#GWF2020

GWF

GEOSPATIAL WORLD FORUM

TRANSFORMING ECONOMIES IN 5G ERA

The Geospatial Way!

7-9 April 2020 /// Amsterdam

www.geospatialworldforum.org

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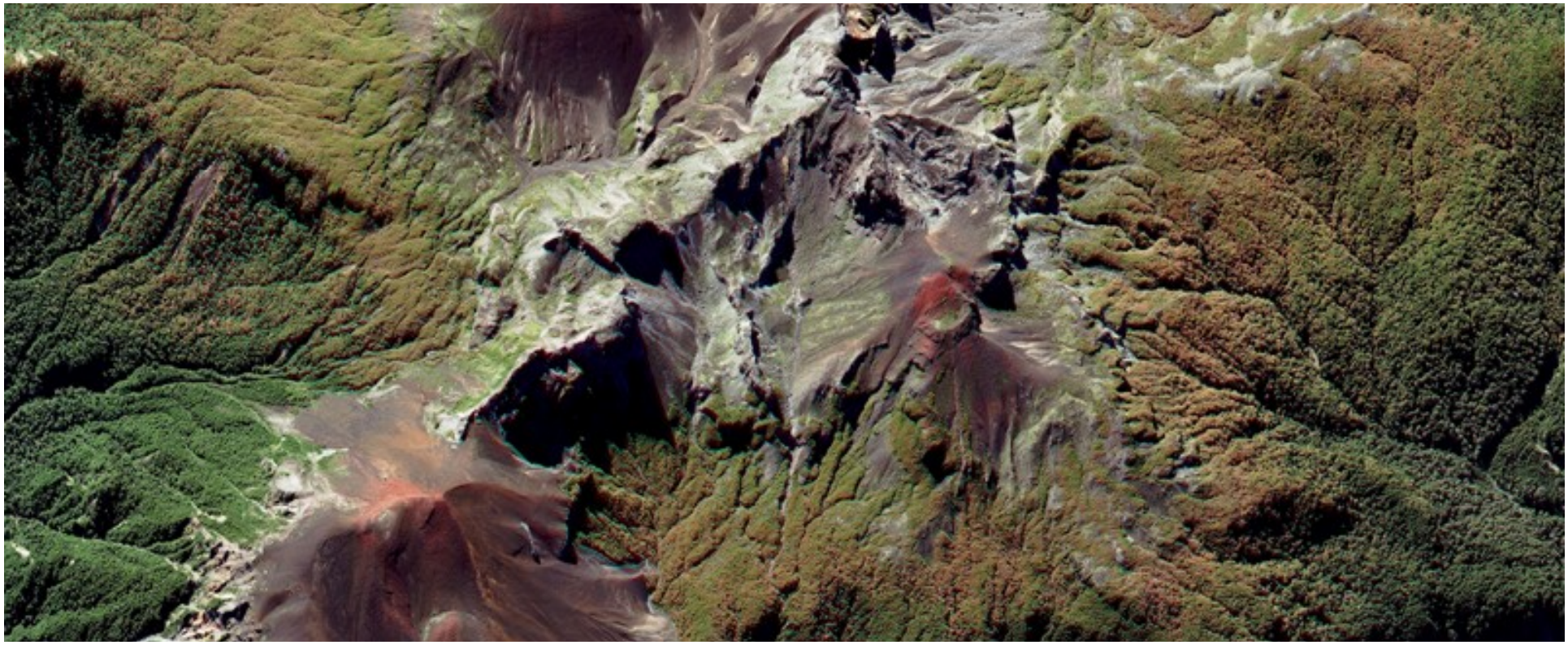
GEOSPATIAL WORLD FORUM

05-09 MAY 2014
Centre International Conferences Geneve
Switzerland

Theme : geoSMART Planet resources + infrastructure & You!

An Overview of the WorldView-3 Sensor

Giovanni Marchisio, Ph.D., Director Product Development



DigitalGlobe

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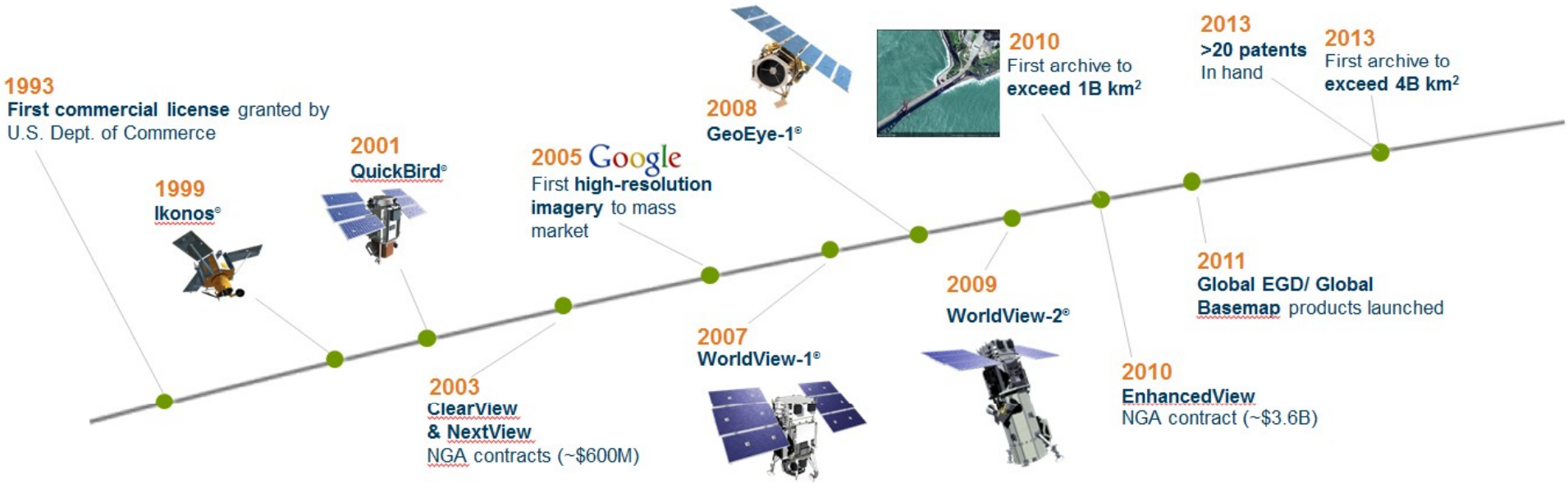
We Are the Innovators of Our Industry



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WorldView-3 Advantages

1. Advantages:
   a. Atmospheric Sensor (CAVIS)
   b. Improved resolution
   c. Material identification (SWIR)
2. Short Wave Infrared (SWIR) reveals materials
3. Chemistry-based absorption features not present in VNIR
4. Superspectral versus hyperspectral and multispectral
5. Applications

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A Sensor Perspective

WorldView 3

- **Multispectral: 16 bands VNIR-SWIR.**
- **Pixels: 0.31, 1.2, 3.7 m.**
- **CAVIS instrument for atmospheric retrievals**.

AVIRIS (aerial sensor):

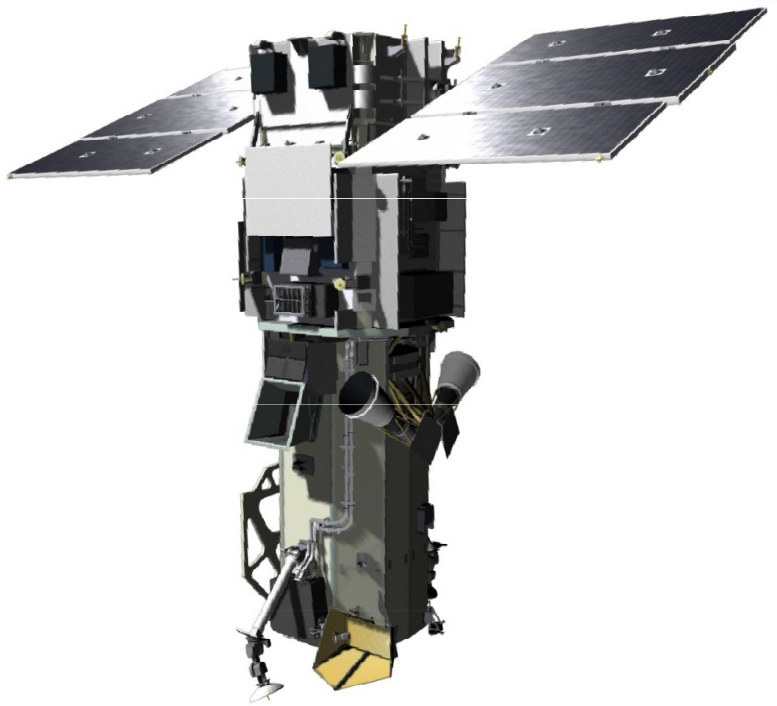
- Imaging Spectrometer: 224 bands VNIR-SWIR.
- Pixels vary: 2 to 20 m.
- Used to generate WV3 simulated spectra.

ASTER

- Multispectral: 10 bands VNIR - SWIR.
- Pixels: 15, 30 m.
- SWIR failed.

Landsat (8)

- Multispectral: 8 bands VNIR - SWIR.
- Pixels: 30 m.



