DIRSIG Modeling Efforts @ RIT
In Support of Landsat & Sentinel 2

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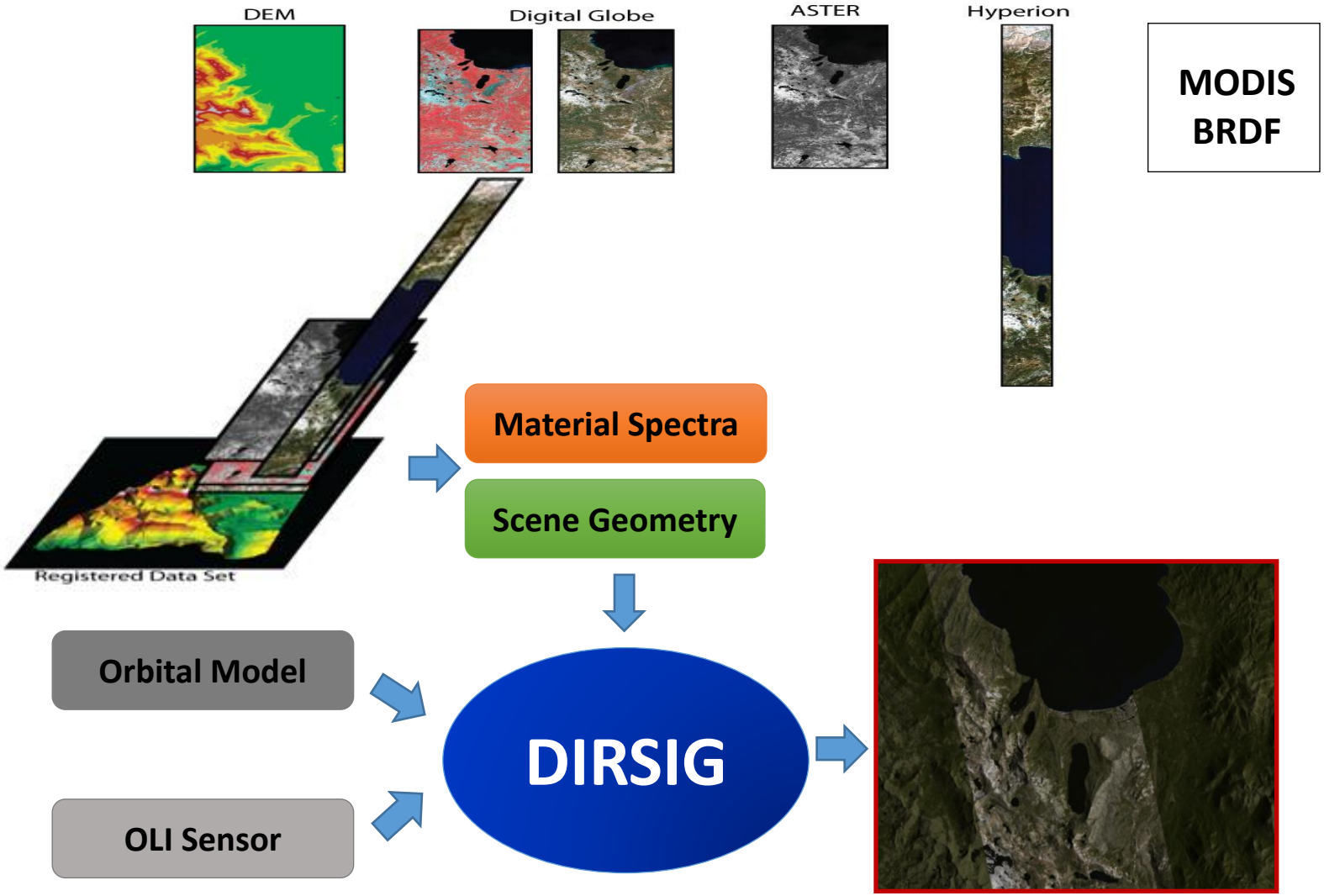
DIRSIG Overview

