

Data Processing Overview

Calibration

Noise Removal

Stray Light Removal

Time-dependent
Signal Drift Removal

Geometric Projection

Band Uncorrelated
Noise Removal

Radiance Correction

Output Images

Standard Data
Products

Processing Overview (con't)

Output Images

Brightness Temperature

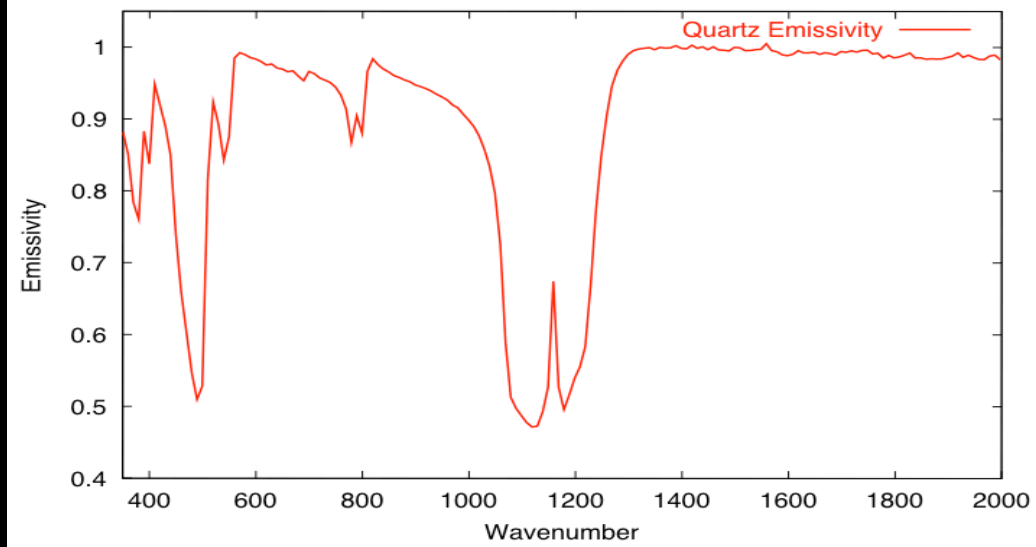
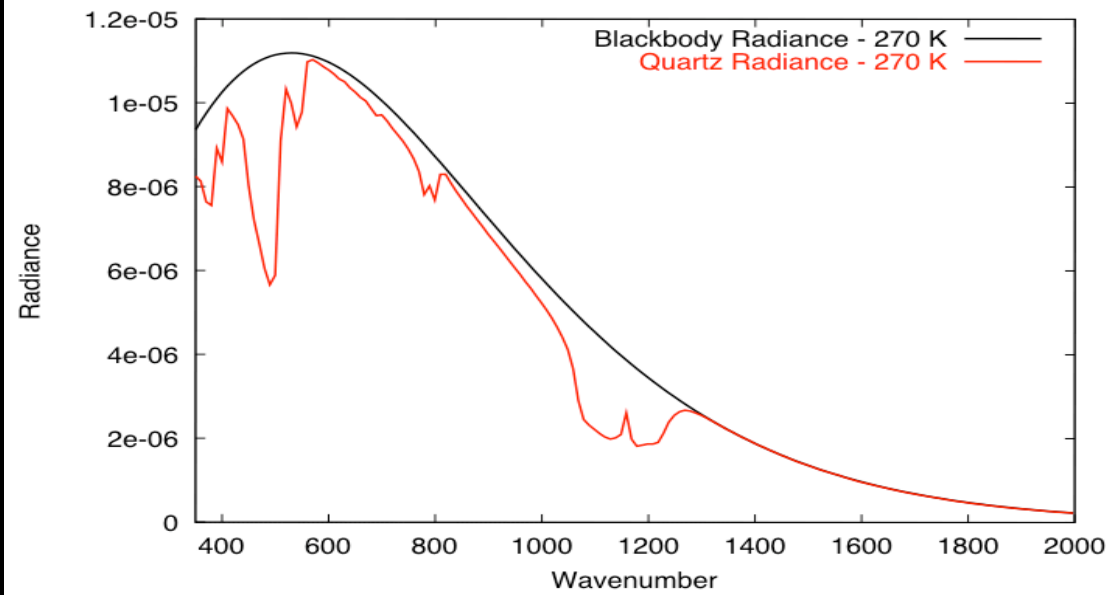
Multi-spectral Color IR

