

eurac
research

Introduction to Remote Sensing Data

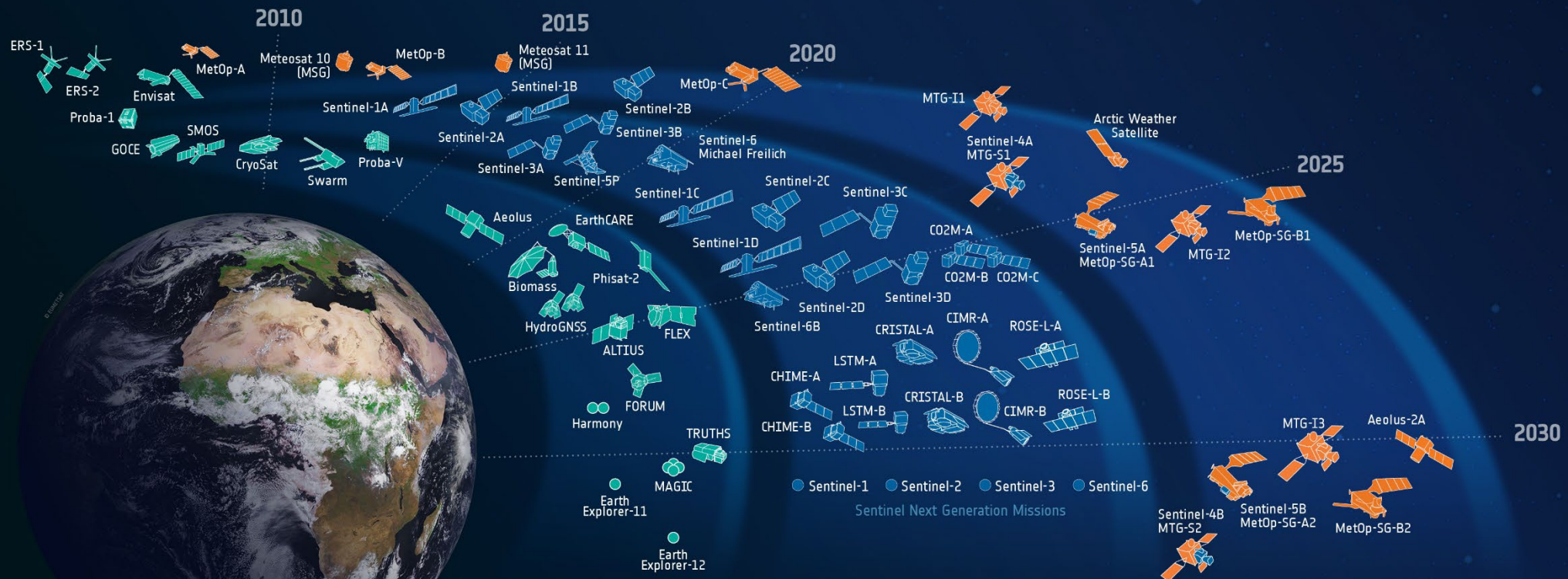
Alexander Jacob
Eurac Research



Sources of Data



ESA-DEVELOPED EARTH OBSERVATION MISSIONS



