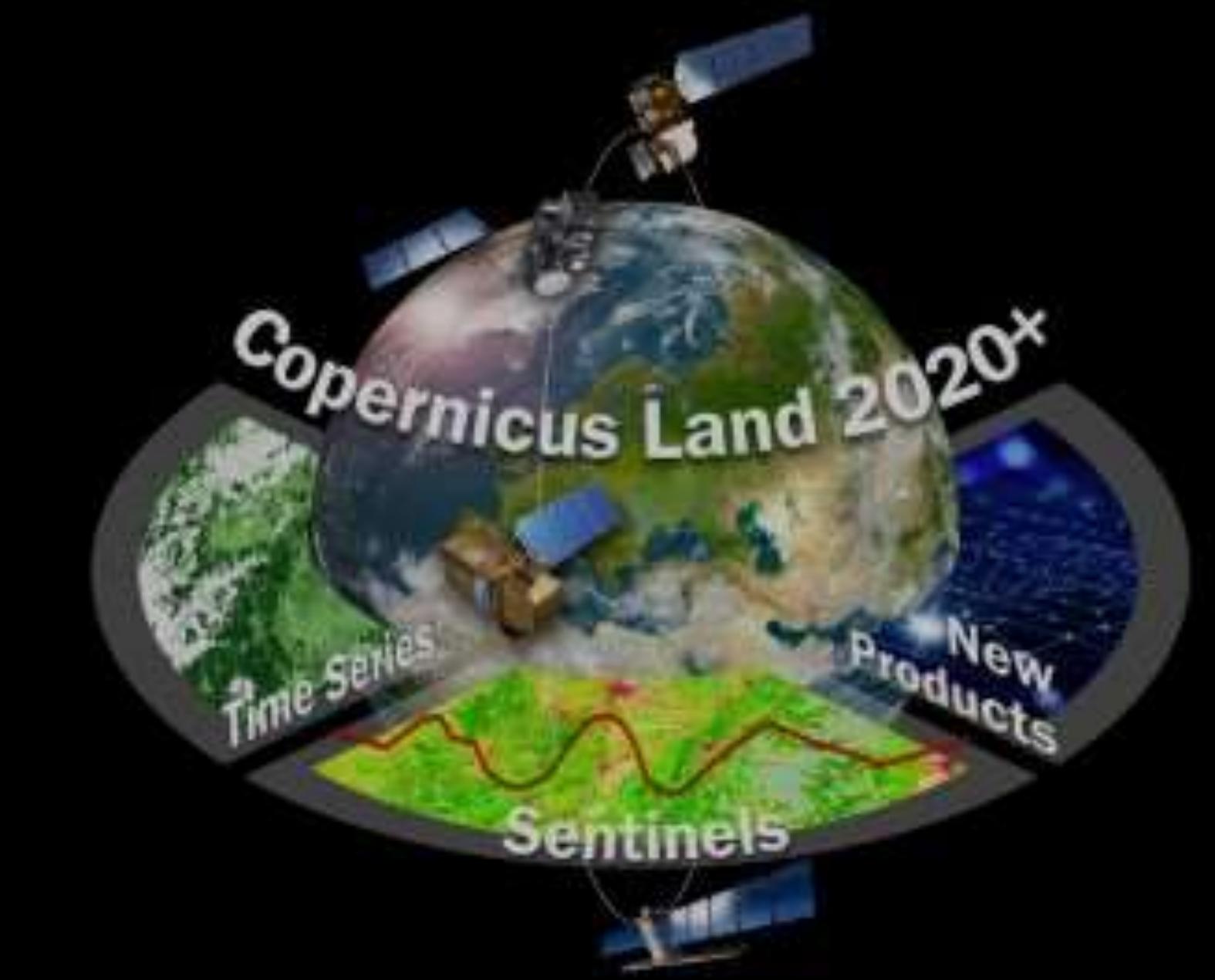
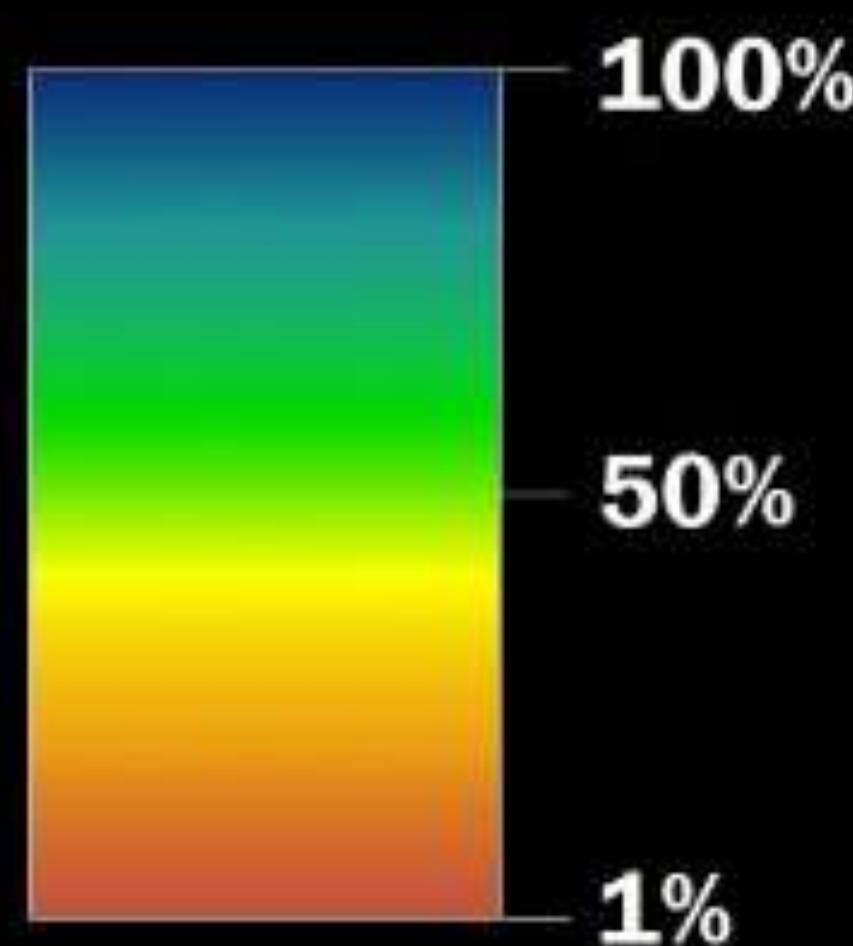


