→ SENTINEL-3 FOR SCIENCE WORKSHOP

# PROBA-V 100 m Products

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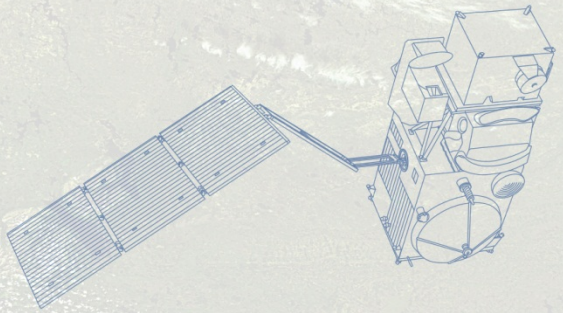
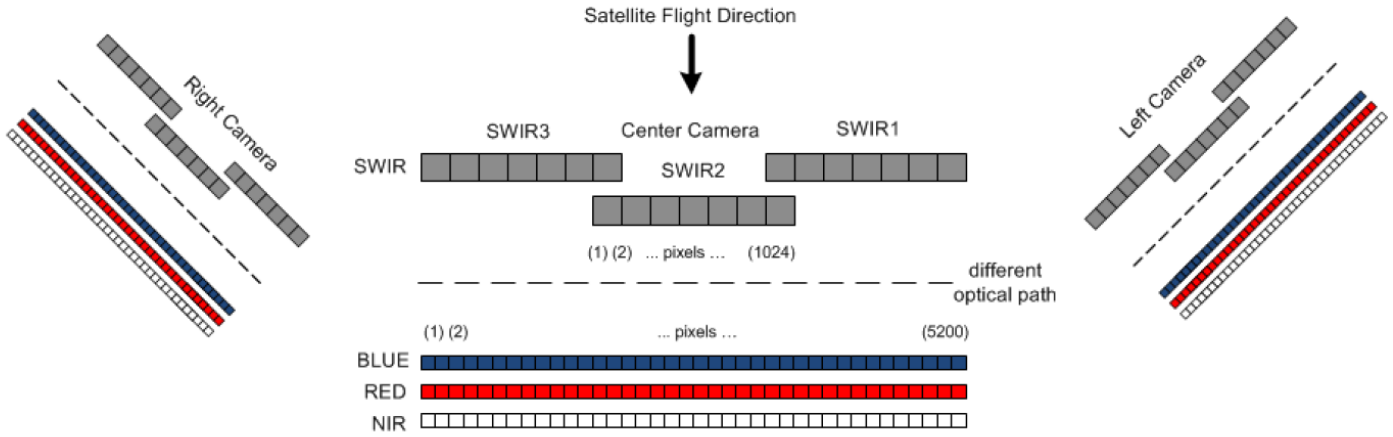
VITO - Belgium



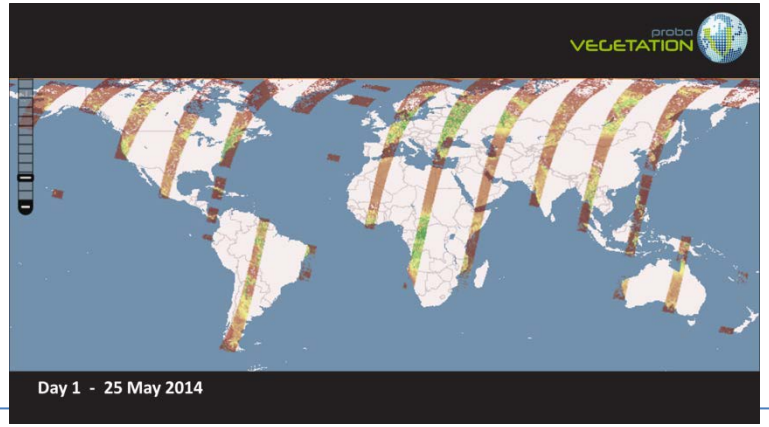
2–5 June 2015 | Palazzo del Casinò–Lido | Venice, Italy

European Space Agency

# PROBA-V 100 m



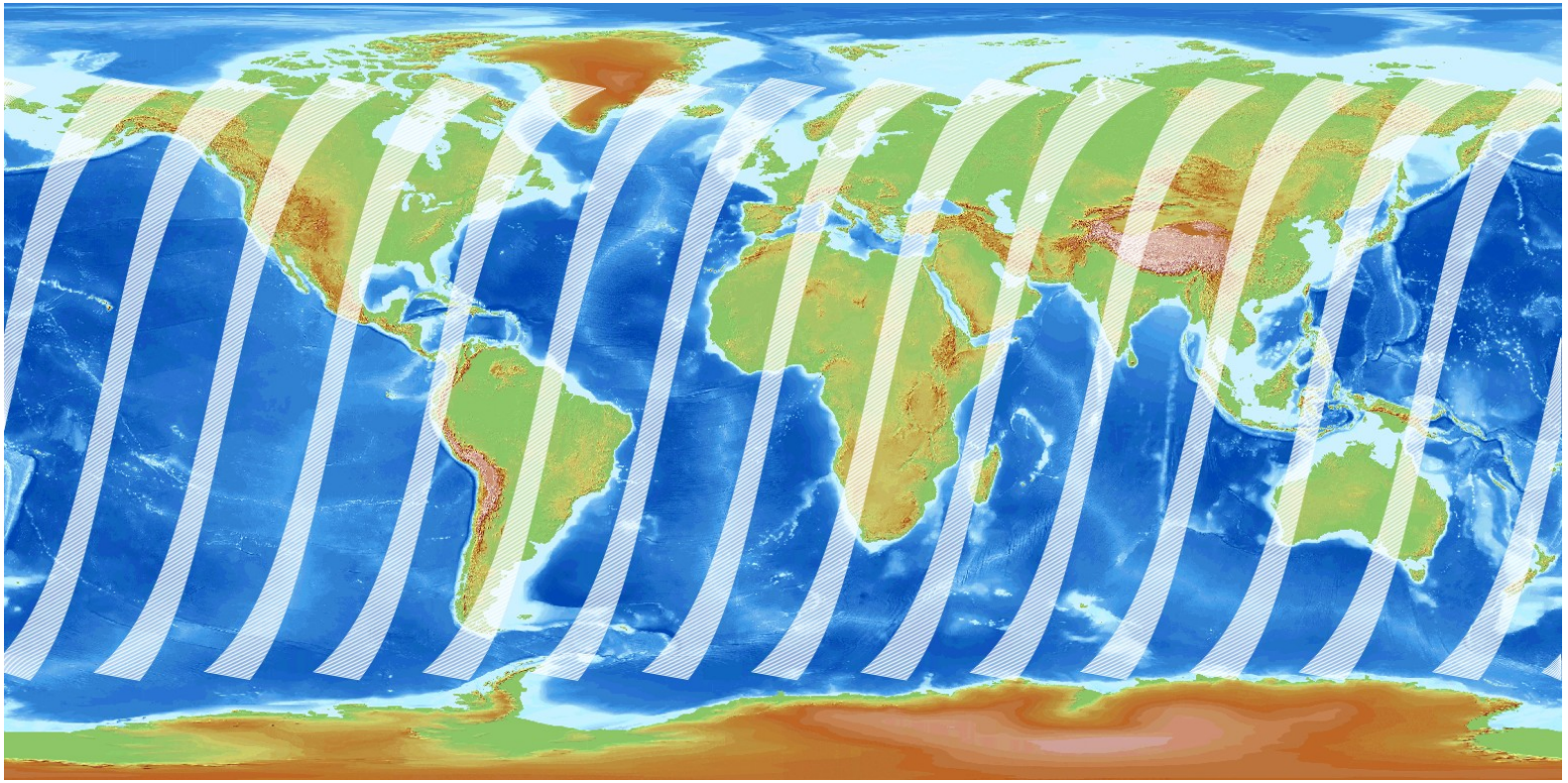

Observations are taken at resolutions between 100 and 180 m at nadir up to 350 and 660 m at the swath extremes for the VNIR and SWIR channels, respectively (*Francois et al, 2014*)




