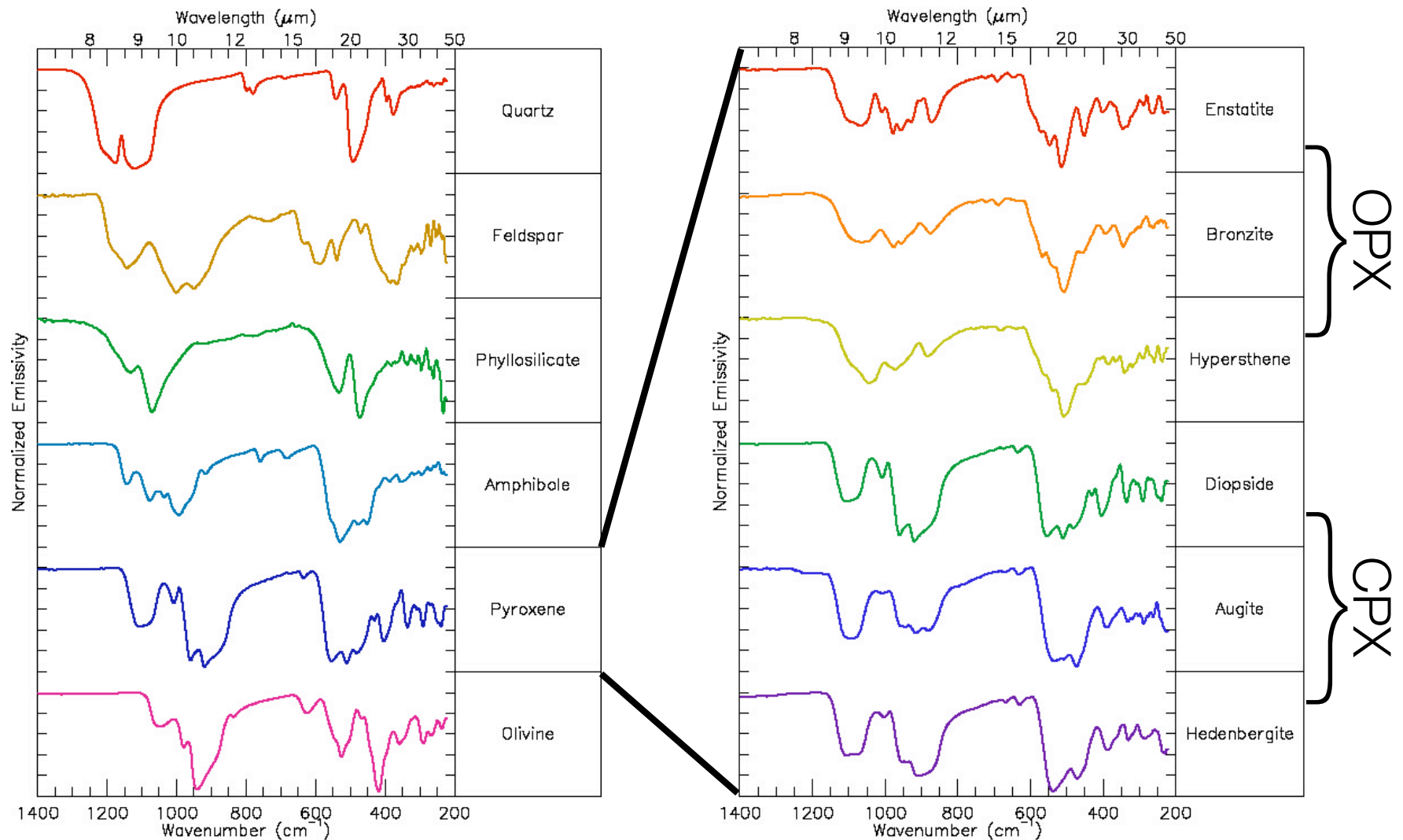


Pyroxene compositions: TES-OMEGA comparison

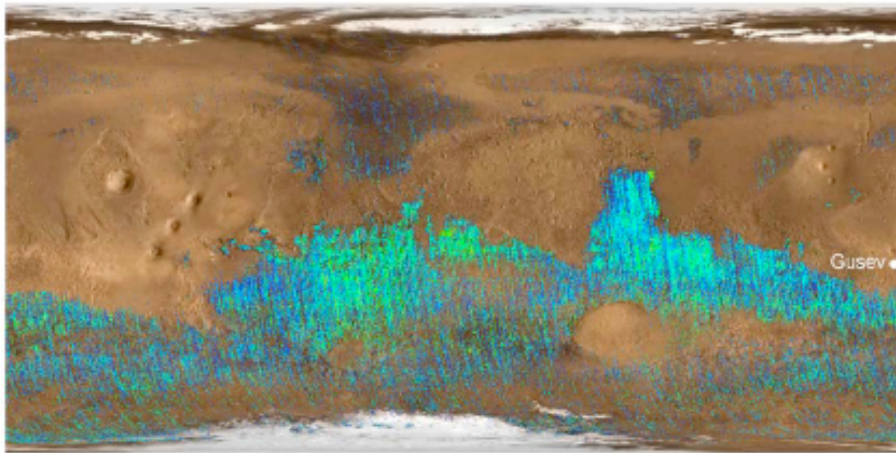


Bibring et al., Science, [2005]

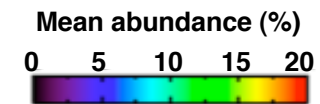
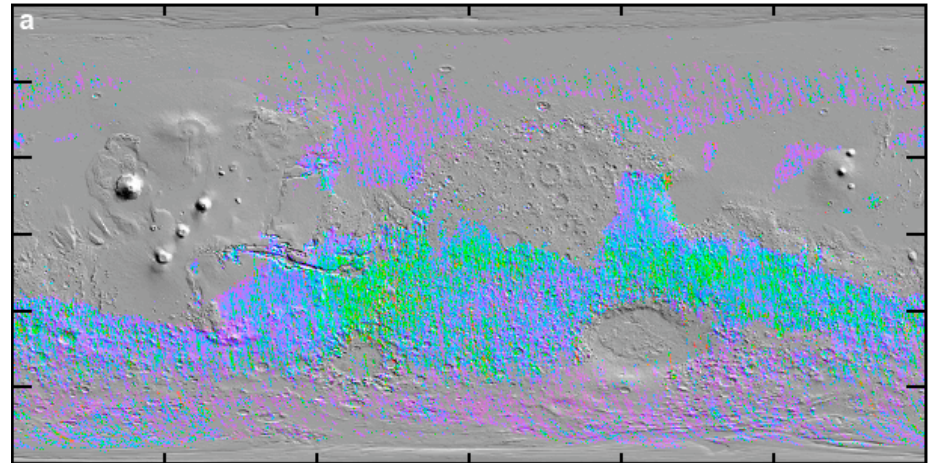
Improved libraries of pyroxenes and olivines in the infrared