If you want to map forest all over Europe...

Copernicus HRL Forest 2015

Tree Cover Density (%)



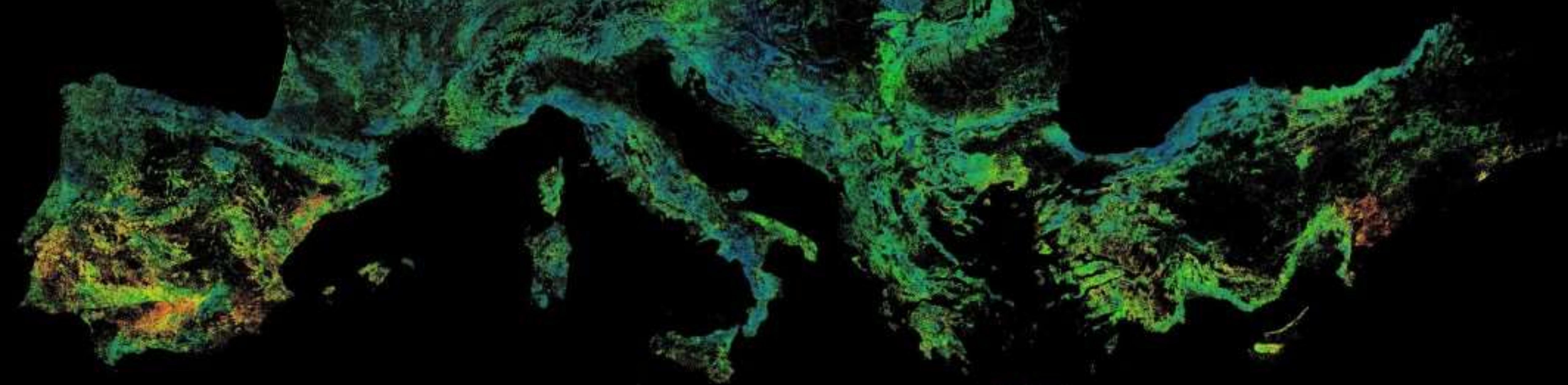
Credits: Copernicus Land Monitoring Service,
courtesy of the European Environment Agency.
*Yet unpublished product

