North American Surface Albedos from Landsat

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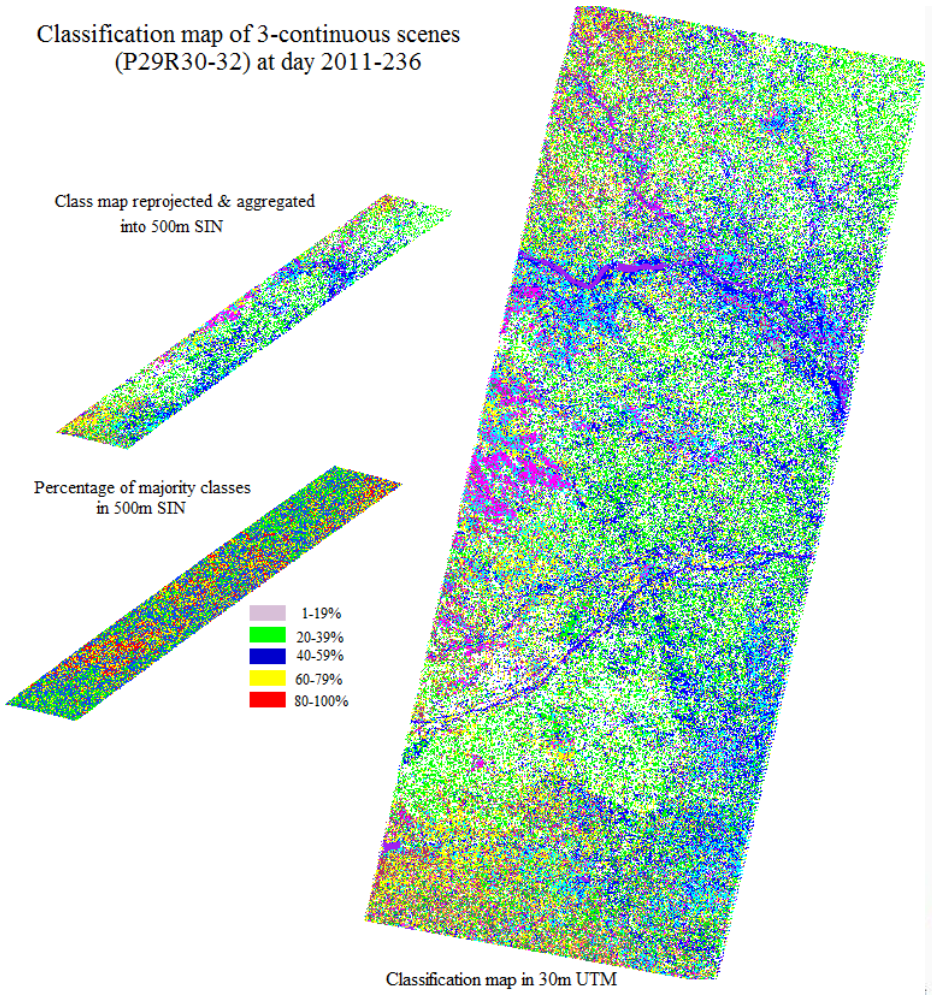
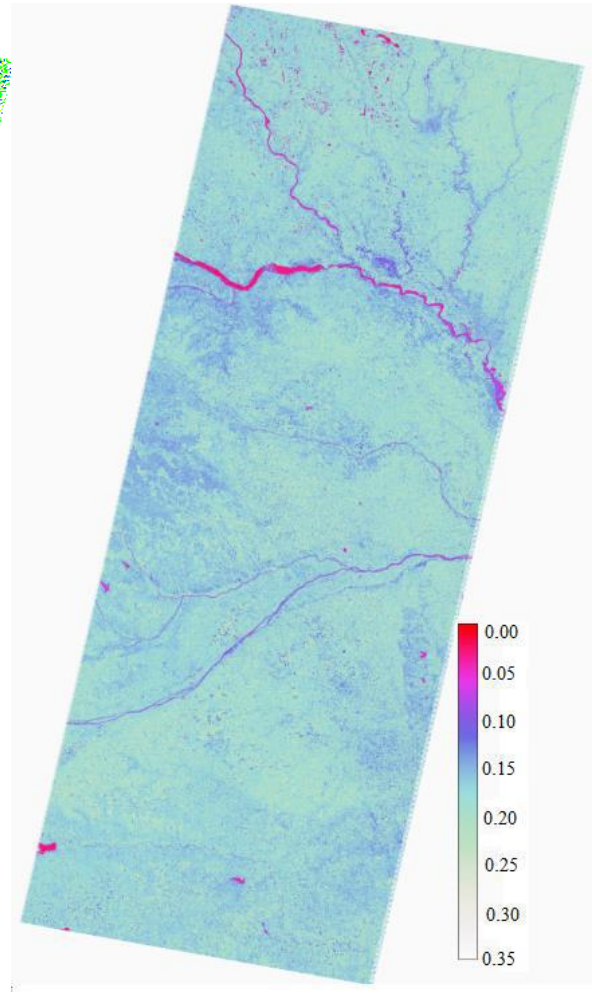
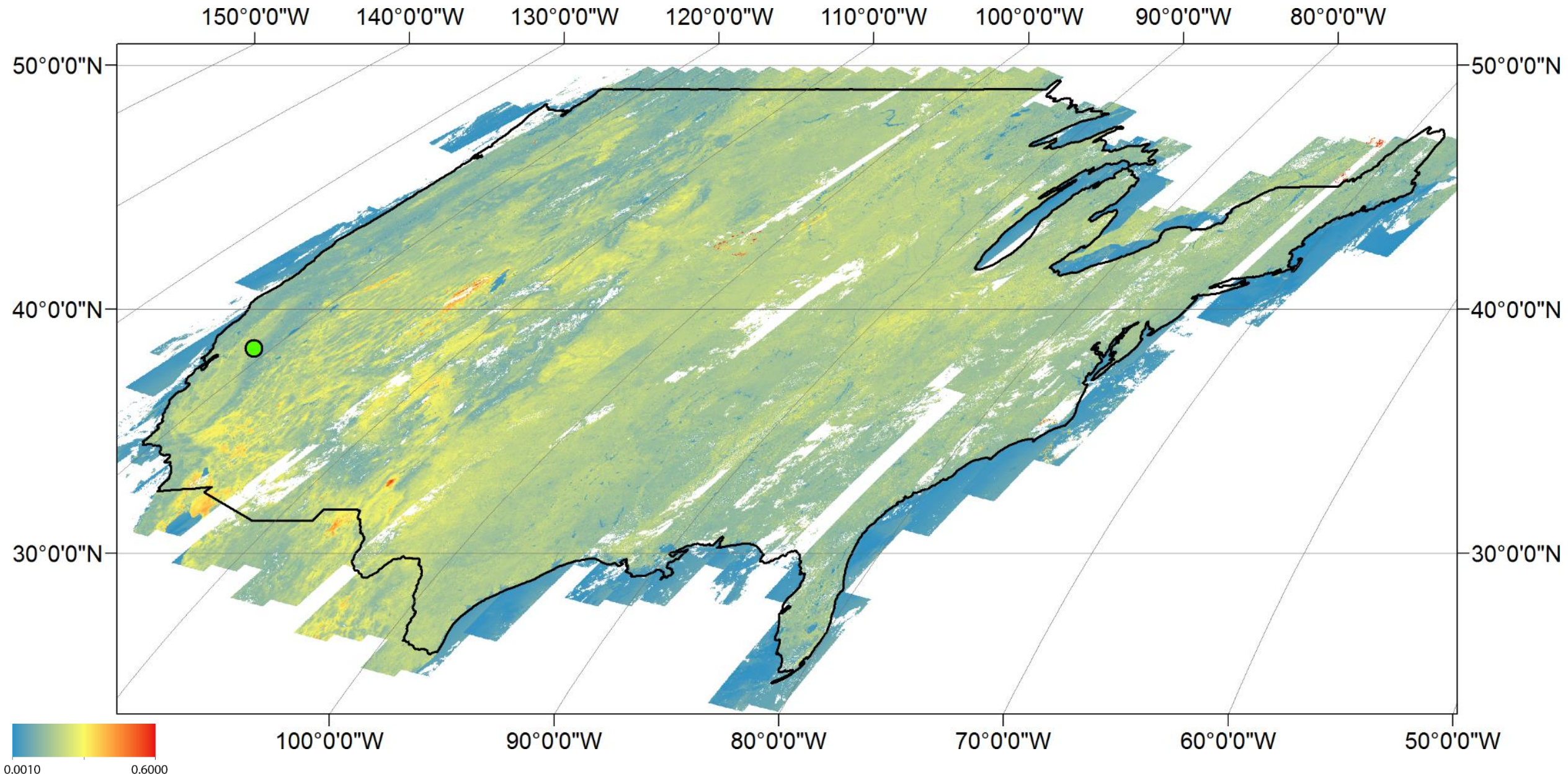
- Landsat 8 Albedos are prepared by coupling Landsat spectral data with associated MODIS (or VIIRS) BRDFs.
- MODIS V006 daily reprocessing is essentially complete
- VIIRS daily algorithm is delivered
- Wang, Z., A. M. Erb, C. B. Schaaf, Q. Sun, Y. Liu, Y. Yang, M. O. Román, Y. Shuai, K. A. Casey (2015). Early spring post-fire snow albedo dynamics in high latitude boreal forests using Landsat-8 OLI data. Remote Sens. Environment