TES-derived surface abundance of olivine

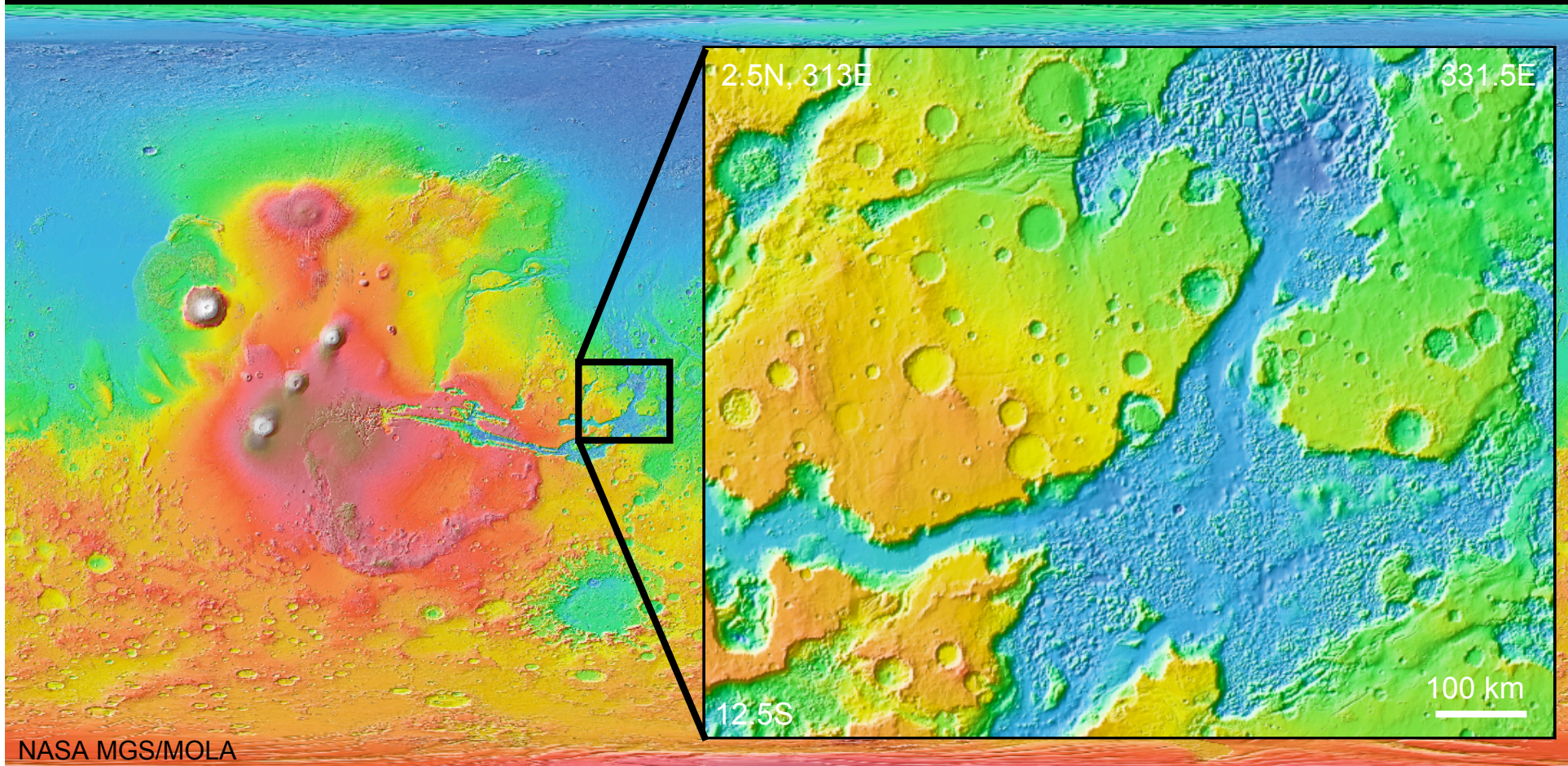


McSween, Wyatt et al. [2006]