Science



Copernicus



Meteorology

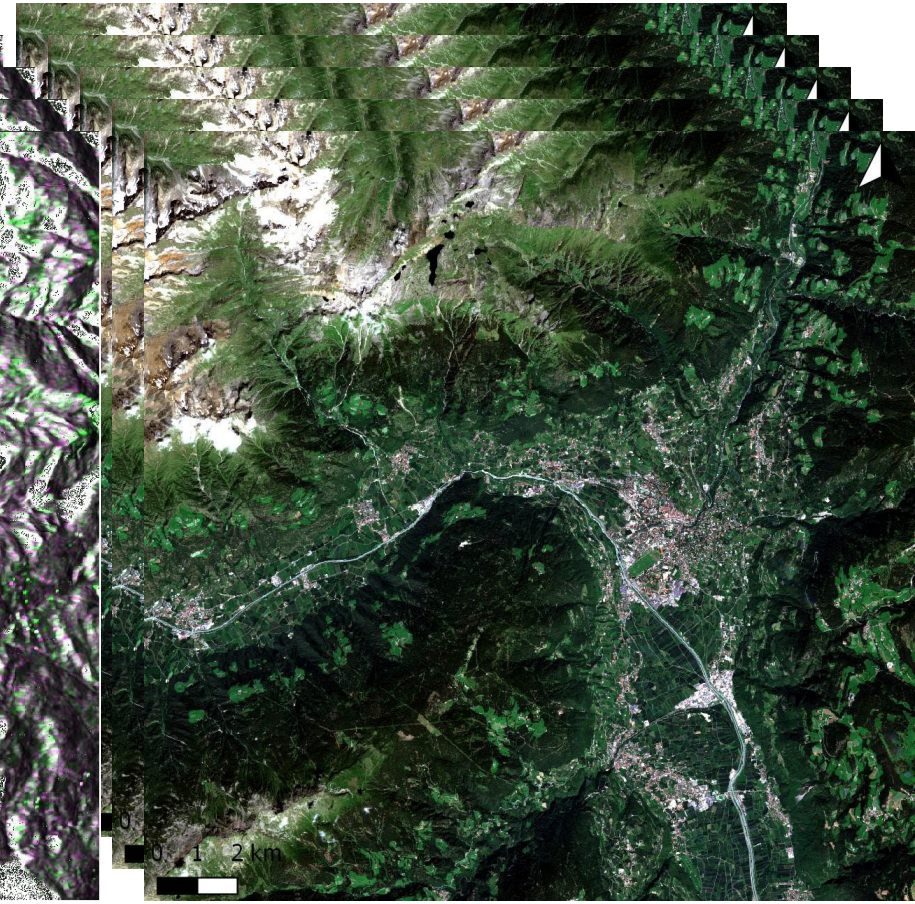
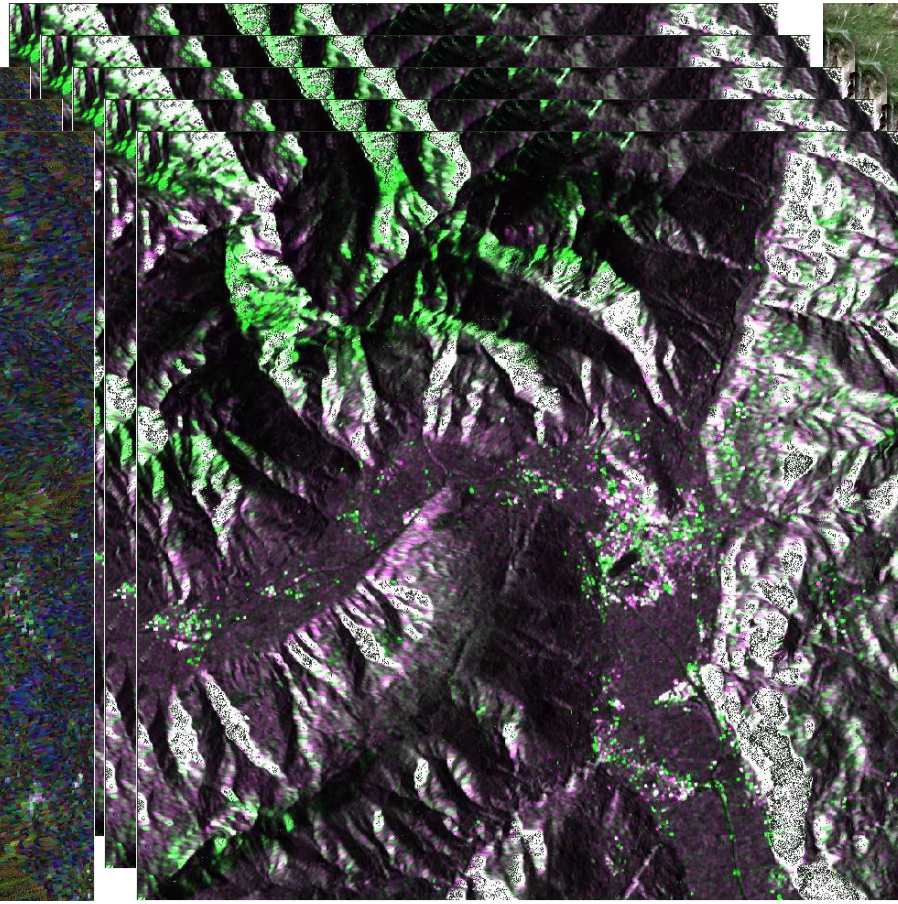
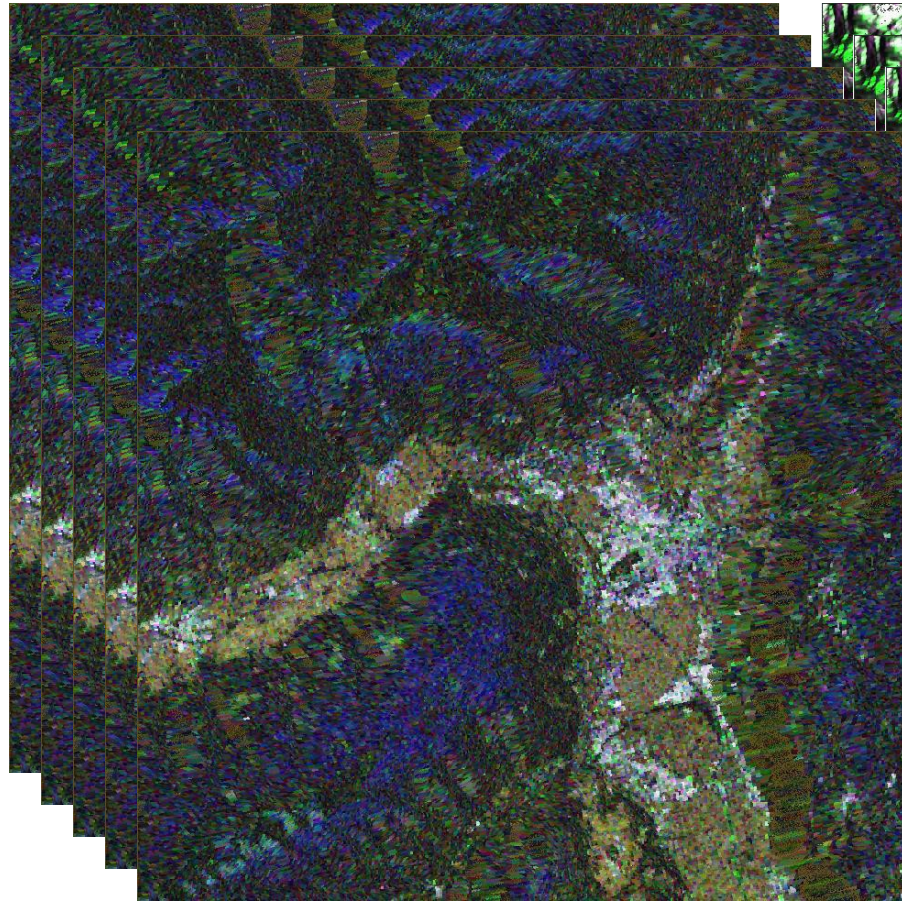