swath width of 520 km

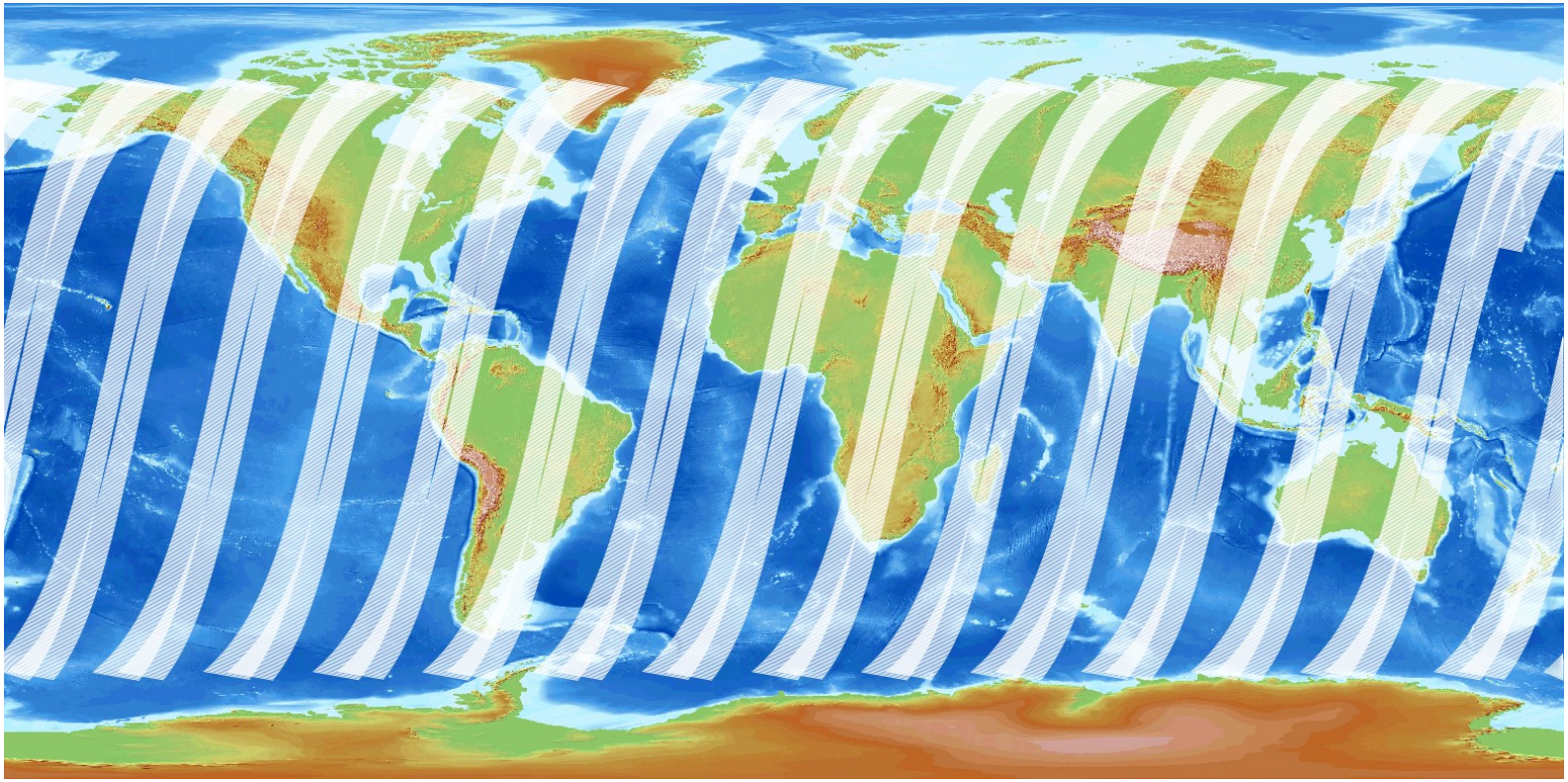
# 100 m Coverage

Day 1



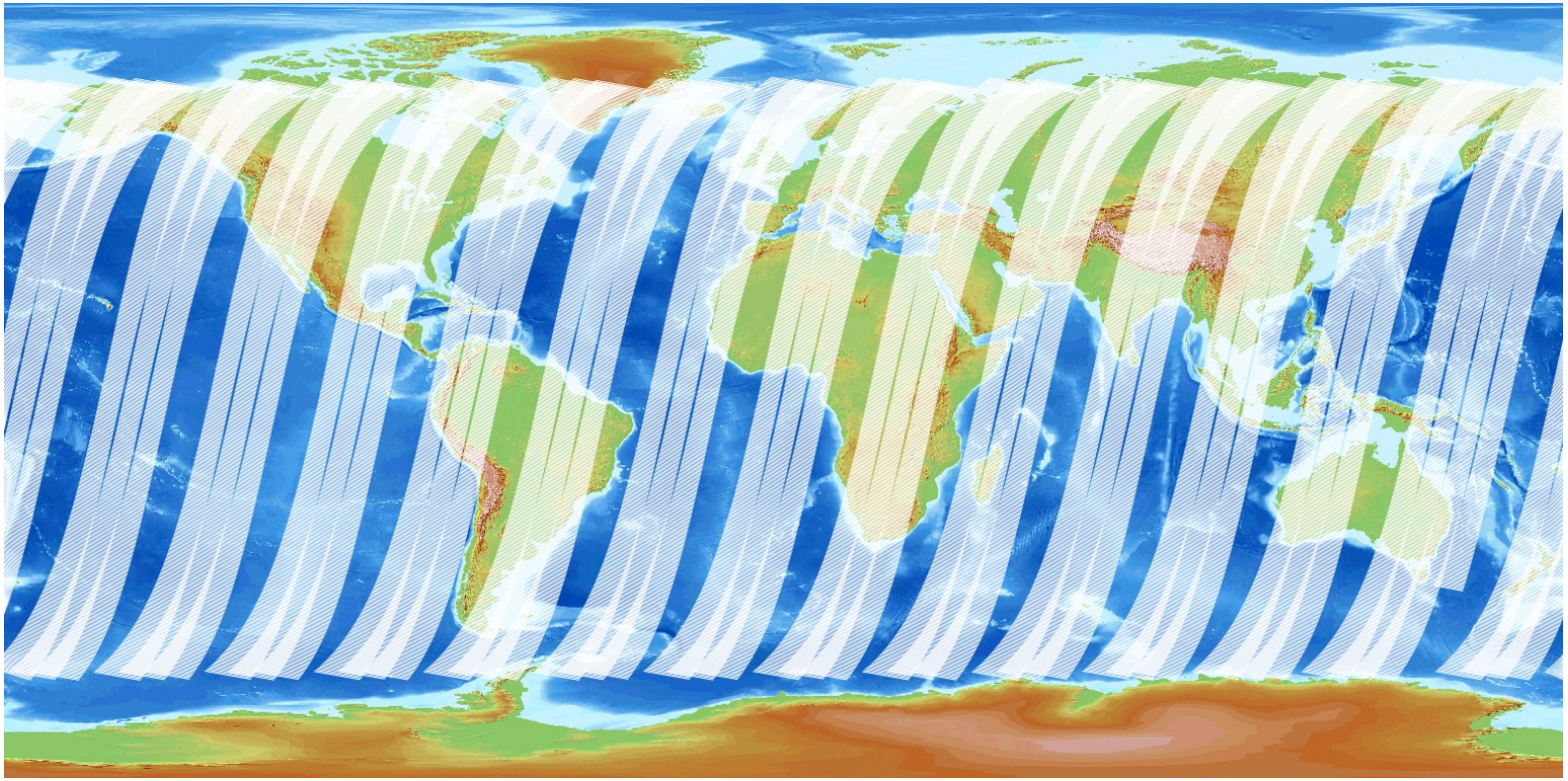
# 100 m Coverage

Day 2



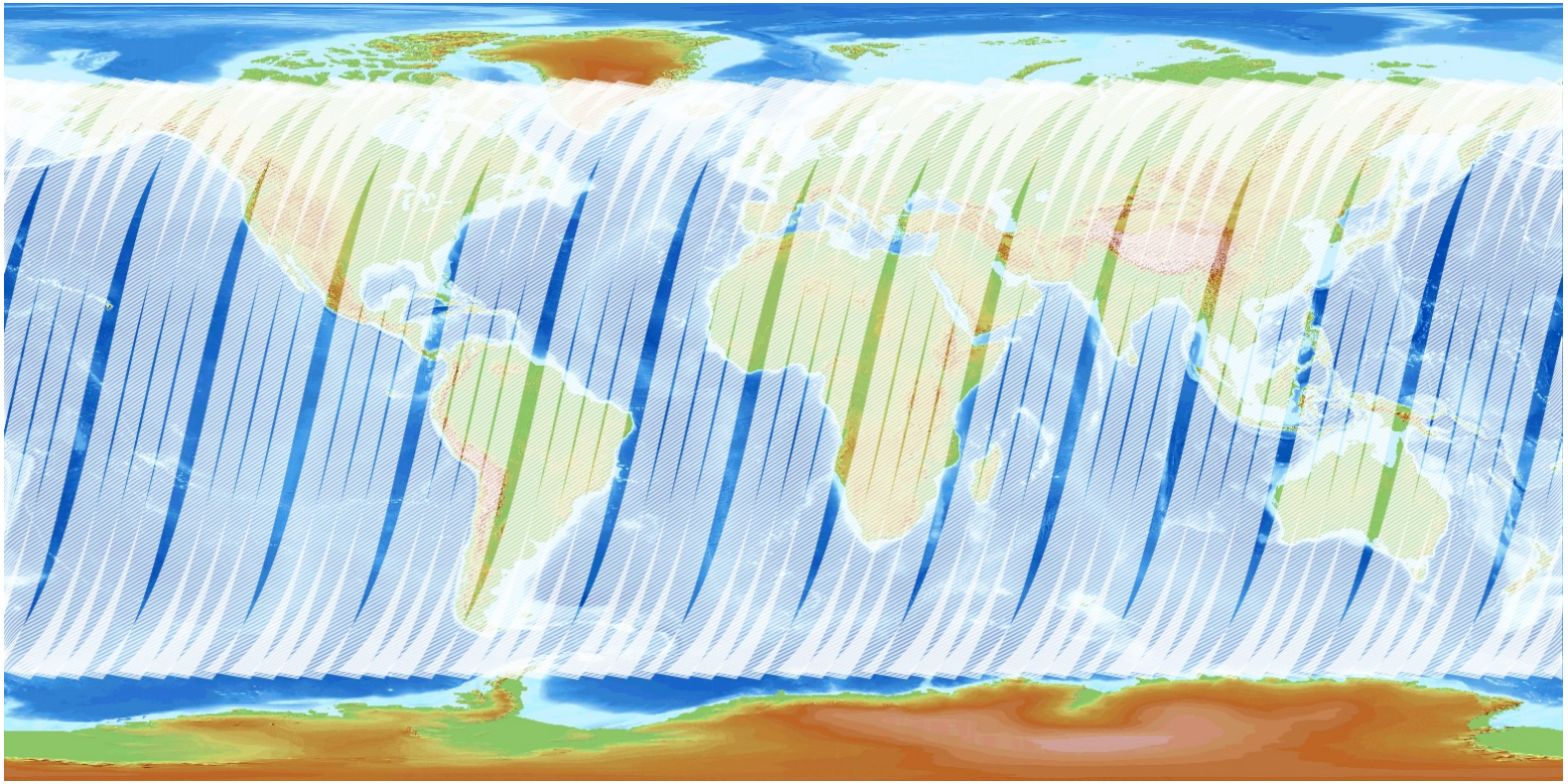
# 100 m Coverage

Day 3



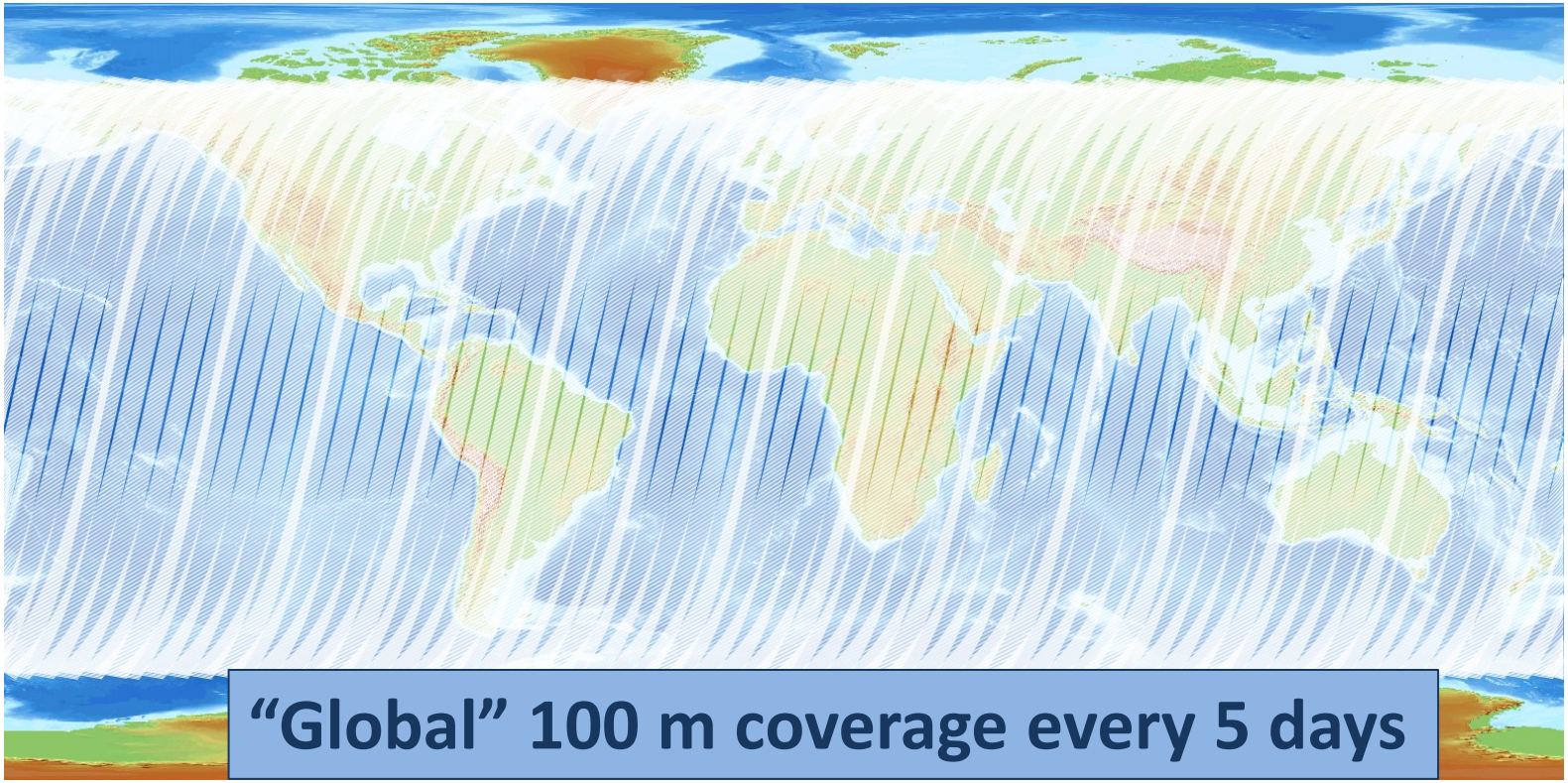
# 100 m Coverage

Day 4



# 100 m Coverage

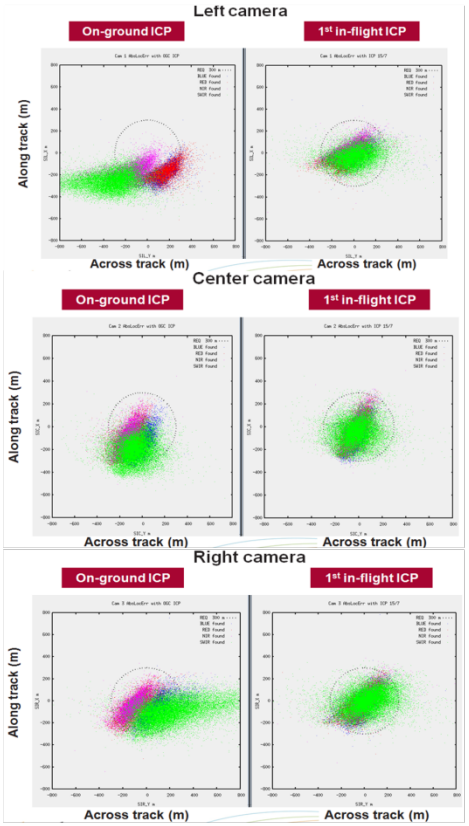
Day 5



# Geometric accuracy

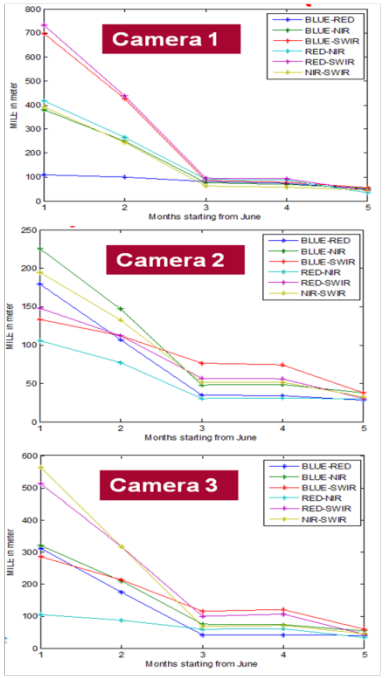
## Results

### Absolute geo-location



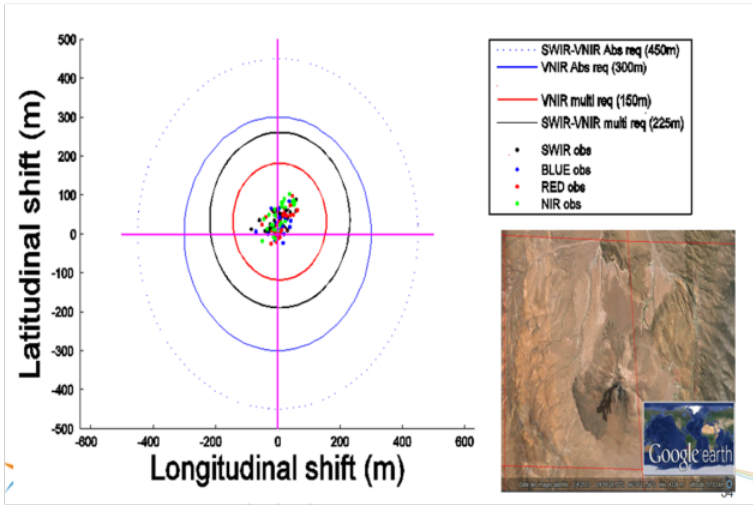

Absolute geo-location error ~ 65m
std = 40 m for all bands

### Inter-bands



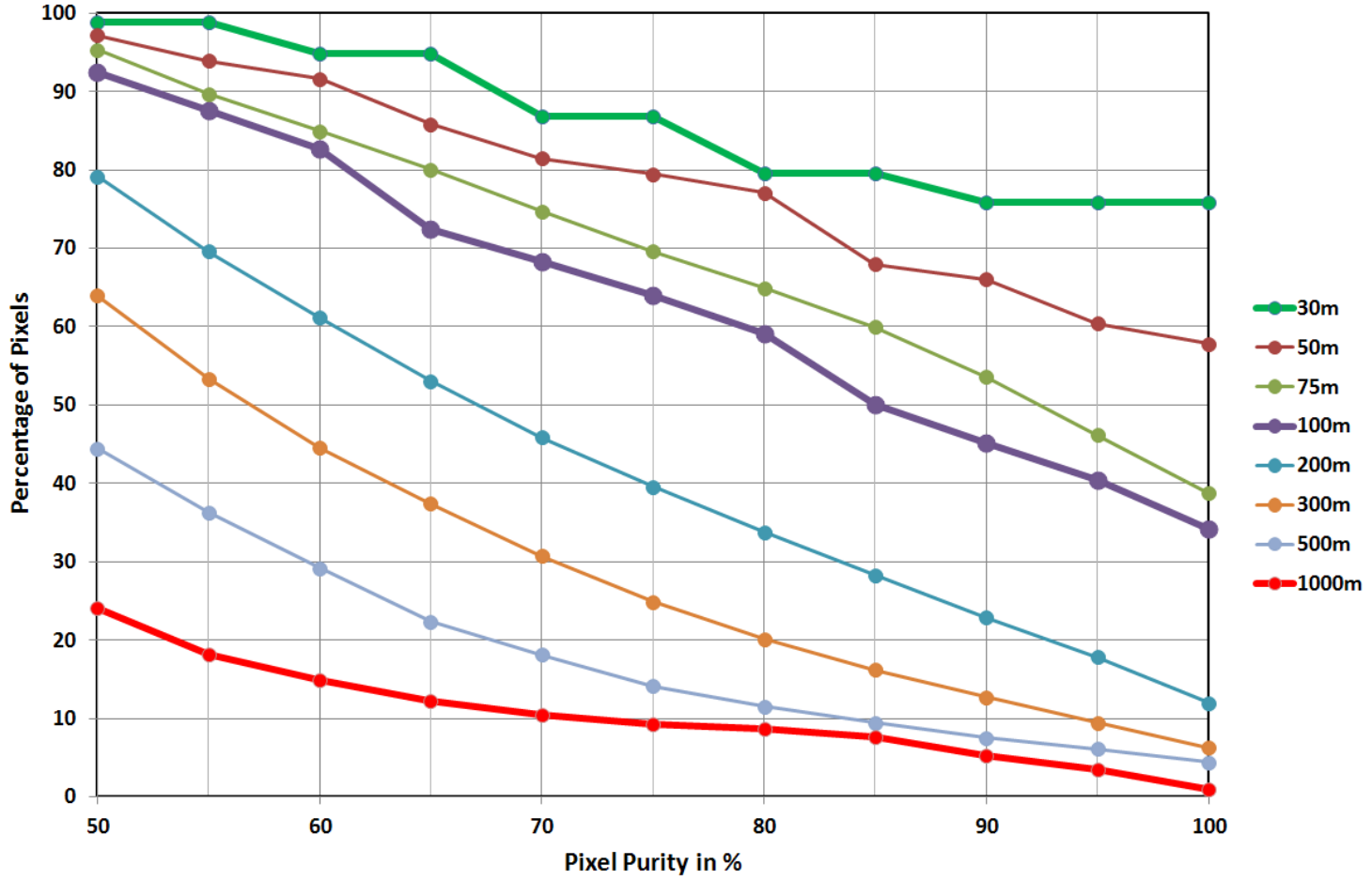

| Band pair | Inter-band error (m) | |