- Digital Imaging and Remote Sensing Image Generation (DIRSIG) modeling software
- First principle radiometry to create simulated VNIR/SWIR/MWIR/LWIR/RADAR imagery
- New ability to construct 'large' area landscapes with BRDF effects



Biomes

- **<u>Algodones Dunes</u>** [32.98 deg, -115.12 deg, 108 m] - Desert
- **Bondville, IL** [40.05 deg, -88.37 deg, 230 m] - Agriculture
- **Sleeping Bear Dunes** [44.88 deg, -86.06 deg, 286 m] - Coastal Sand Dunes
- **Desert Rock, NV** [36.62 deg, -116.02 deg, 1007 m] - Sparse Vegetation
- **Harvard Forest, MA** [42.54 deg, -72.17 deg, 353 m] - Deciduous Forest
- **Lake Tahoe** [29.52 deg, -91.82 deg, 0 m] - Water
- **Coastal Wetland, LA** [29.52 deg, -91.82 deg, 0 m] - Marsh / Wetlands
- **Penn State University** [40.72 deg, -77.93 deg, 376 m] - Agriculture

Actual L8 image

Simulated L8 image

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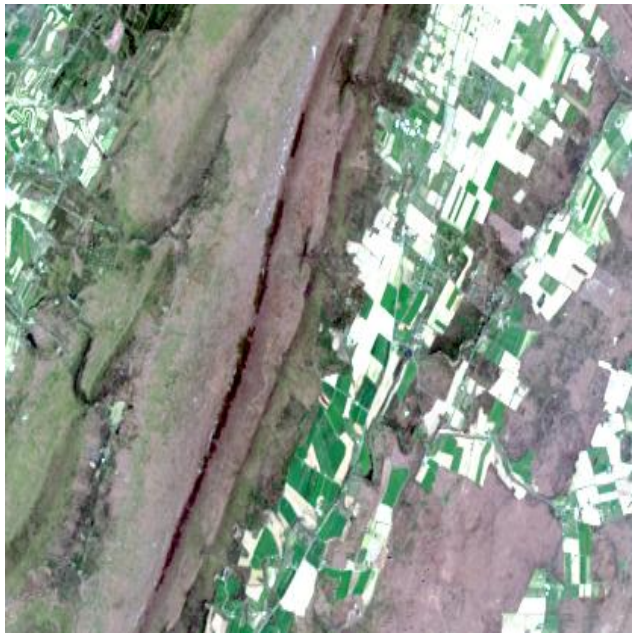
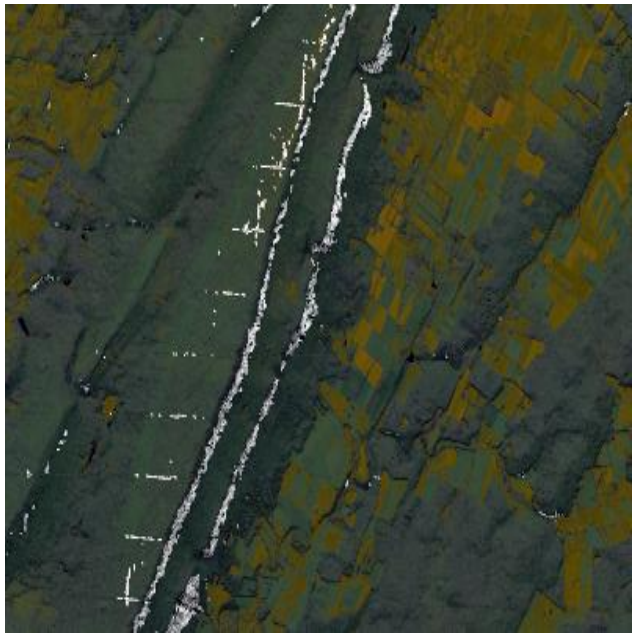