Expected launch: 2014

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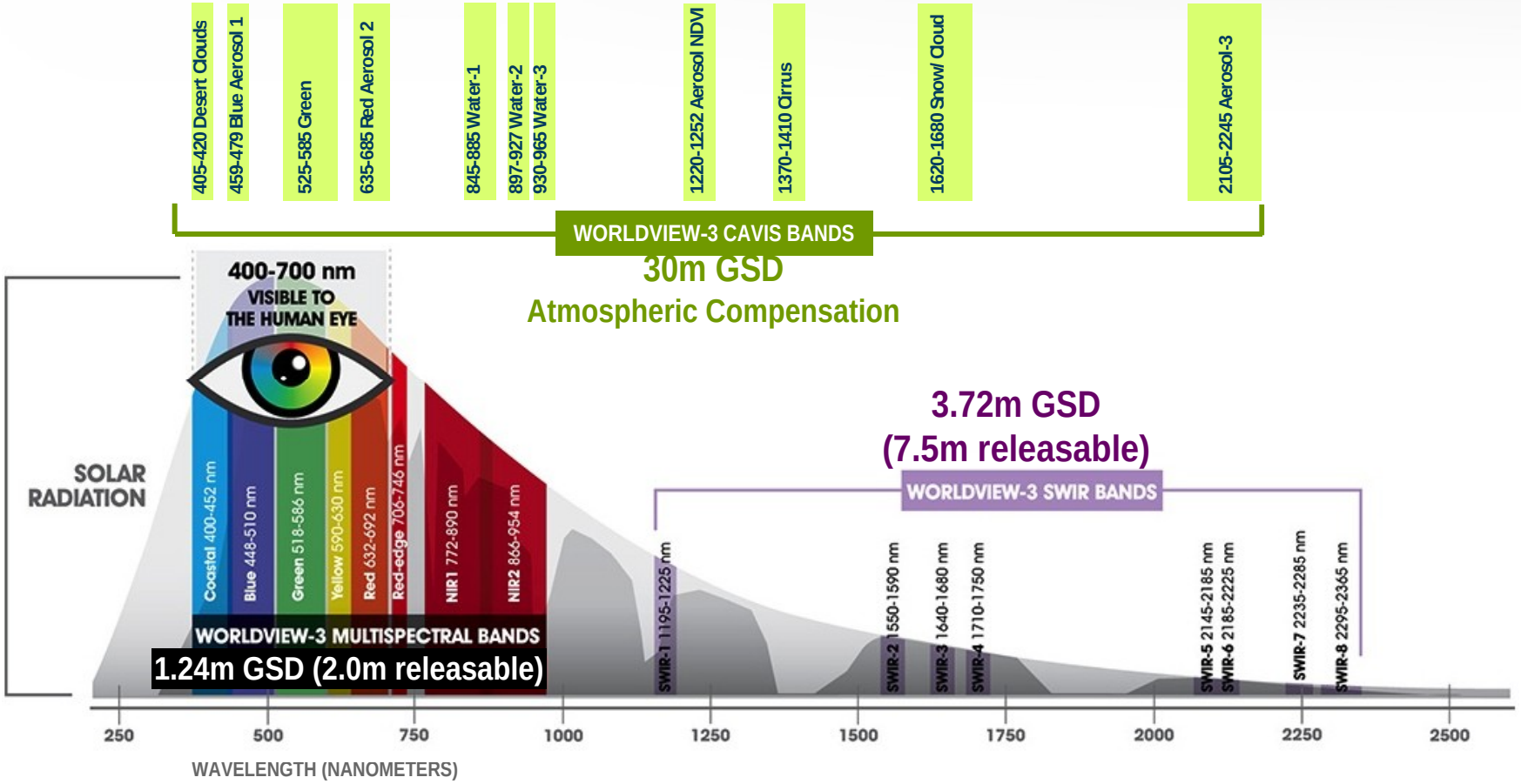
WorldView-3 will be the first high-resolution "super spectral" satellite in the industry



Pan: 0.31m GSD (0.5m releasable)

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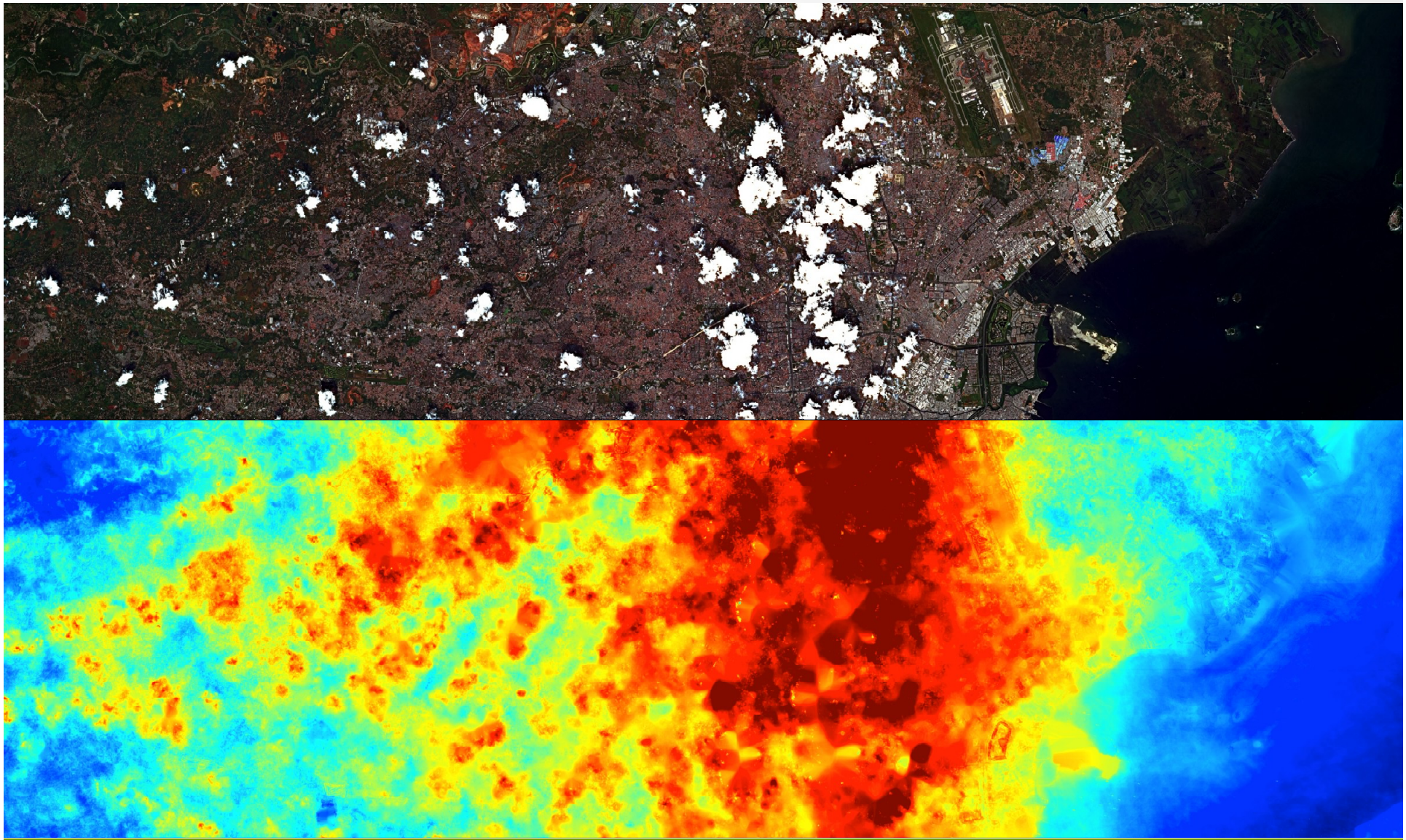
CAVIS will improve measurement and removal of atmospheric effects



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Does resolution make a difference? WV-3 vs ASTER

WV-3 simulation 3.5 m
SWIR Composite

ASTER actual 30 m
SWIR Composite

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Examples of what WV-3's bands can see

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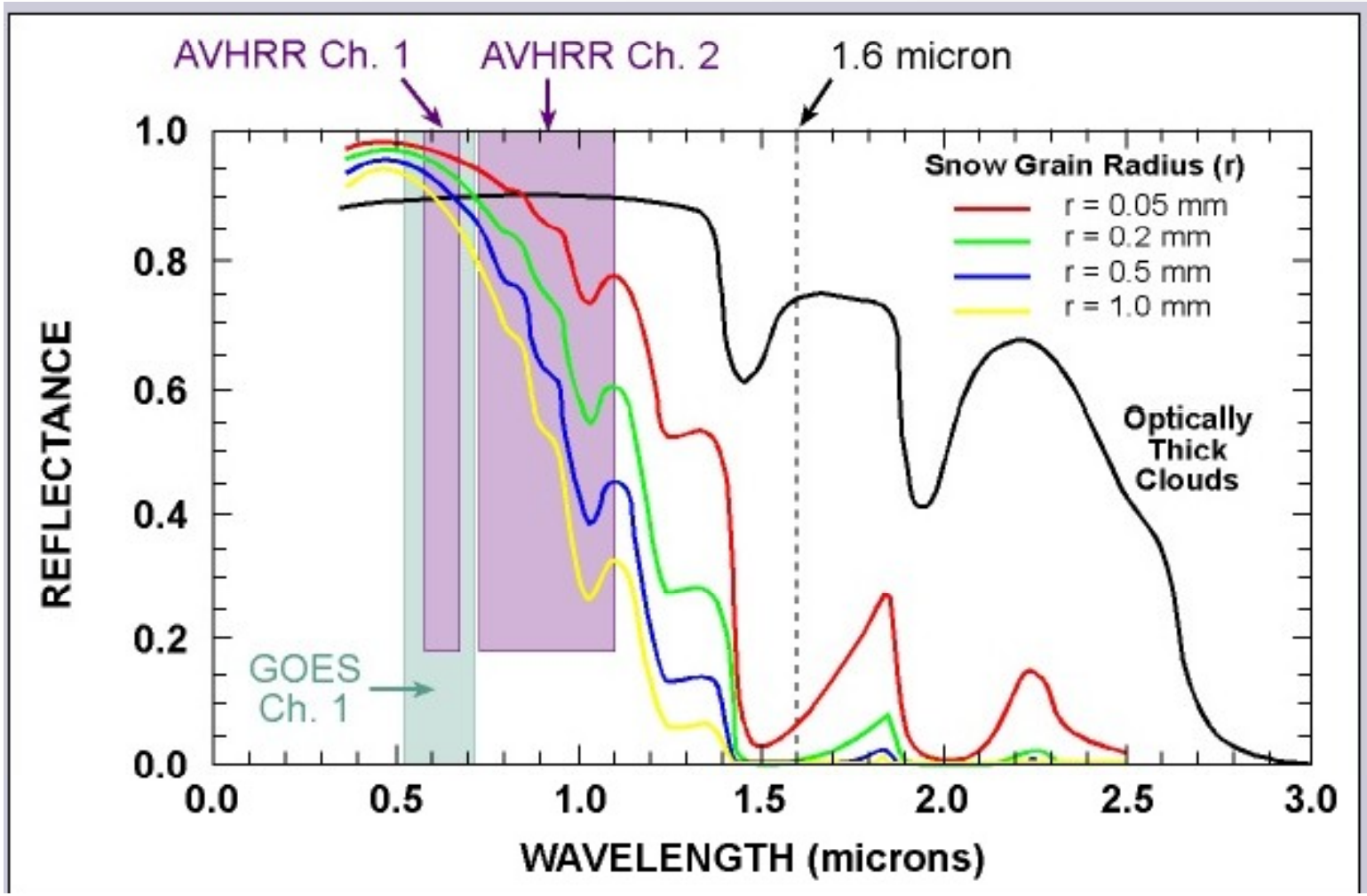
Differentiating Snow from Clouds