|---|---|---|
| BLUE-RED | 39.343 | std=12.814 |
| BLUE-NIR | 48.941 | std=17.984 |
| BLUE-SWIR | 51.919 | std=17.688 |
| **RED-NIR** | **32.048** | **std=10.681** |
| RED-SWIR | 39.121 | std=10.326 |
| NIR-SWIR | 40.398 | std=11.235 |

### Multi-temporal




See Poster of I. Benhadj et al.

# Pixel purity



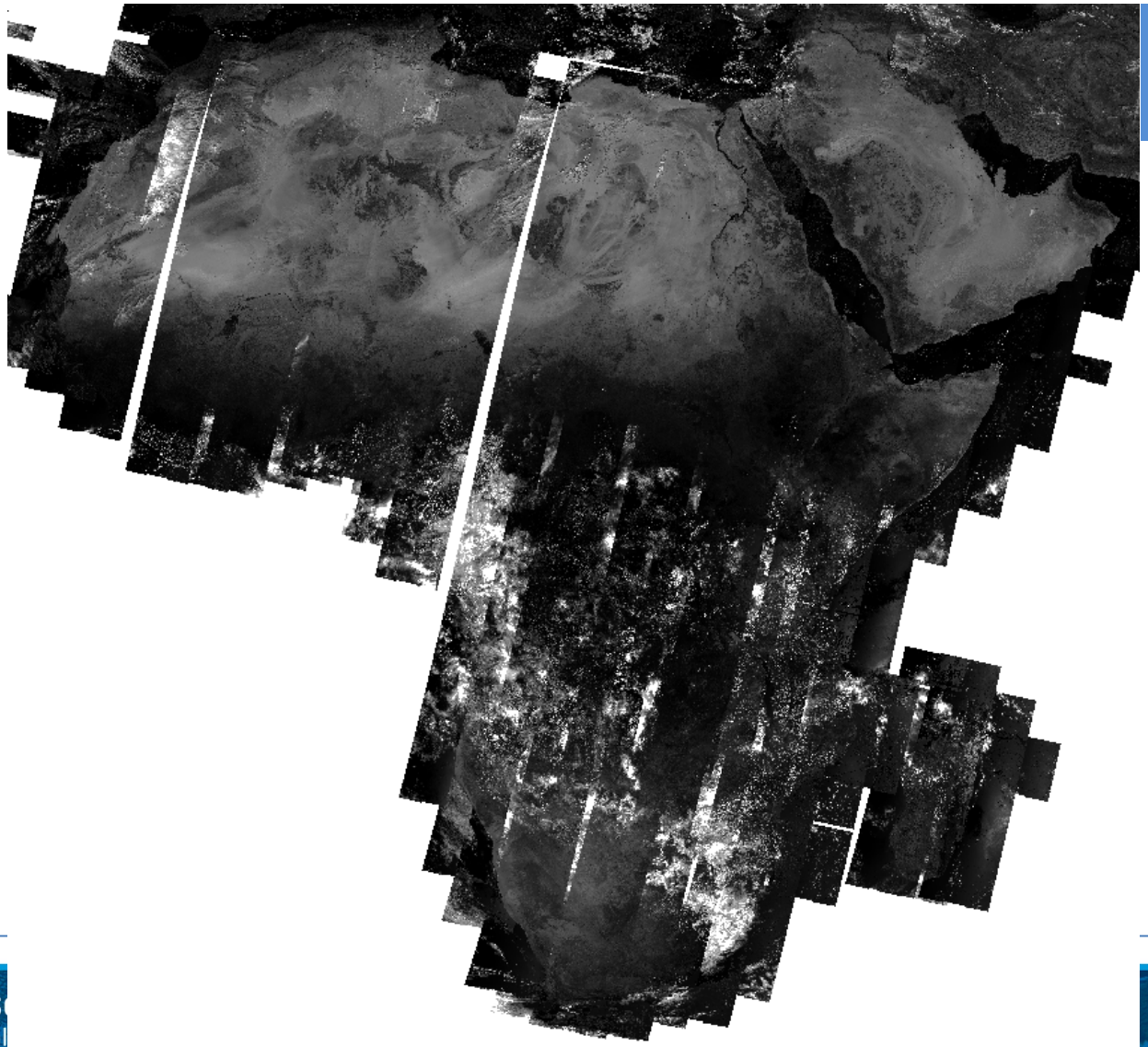
# Products available

## User Workshop in Nov ‘14

“The objective of the workshop was to gather user requirements for the PROBA-V 100m synthesis products.”

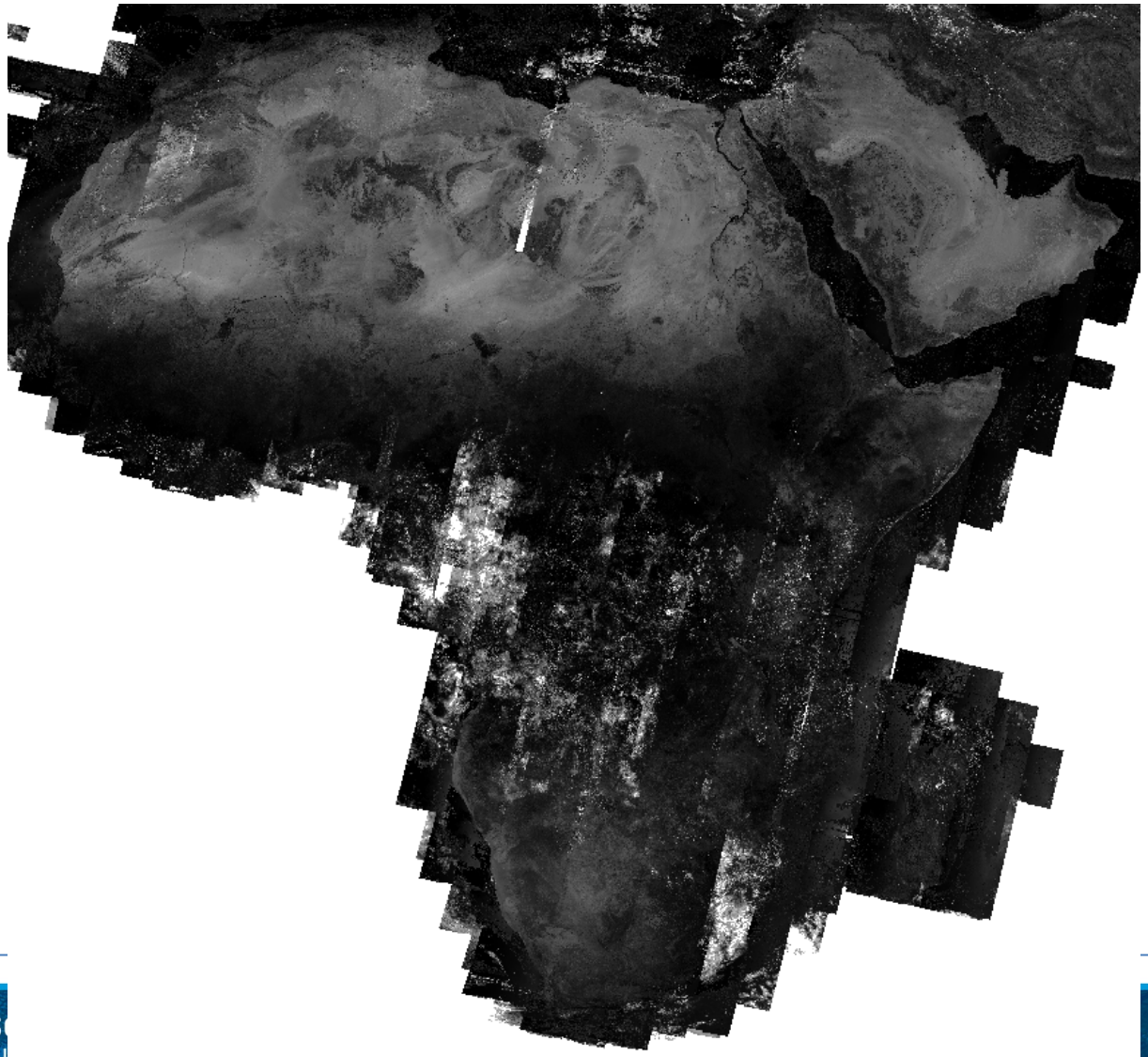
- Compositing period: consensus on 5-daily synthesis (1 observ.) > freedom of user to make S20-S30 out of this S5