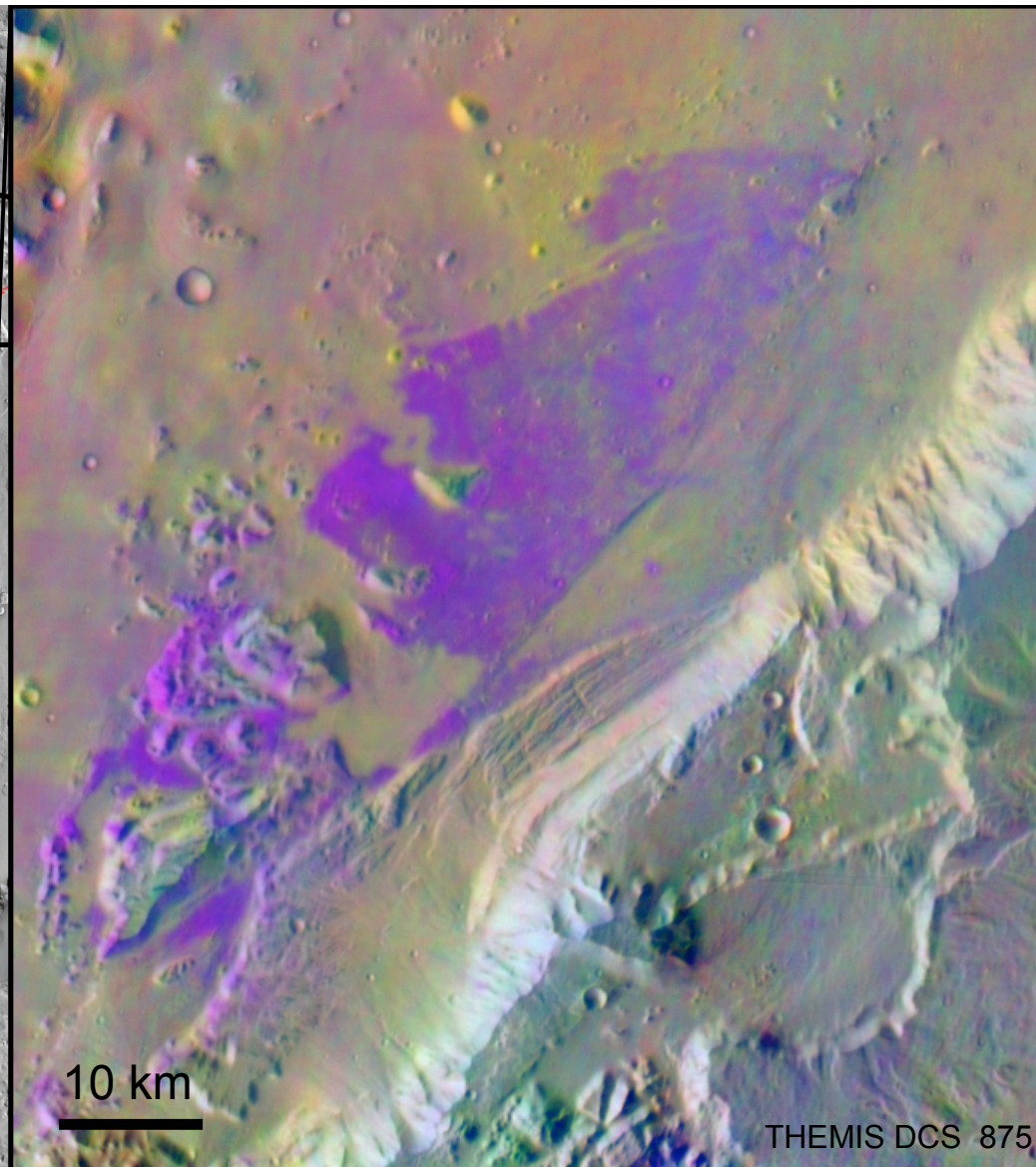
Koeppen & Hamilton, submitted

Olivine Basalt in Eastern Valles Marineris



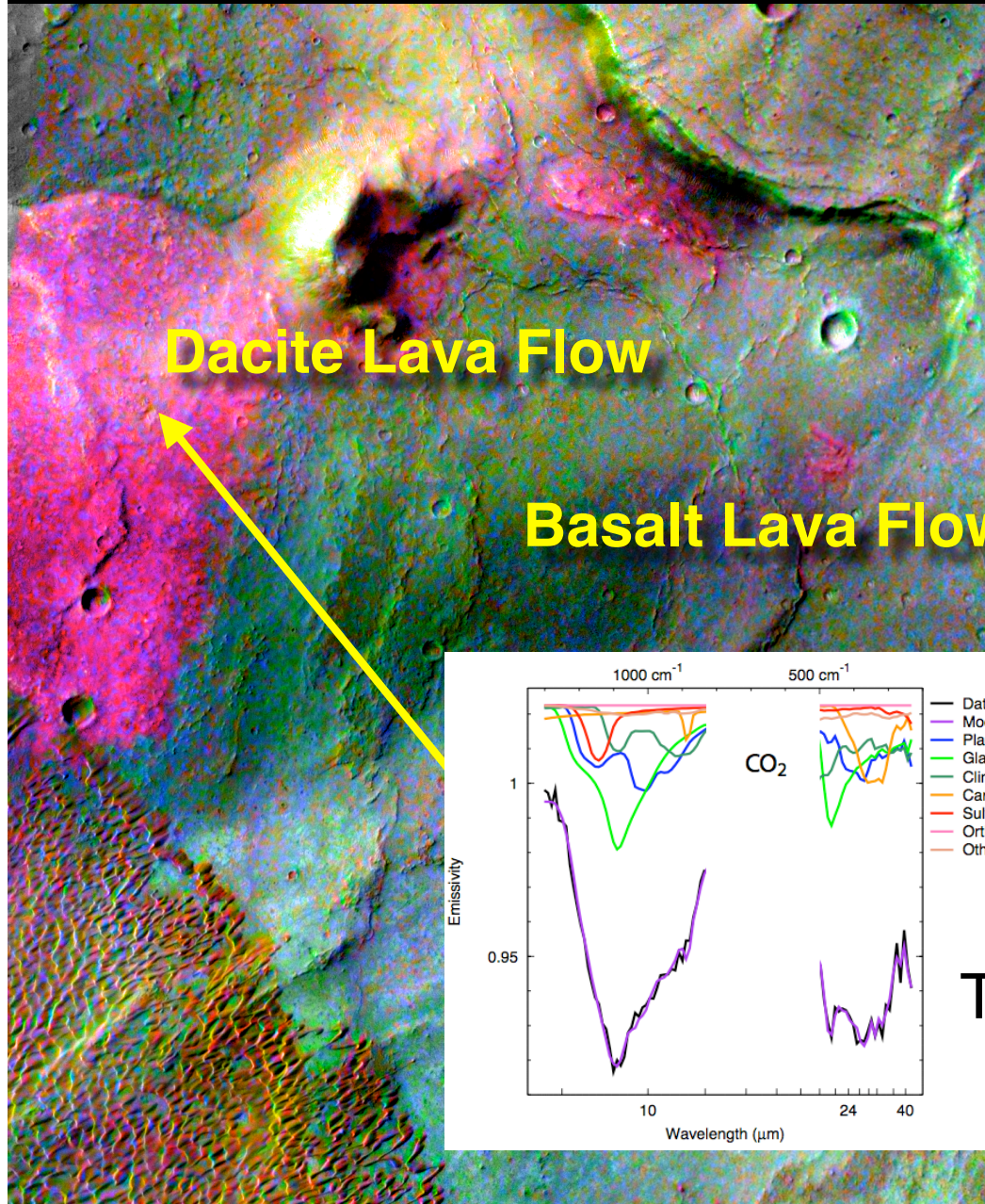
2.5N, 313E

12.5S

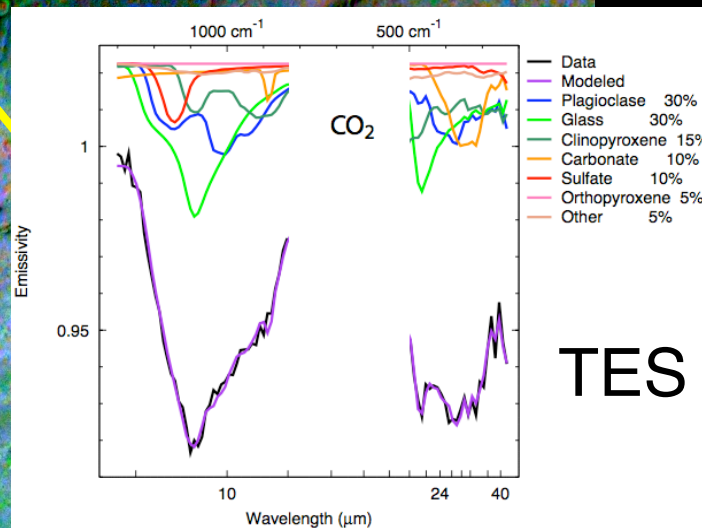
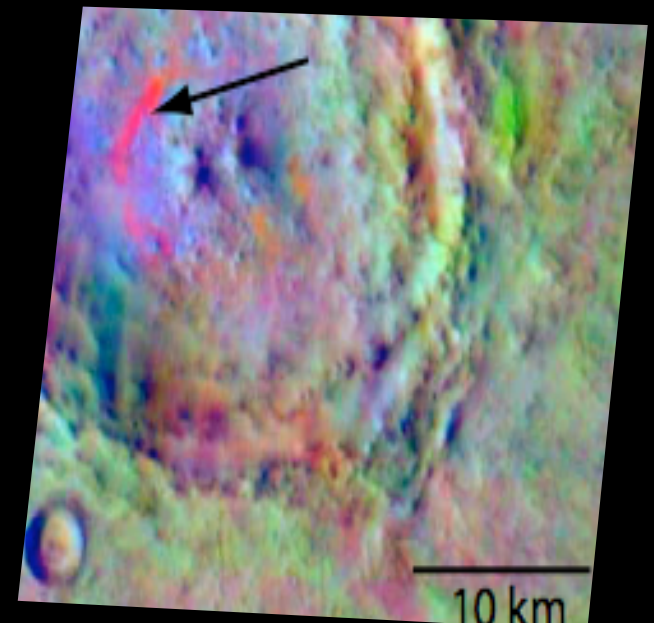