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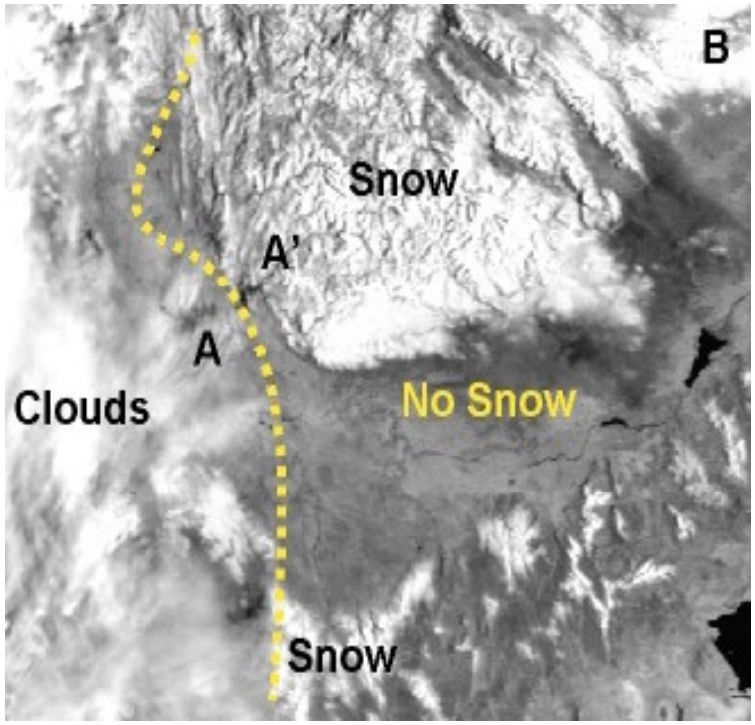
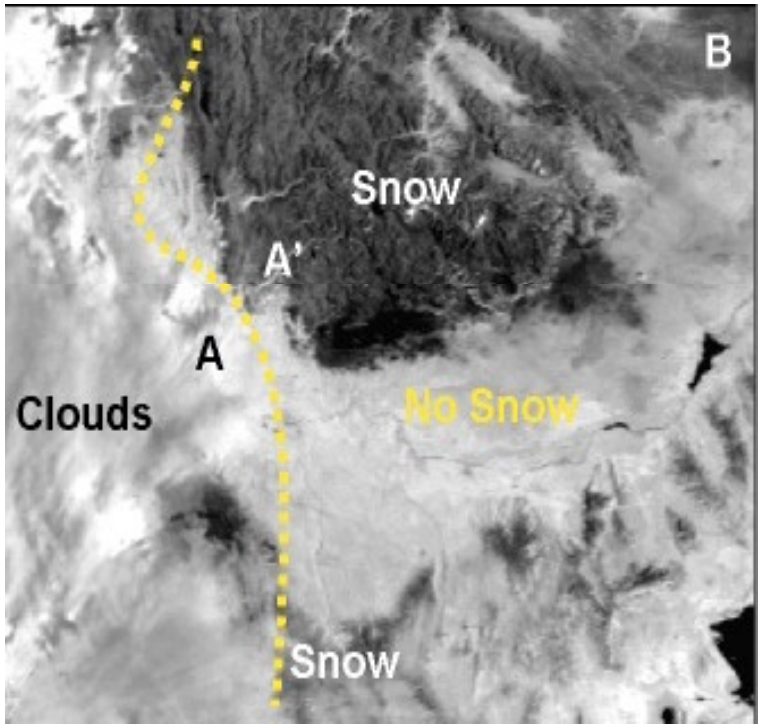
Differentiating Snow from Clouds

Red Band 660nm



SWIR Band 1.63nm



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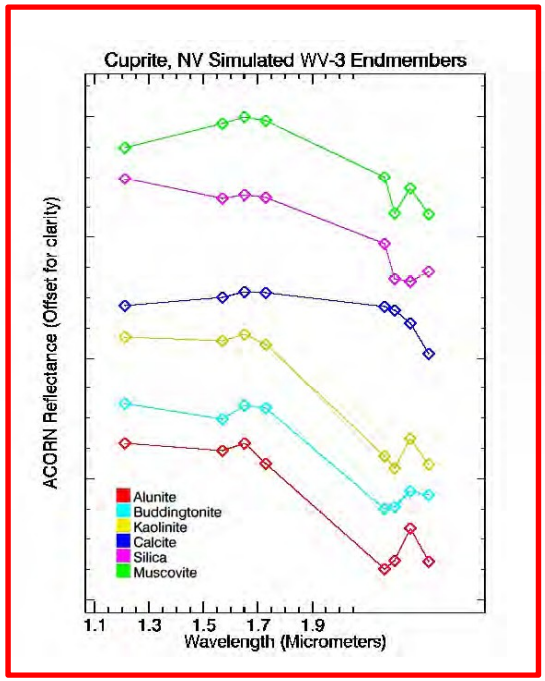

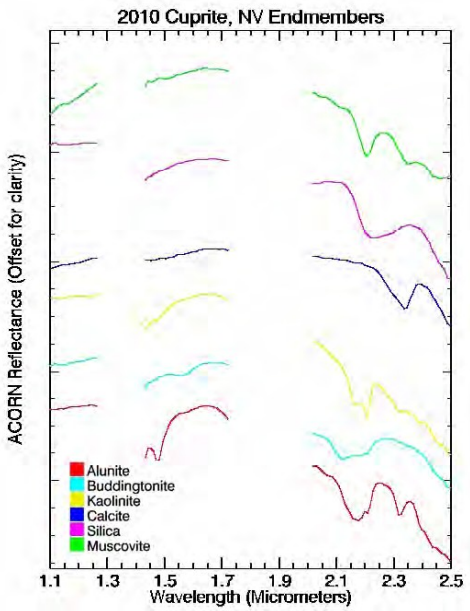

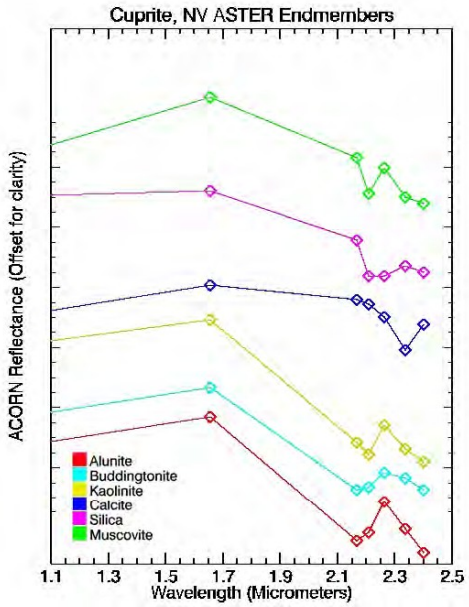

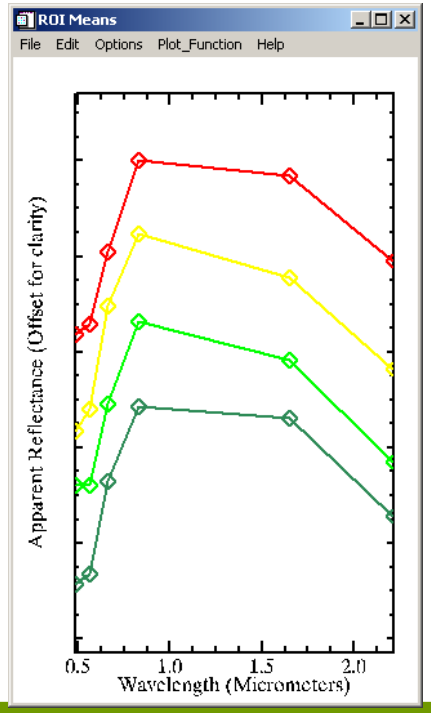

Compare Spectra:

- WV-3 (simulated)
- AVIRIS
- ASTER
- Landsat TM

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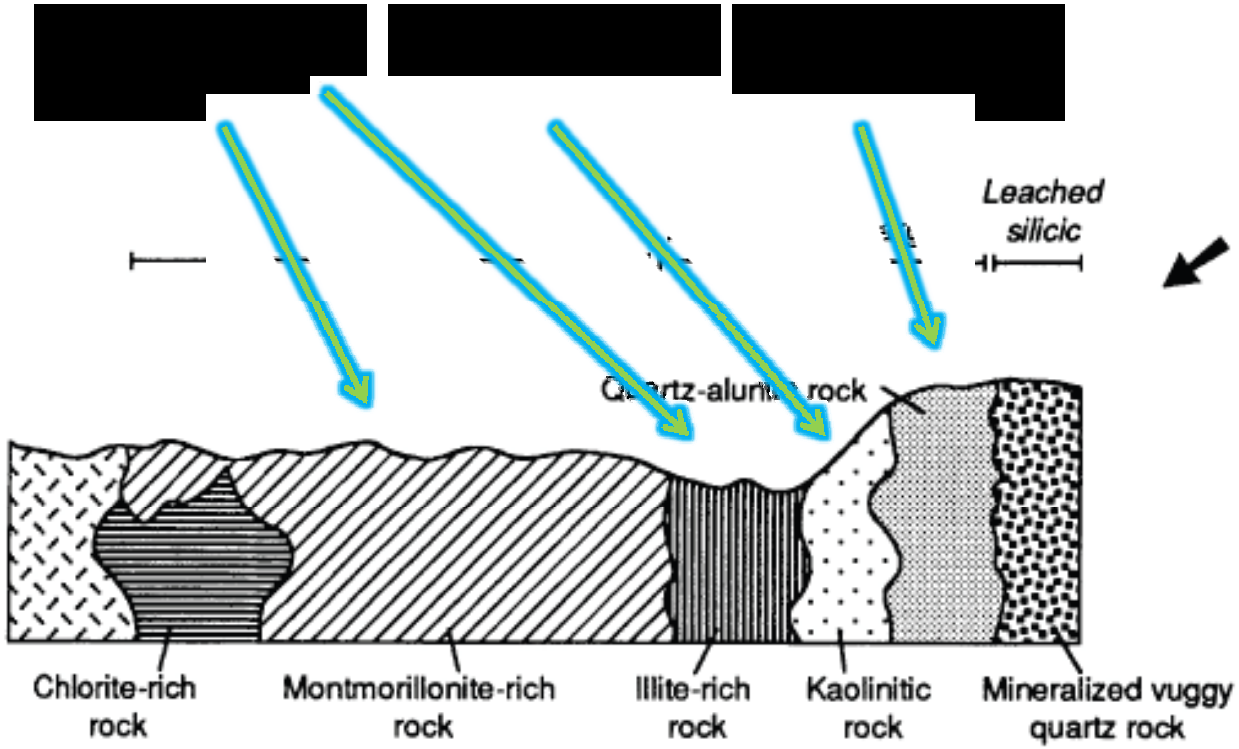
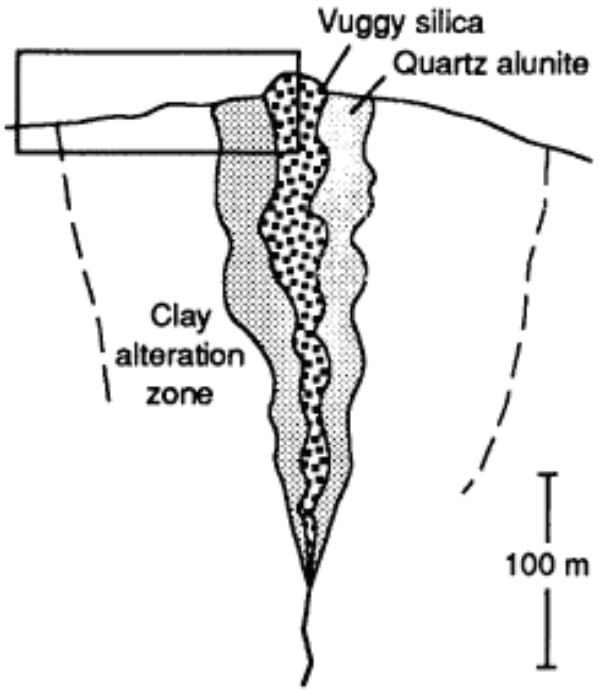
Zonation aids in predicting location of precious metals.

Hydrothermal Ore Deposit Model





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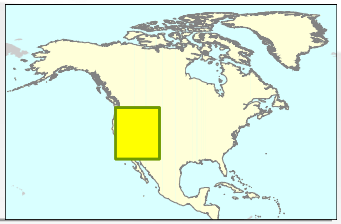
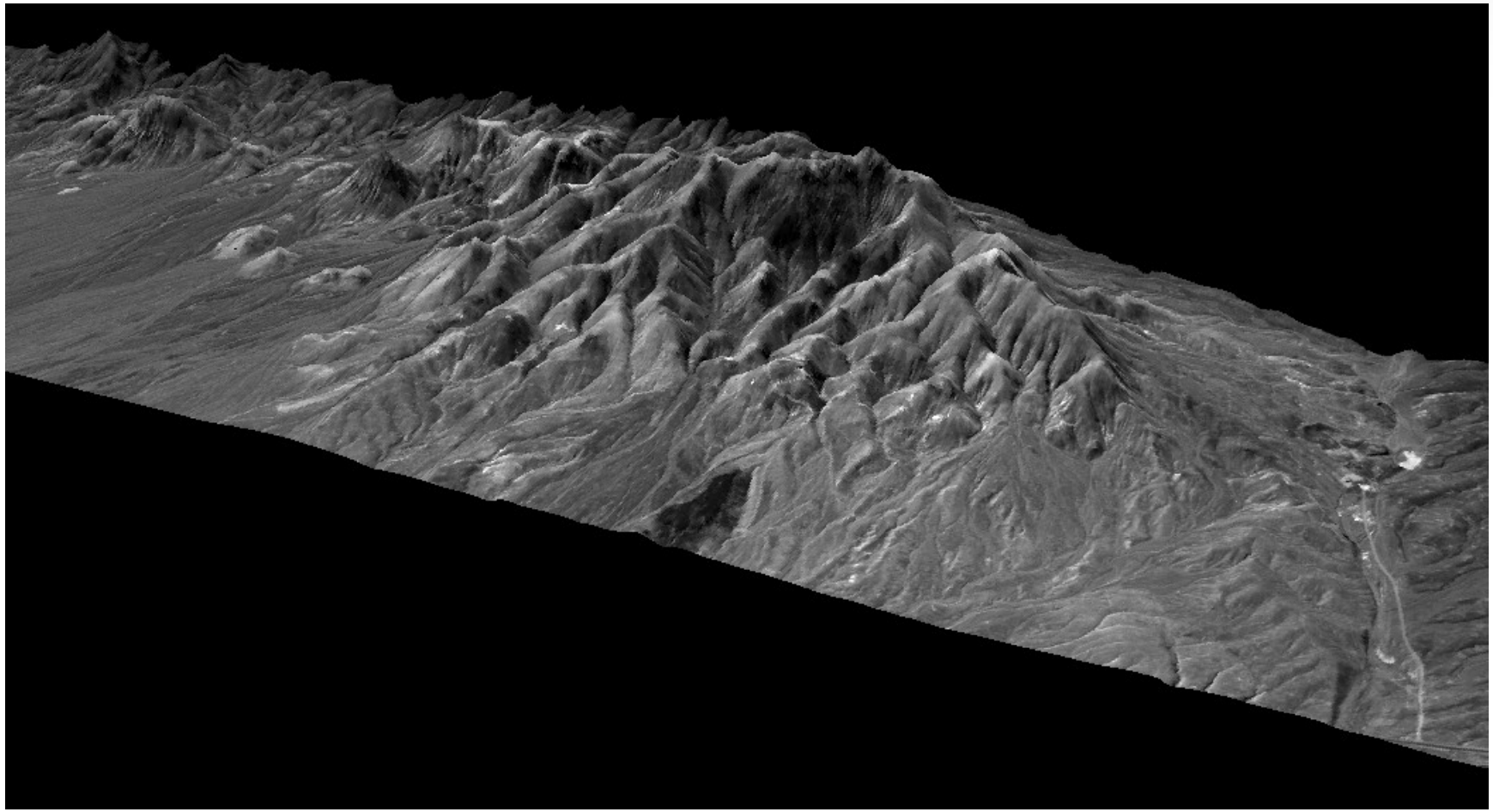
Application to Mineral Exploration

Panchromatic “WV-1”





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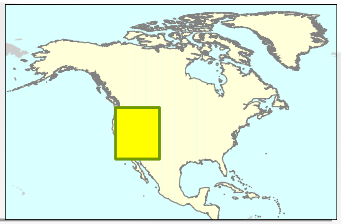
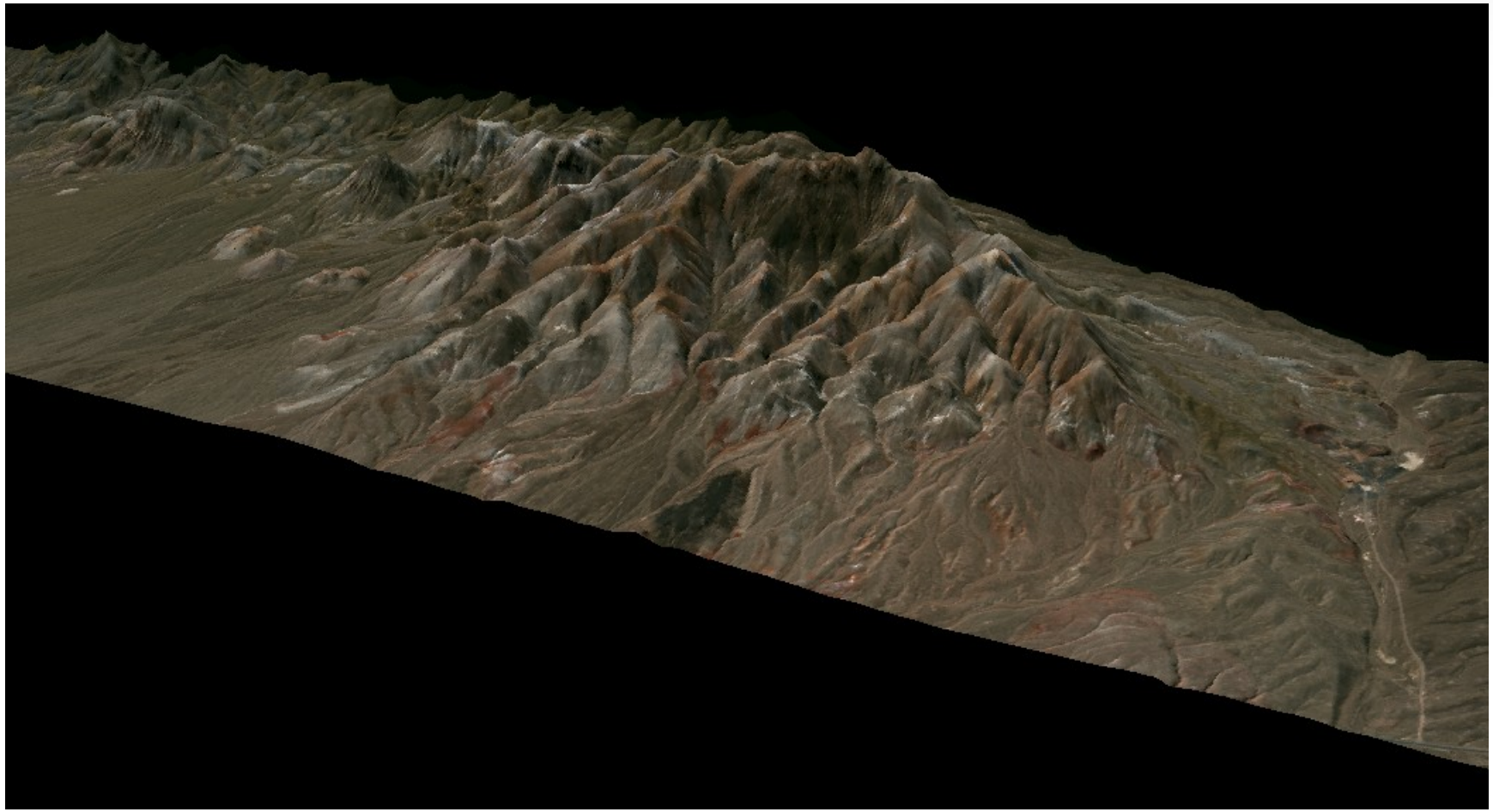
Application to Mineral Exploration