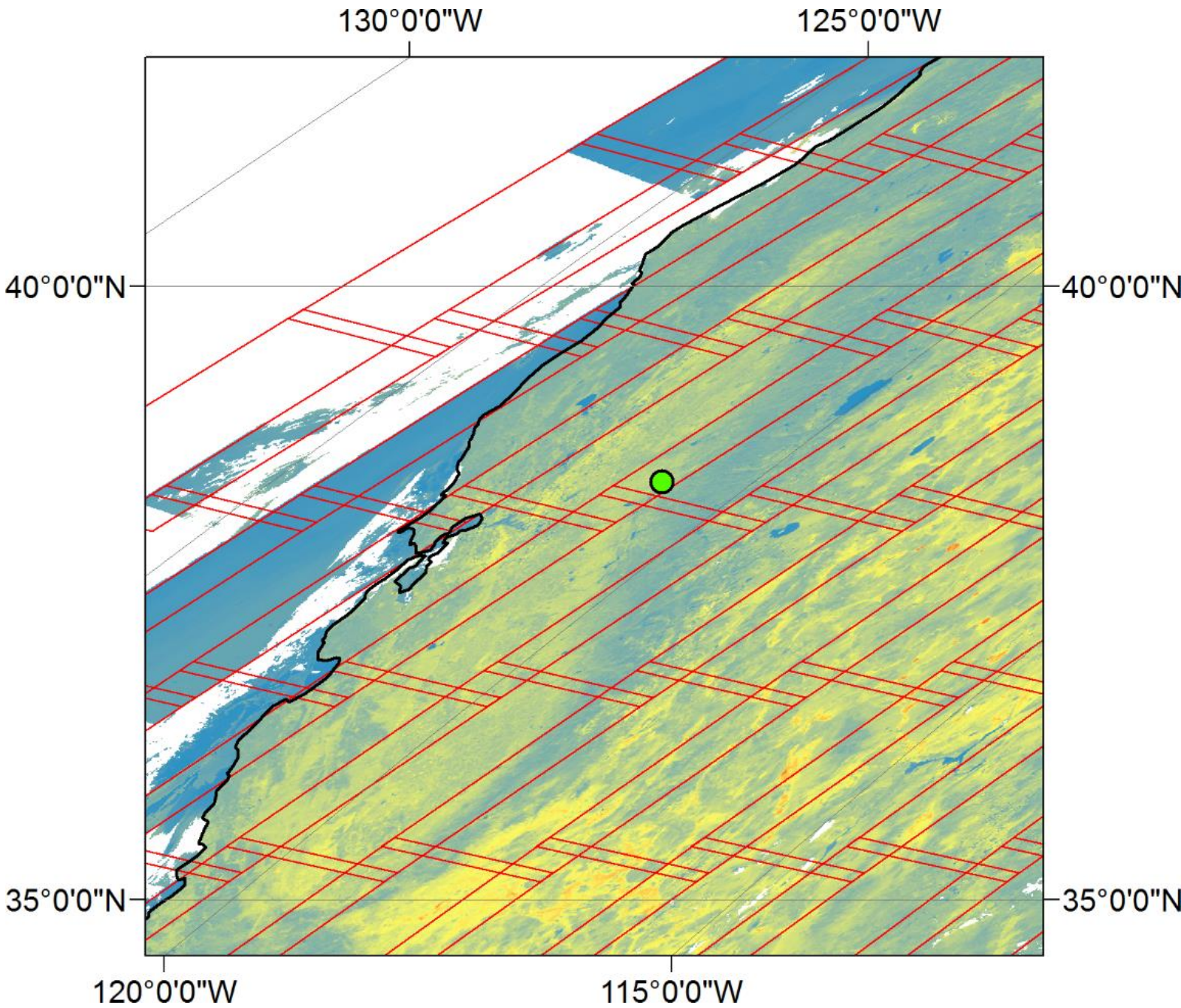


Landsat8 Browse White Sky Albedo Aug 2013

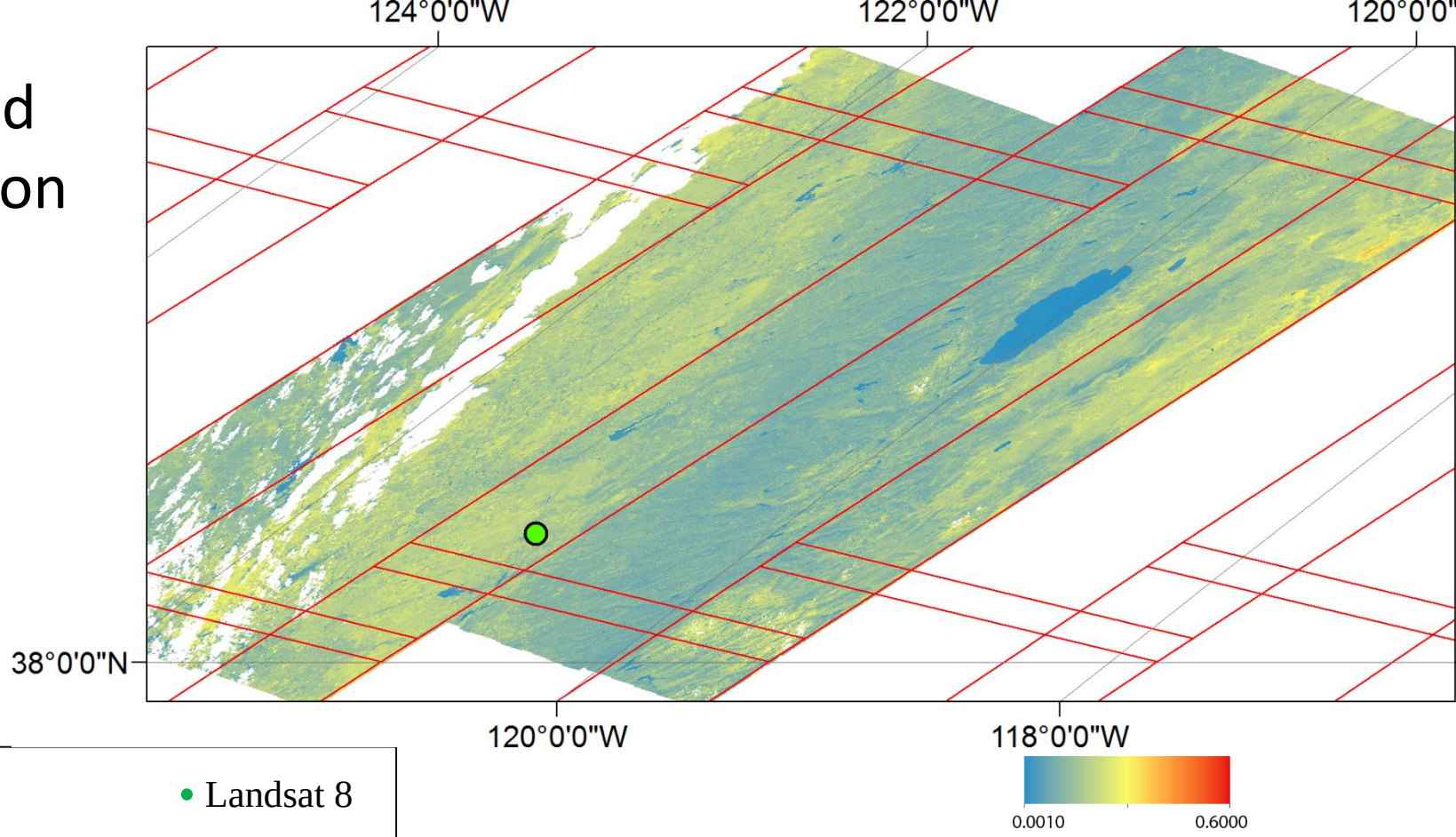


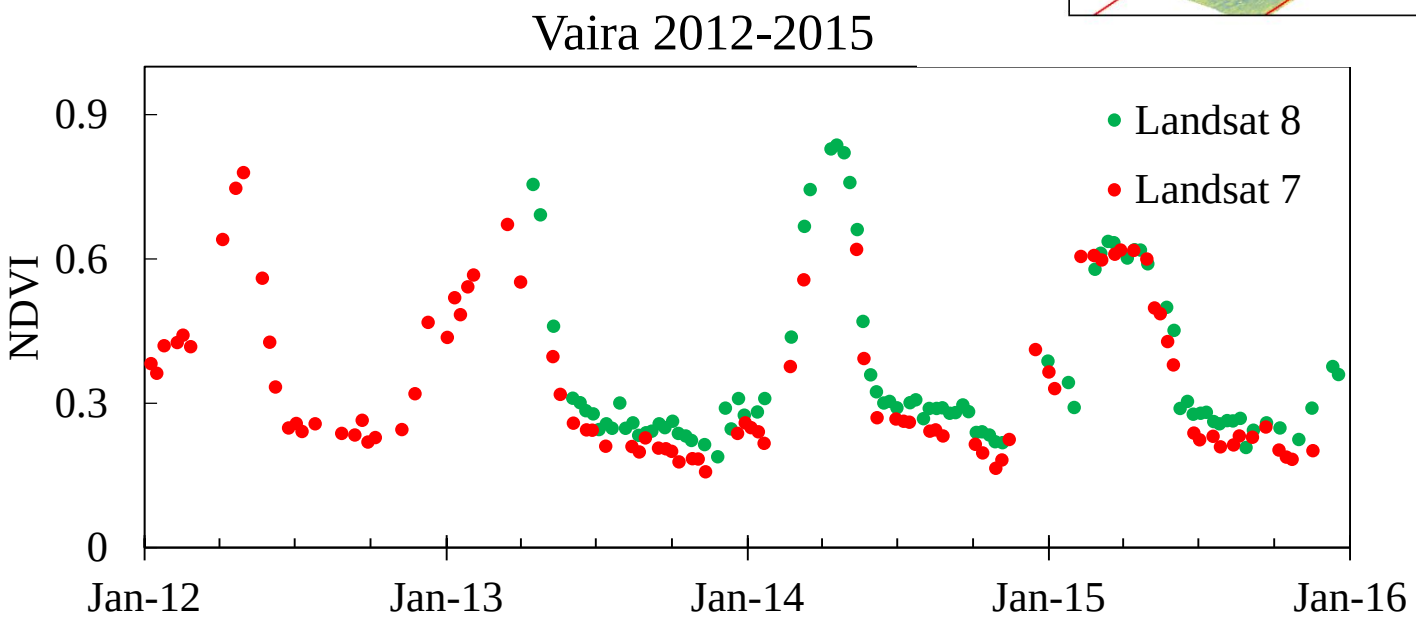
Three Landsat 8 scenes in path are processed at a time (with corresponding MODIS or VIIRS) to obtain center scene albedos

- Vaira flux tower



- Vaira flux tower is located in a Landsat overlap region