Sources of Data

S1 Coherence (VV & VH comp.)

S1 Backscatter (VV & VH comp.)

S2 Surface Reflectance (RGB)

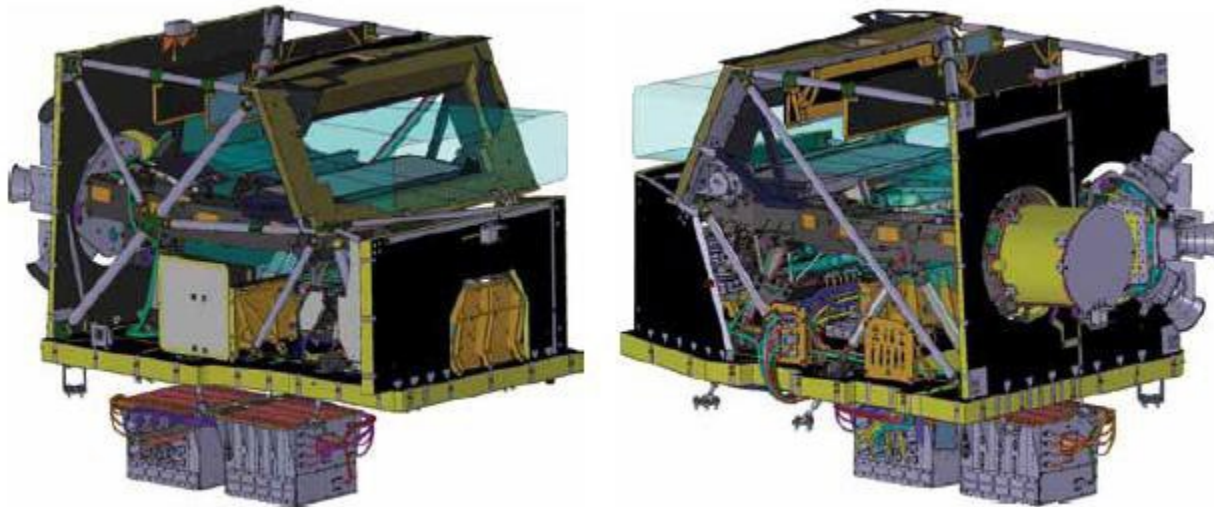


Sentinel-2

MSI

Characteristics

Satellite altitude, km	786
Terrain coverage, km	290
Spatial resolution, m	10, 20, 60
Spectral resolution, bits	16
Spectral bands	13
Multi-Spectral, μm	.4 -2.19