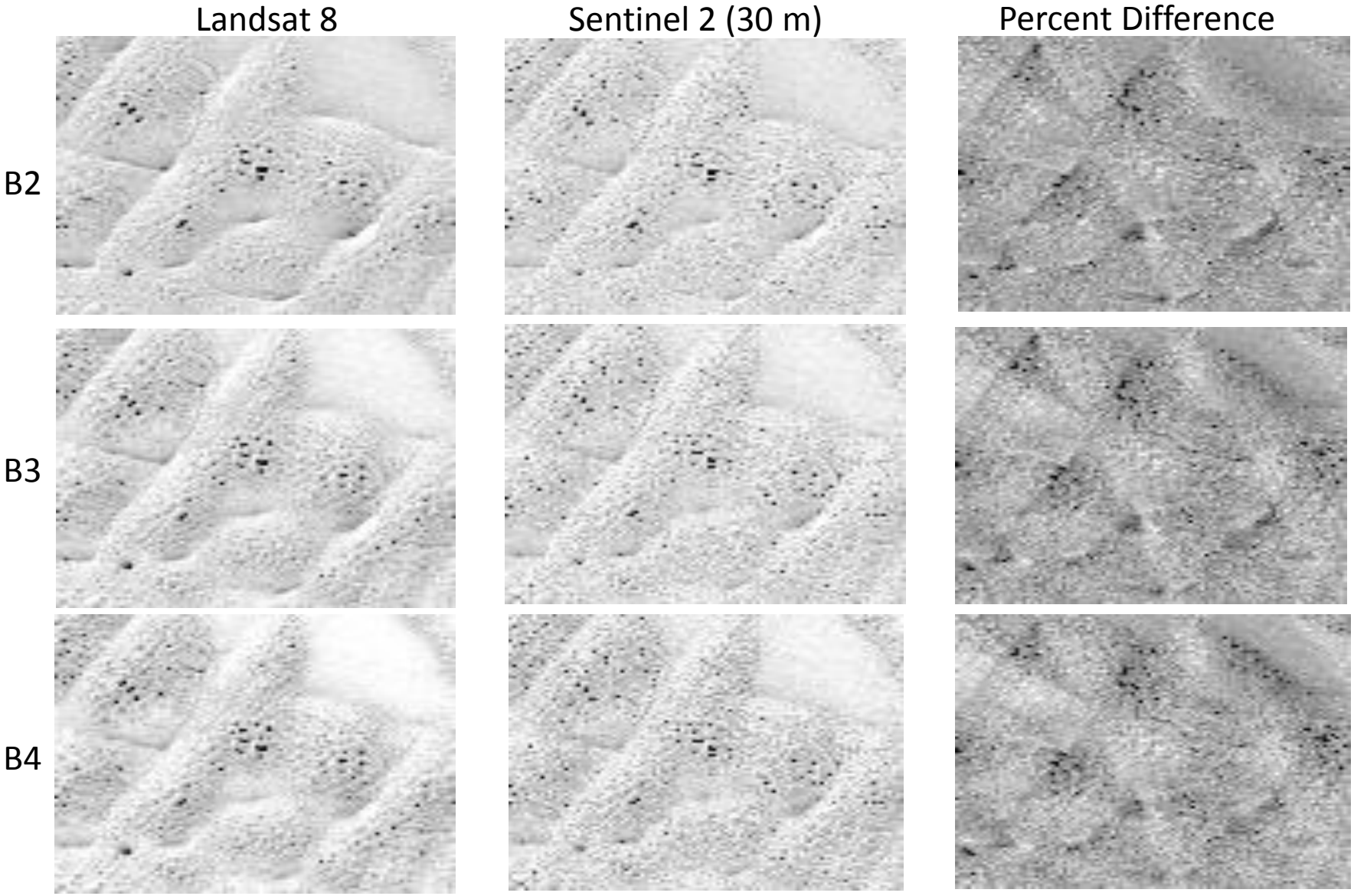
Actual L8 image



Simulated L8 image

Landsat 8 vs. Sentinel 2

- Render the scenes with a Landsat 8 (OLI) and a Sentinel 2 sensor model
- Quantify differences due to band shapes, BRDF, atmospheric path