Surface Temperature

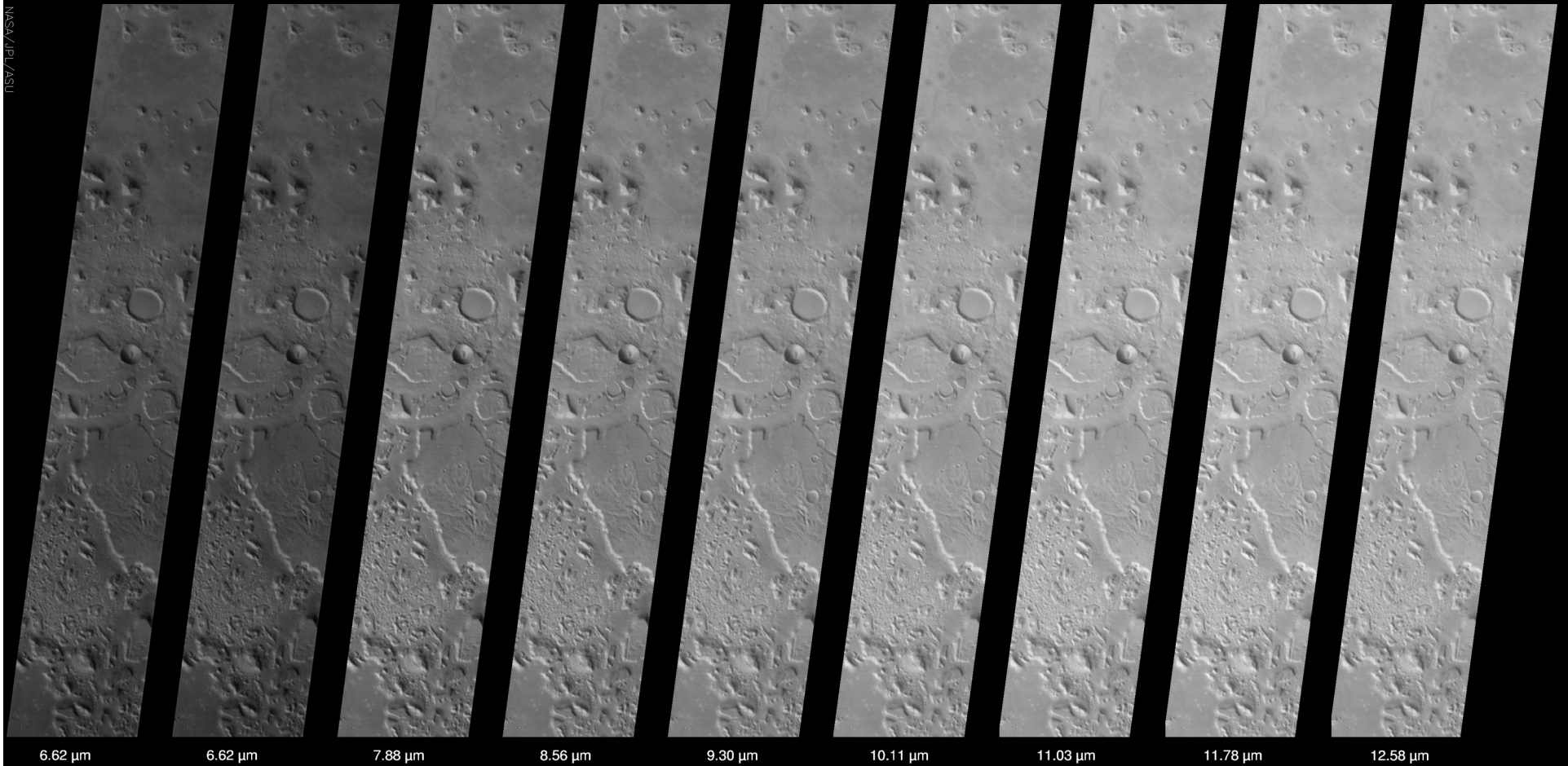
Emissivity

Output Data Products

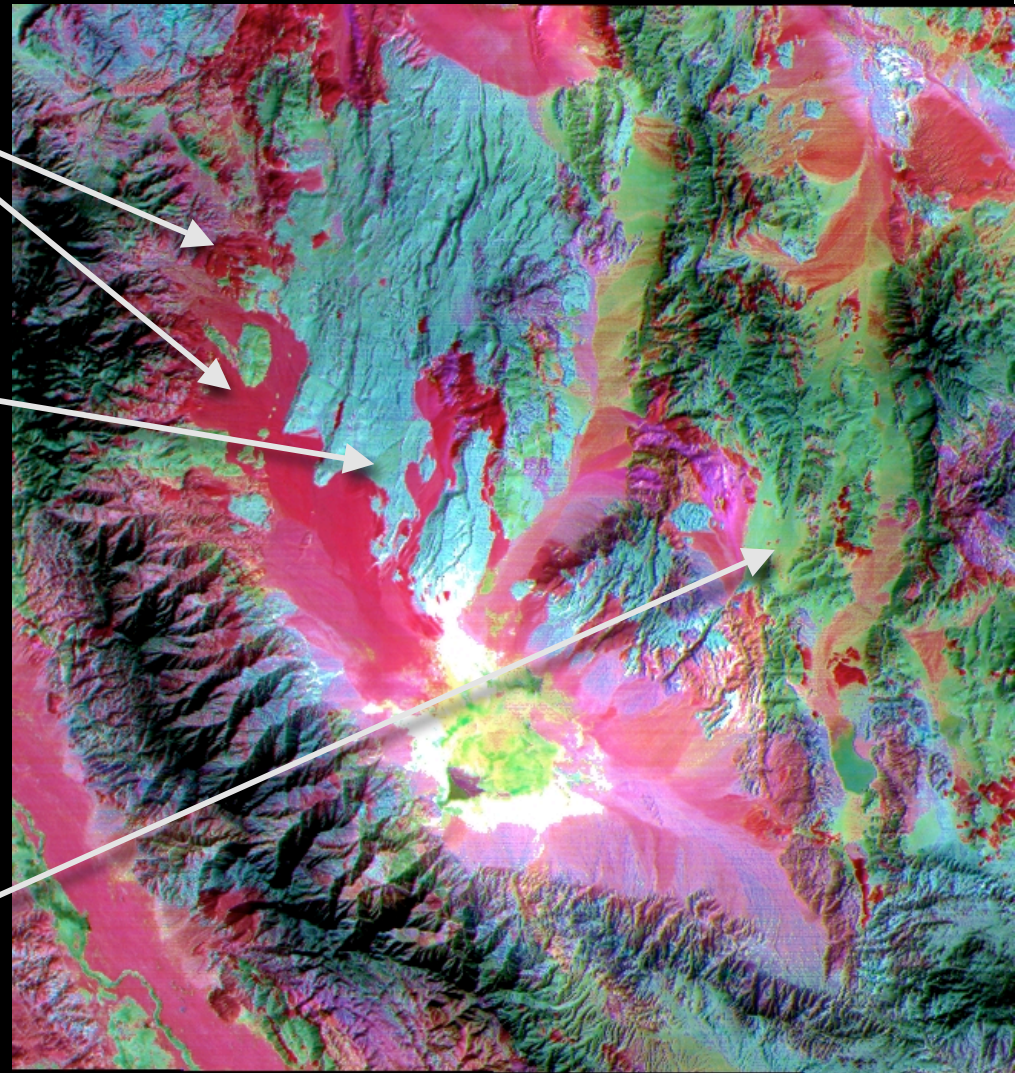
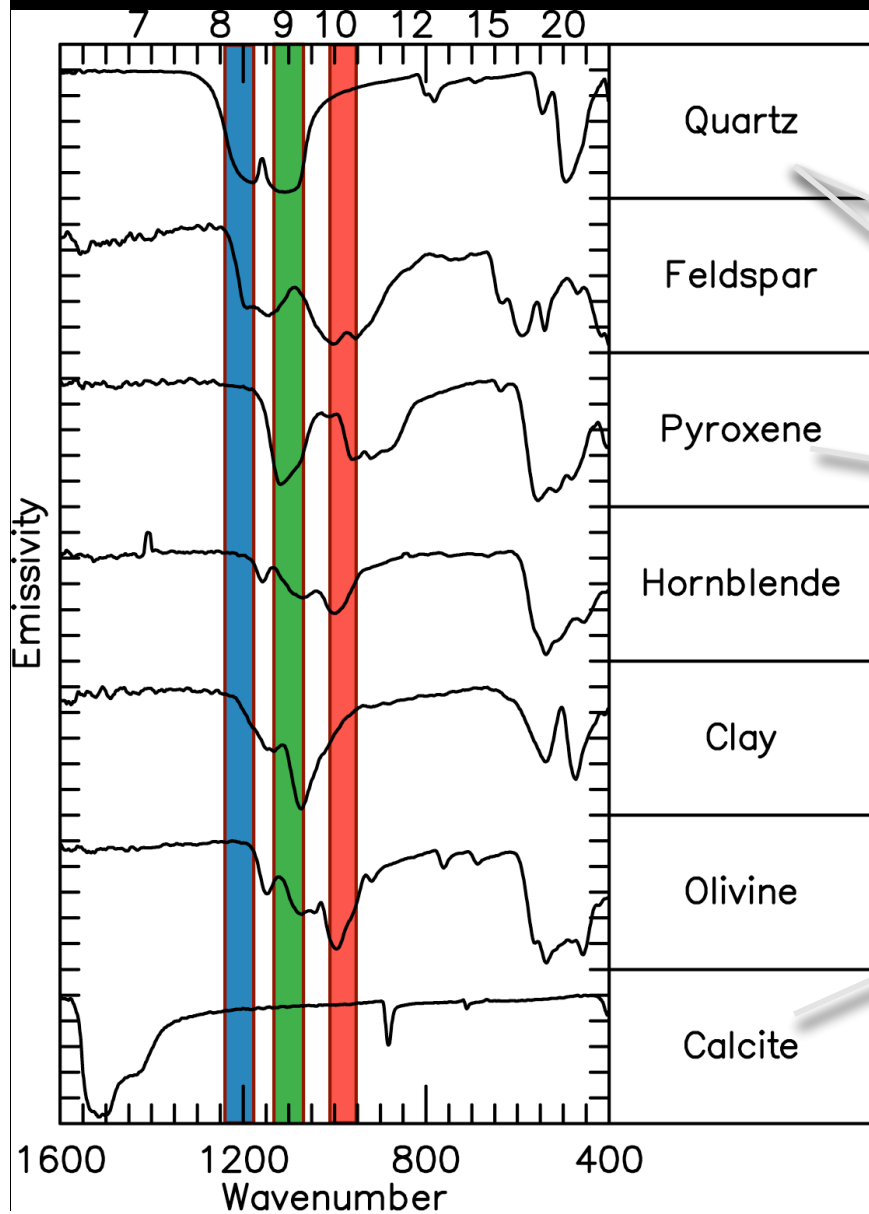
- Radiance and Brightness Temperature
 - Computed for each band
 - Look up table - radiance to $T_B(\lambda)$
 - Standard Data Products - currently available on THEMIS PDS web site
- Surface (Target) Temperature
 - Maximum Brightness Temperature
 - Don't use for nighttime images
- Emissivity
 - Only computed for Bands 3-9
 - 1 & 2 - noisy
 - Band 10 - atmospheric temperature