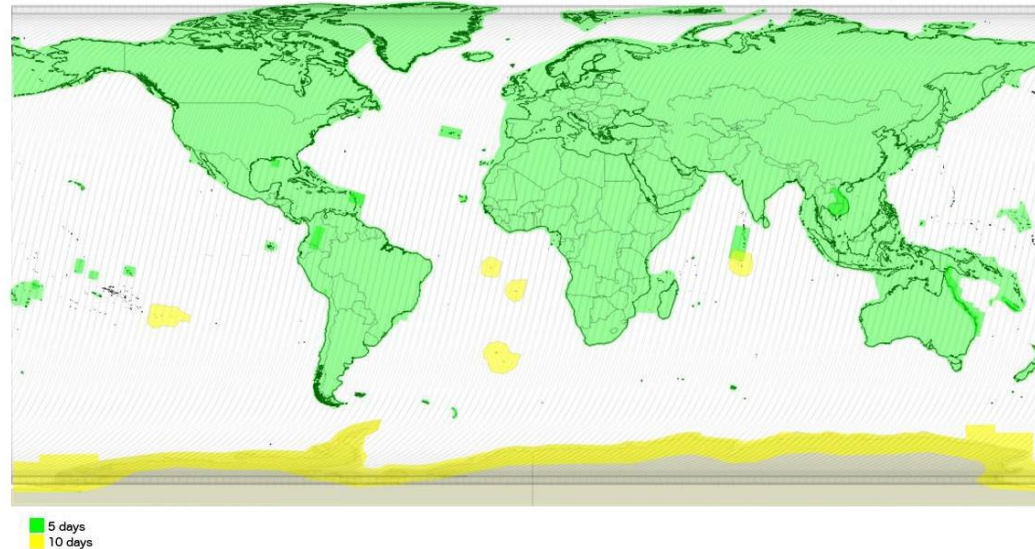
Sentinel-2

- Sentinel-2 is planned in an near polar orbit with a twin satellite configuration
 - Sentinel-2A launched 2015
 - Sentinel-2B launched 2017.
- Revisit time at the equator will be 5 days in the constellation.
- All continental land surfaces and coastal areas within 20km from shore