100 km

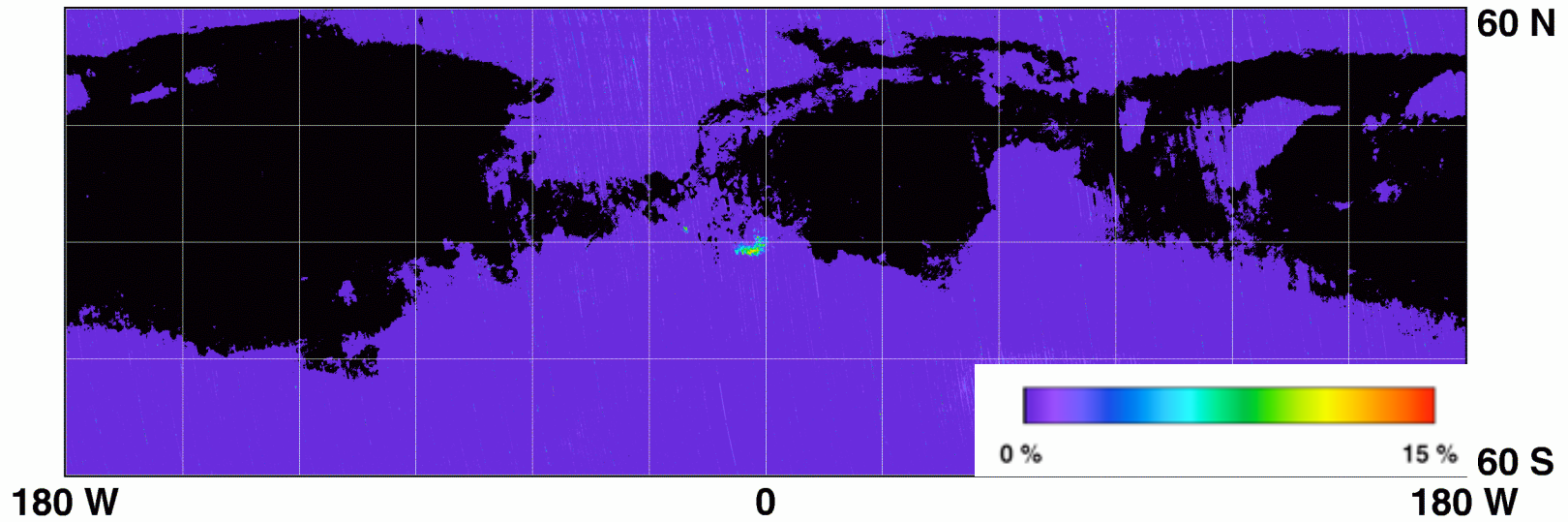
THEMIS Multi-spectral IR



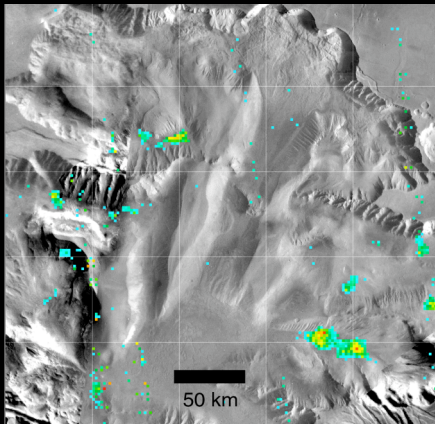
Granitoid Rocks



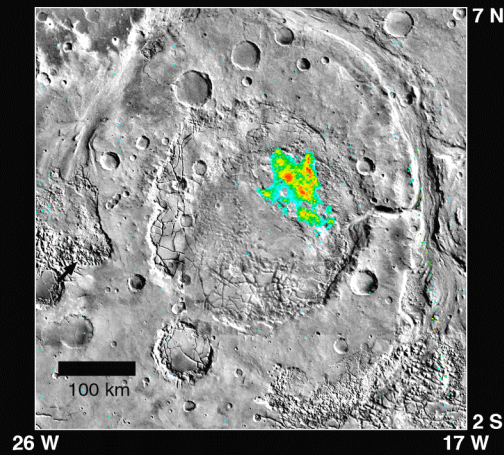
TES Hematite Abundance



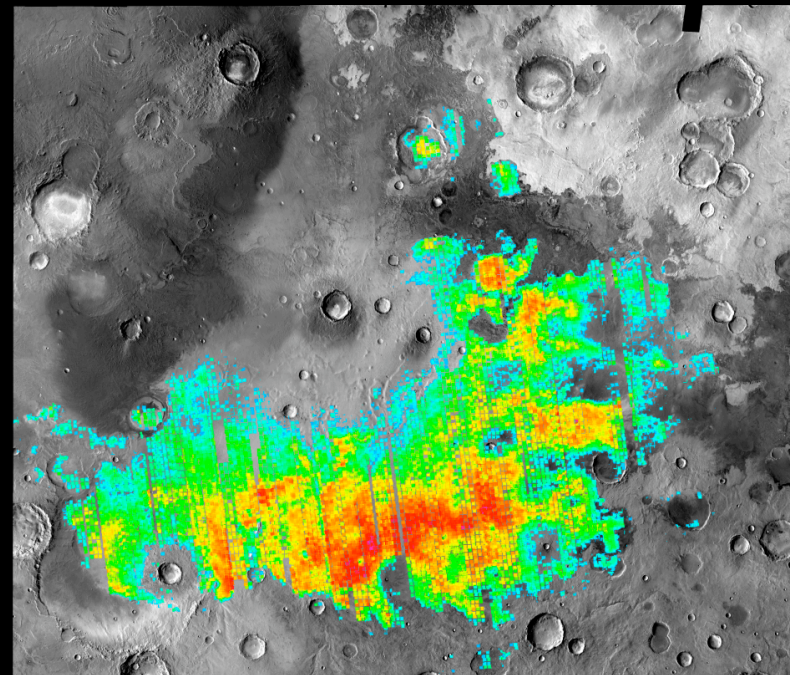
Ophir/Candor



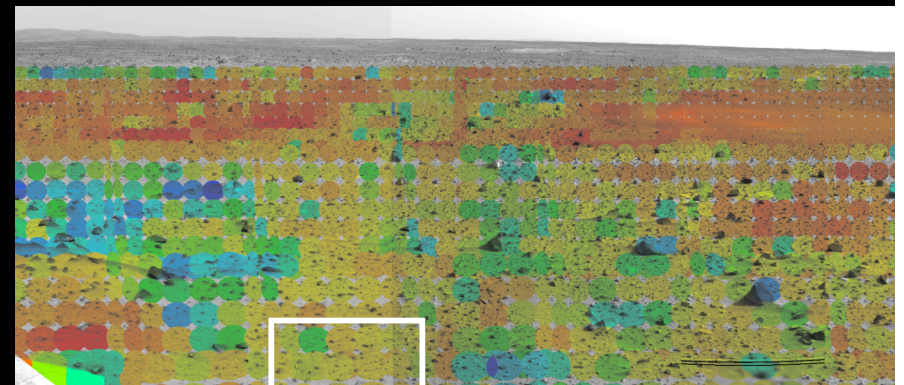
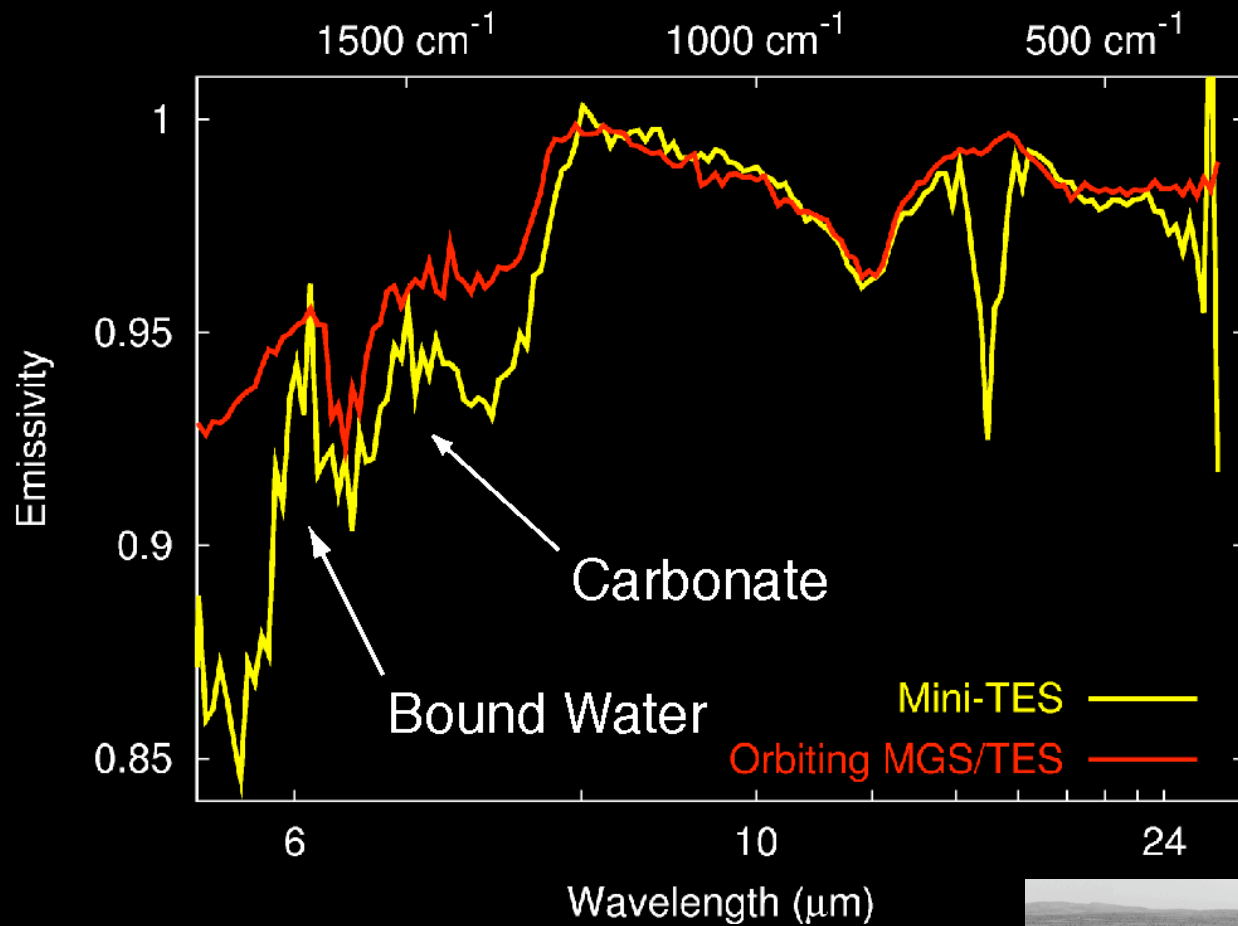
Aram Chaos