Brightness Temperature

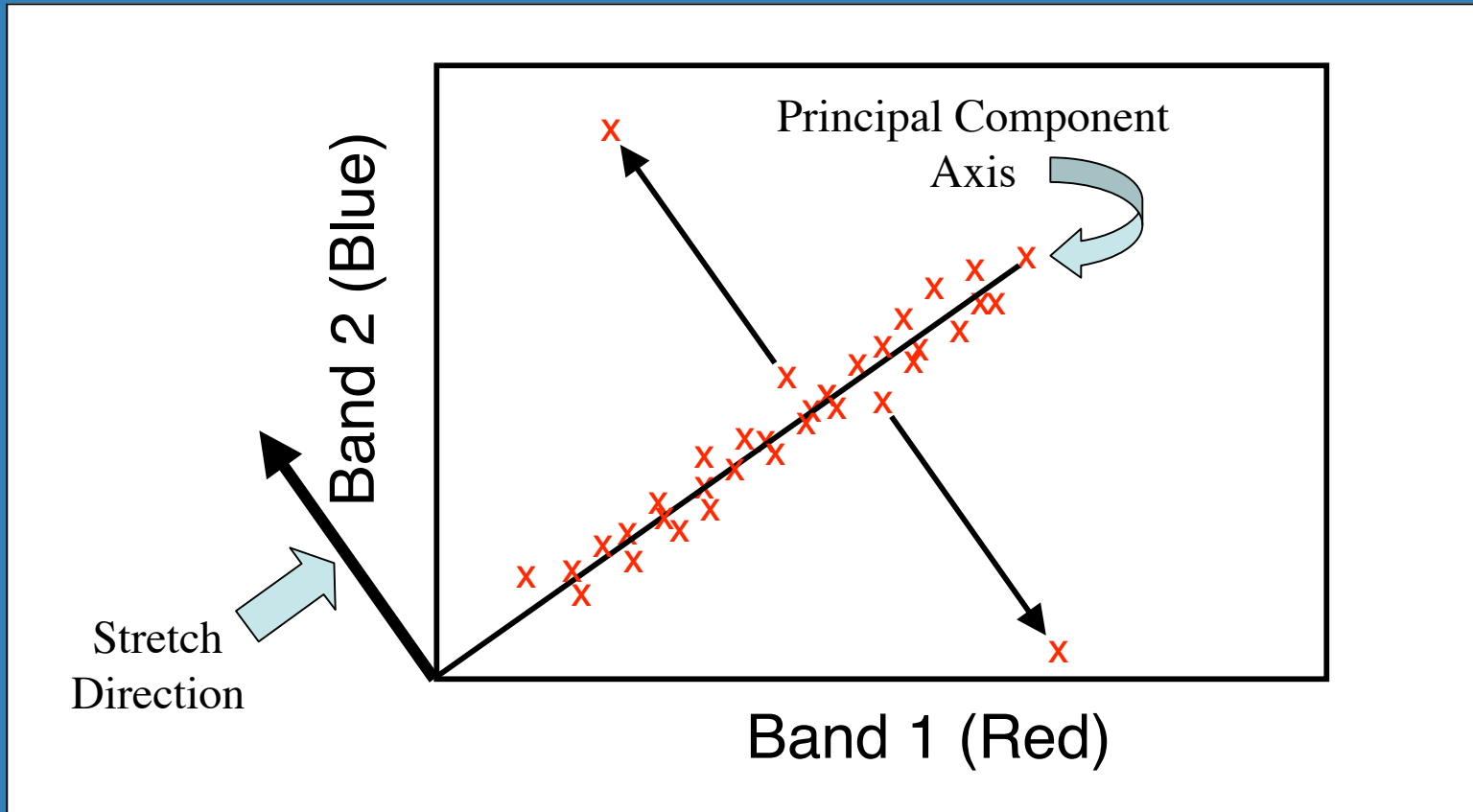


Infrared Multi-spectral