Improved time series possible for phenological monitoring (Liu et al., 2016)

Validation

- Utilize Baseline Surface Radiation Network (BSRN), Surfrad, and Flux tower data
  - CEOS/WGCV/Land Product Validation (LPV) protocol
  - Cescatti et al.,2012; Wang et al.,2012; 2014
- Spatially Representative sites
  - Román et al., 2009; 2011

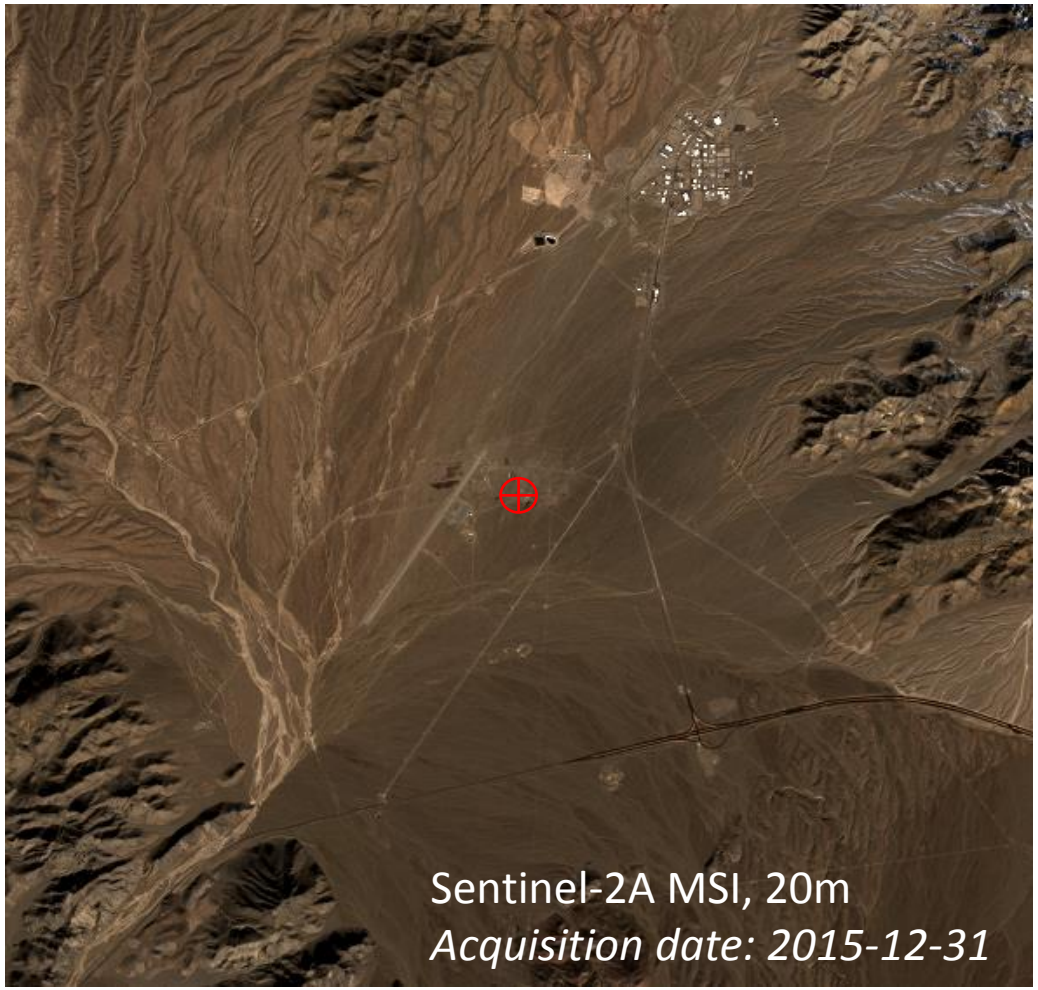
Albedos, AOD, 10m towers, footprint 126.28m