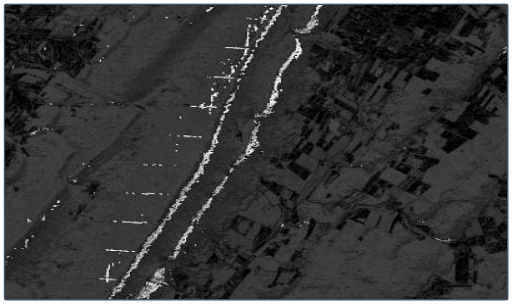
Landsat 7

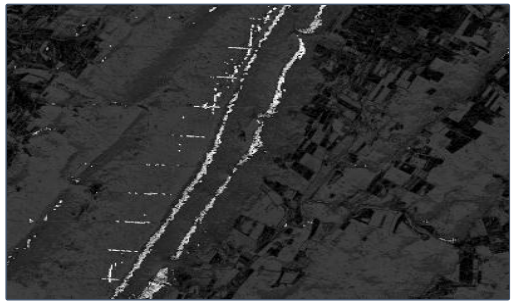
- Simulate L7 drift to earlier crossing time

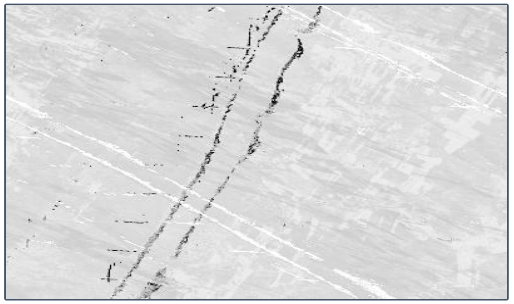
Penn State Univ. (Agriculture)

L7 Simulated 10:18 Local | L7 Simulated 08:30 Local | Difference (%)

B 2







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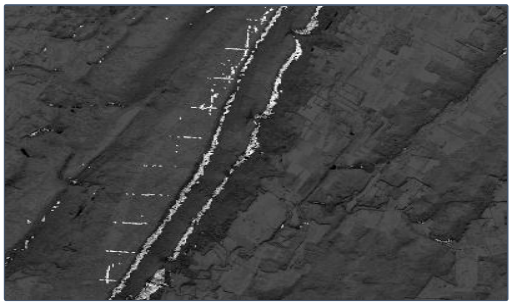

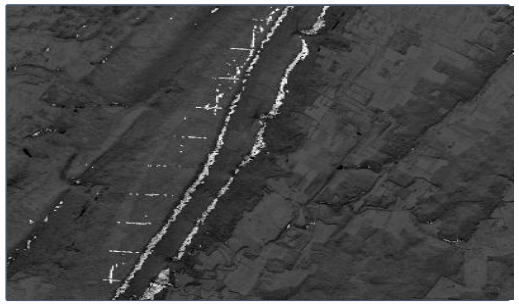

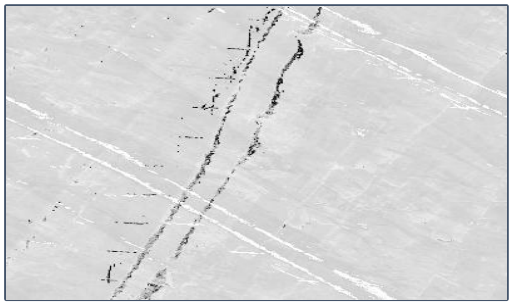

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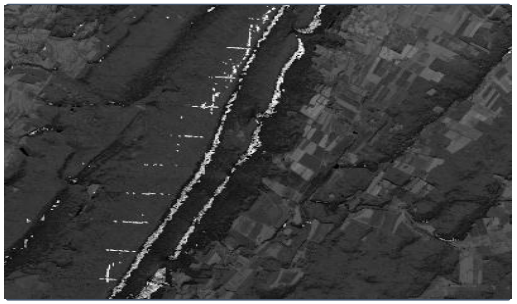