Imaging

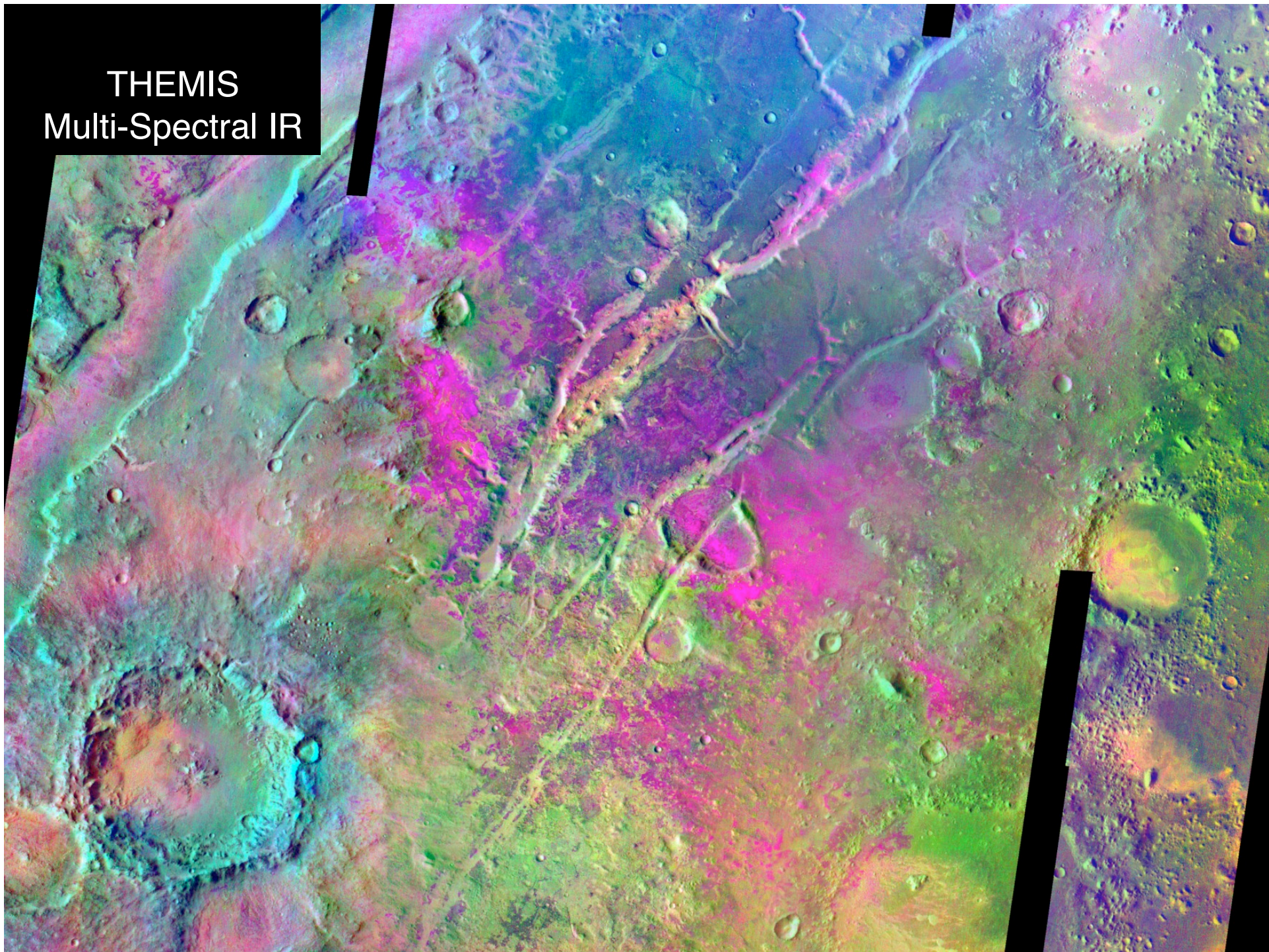


Output Data Products (con't)