**Sentinel-2 Constellation Observation Scenario:
Revisit Frequency**



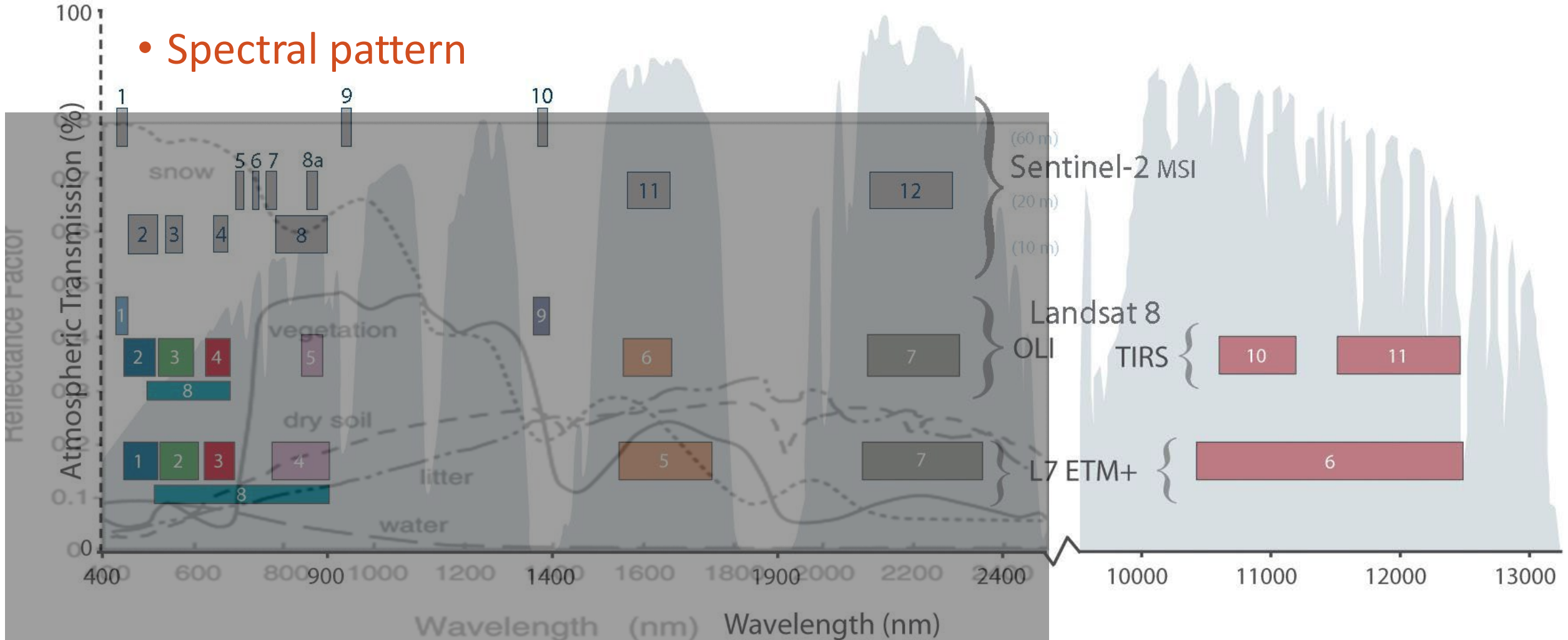
Validity start: Mar 2018