Site name	Latitude	Longitude	Land cover
Desert Rock	36. 62320° N	116. 01962° W	Desert, Sparse grass
Fort Peck	48.30798° N	105.10177° W	Grassland
Sioux Falls	43.73431° N	96.62334° W	Grassland
Table Mountain	40.12557° N	105.23775° W	Grassland

Applying the Landsat Albedo algorithm to Sentinel-2a

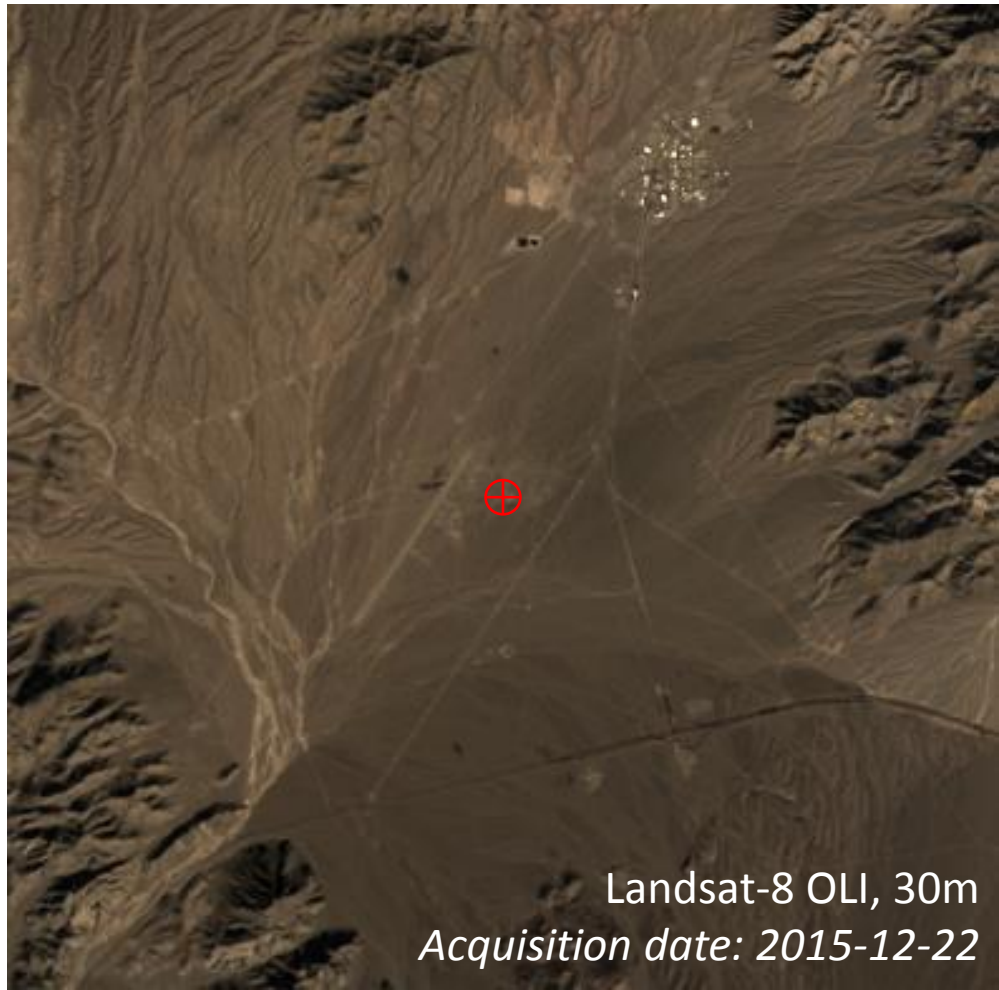
Desert Rock

(surface reflectance, true color, ~ 12km by 12 km, 0.0-0.5)