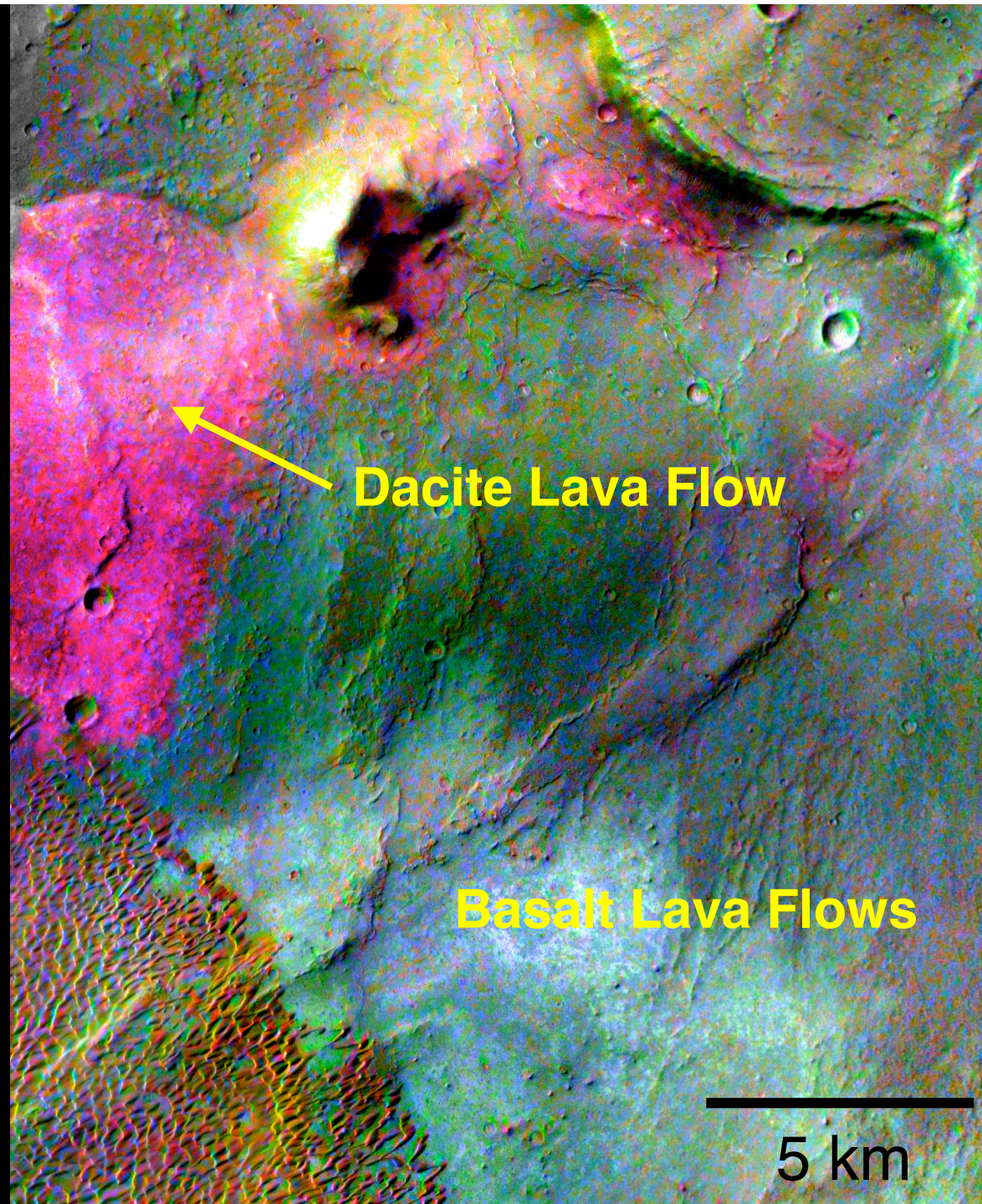
- Decorrelation Stretch Color Images
 - Select 3 bands for decorrelation stretch
 - Stretches data in axes perpendicular to principal correlations