Comparison of Landsat 7 and 8 bands with Sentinel-2

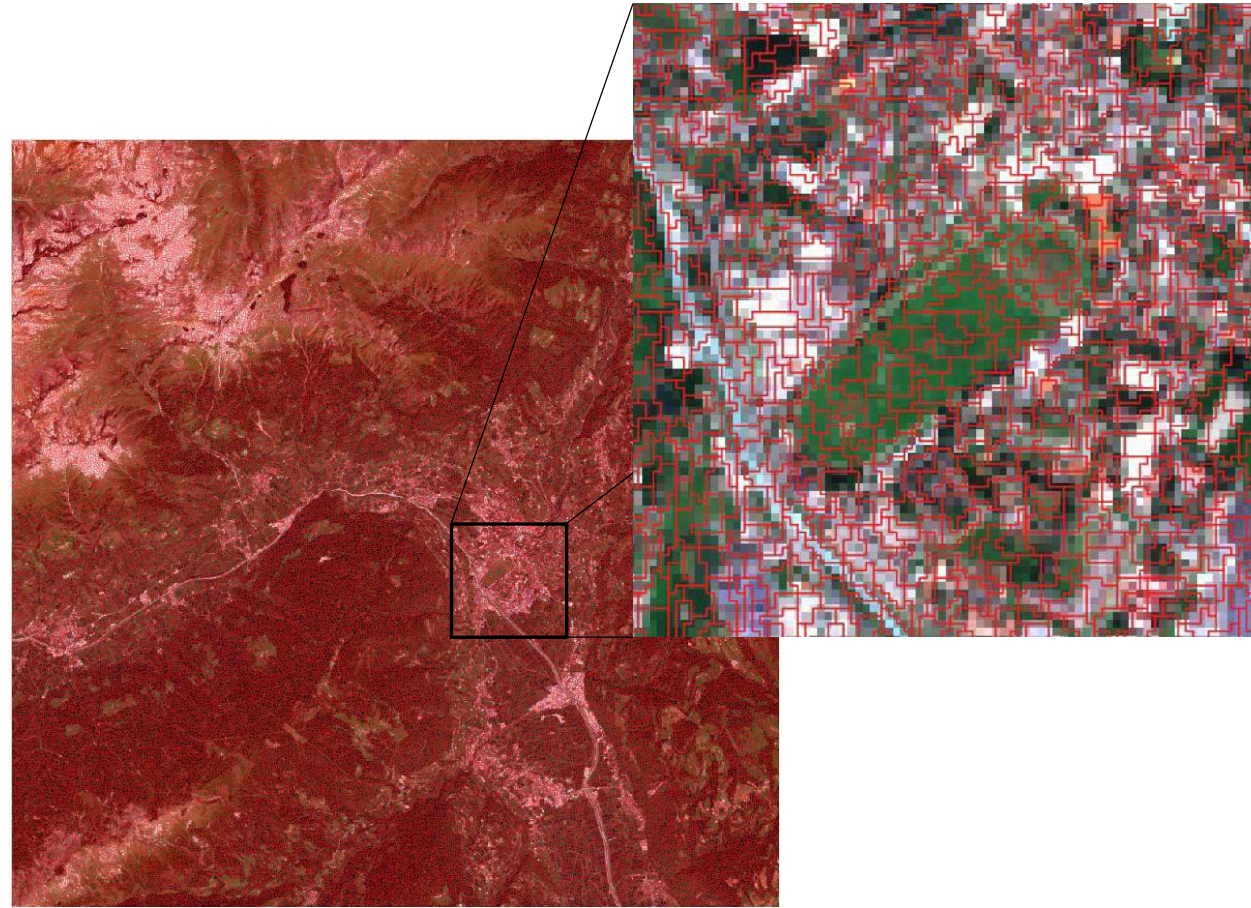
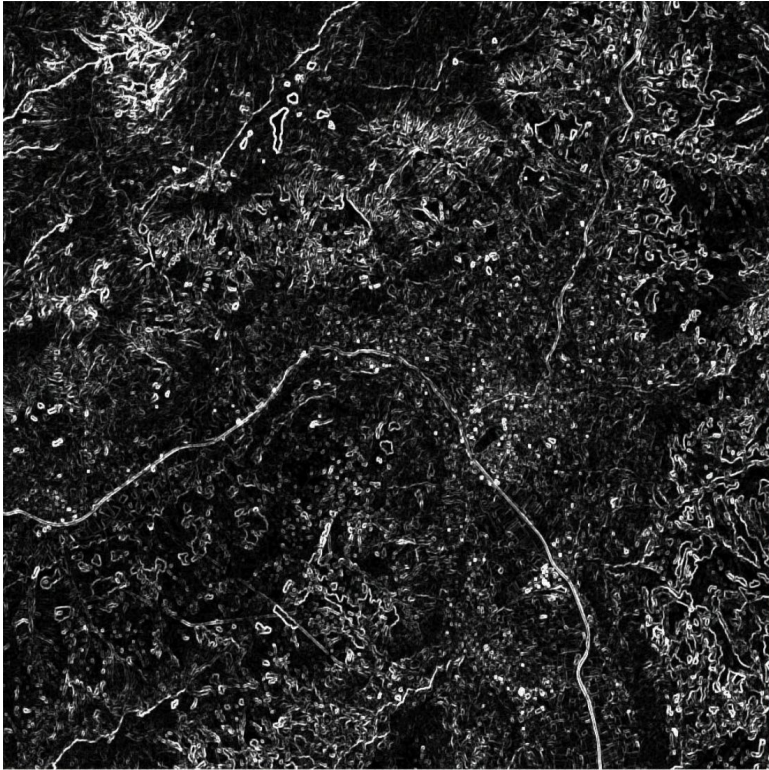
Sources of Information in the Data