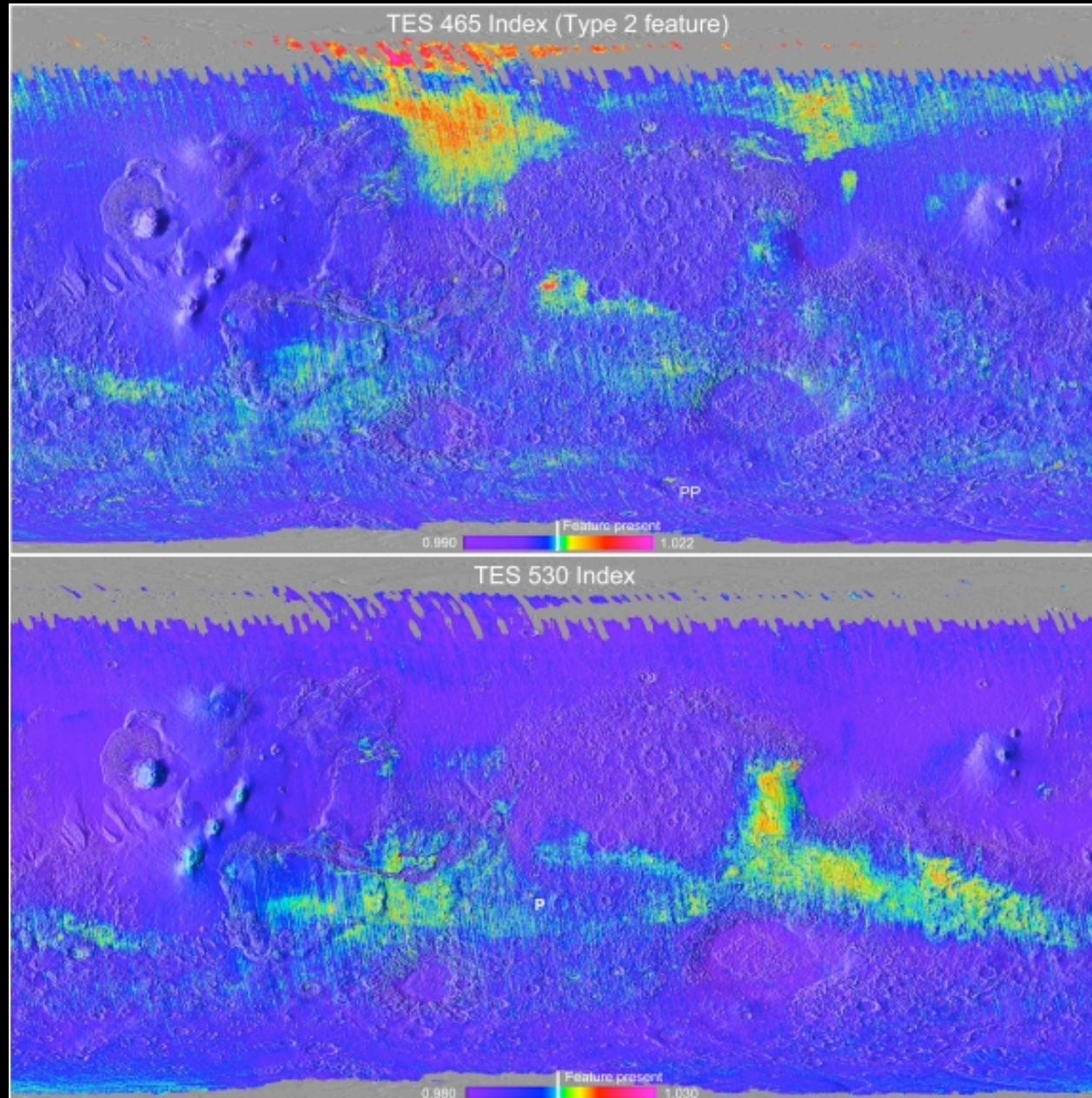
Meridiani



Carbonates



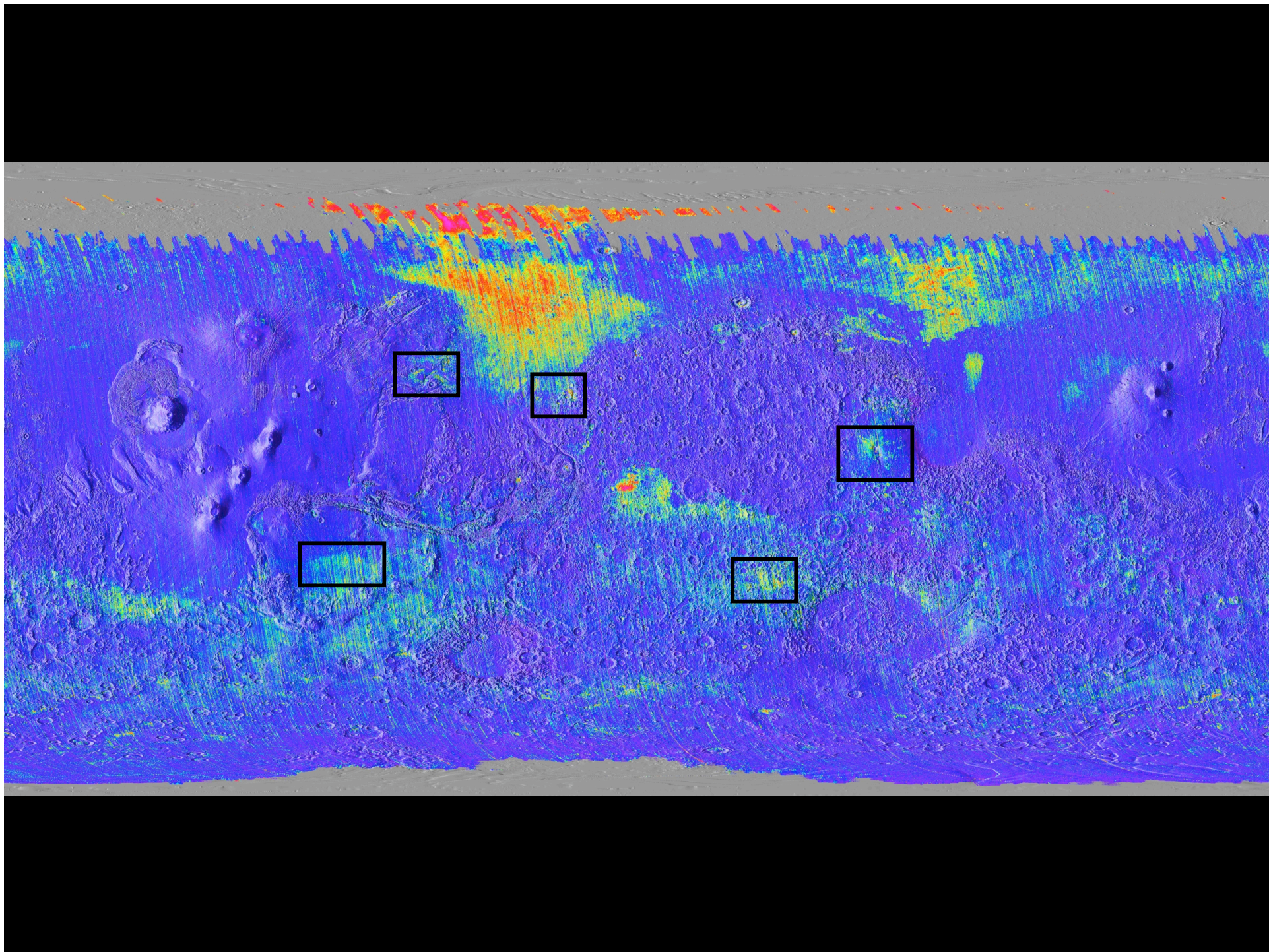
Phyllosilicates

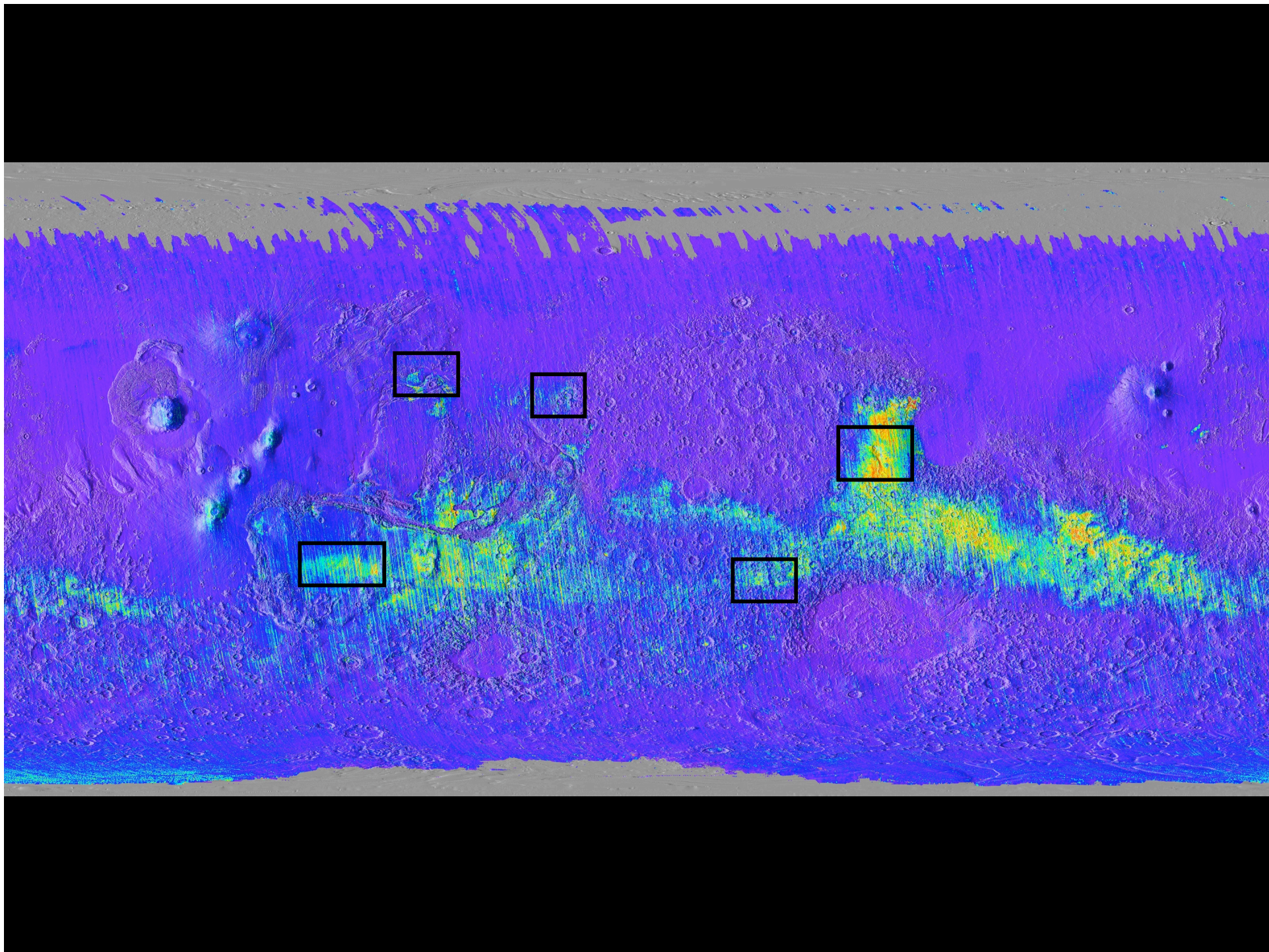


Steve Ruff's
465 cm^{-1} index

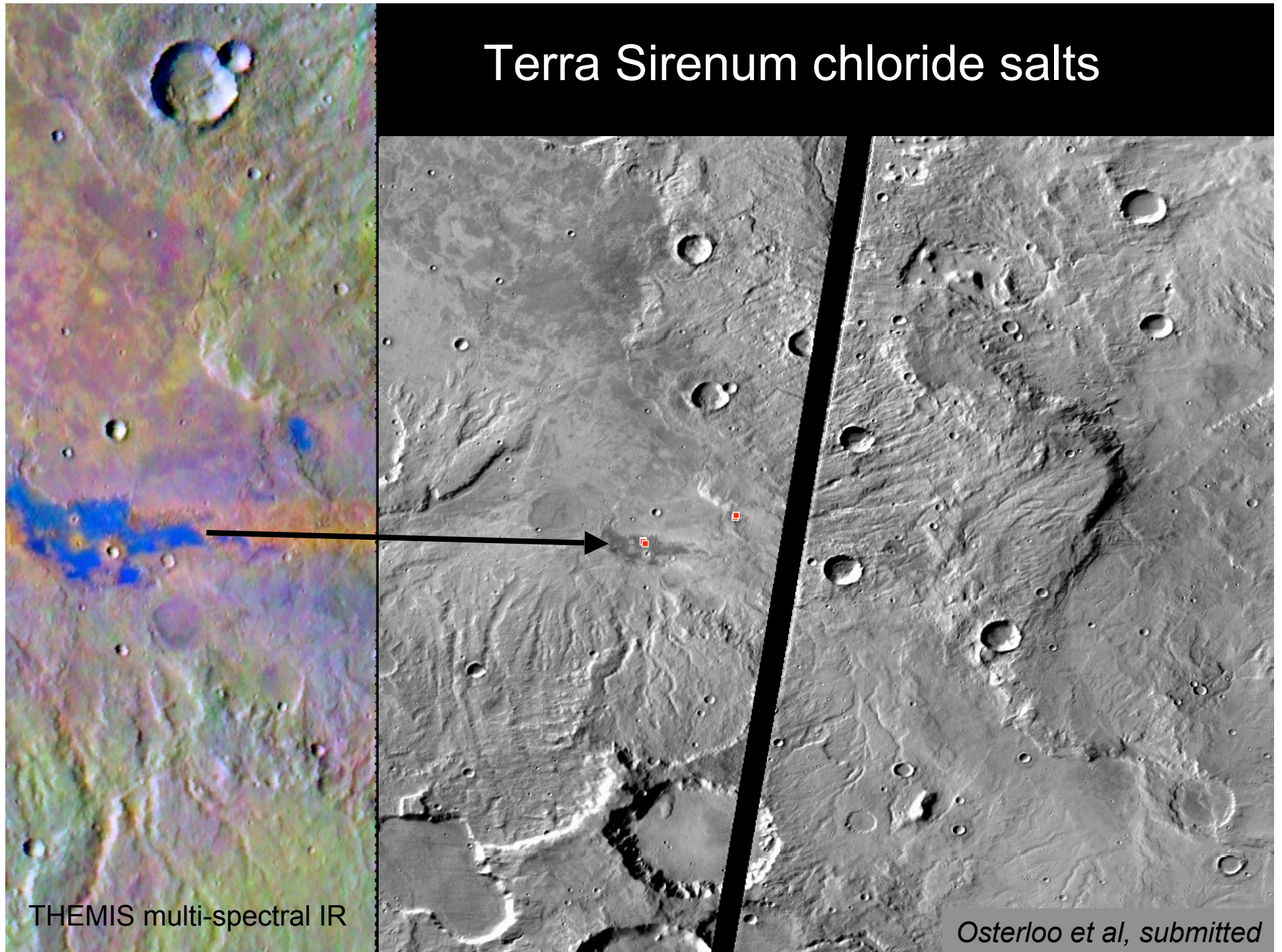
Both present
= crystalline
clay