True Color “GE-1, WV-2”





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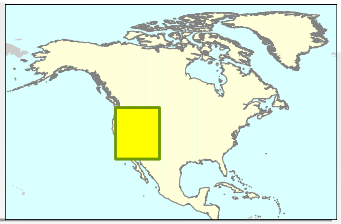
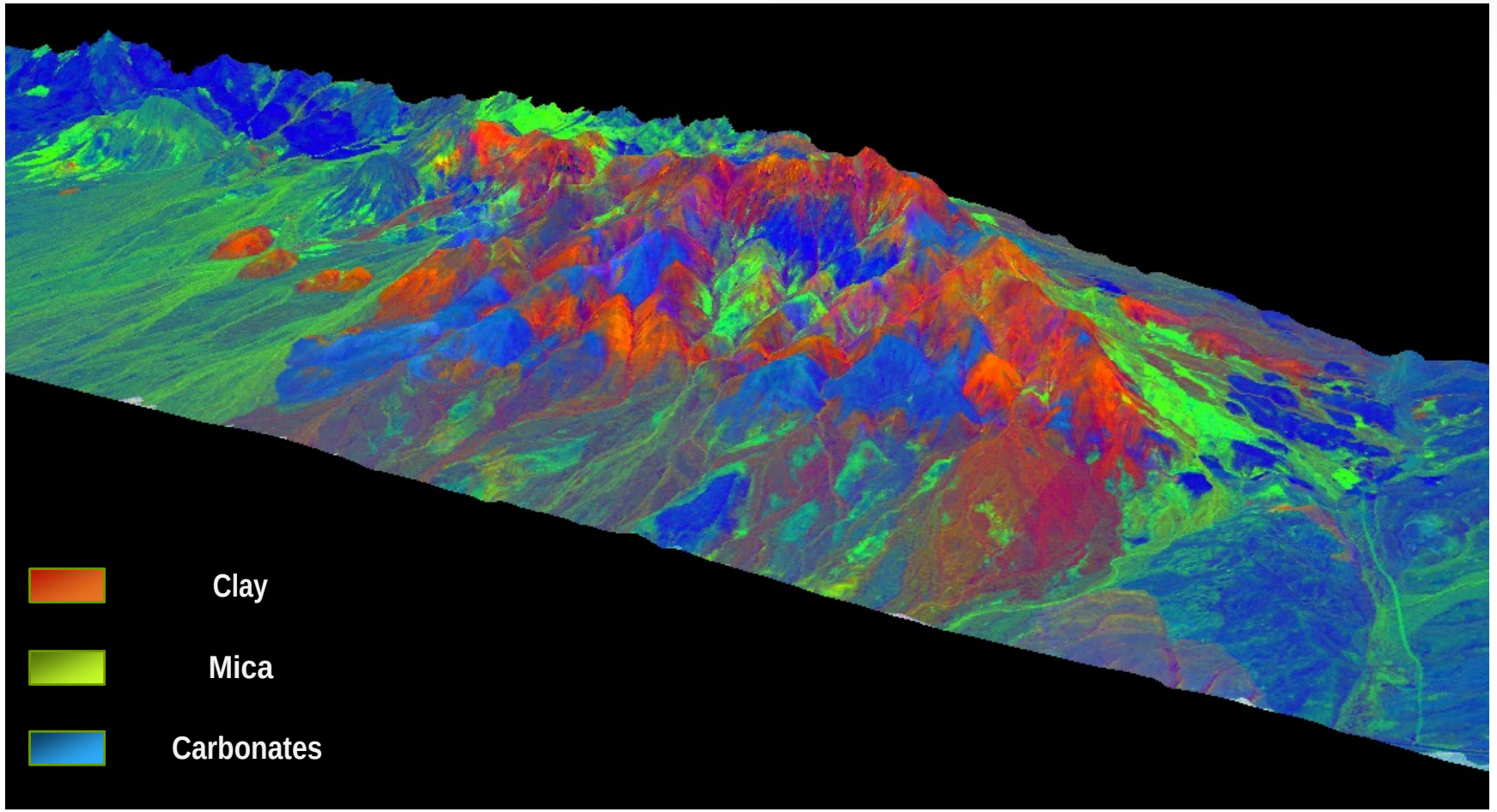
Application to Mineral Exploration

Mineral Indices “WV-3”





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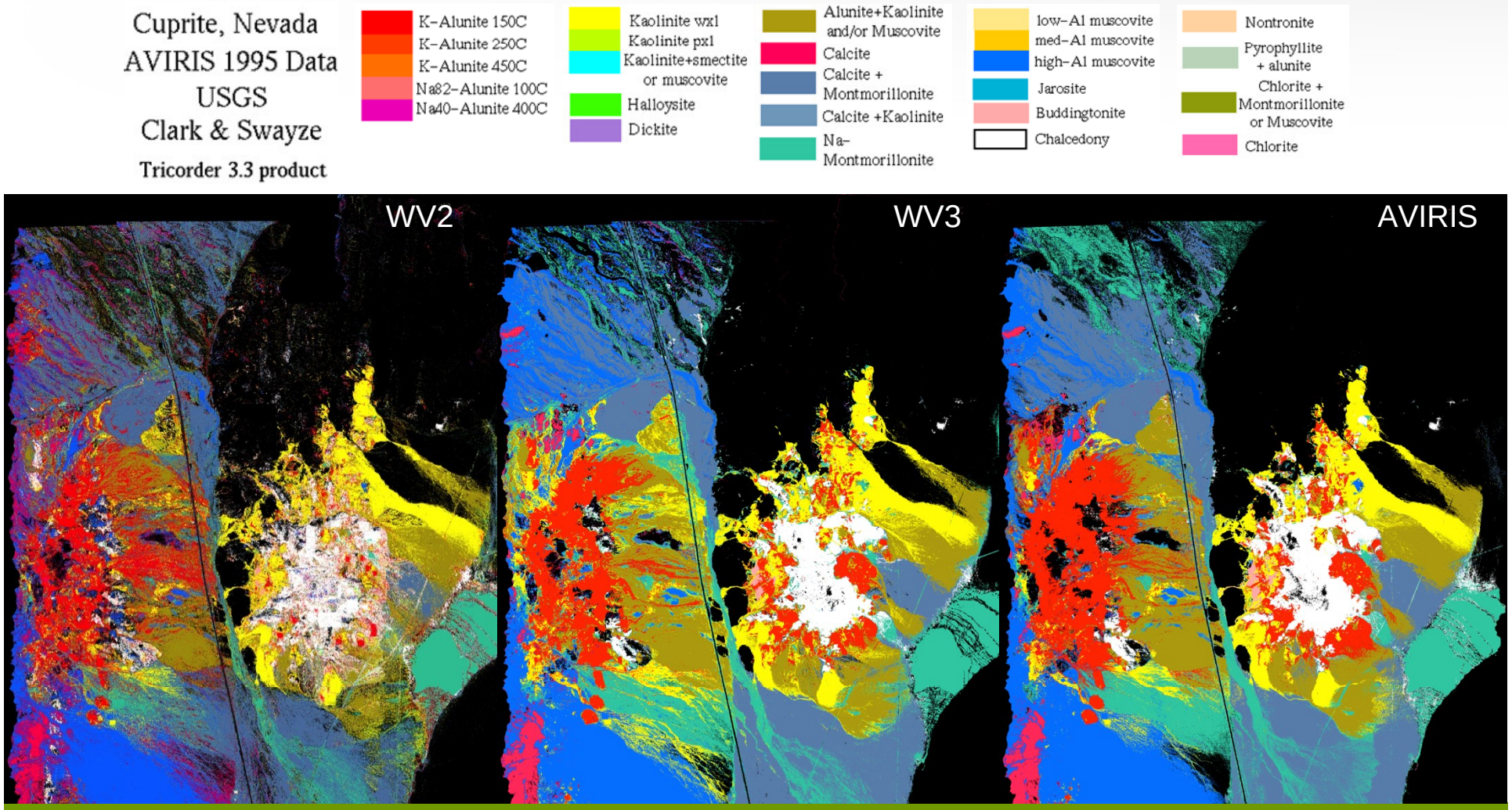
8-band WV-3 SWIR enables accurate geological classification, ± 2–5% of hyperspectral AVIRIS!