- Spectral pattern



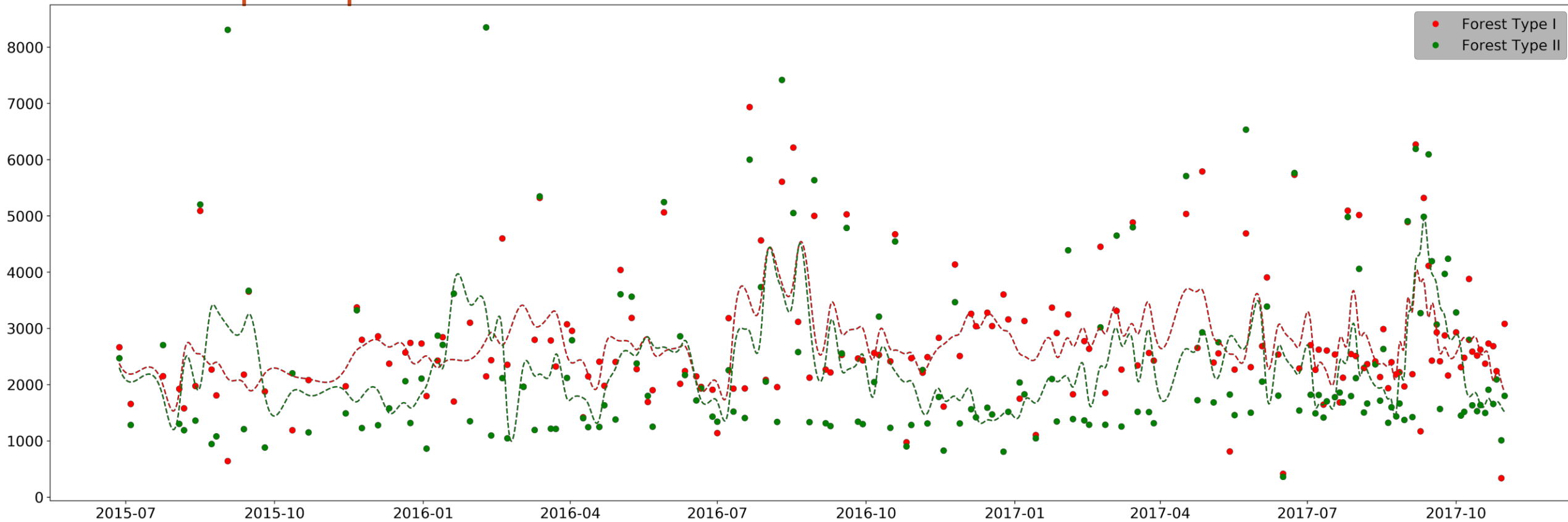
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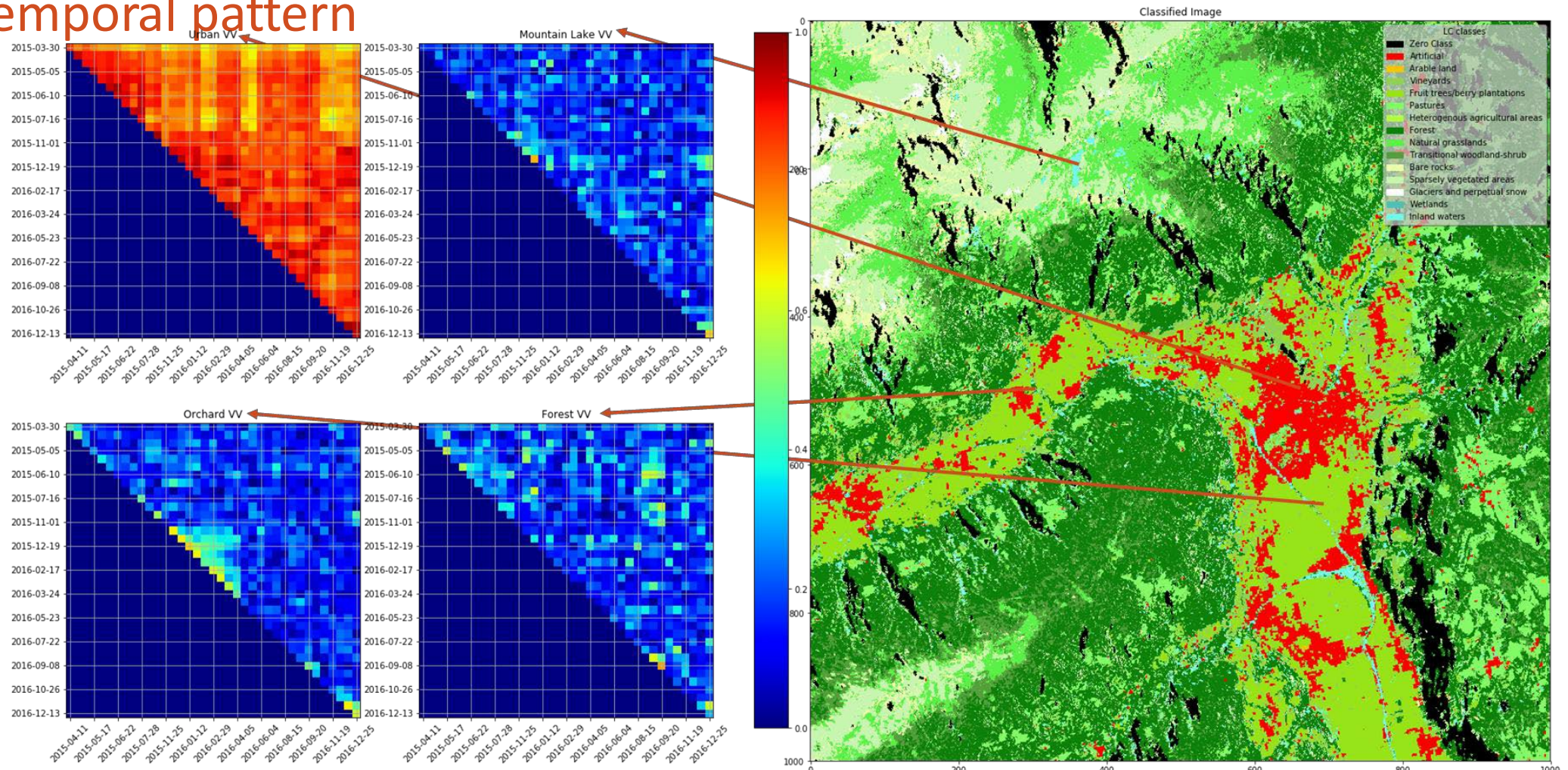
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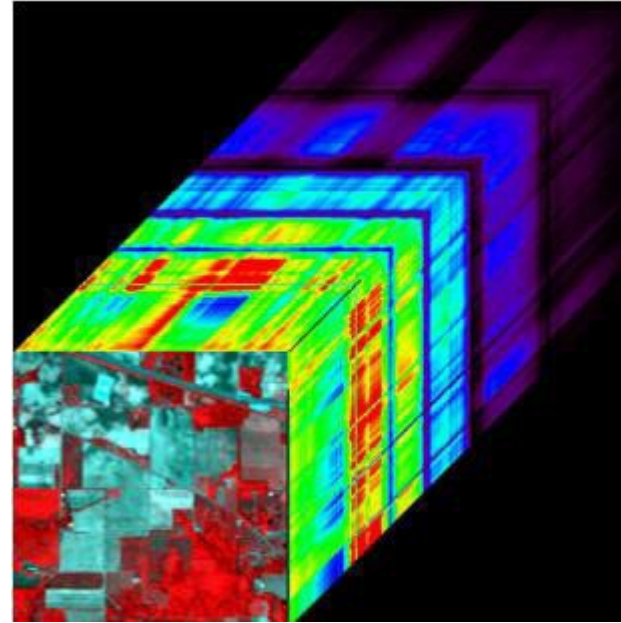


Sources of Information in the Data

- **Spectral pattern**
 - Information at pixel level is used (brightness, backscatter, radiation, etc.)
- **Spatial pattern**
 - Information of groups of pixels is used
 - More details in Object-based classification
- **Temporal pattern**
 - Multi-temporal information either pixel or object-based