# Products available



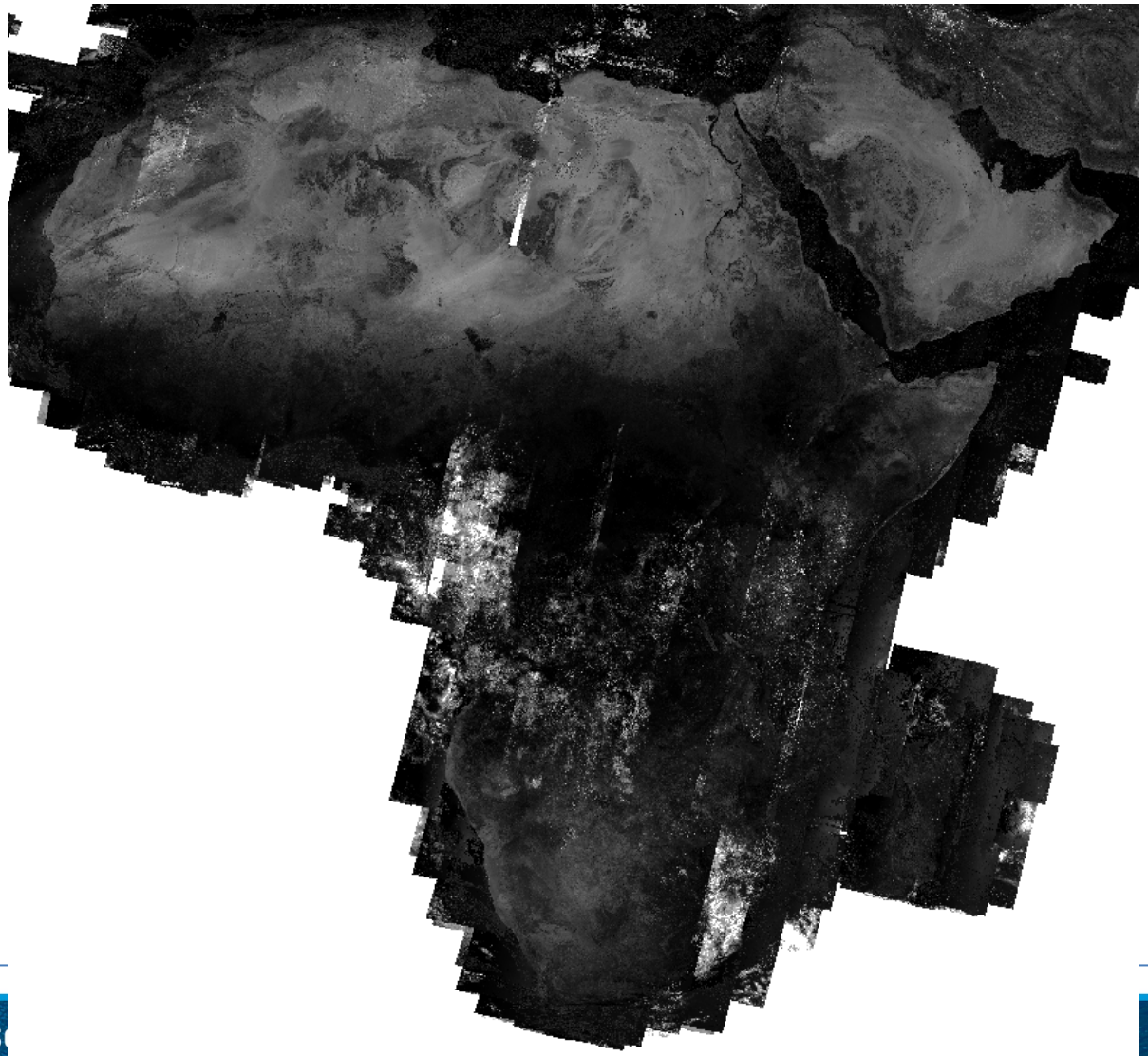
S10

# Products available



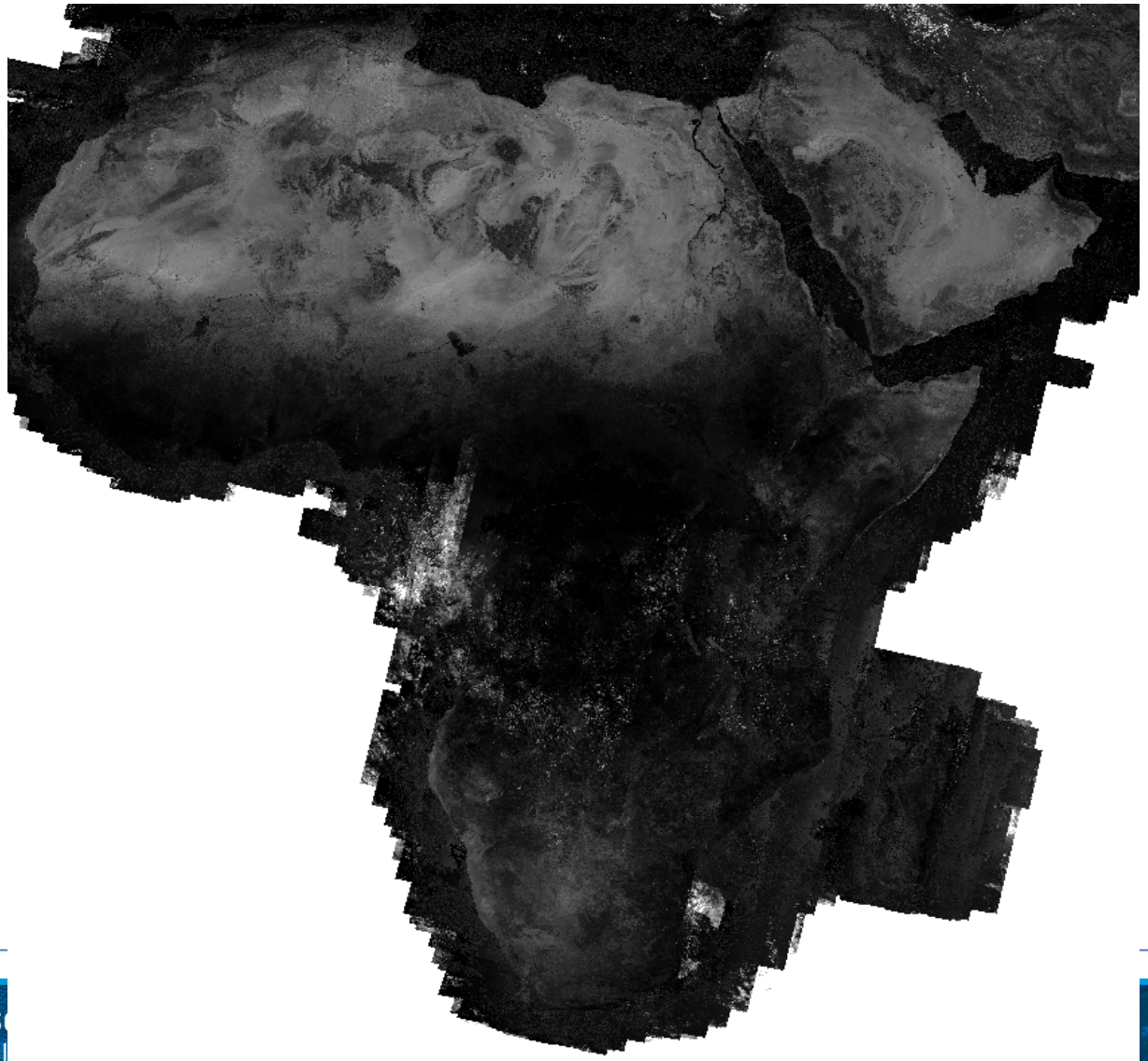
S15

# Products available



S20

# Products available



S30

# Products available

## User Workshop in Nov ‘14

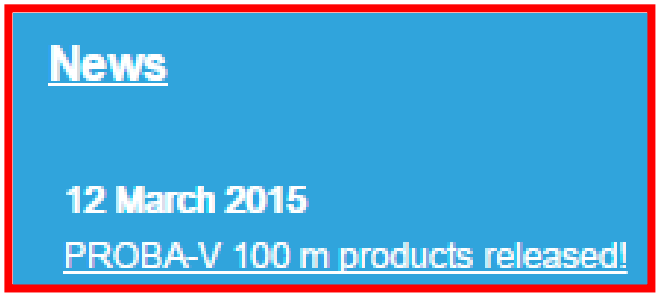
“The objective of the workshop was to gather user requirements for the PROBA-V 100m synthesis products.”

- Compositing period: consensus on 5-daily synthesis (1 observ.) > freedom of user to make S20-S30 out of this S5
- Compositing method: max NDVI not always best, median could be better > no issue for S5
- Improve cloud mask to avoid overdetection in bright areas
- A clear validation and quality control strategy should be defined and communicated to the users through the website (To Do for 100m)
- Information on the consistency between VGT and PROBA-V should be made available to the users (cf. ppt Else Swinnen)

# Products available

## Products available via the PDF (www.vito-eodata.be)

- S1 TOA reflectance (not atmospherically corrected)
- S1 TOC reflectance (atmospherically corrected)
- S5 TOA reflectance (not atmospherically corrected)
- S5 TOC reflectance (atmospherically corrected)
- S5 NDVI (atmospherically corrected)




All 100 m products older than 1 month can be downloaded for free. (same as 300 m)
S1 TOC is also freely available through CSCDA (under CSCDA conditions).

Products available since March 12, 2014!