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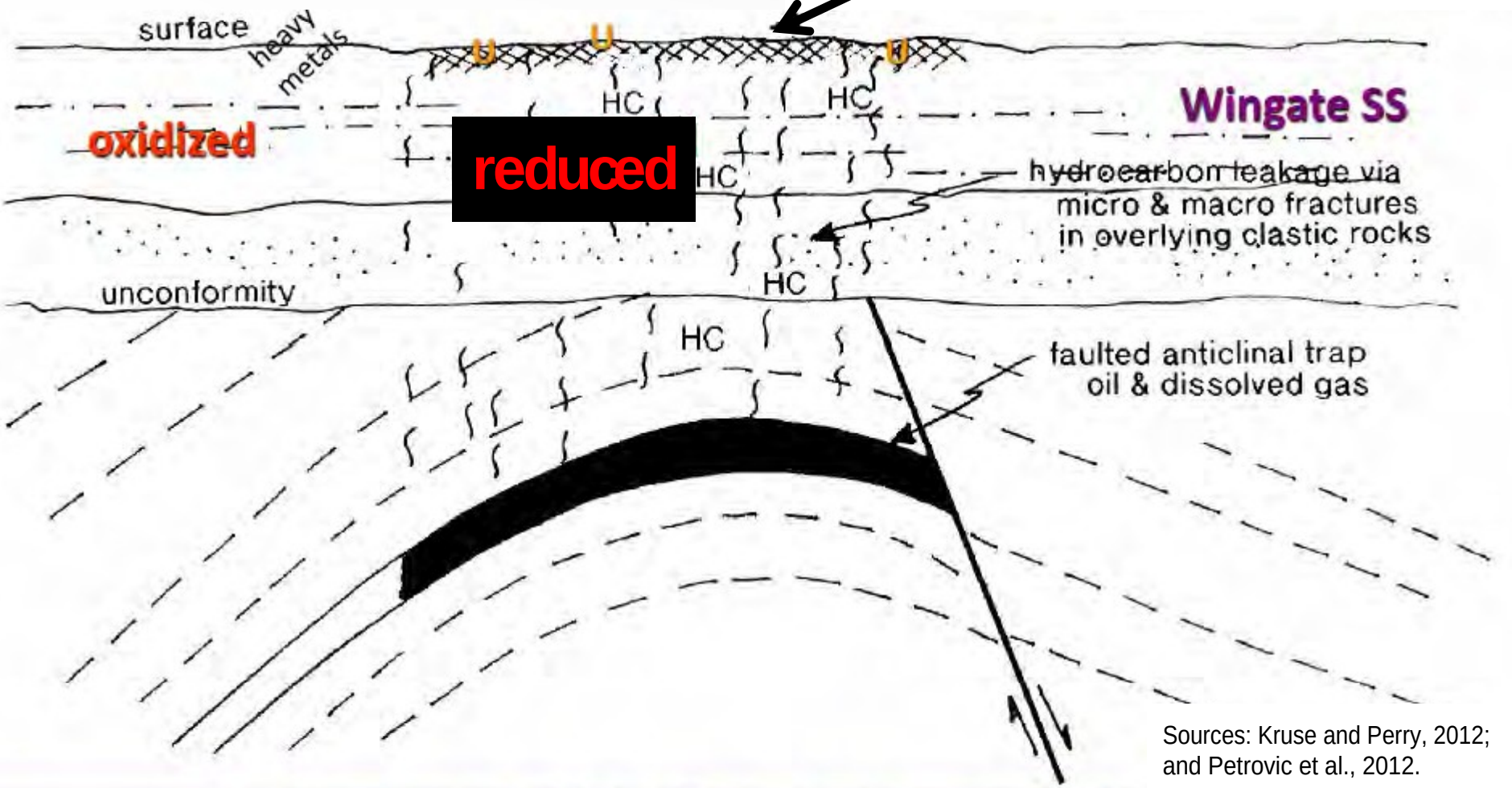
Hydrocarbon Alteration Model

DigitalGlobe

Lisbon Valley, Utah USA

Red un-altered surface rock

Bleached surface rock, higher Calcite, Hematite, Kaolinite



Sources: Kruse and Perry, 2012; and Petrovic et al., 2012.

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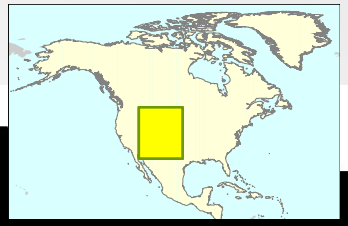
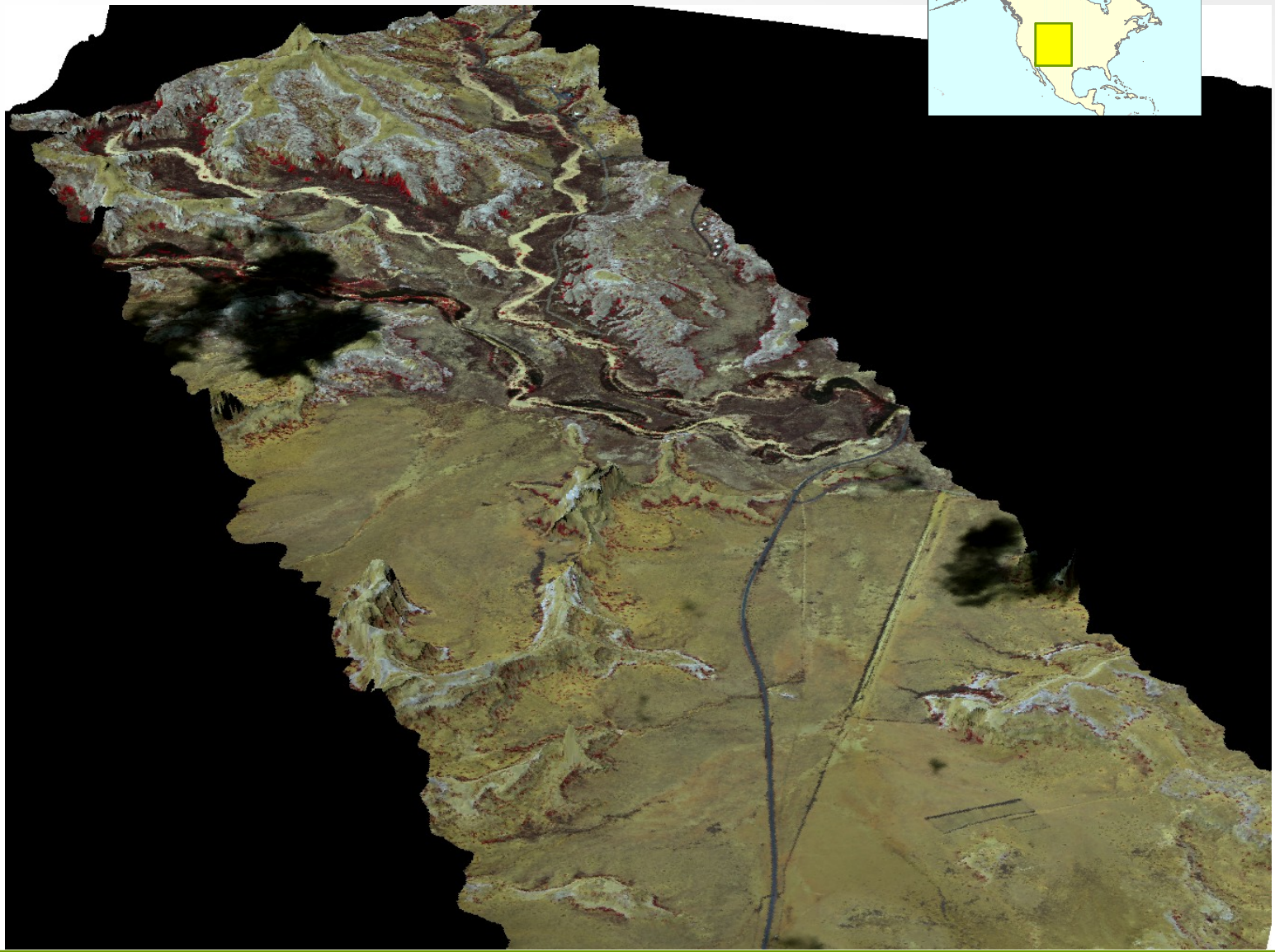
Hydrocarbon Alteration Mapping

Canyon Lands, Utah USA





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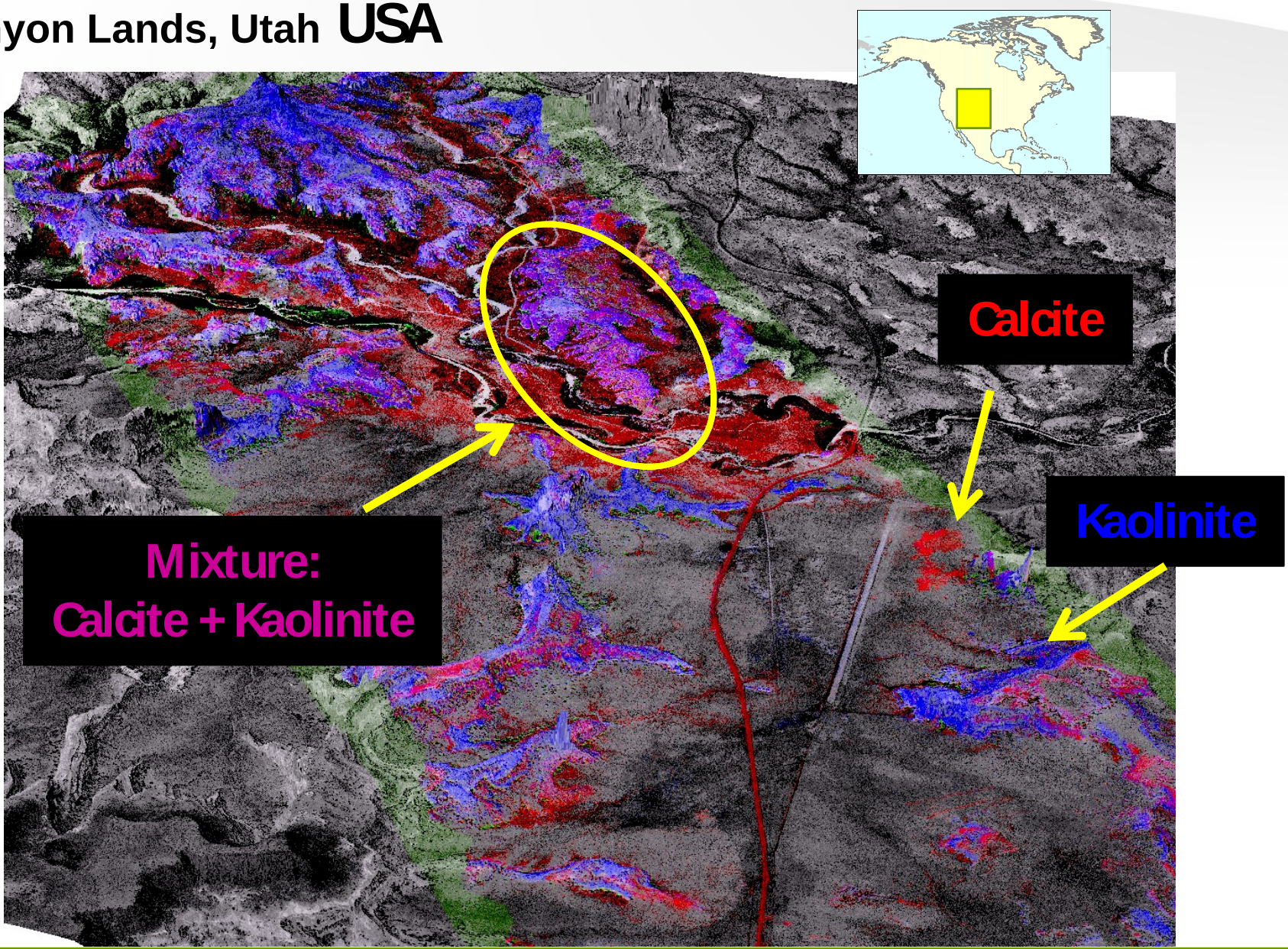
Hydrocarbon Alteration Mapping