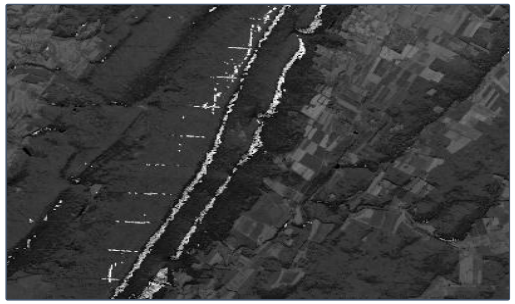

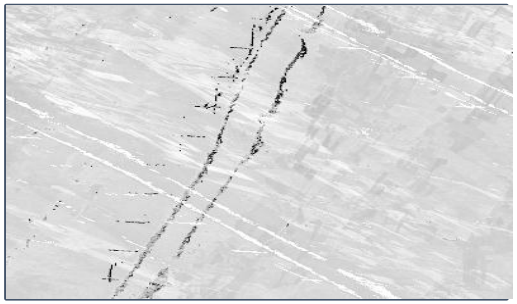

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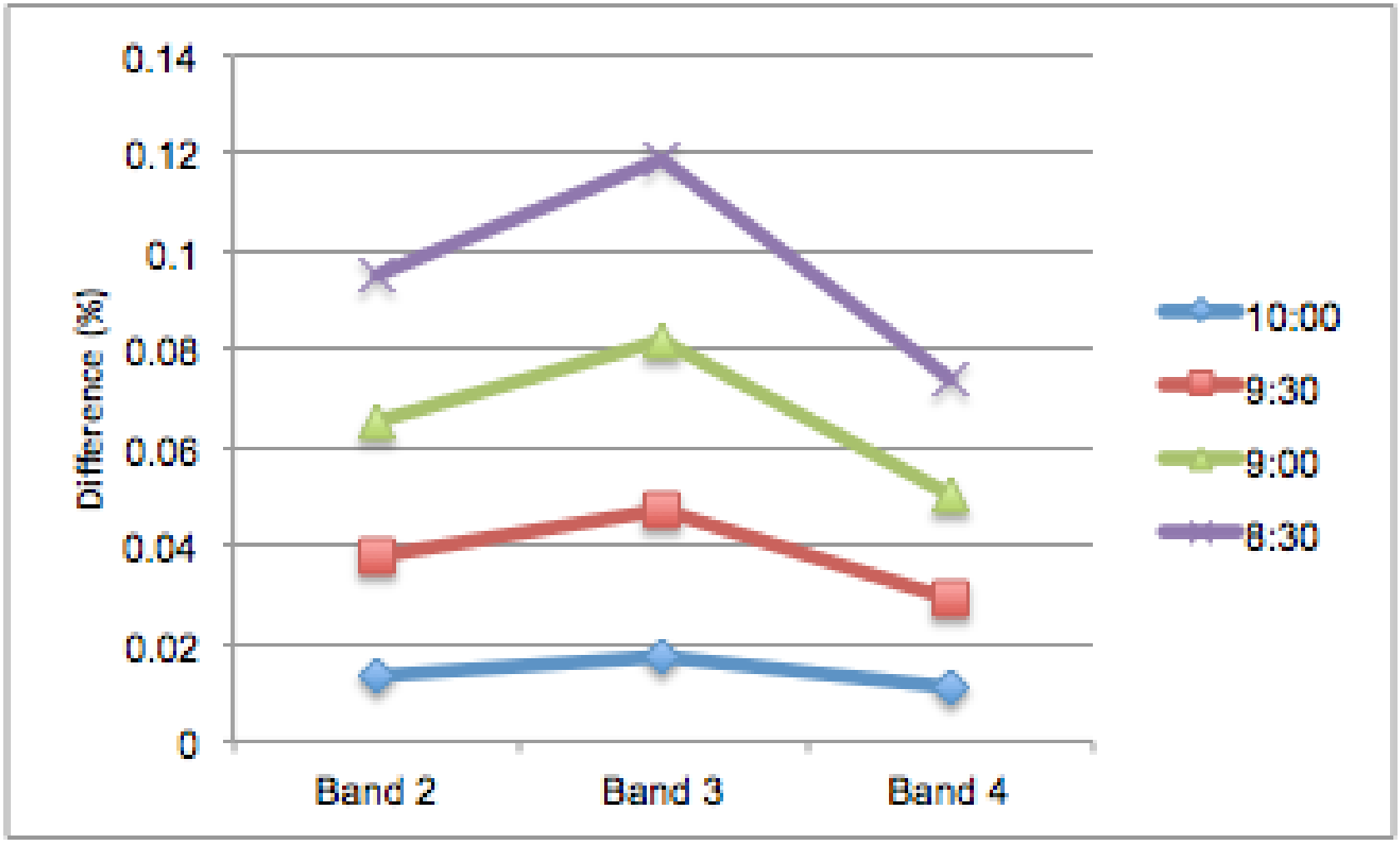