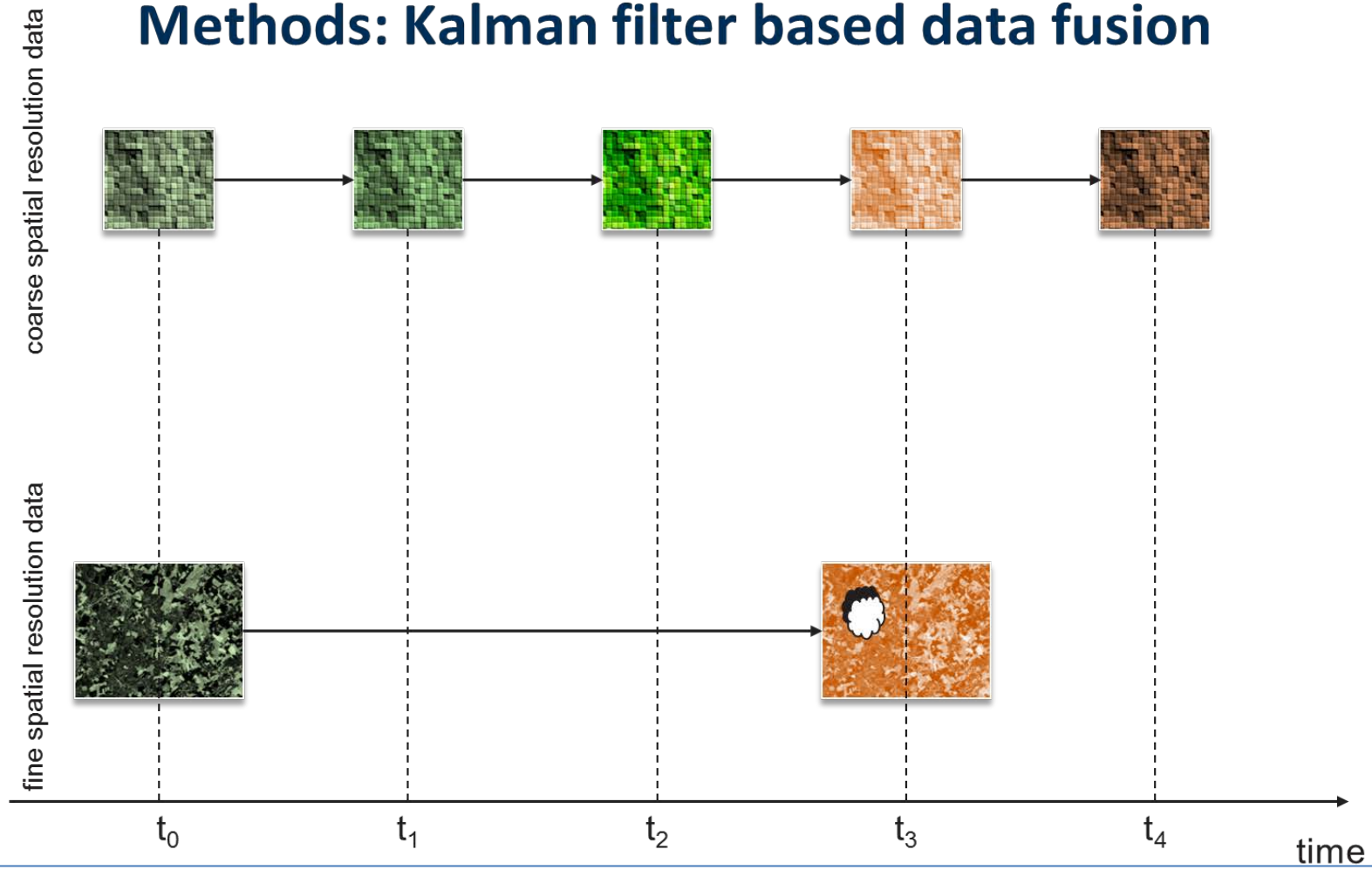
# Products available

There is more…

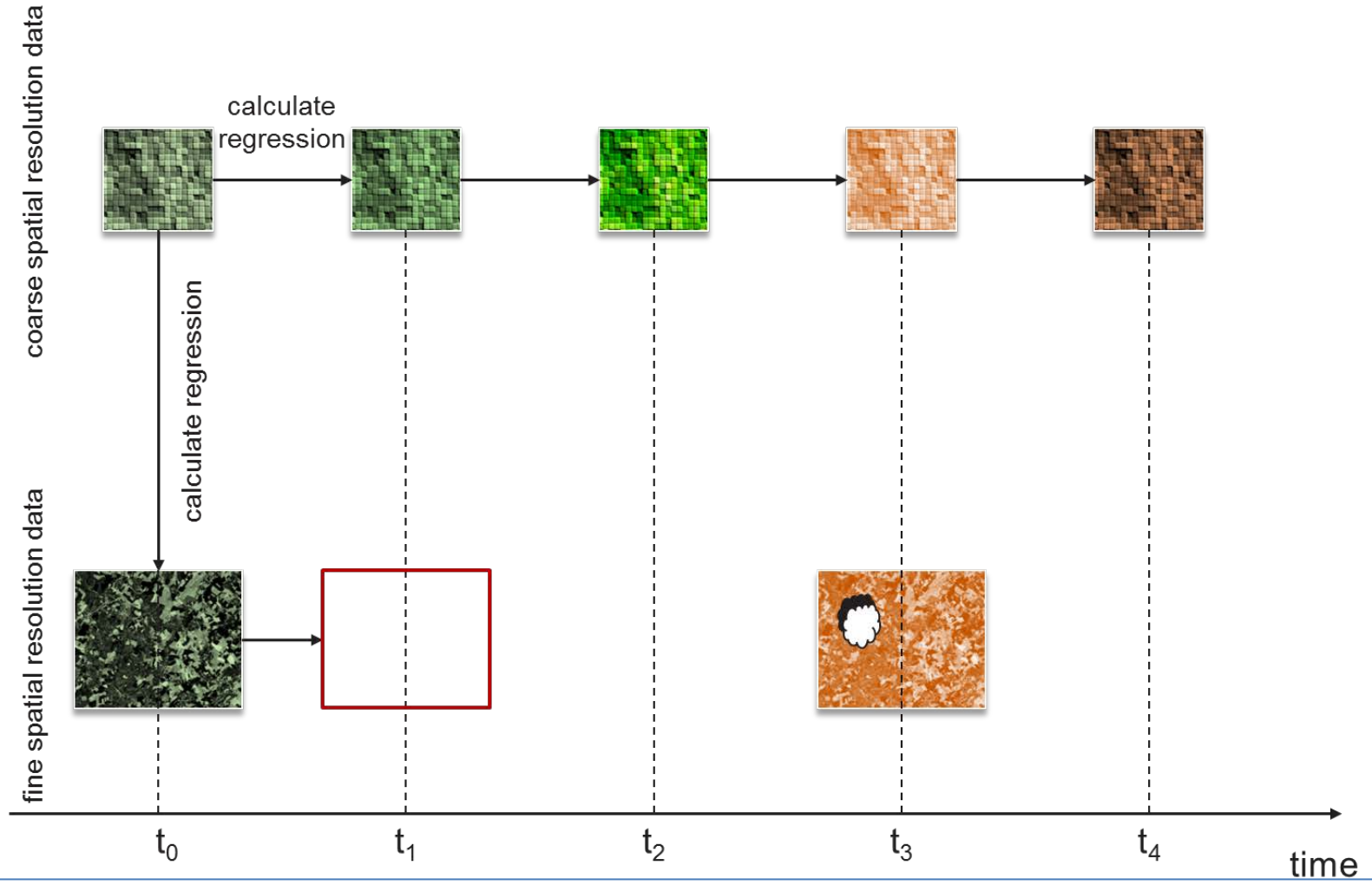
- Monitoring phenology (agriculture applications) requires frequent revisit time (e.g., S10)
- To create cloud free S10 at 100 m
  - 5 day revisit of 100 m products is insufficient in cloudy regions (e.g., N-Europe)
- Dual sensor design 100 m (nadir) - 300 m (off-nadir) offers potential for data assimilation
- Kalman filter produces promising results (K10@100)

# K10 product

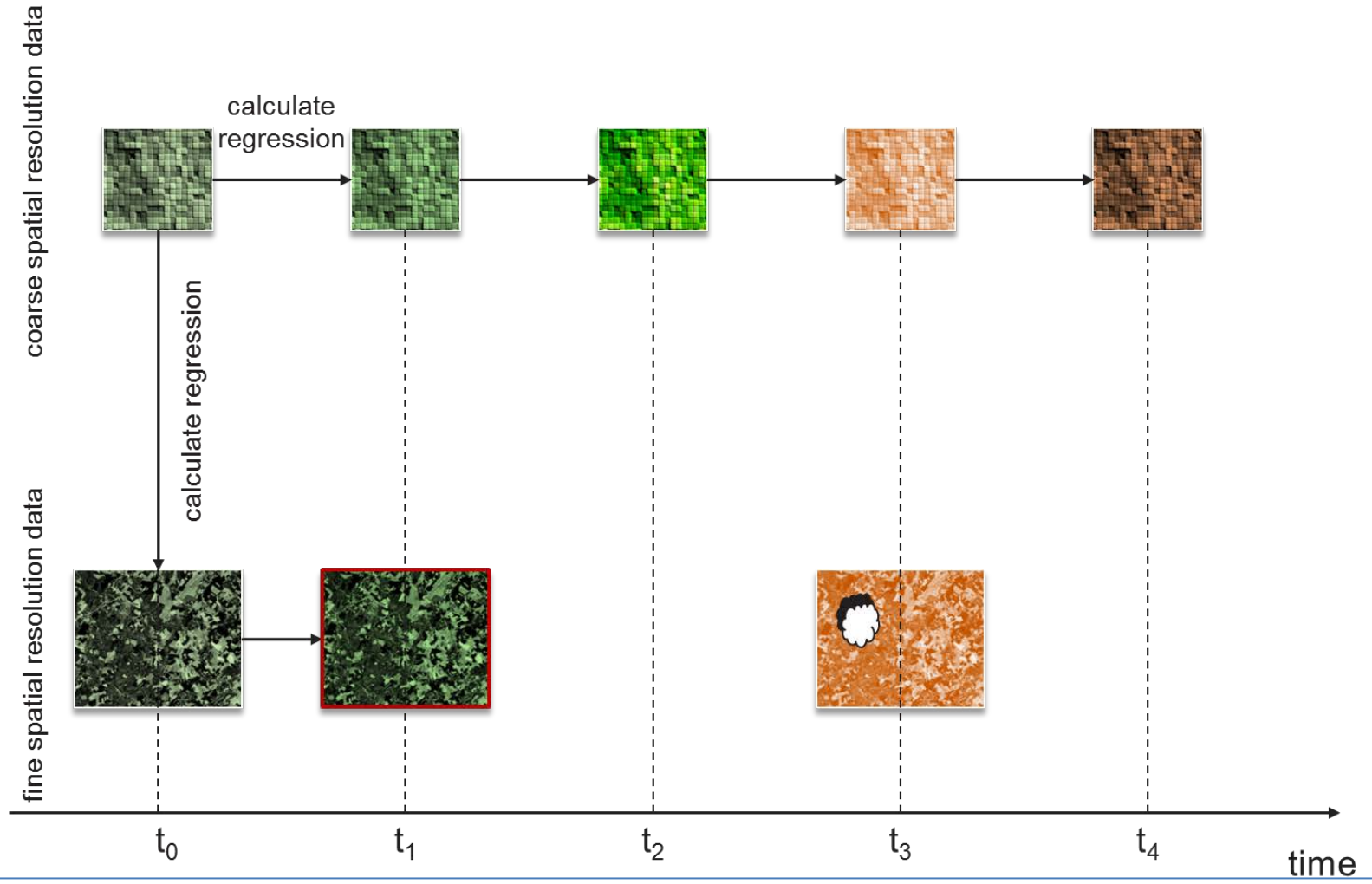
## Methods: Kalman filter based data fusion



# K10 product


coarse spatial resolution data
calculate regression
calculate regression
fine spatial resolution data
$t_0$
$t_1$
$t_2$
$t_3$
$t_4$
time