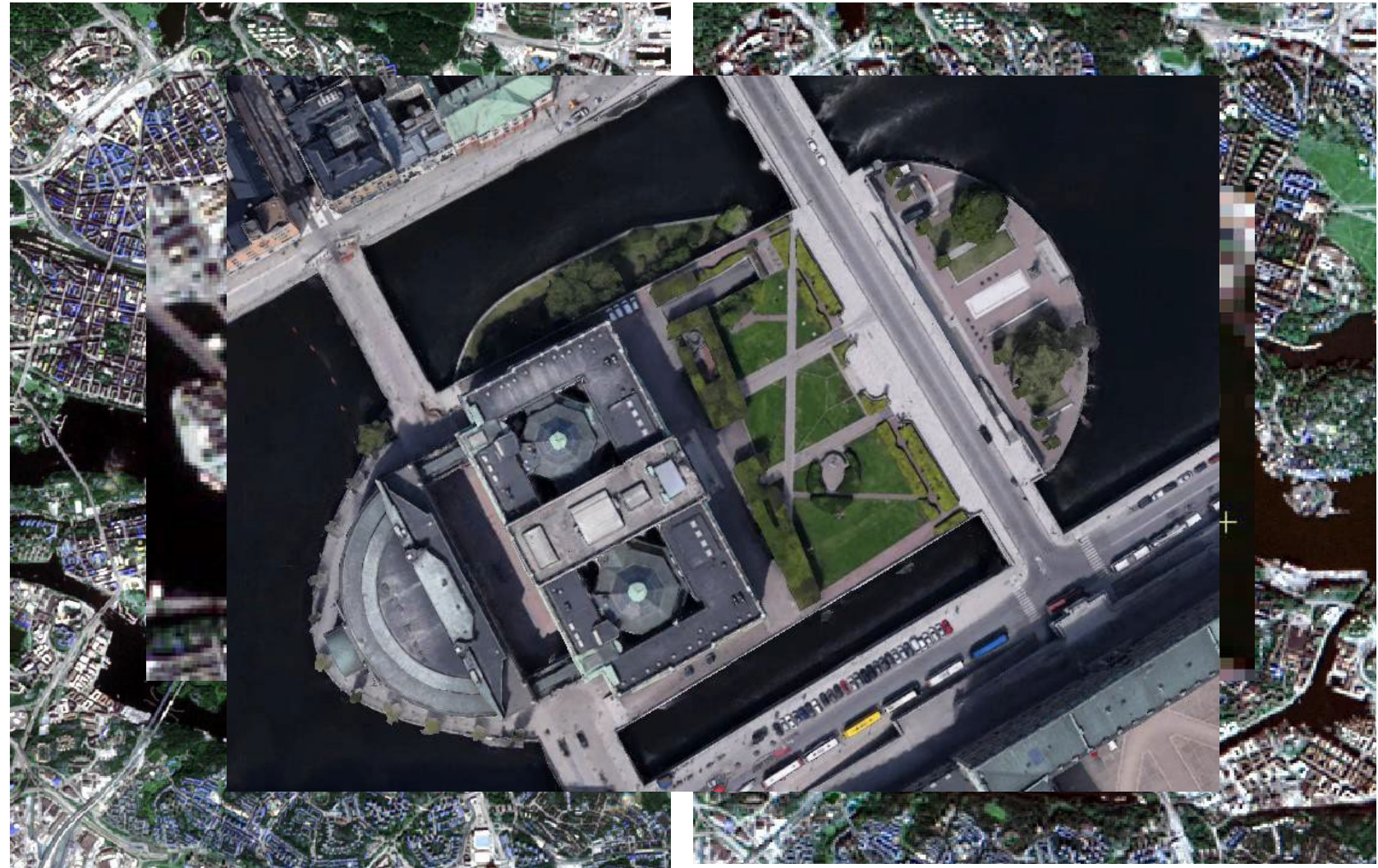
The Role of Resolution

- Spectral resolution
 - No of bands
 - Width of bands
- Radiometric resolution
 - No of bits used for saving data
 - 8 bit – 256 values
 - 11bit – 2048 values
 - 16 bit – 65536 values
 - etc...



The Role of Resolution

- Spatial resolution
 - Geometric detail
 - Size of data



The Role of Resolution

- Temporal resolution
 - Rate of available data
 - E.g.
 - ~ Hourly -> geo-stationary meteorological satellites
 - ~ Daily -> coarse to medium resolution satellites -> MODIS; NPP; Sentinel-3 ...
 - Or constellations of satellites -> Planet
 - ~ Weekly -> medium-high resolution -> S1, S2, L8, ...
 - ~ Monthly -> single instruments, older missions
 - Time of observation during the day
 - Sun angle
 - Night time imagery