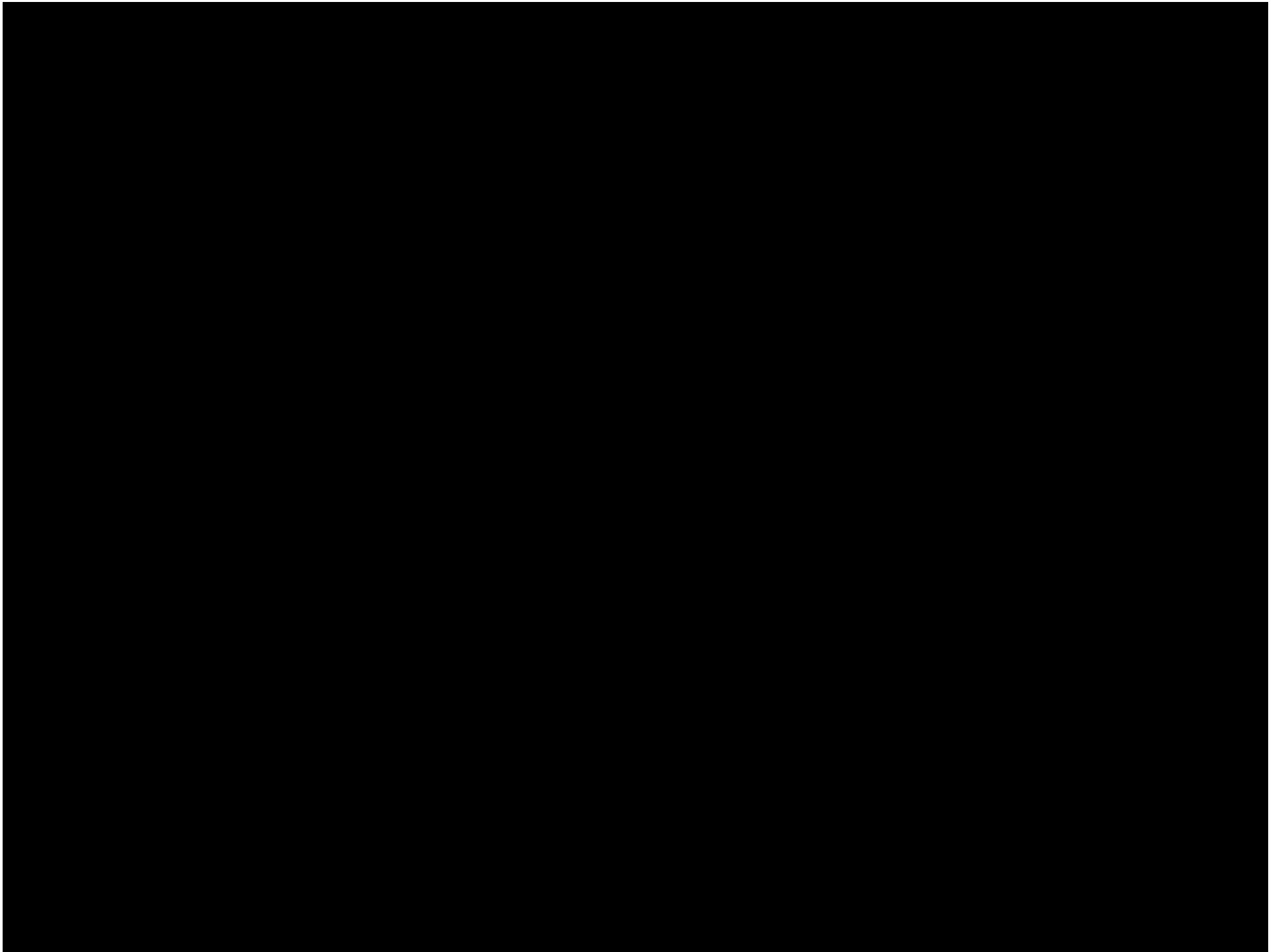


THEMIS
Multi-Spectral IR

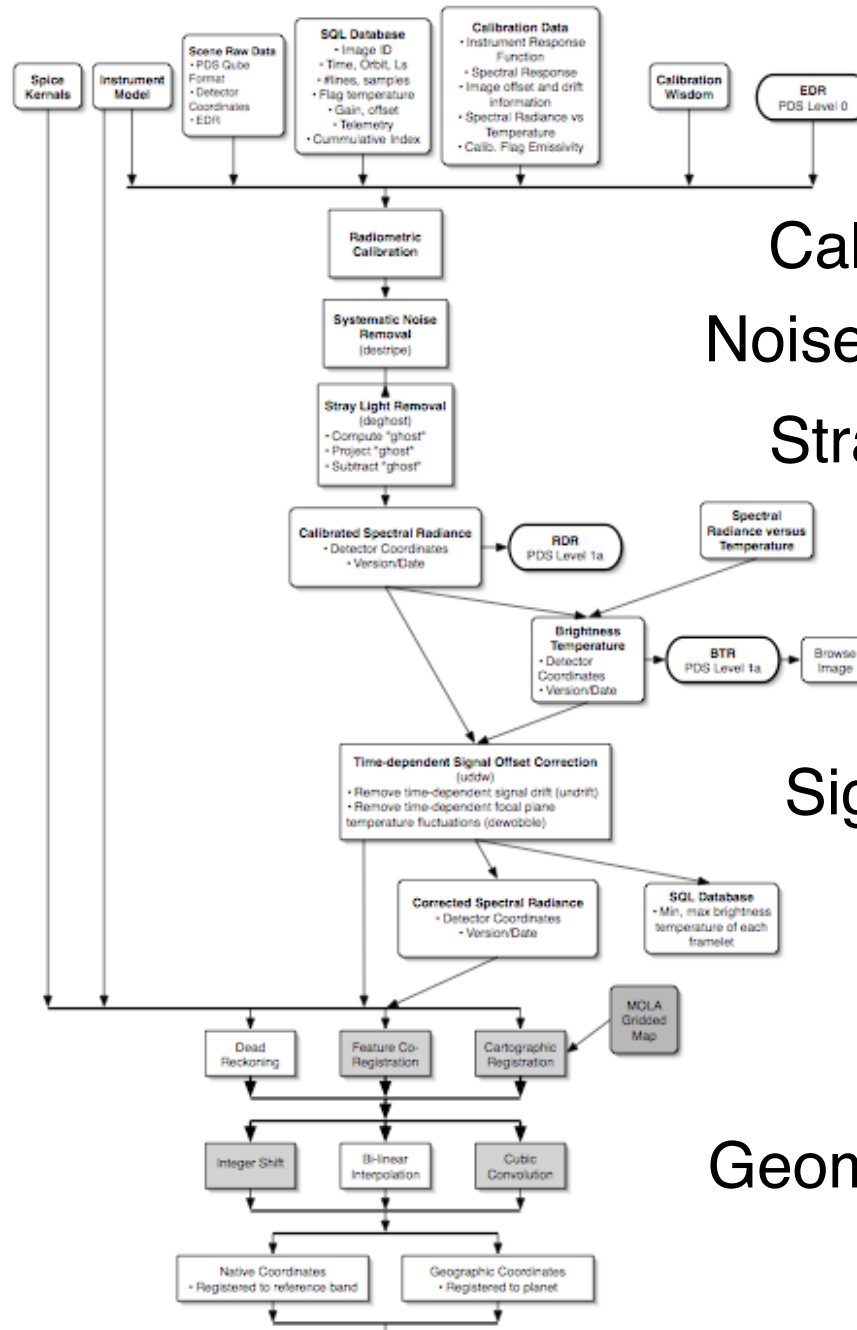


THEMIS
Multi-
spectral IR





THEMIS Data Processing Flow



Calibration

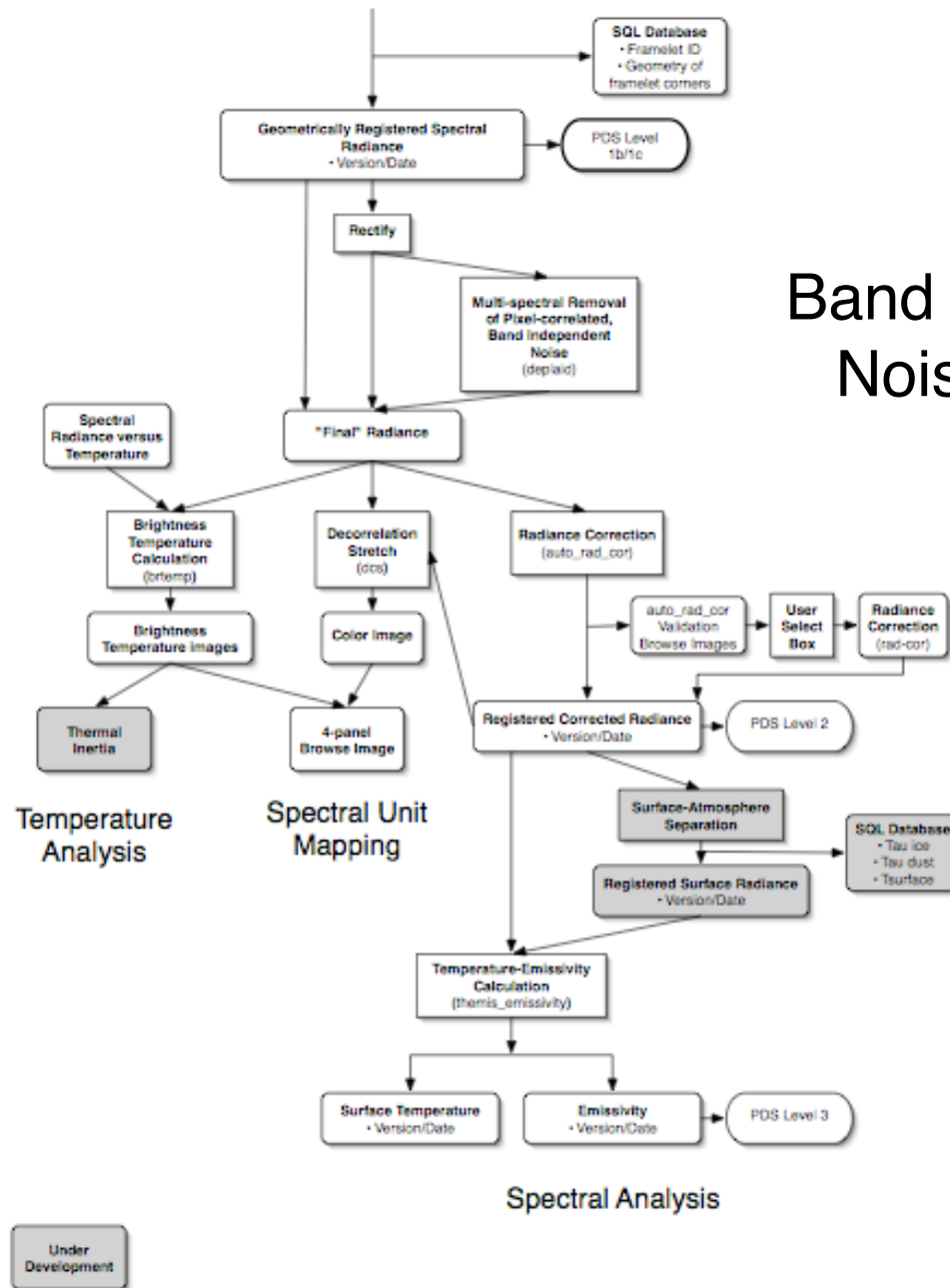
Noise Removal

Stray Light

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Geometric Projection



Band Uncorrelated
Noise Removal

Radiation
Correction

Output
Images

Glossary

- **Spectral Radiance (Radiance): $R(\lambda)$**
 - Total energy emitted per unit area, angle, and wavelength
 - $\text{W m}^{-2} \text{ str}^{-1} \mu\text{m}^{-1}$
- **Blackbody**
 - An ideal body that emits with maximum thermodynamic efficiency (Planck function)
- **Emissivity: $\varepsilon(\lambda)$**
 - Ratio of actual emitted radiance to that of an ideal blackbody

Glossary (2)

- **Brightness Temperature: $B_T(\lambda)$**
 - The temperature at each wavelength of a blackbody emitting the measure radiance
- **Surface (Target) temperature**
 - The maximum brightness temperature over wavelength range