Canyon Lands, Utah USA



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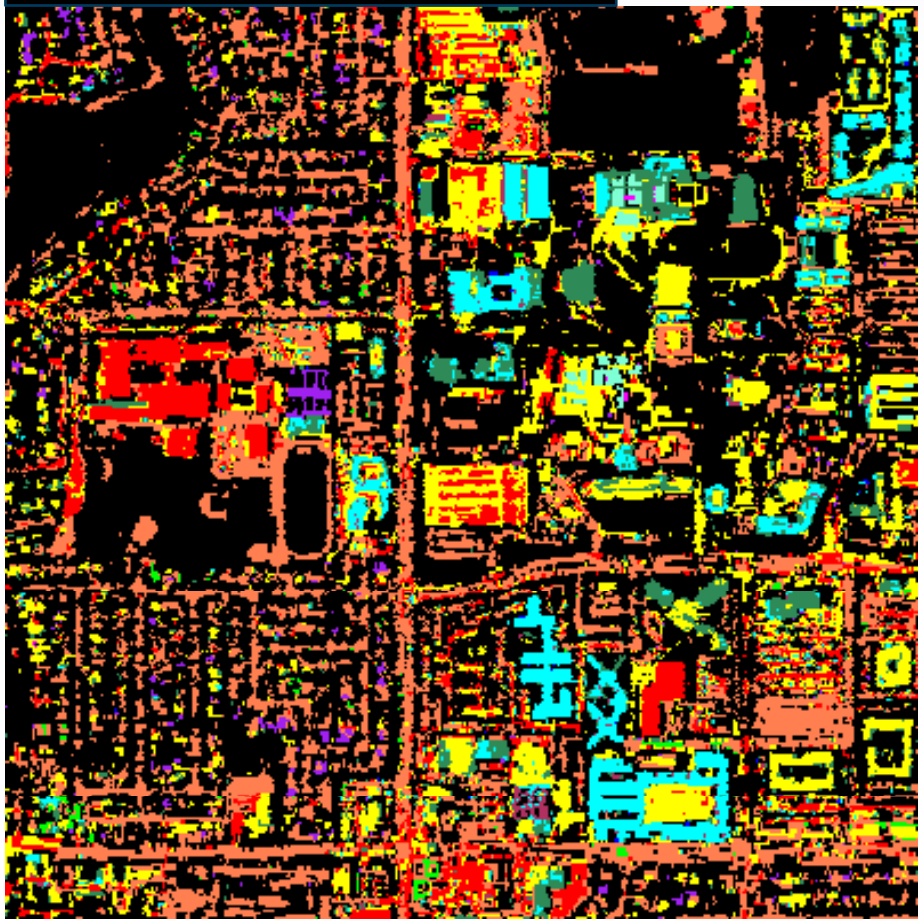
Simulated SWIR rooftop classification



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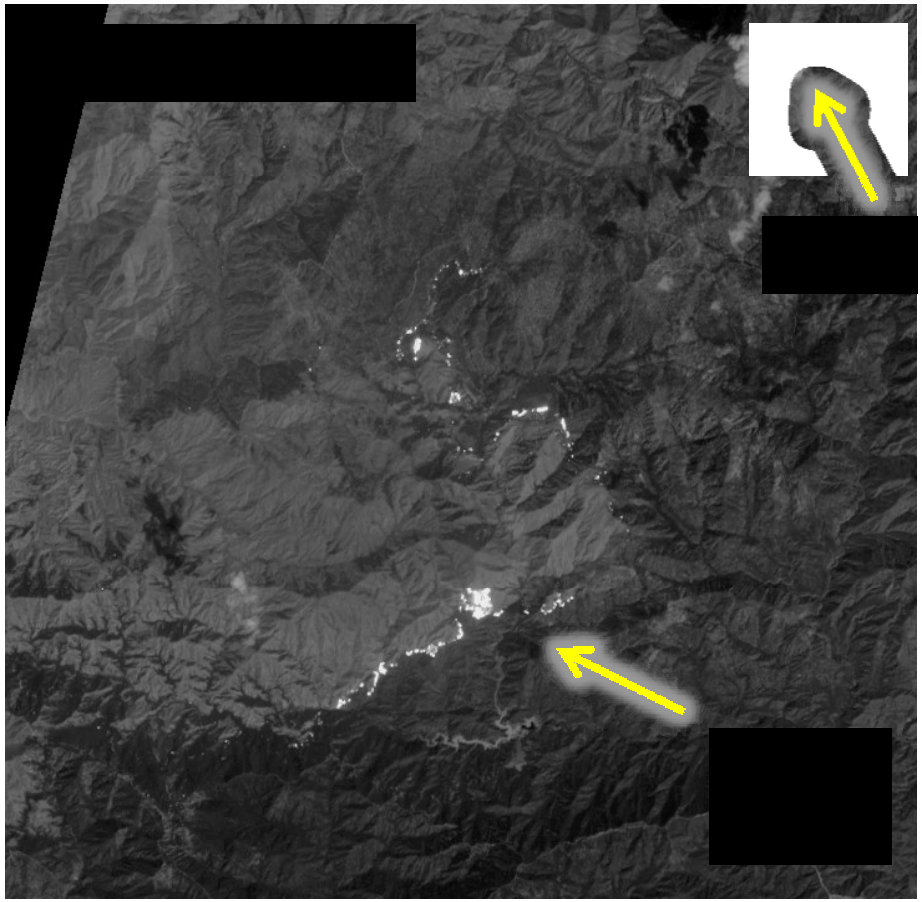
Smoke Penetration in SWIR

Station Fire, Los Angeles National Forest, CA
Advanced Land Imager (ALI) 03 SEP 2009



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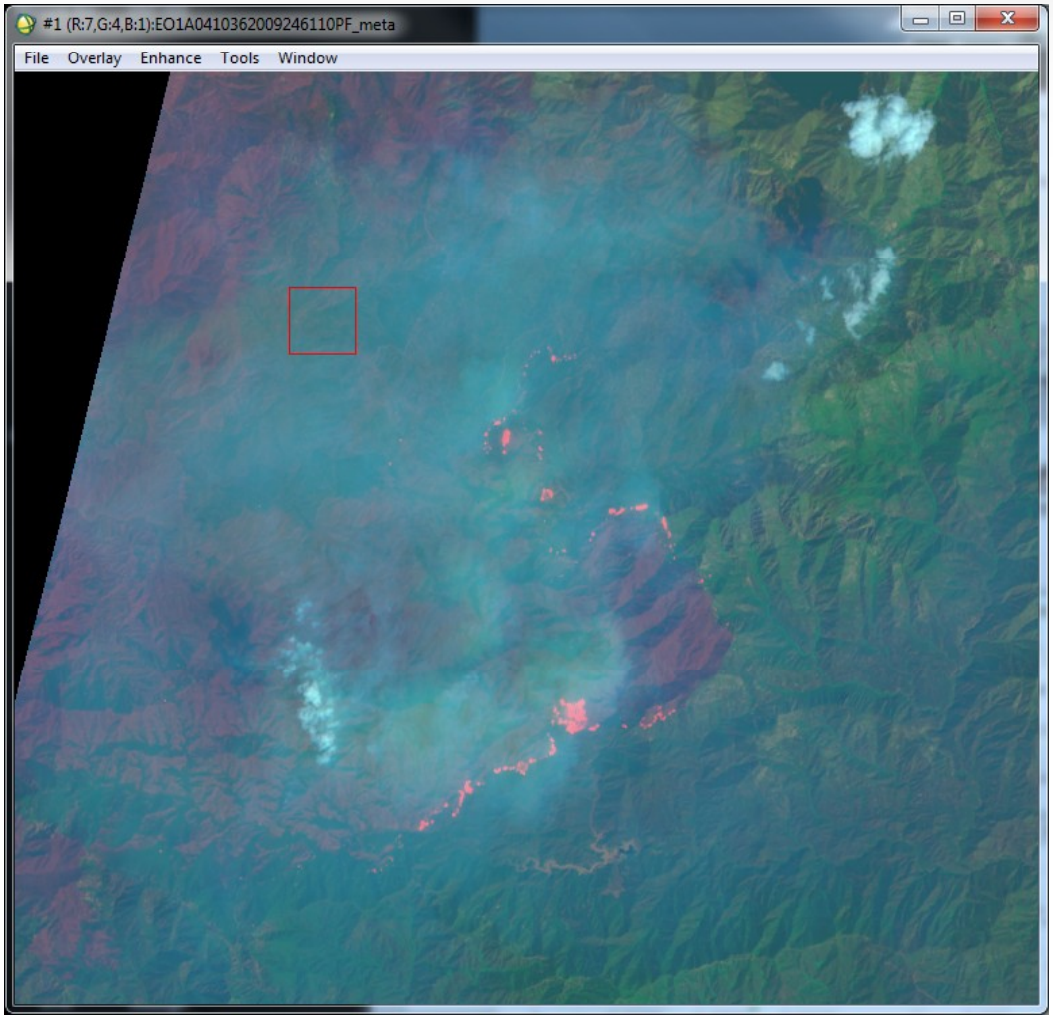
Smoke Penetration in SWIR