# K10 product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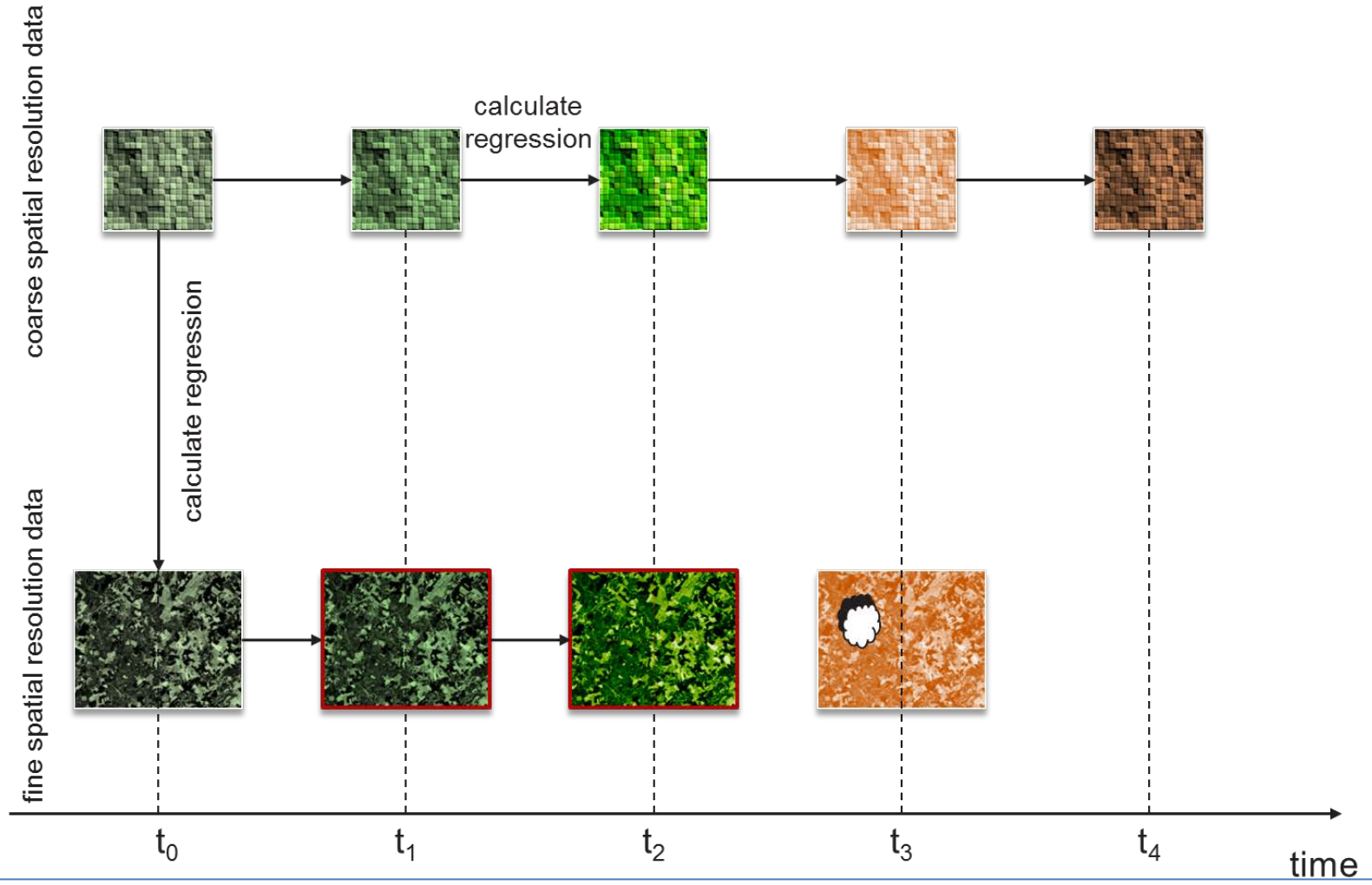
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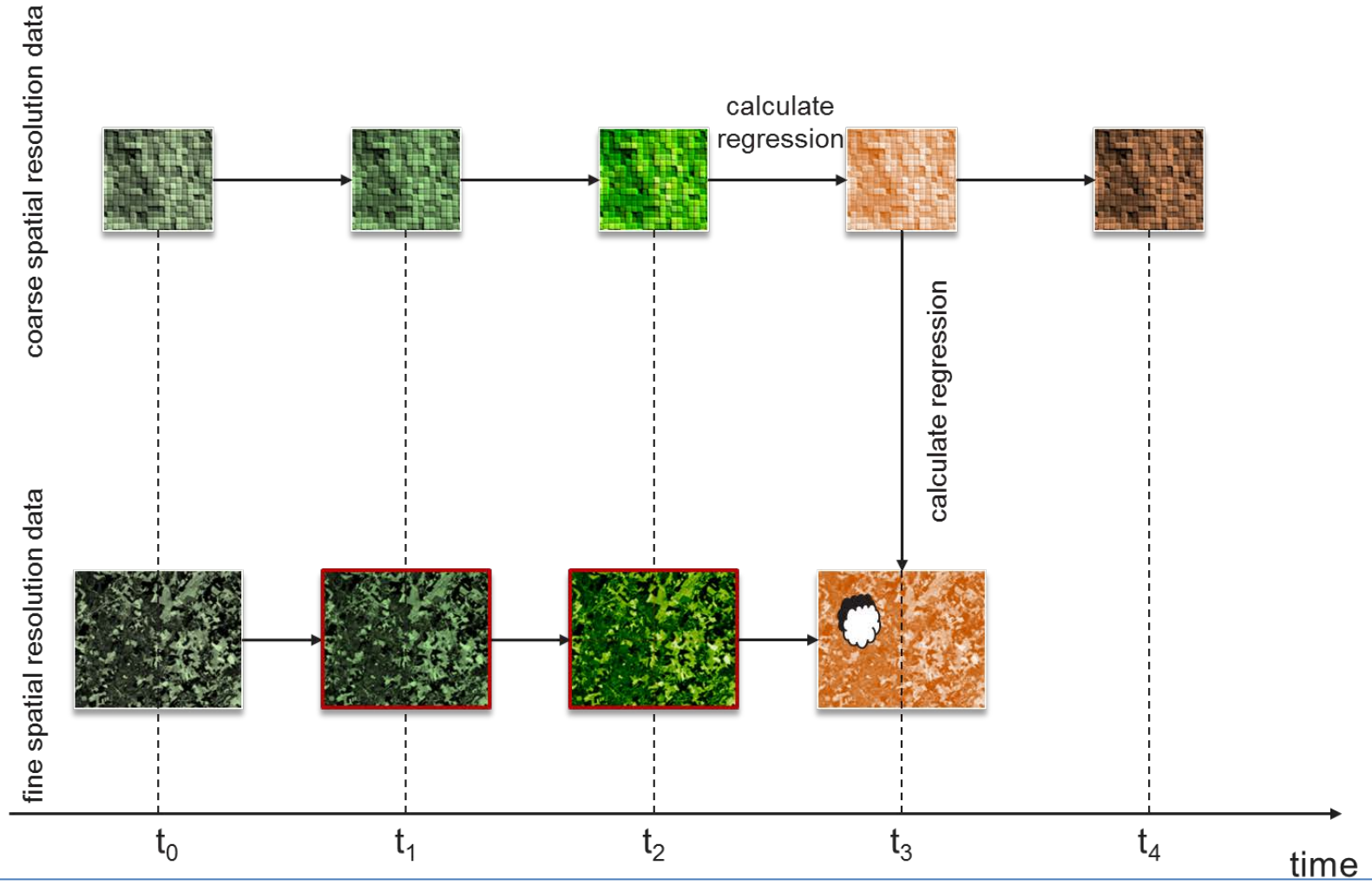
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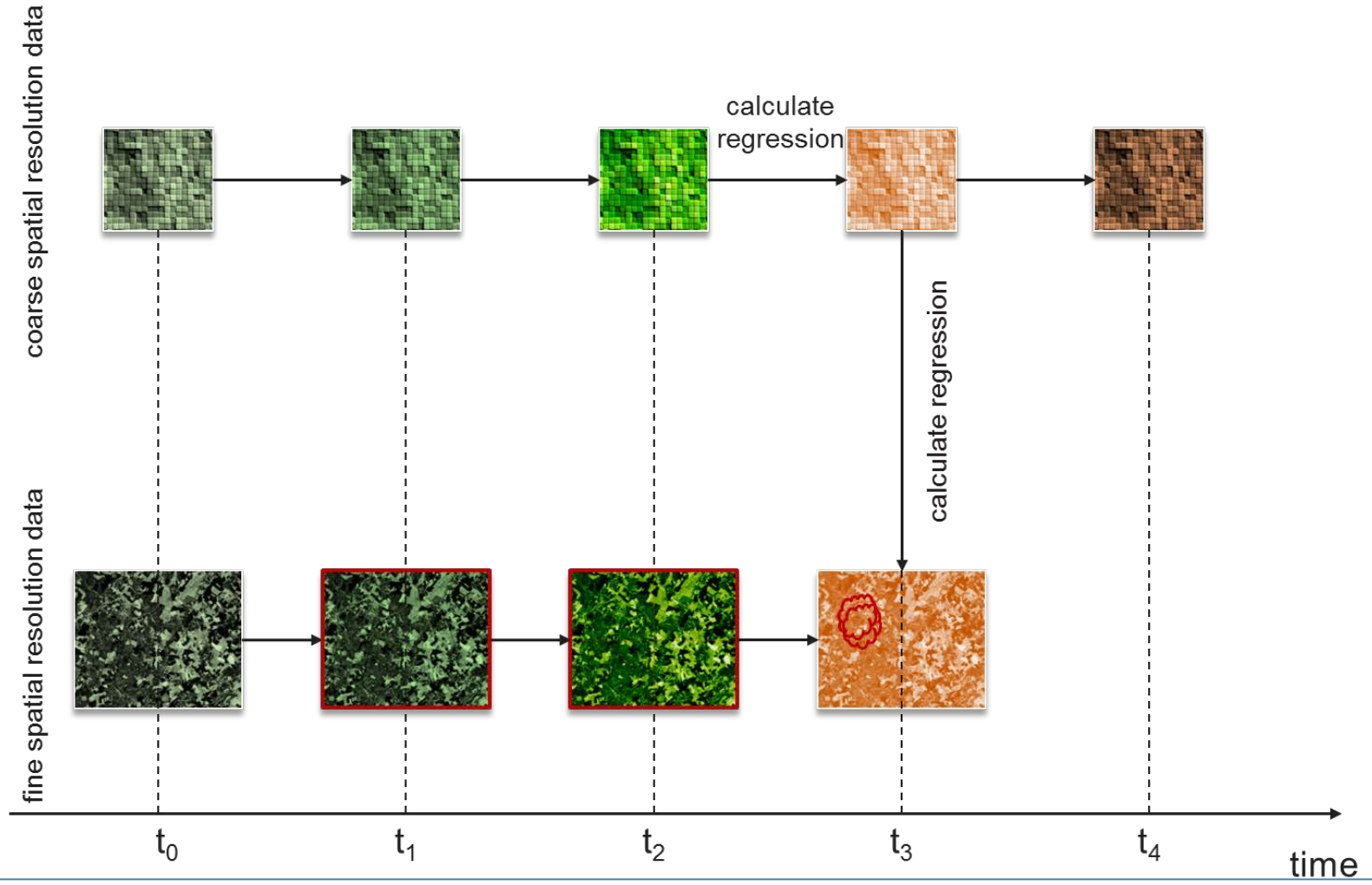