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Algodones Dunes (Desert)

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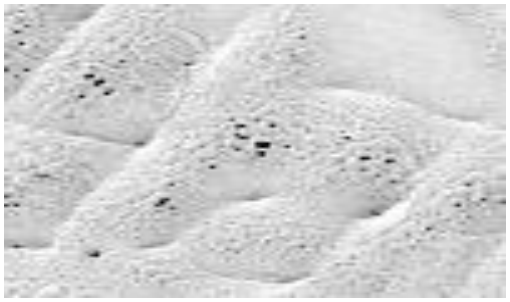
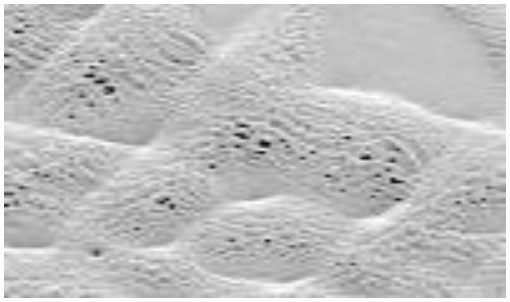
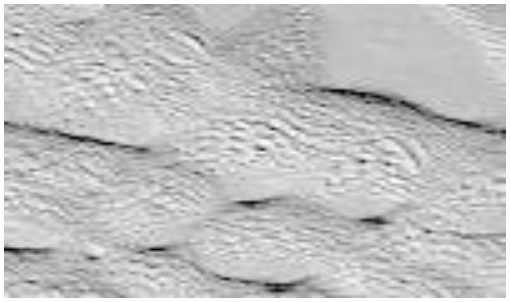
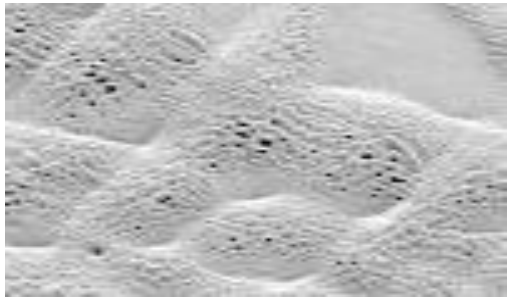
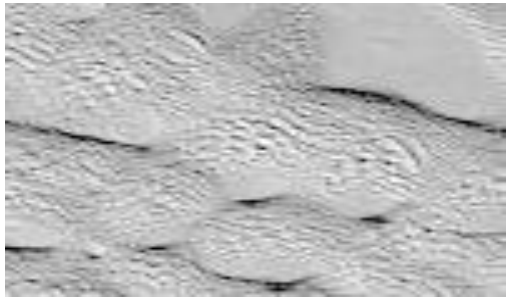
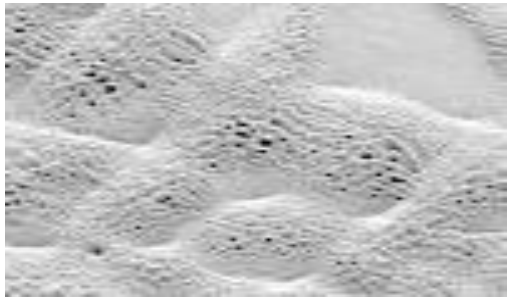
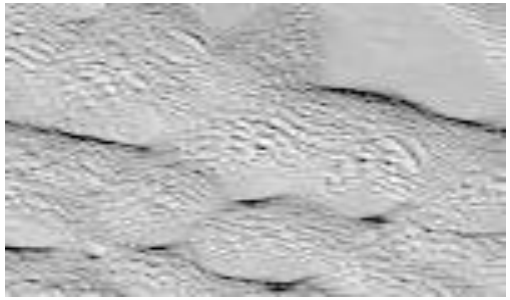
B 2			
B 3			
B 4			