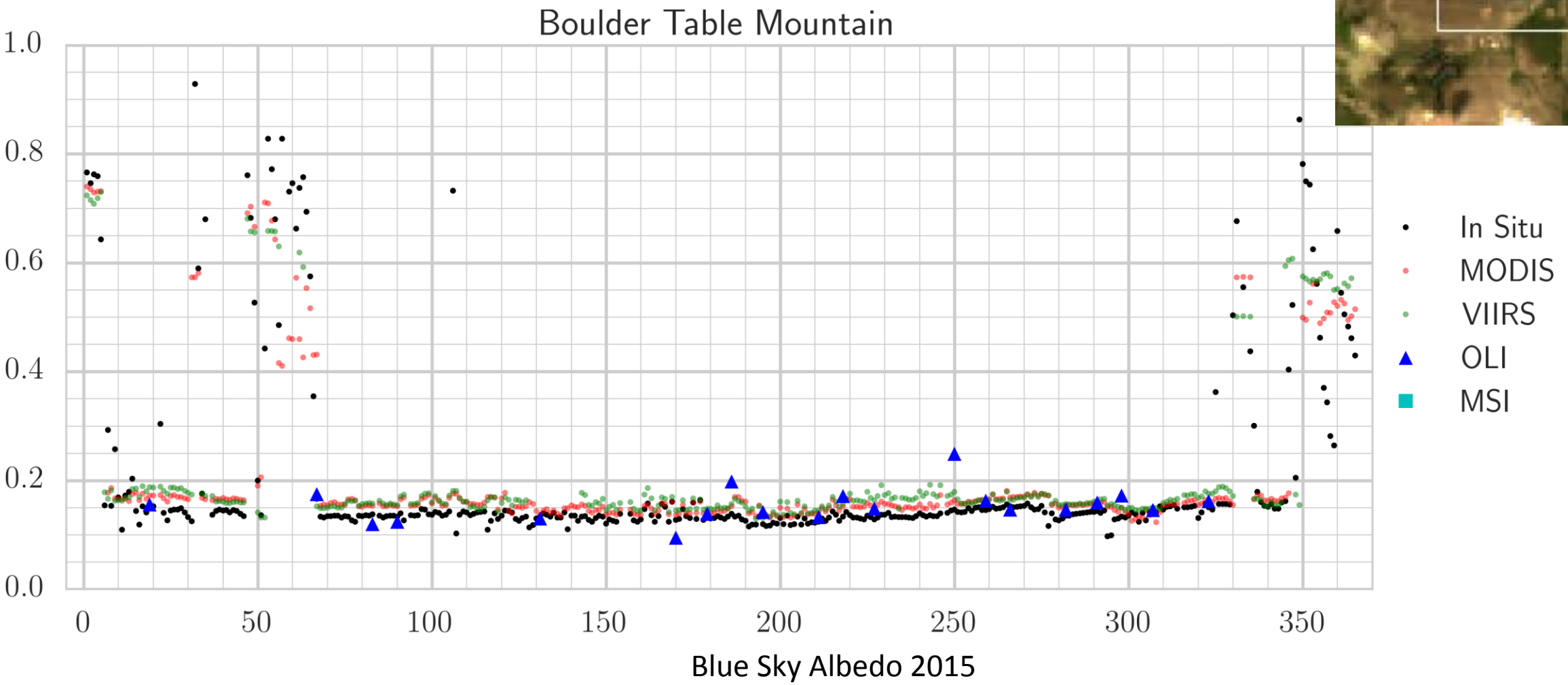


Using atmos correction Sen2Cor from S2toolbox

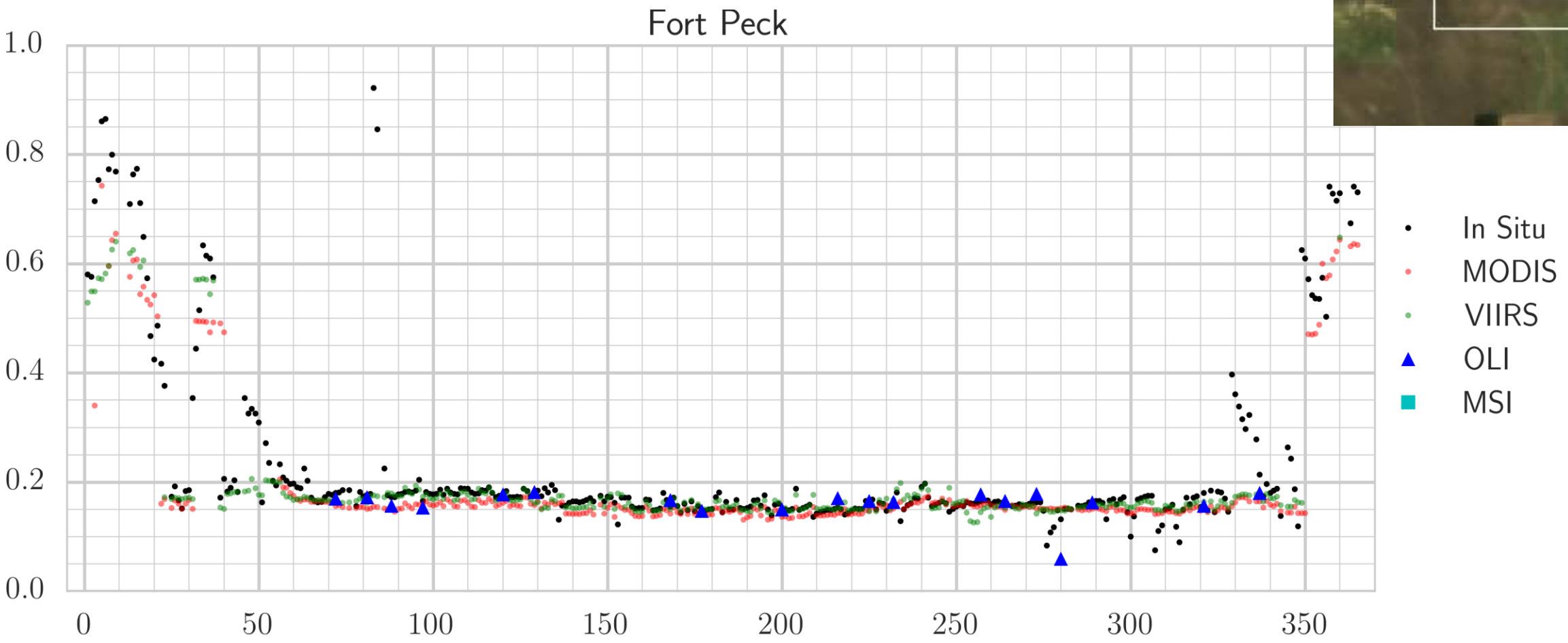
Narrow 2 Broadband Coefficients developed for Sentinel-2a (Dr Qingsong Sun)



Validation


Boulder Table Mountain
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
200
250
300
350
Blue Sky Albedo 2015
In Situ
MODIS
VIIRS
OLI
MSI