GAFAG

Copernicus
Europe's eyes on Earth

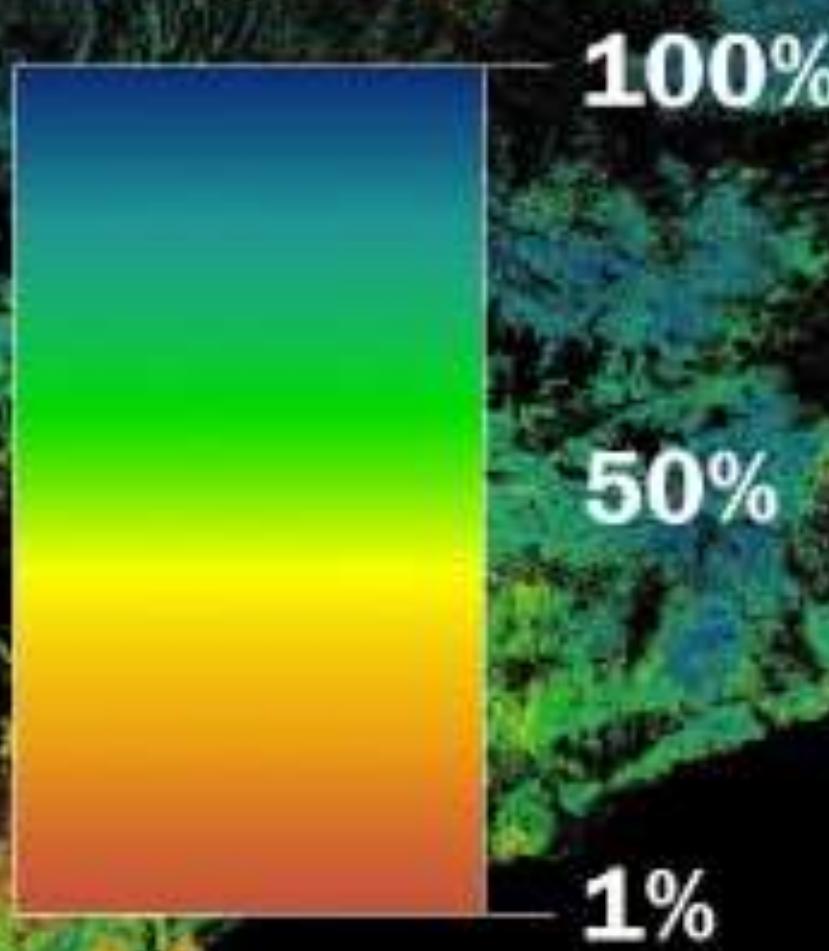
Land
Monitoring

European Environment Agency



... e.g. in Central Europe/Italy/the Balkans

Copernicus HRL Forest 2015
Tree Cover Density (%)



GAFAG

Copernicus
Europe's eyes on Earth

Land
Monitoring

European Environment Agency

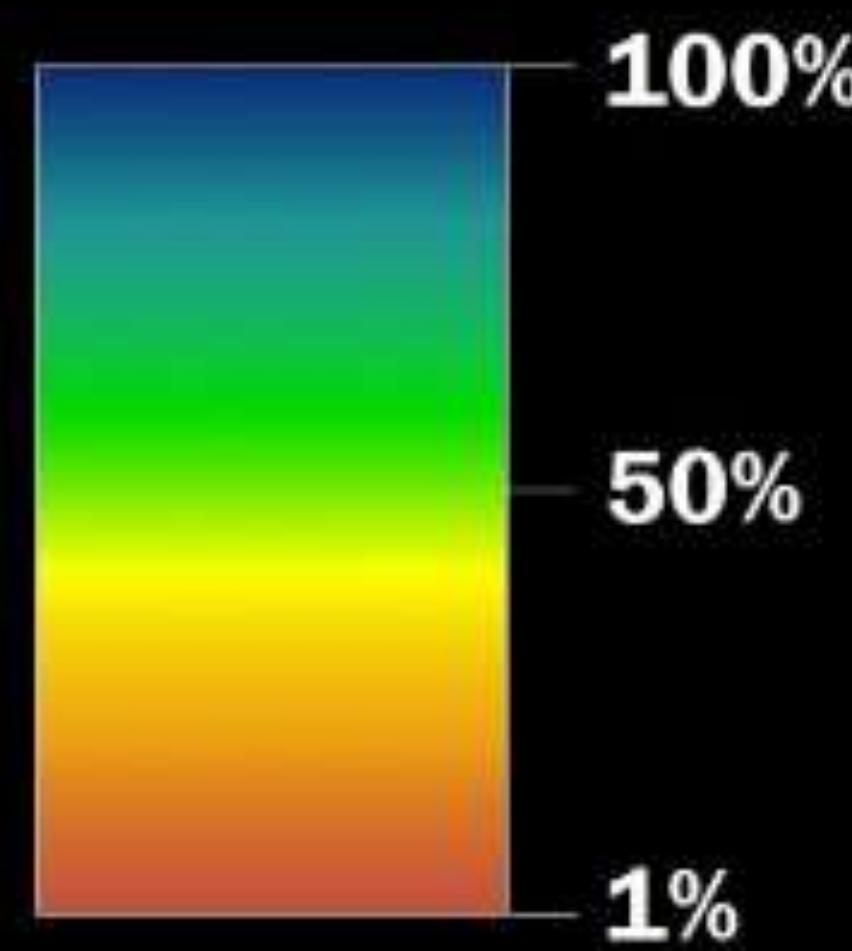


Credits: Copernicus Land Monitoring Service,
courtesy of the European Environment Agency. *Yet unpublished product