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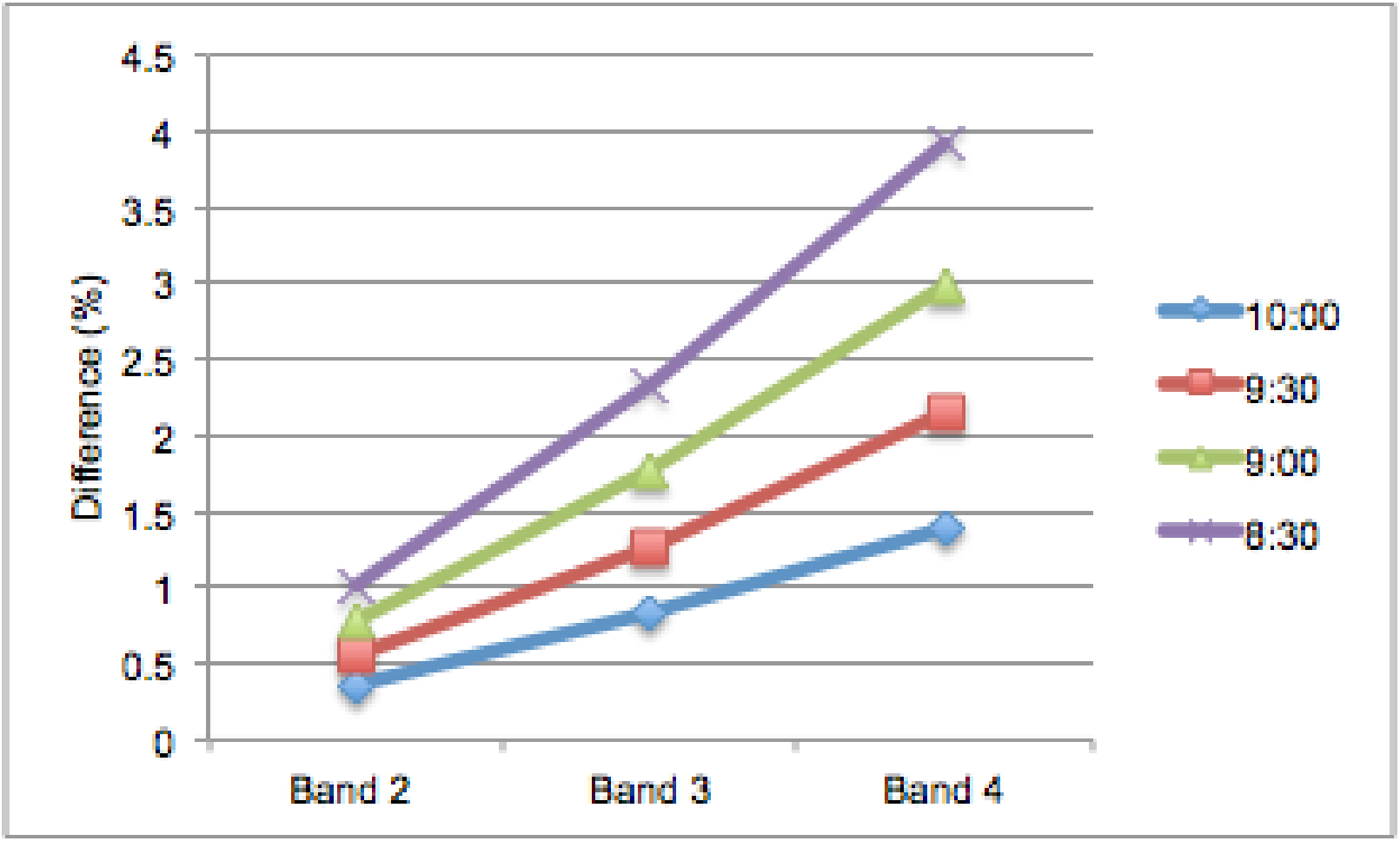
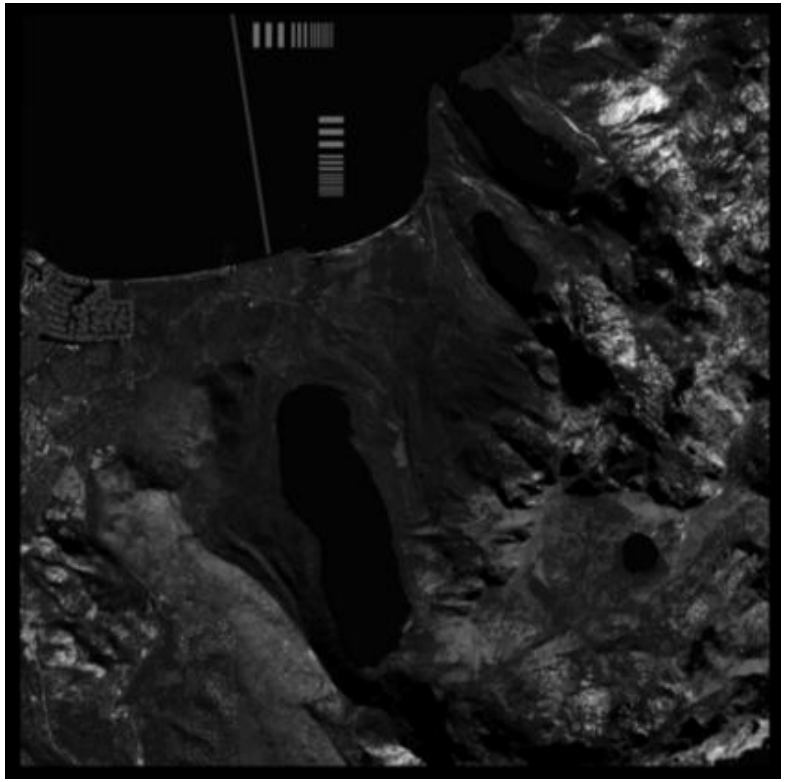