Validation



Blue Sky Albedo 2015

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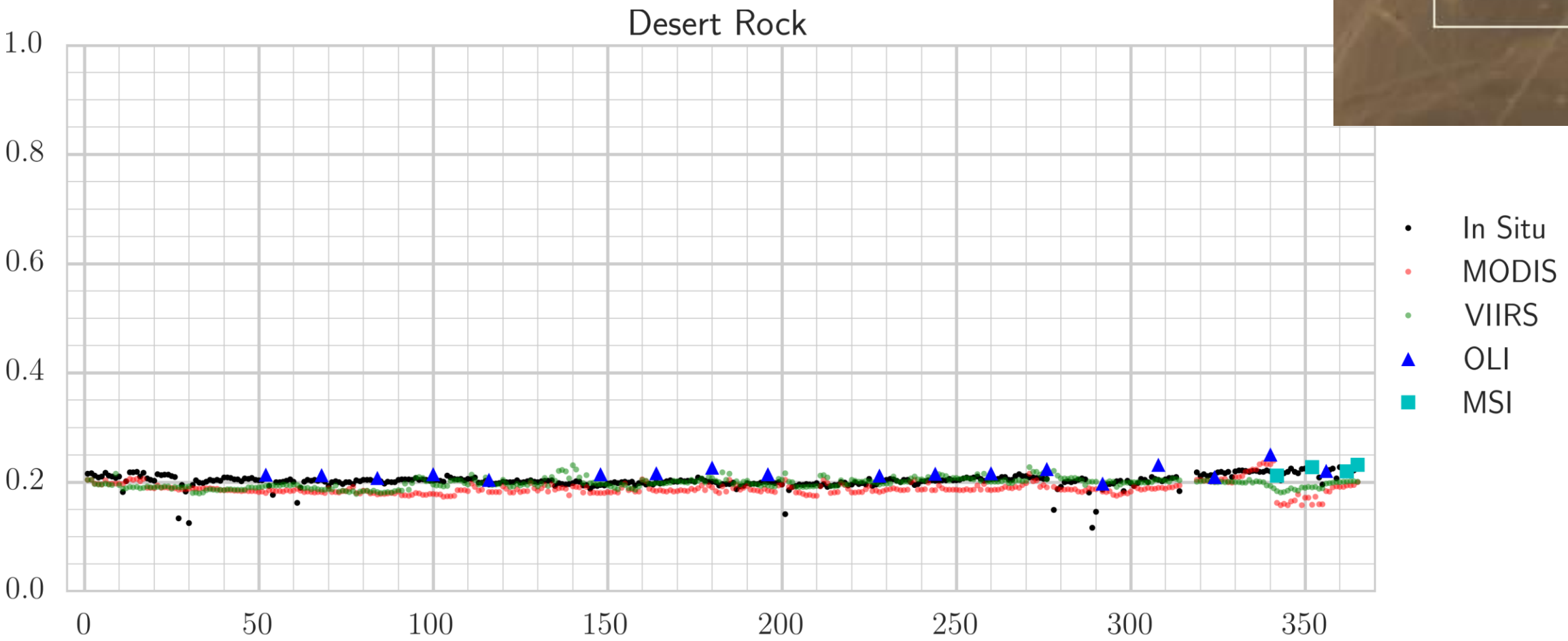
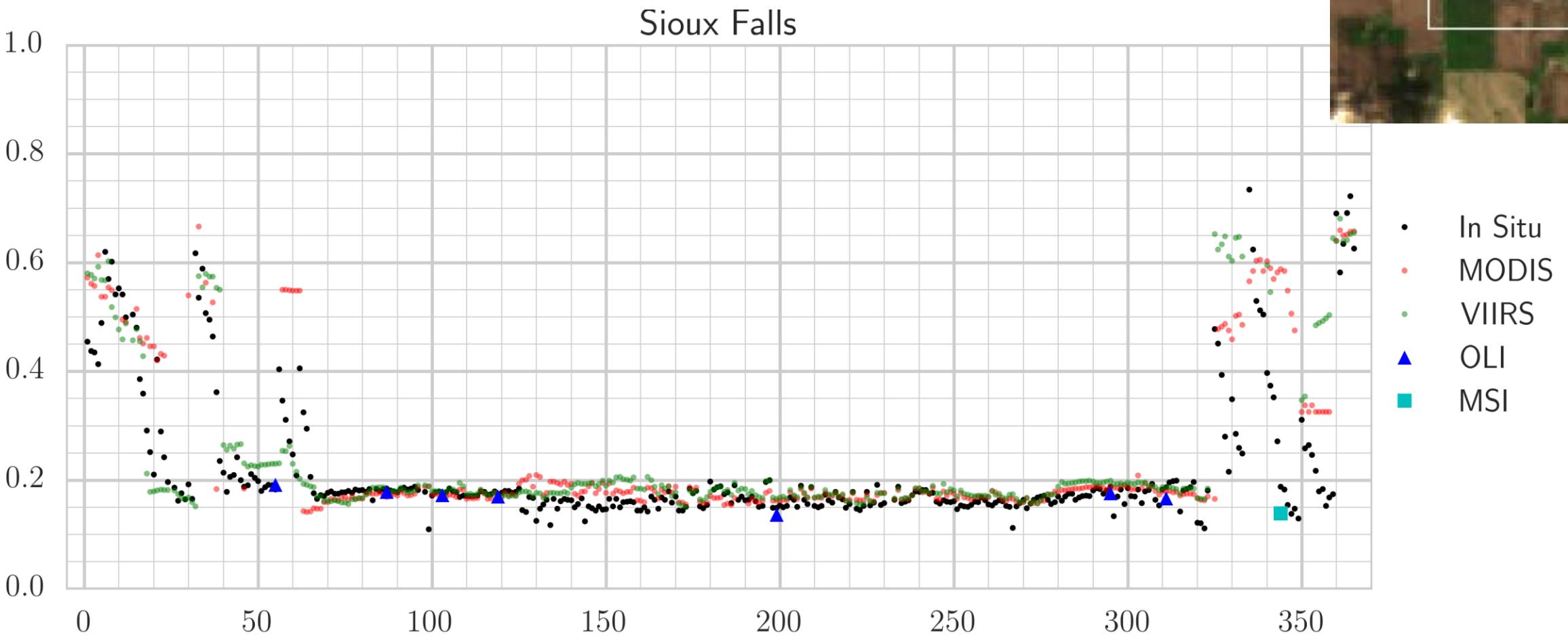