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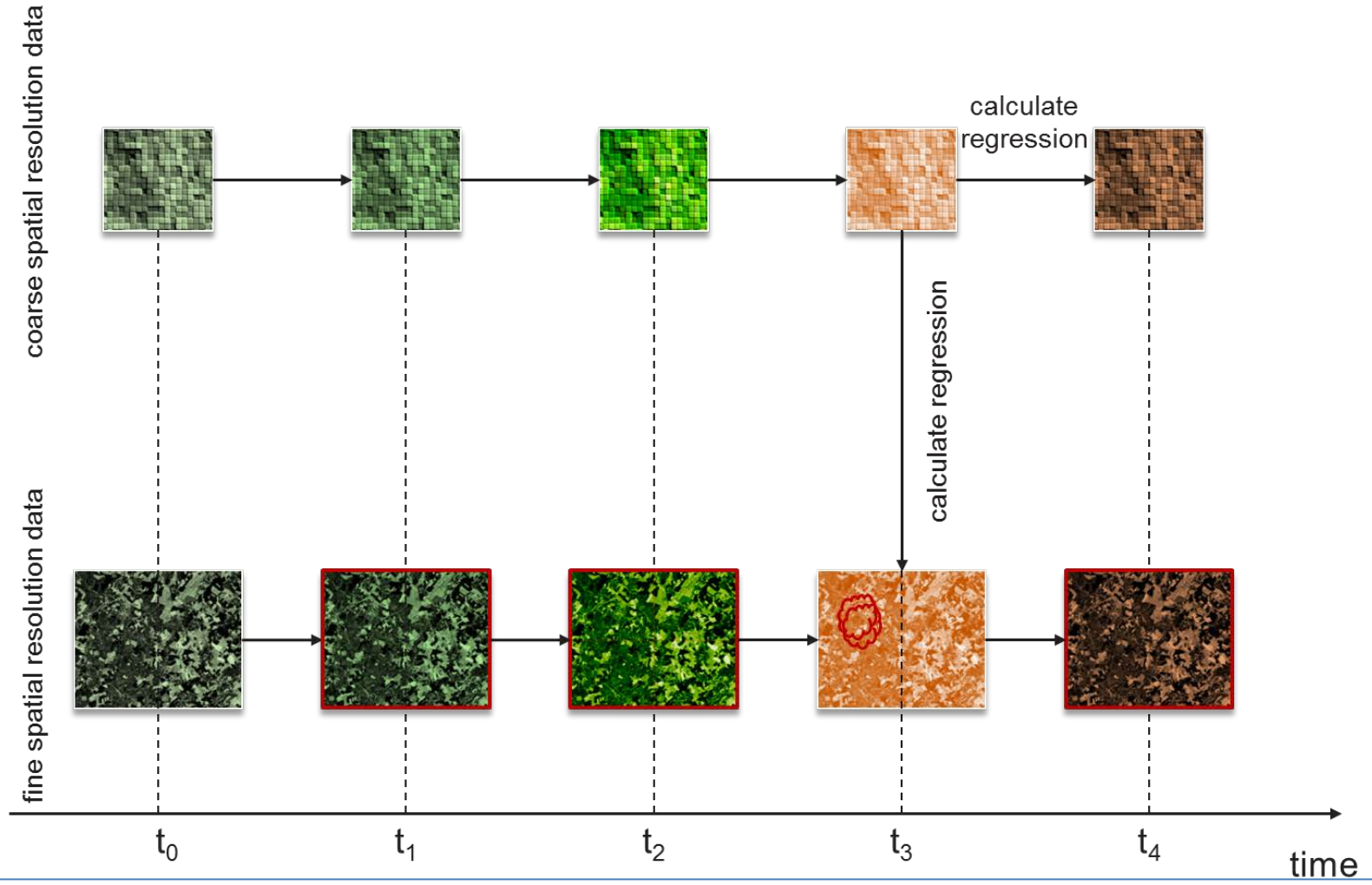
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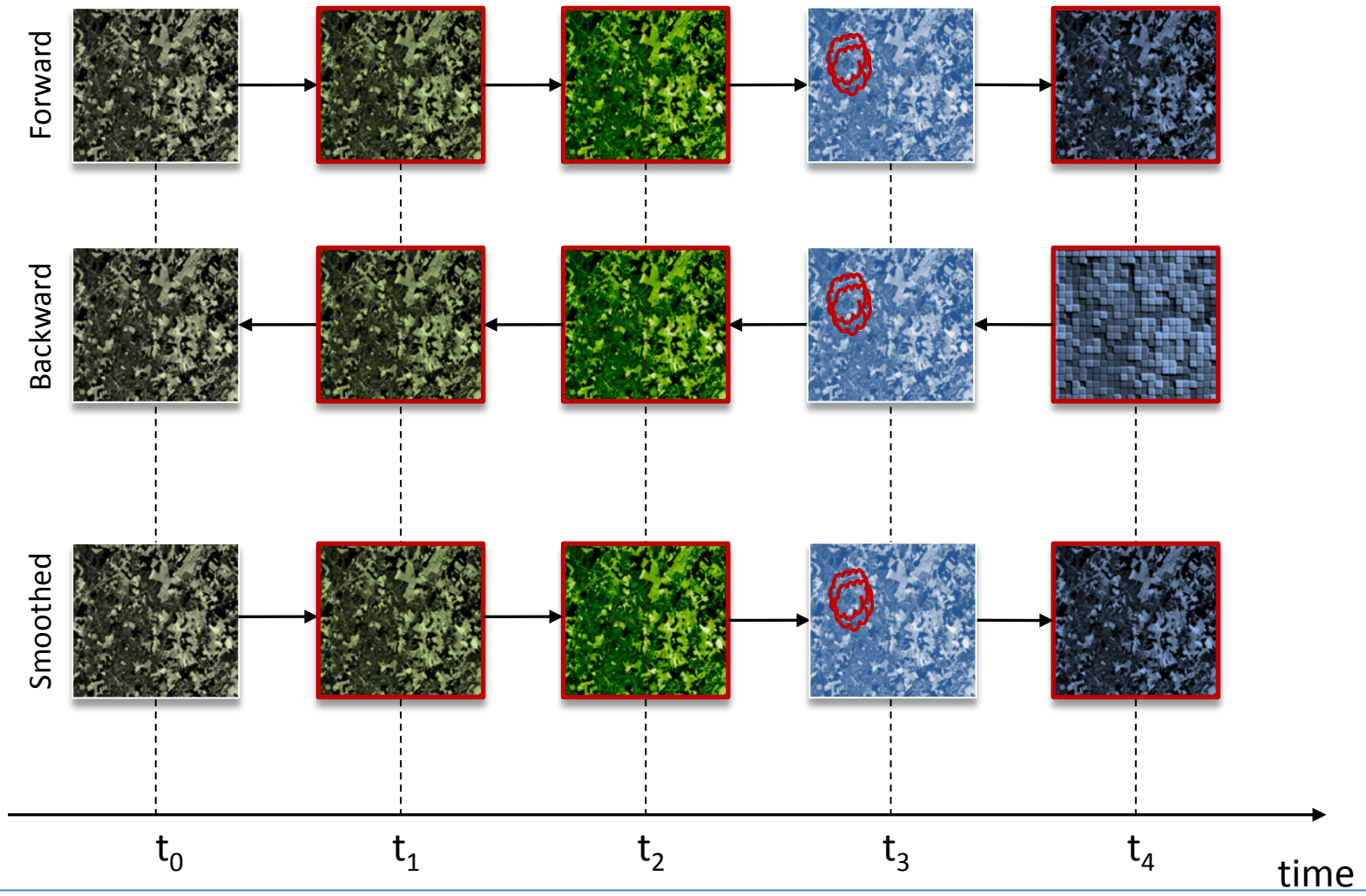
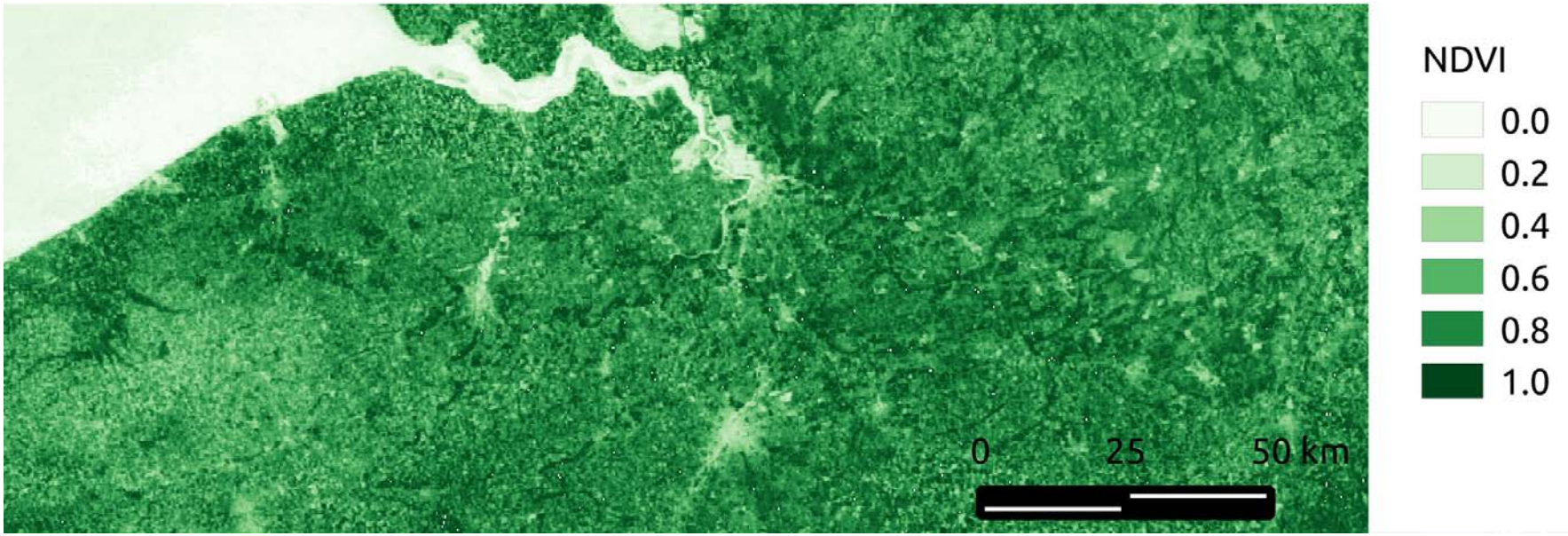