Station Fire, Los Angeles National Forest, CA
Advanced Land Imager (ALI) 03 SEP 2009

False color composite :

- Active fire in bright red
- Healthy vegetation in green
- Burned vegetation dark red
- Smoke in blue-gray
- Clouds in white

ALI bands: 7, 4, 1
[WV3 equivalent:
SWIR-6, NIR-1, Blue]



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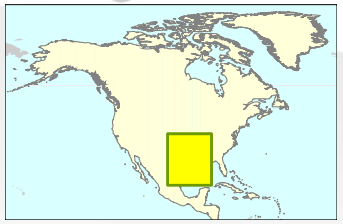
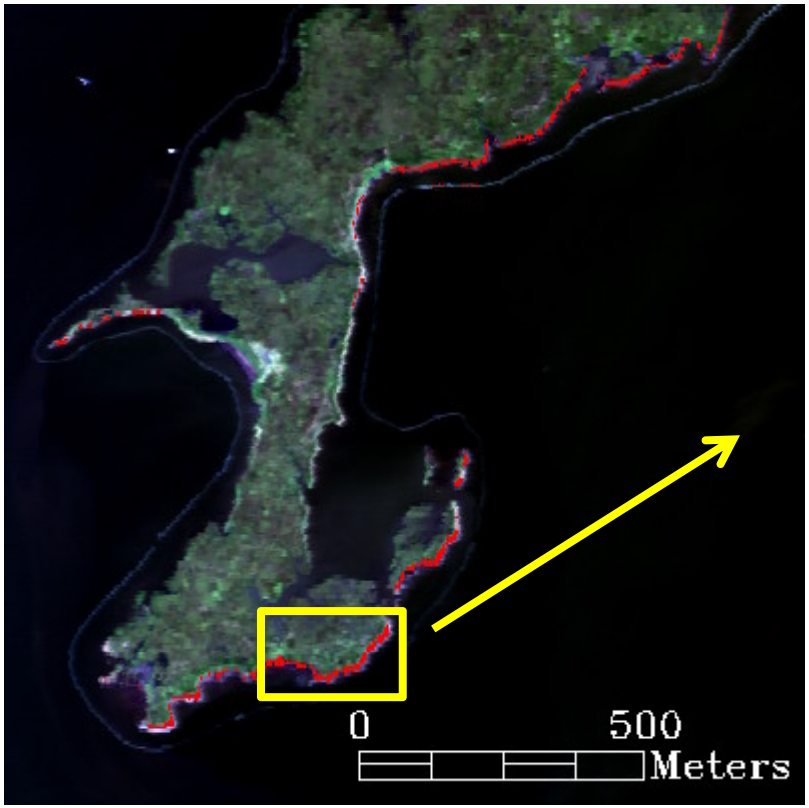
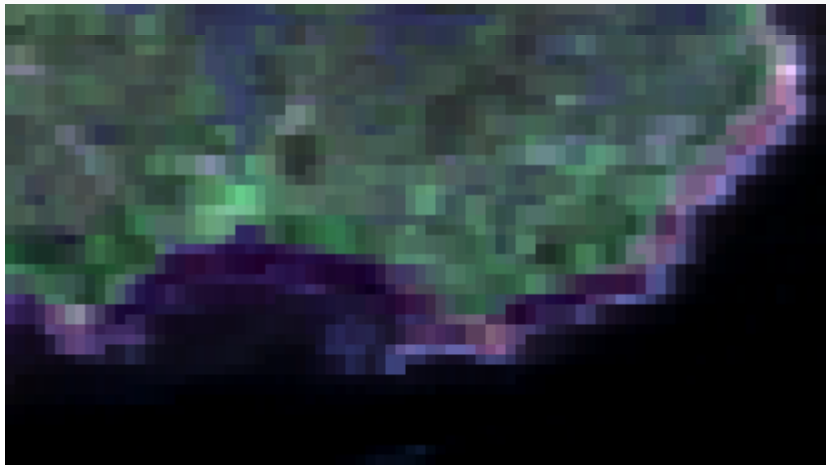
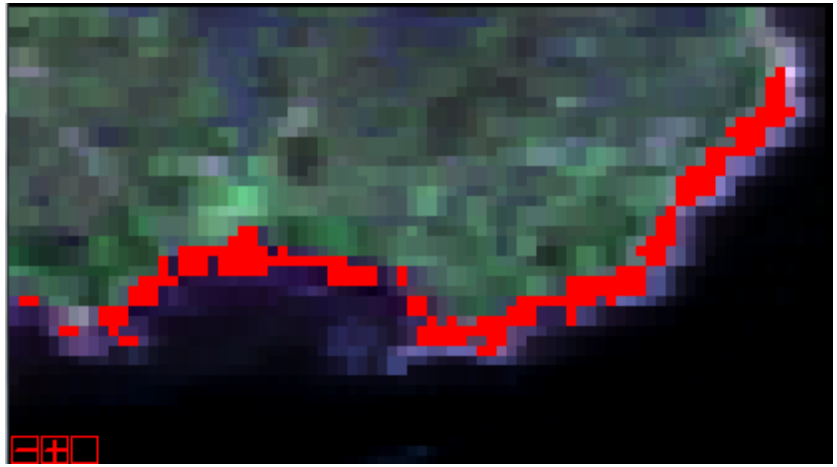
Environmental Monitoring:
Mapping marsh oil using simulated WV-3 SWIR data (Louisiana Oil Spill 2010)









Marsh oil mapped by spectral matching of simulated WV3 data.

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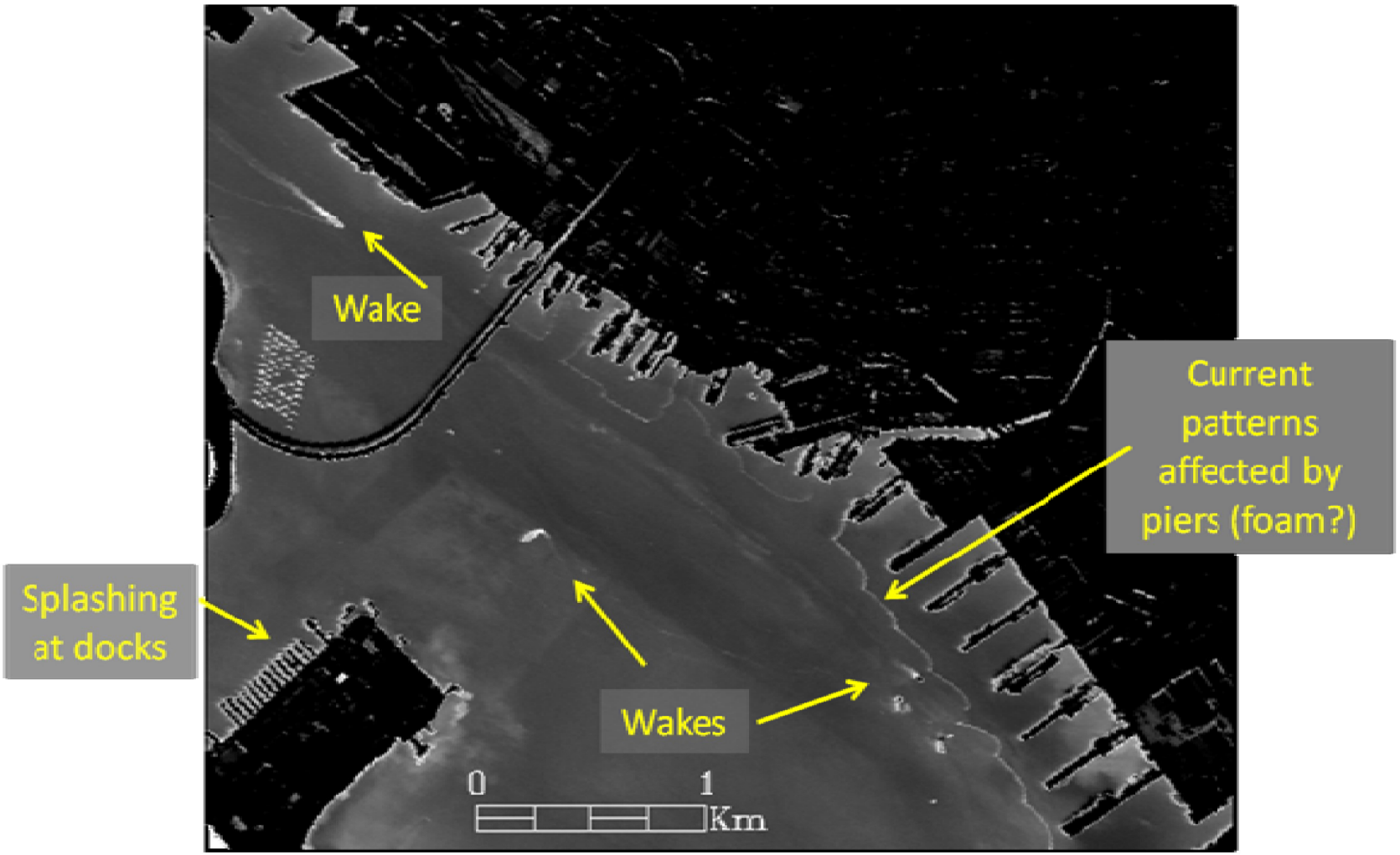
Maritime SWIR applications:
Wake and 'Splash' Detection



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Conclusion

- DigitalGlobe is the leader in the Global Earth Observation market. DigitalGlobe's sensors have unmatched spatial, spectral resolution and accuracy. We have the largest and highest resolution collection capacity in the world.
- WorldView-3 will be the first high resolution super-spectral satellite in the industry, dramatically improving the resolving power of many image exploitation applications.
- WorldView-3 will provide improved spatial and spectral resolution with 8 additional bands in the SWIR and an atmospheric sensor for accurate rendering of super-spectral signatures.
- The SWIR bands will detect chemistry-based absorption features and dramatically improve our ability to identify man-materials, soils and minerals with applications to mineral, gas and oil exploration, environmental monitoring, urban inventorying and intelligence.

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