Future Studies

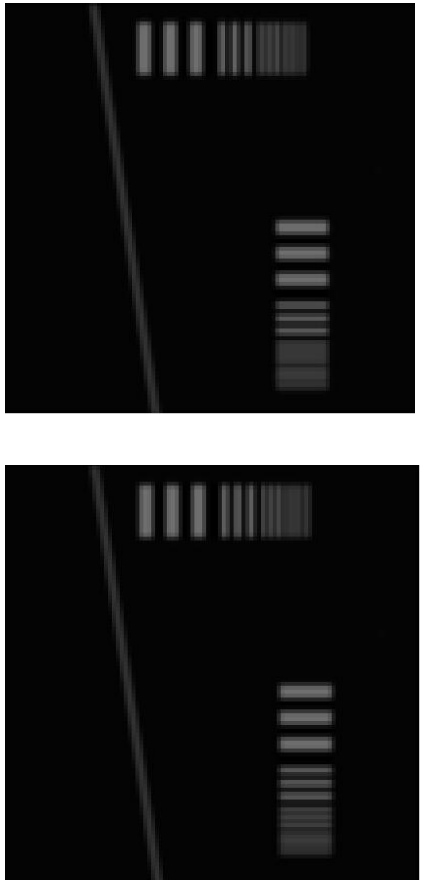
- With scene constructor tool, able to generate any scene of interest provided necessary input data

- Able to perform sensor trade studies:

  - Example: - generate a scene with as-built OLI specs
    - change one spec and re-generate scene



Actual L8 image



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