Blue Sky Albedo 2015

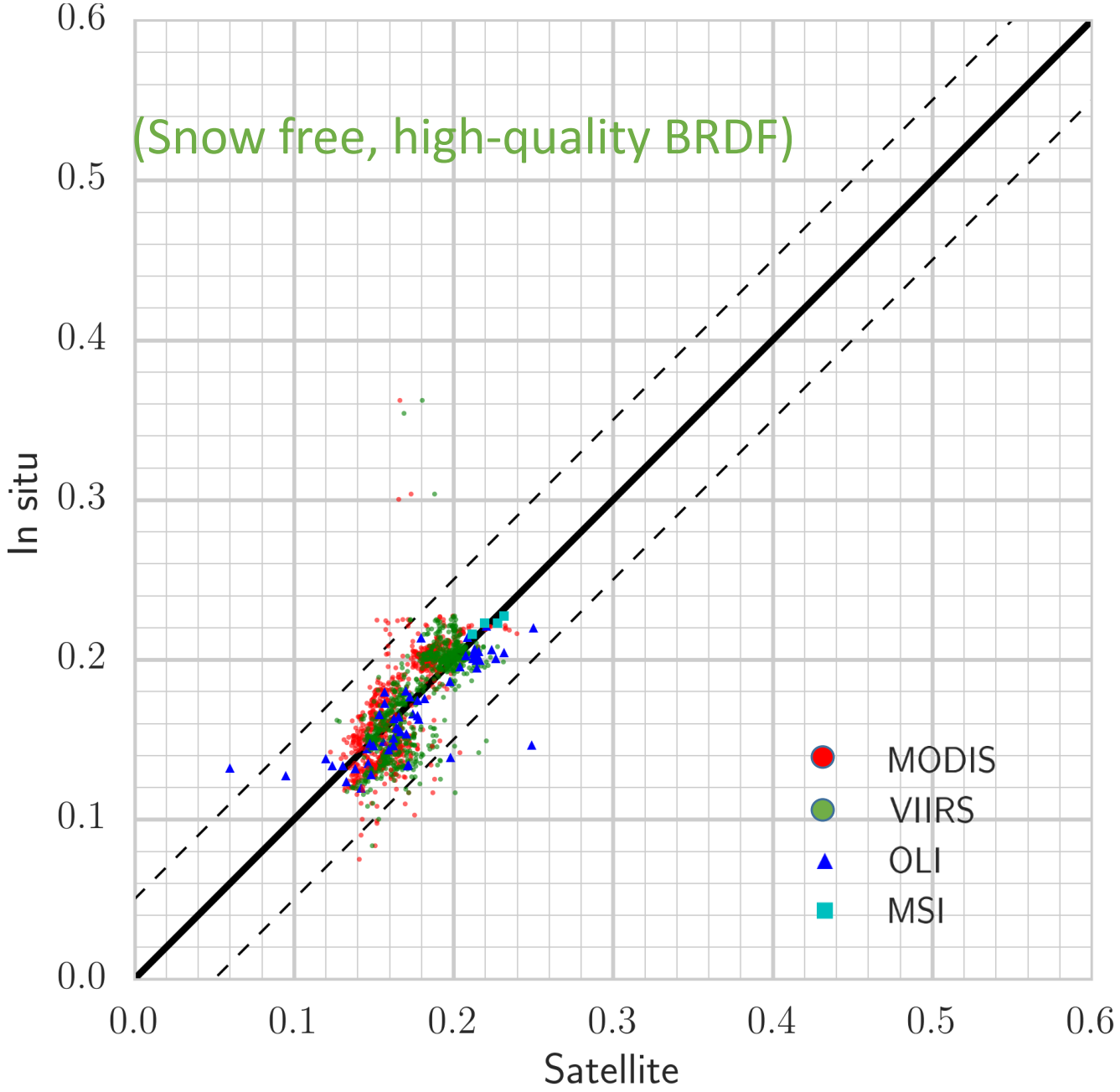
Validation



Blue Sky Albedo 2015

Validation

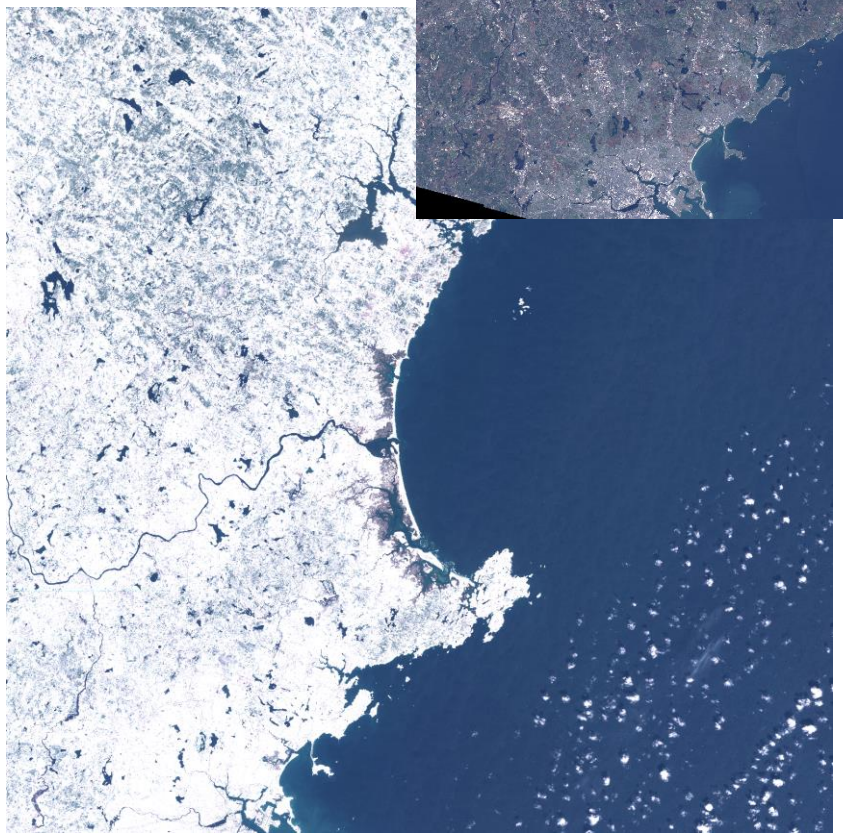
Ft Peck, Table Mtn,
Desert Rock 2015



Summary

- Landsat Albedo is working well
  - First Conus Albedos completed
  - Start working with EDC to deliver
- Landsat Albedo algorithm has been extended to be able to handle Sentinel-2A data as well
- Validation efforts continue
  - MODIS, VIIRS, Landsat OLI, Sentinel-2A MSI
  - BSRN, Flux sites
  - Dynamic coastal areas
    - Plum Island LTER, nearshore albedos
  - Disturbance regimes
    - Alaska, Pacific Northwest
  - Snow albedo

Landsat8 30m
Plum Island LTER
April 24, 2016



Sentinel-2A 10m
Plum Island LTER
April 5, 2016