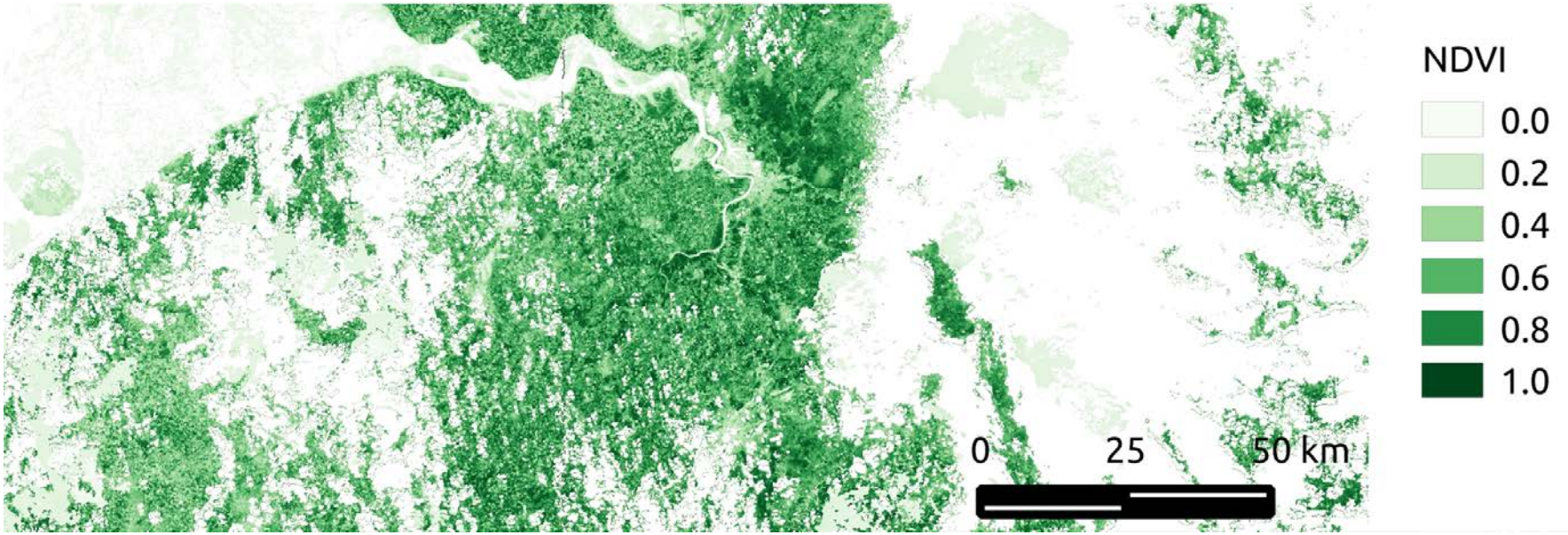
# K10 product

## S10 at 300 m resolution



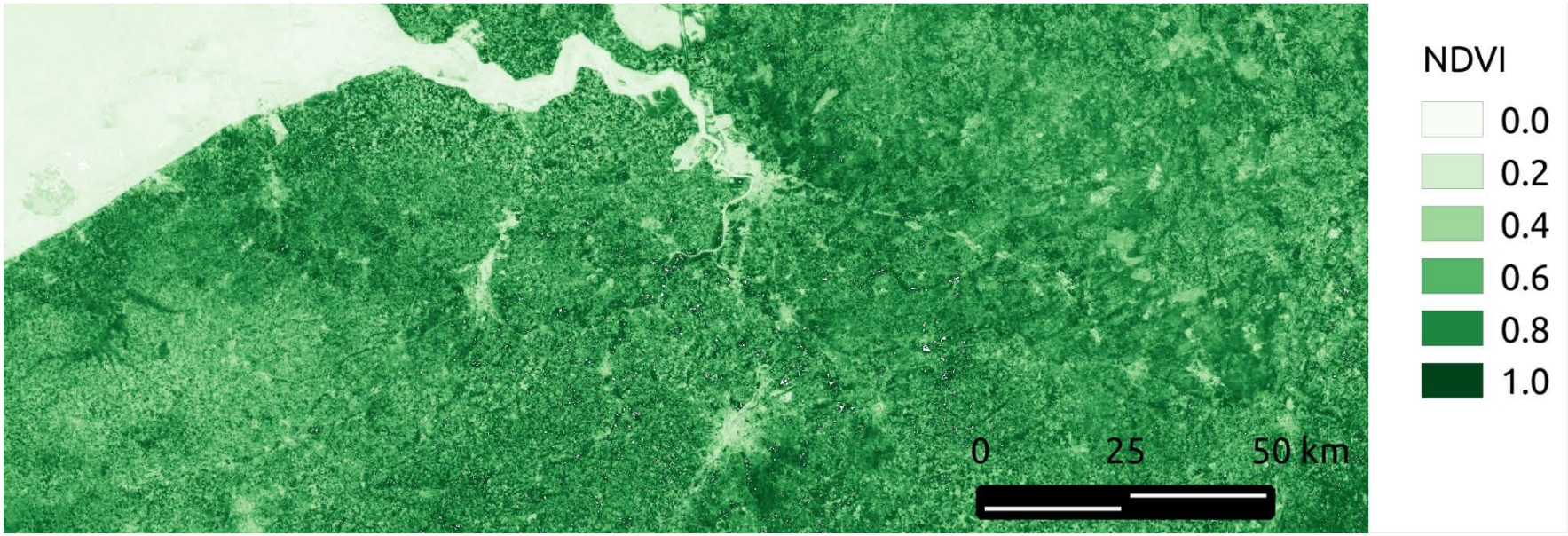
# K10 product

## S10 at 100 m resolution without data fusion



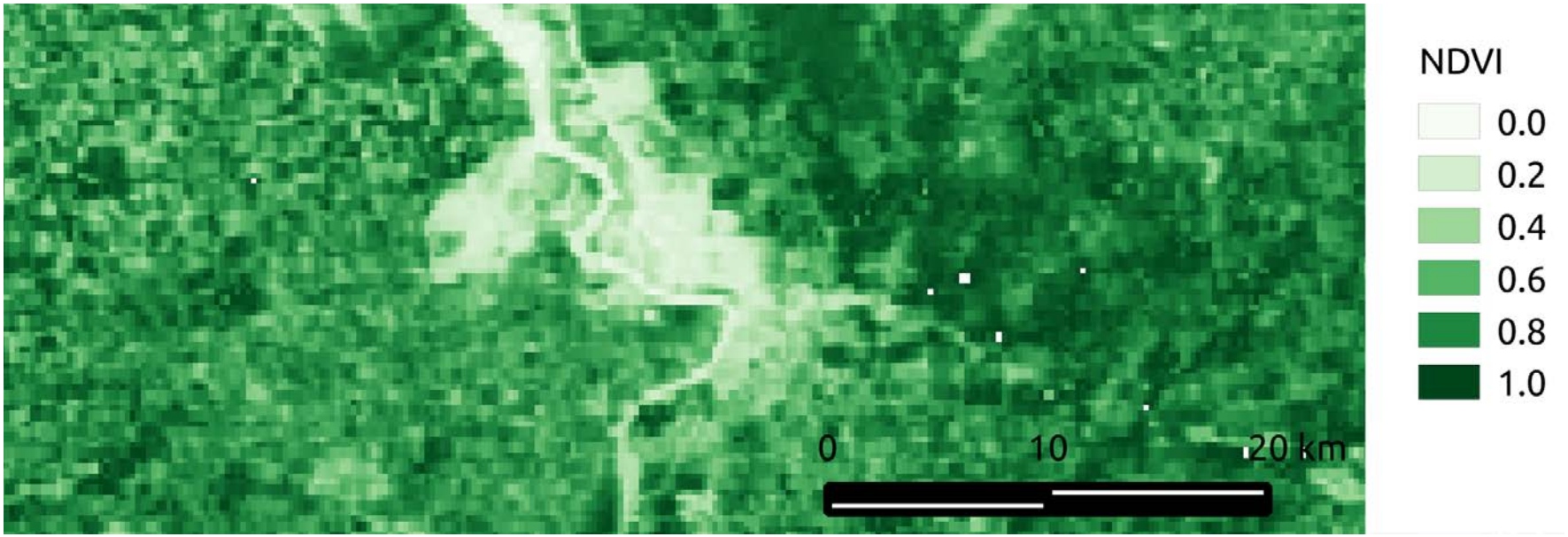
# K10 product

## K10 at 100 m resolution (with data fusion)



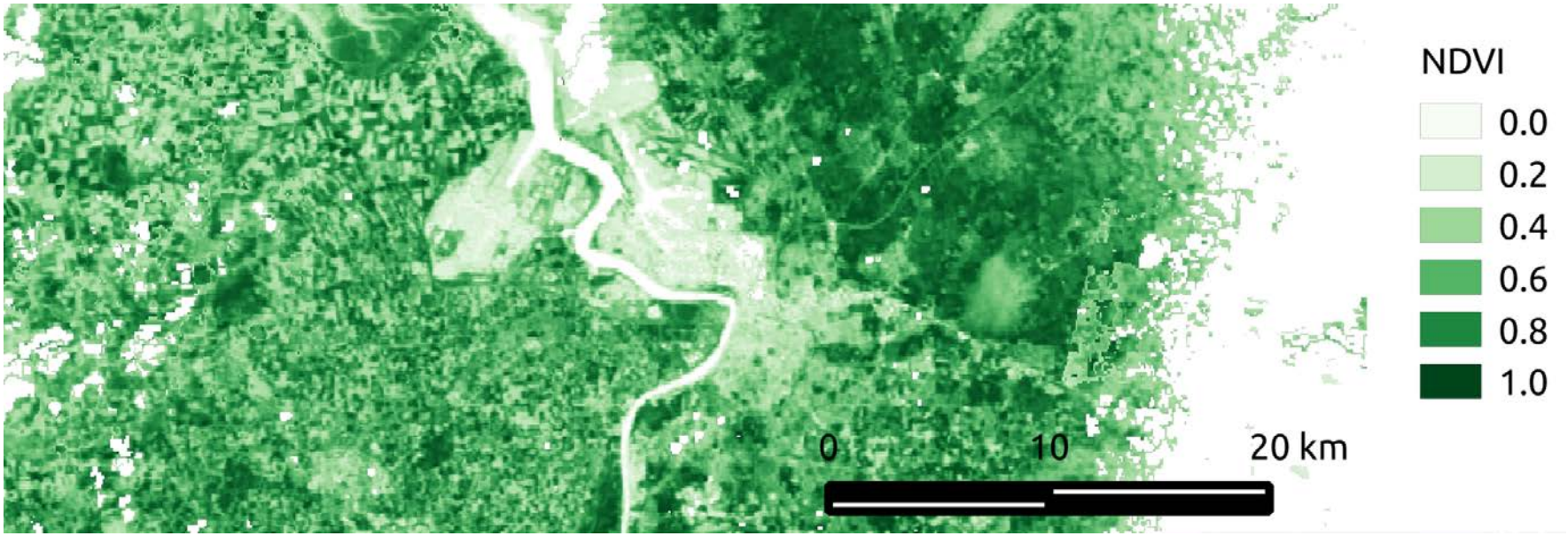
# K10 product

## S10 at 300 m resolution (detail)



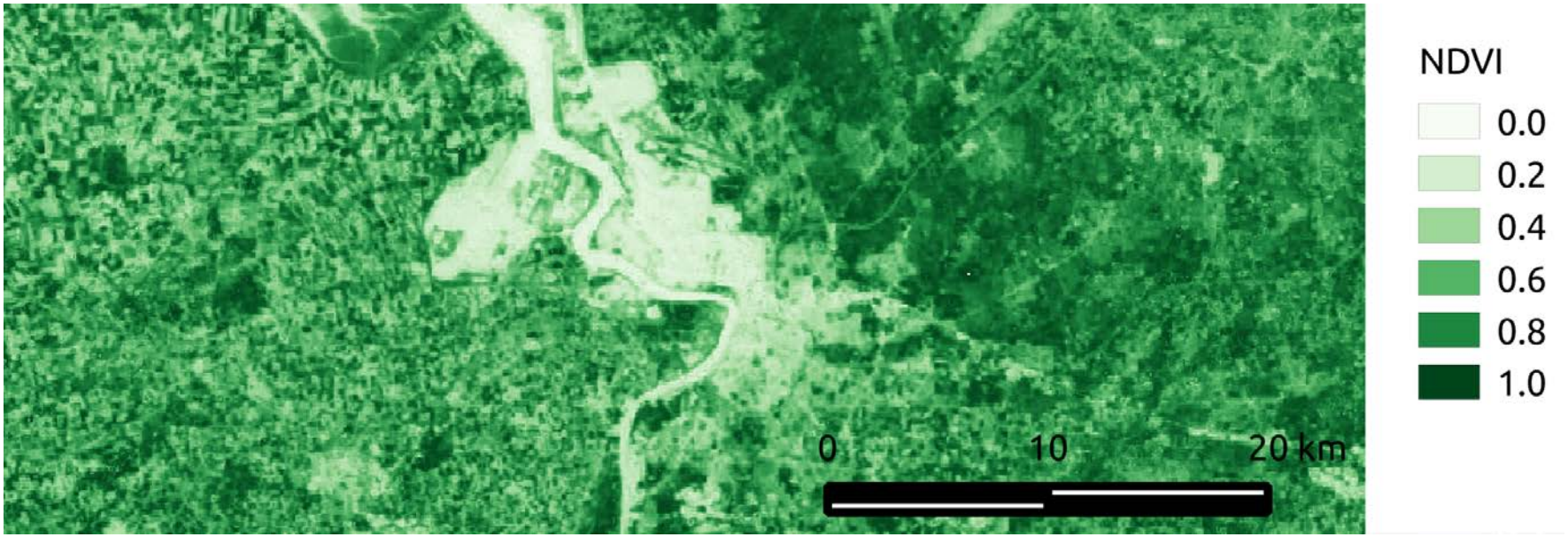
# K10 product

## S10 at 100 m resolution (detail, without data fusion)



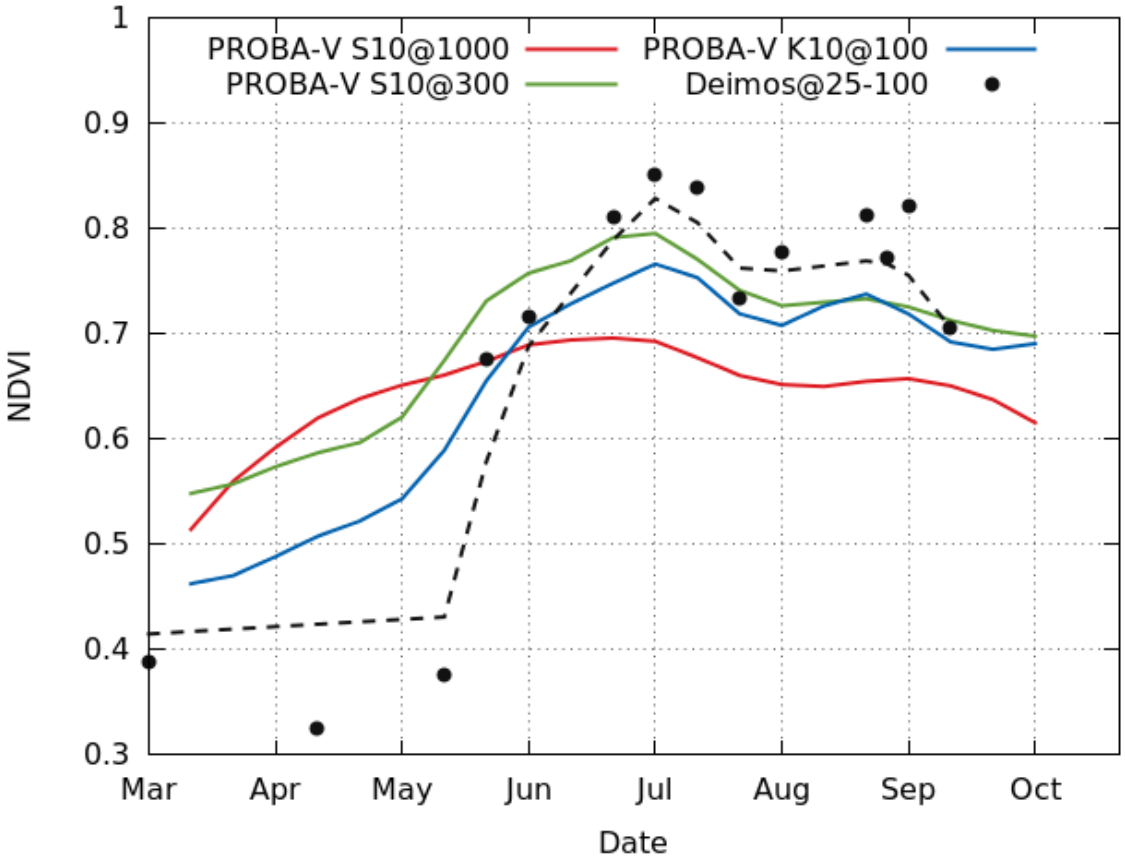
# K10 product

## K10 at 100 m resolution (detail)



# K10 product

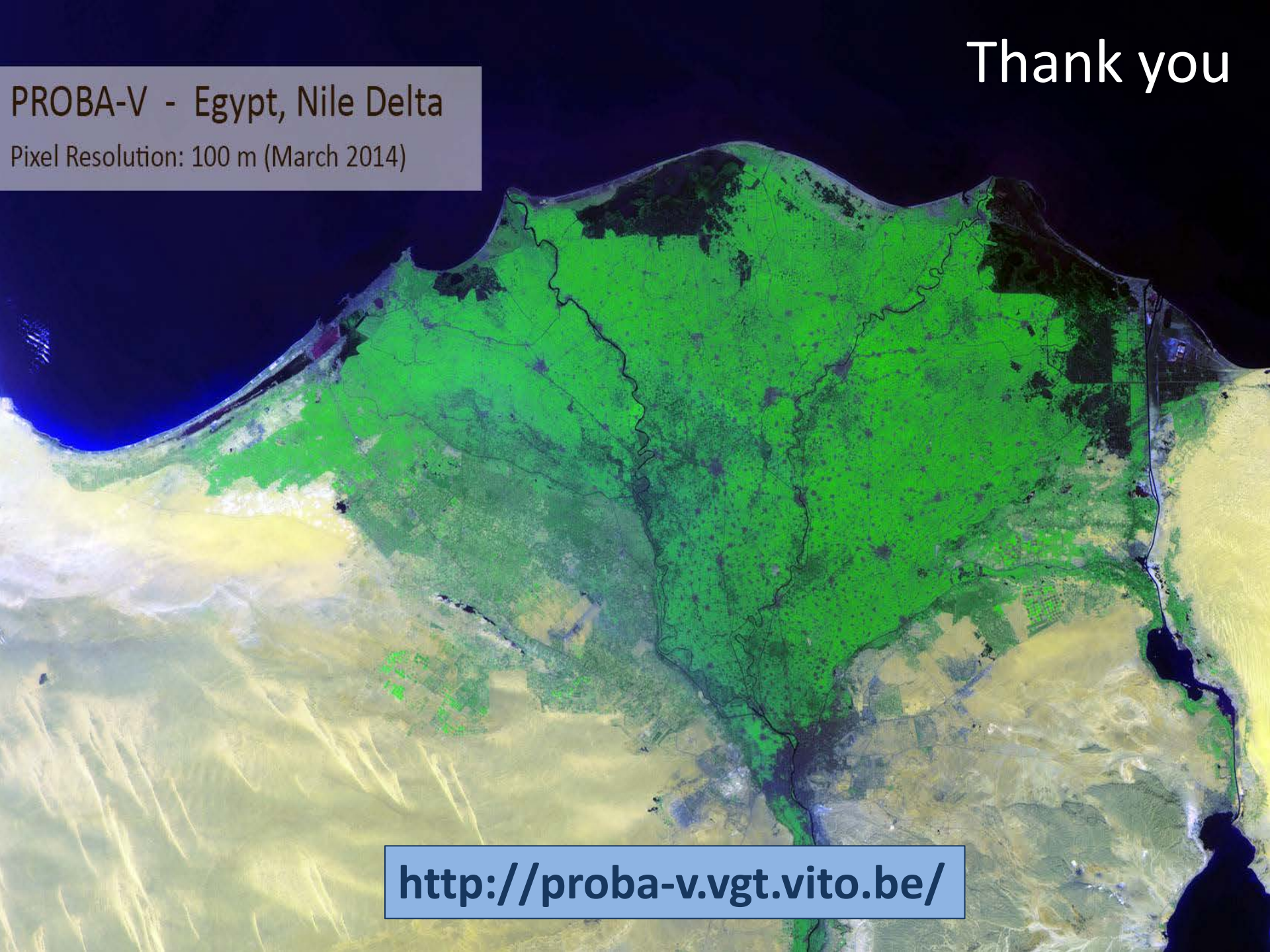
## Temporal profiles for crop monitoring




Sugar beet

# Applications with 100 m products

- Agriculture! Crop mapping, yield forecasting, biomass estimation, stress and disease detection
- Ecosystem mapping & monitoring, Seasonal Dynamics
- Drought monitoring
- Deforestation
- Coastal mapping & Water quality (PROBA-V water Q products are under construction)
- Proxy's for climate change




# Thank you

**http://proba-v.vgt.vito.be/**