530 cm^{-1} index

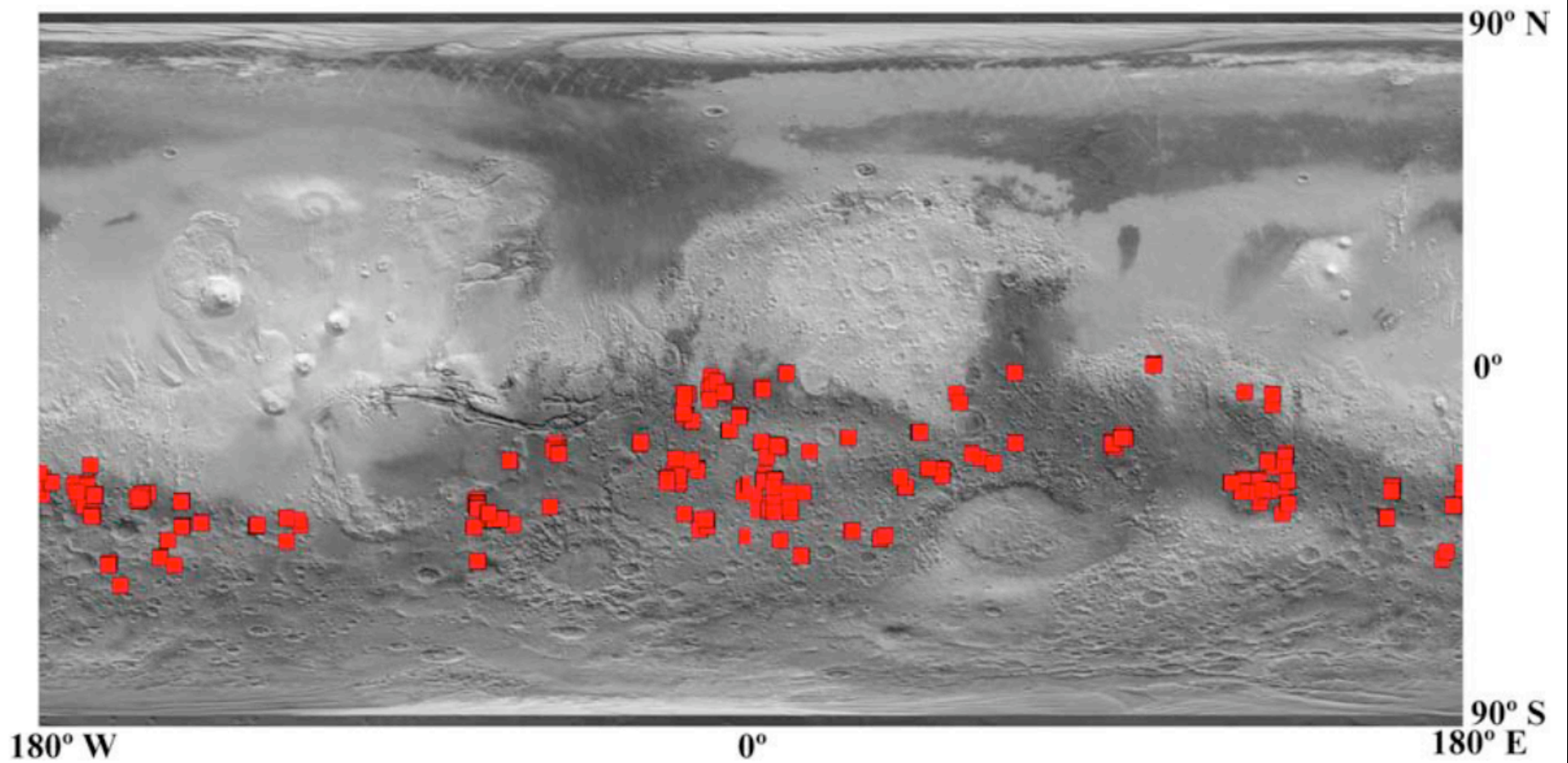




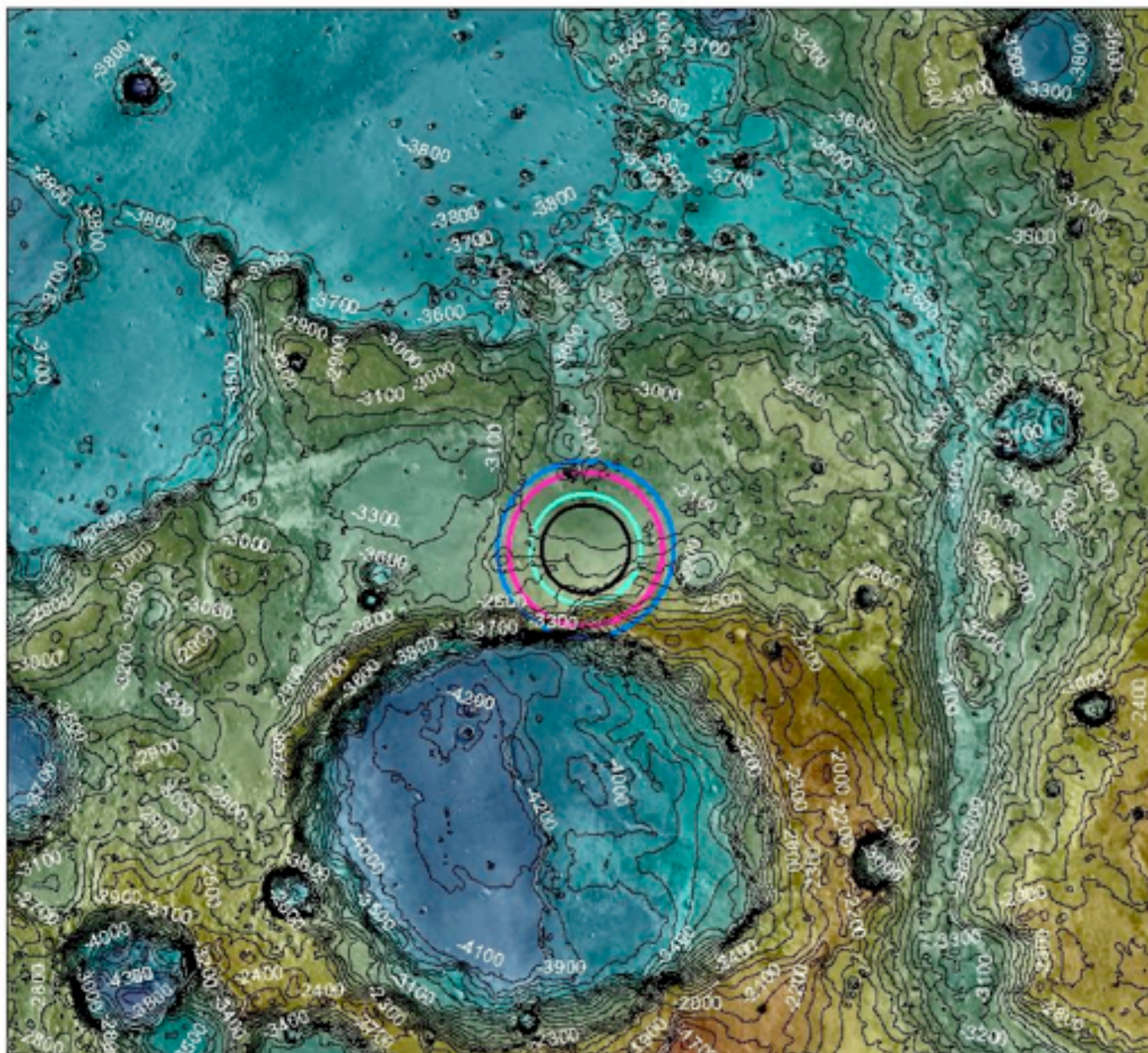
Terra Sirenum chloride salts



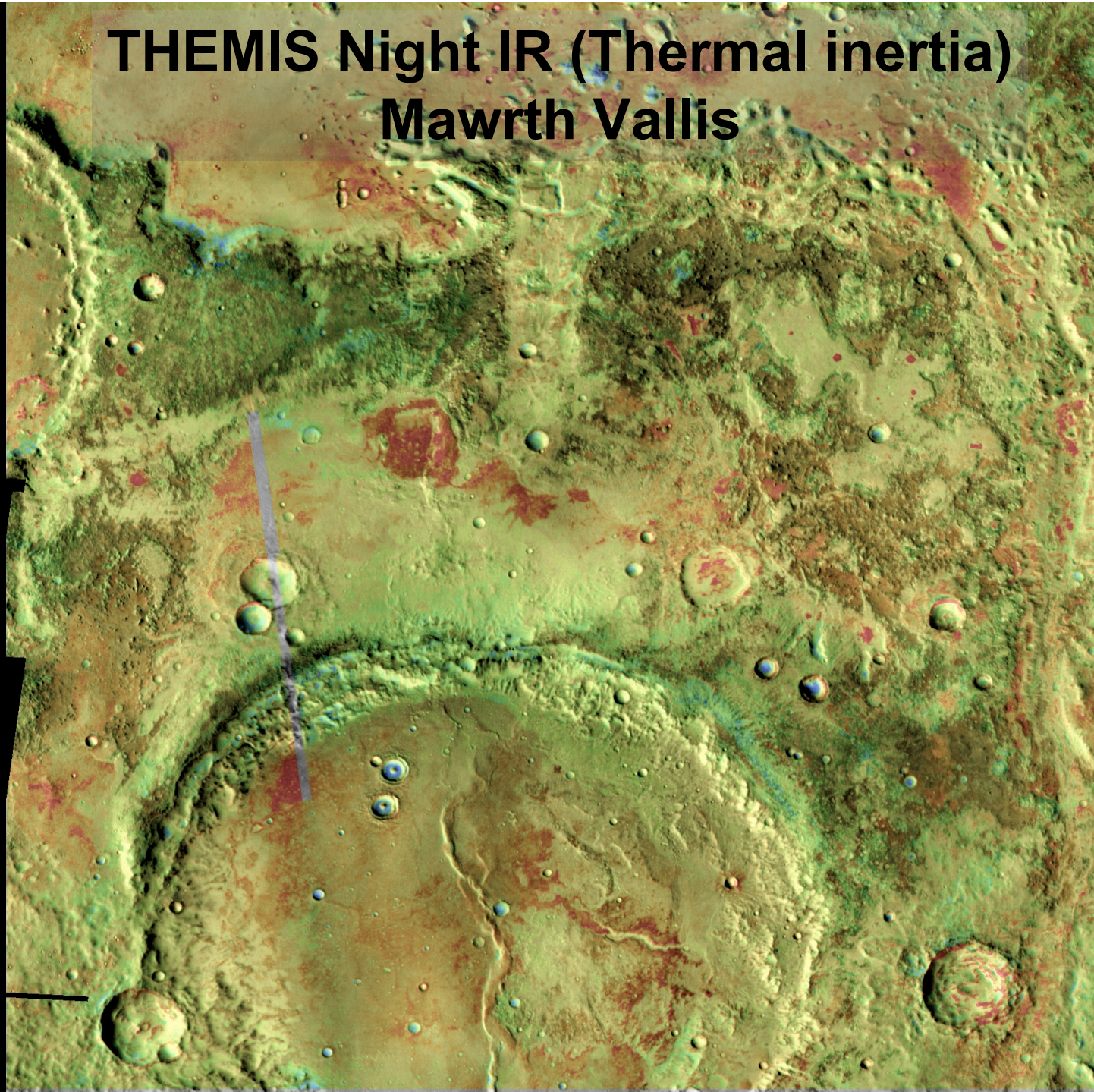
Salt Sites



Center elevation 3.1 km



THEMIS Night IR (Thermal inertia) Mawrth Vallis



Summary

- Knowledge of martian mineralogy from TES and THEMIS data has improved substantially over the past 5 years
- Mars is a volcanic planet with diverse compositions
- Weathering has occurred, but extensive exposures of unweathered rock and regolith are present
 - Water-related environments need to be kept in this context
- Clays (and sulfates) appear from TES and THEMIS data to be present at abundances of $< \sim 10\%$
- Carbonates are present - but in dust
- Chloride salts appear to have been detected
- Bedrock is present - Mars is still actively (physically) eroding