... or in Spain & Portugal

Copernicus HRL Forest 2015

Tree Cover Density (%)



GAFAG

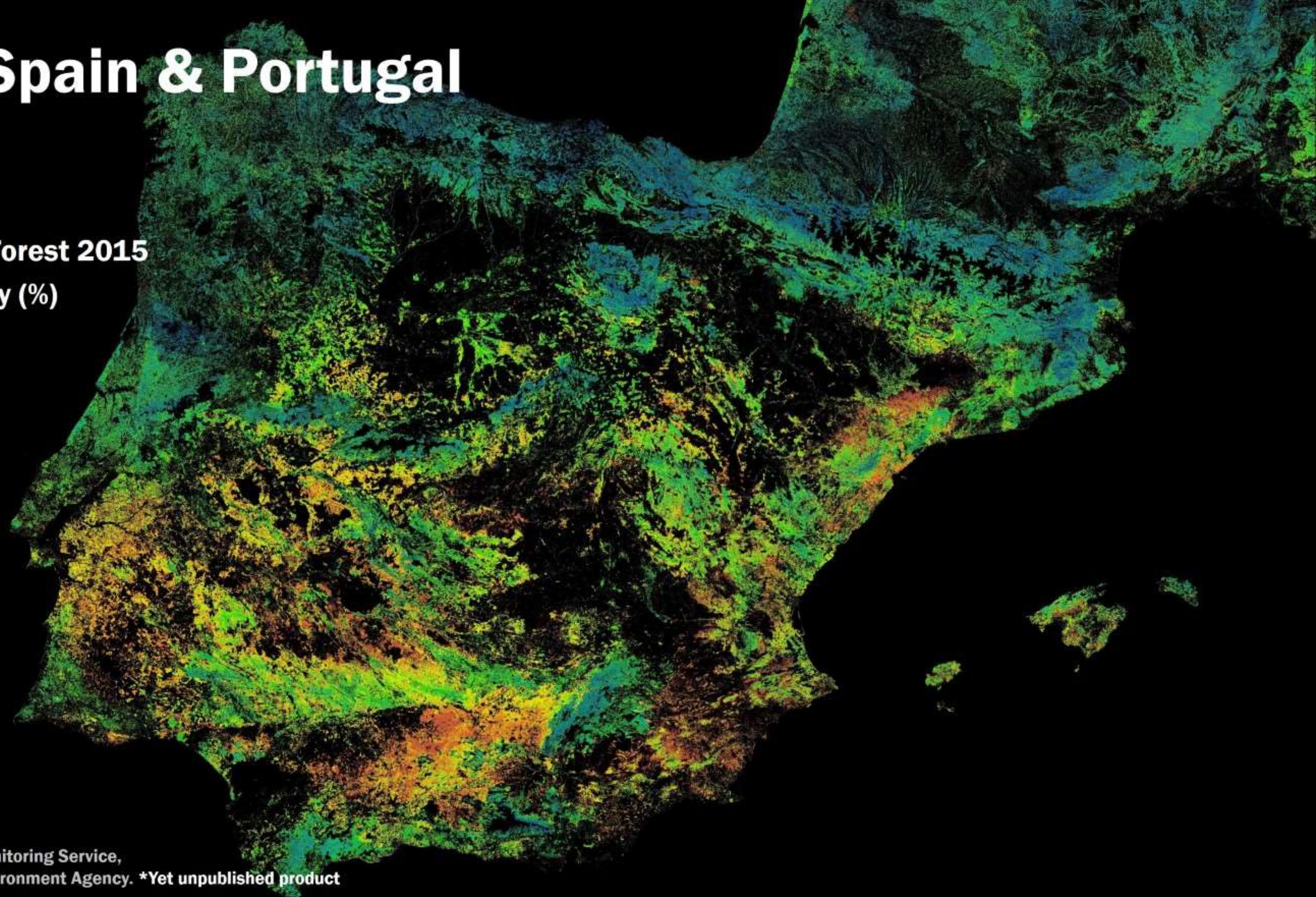
Copernicus
Europe's eyes on Earth

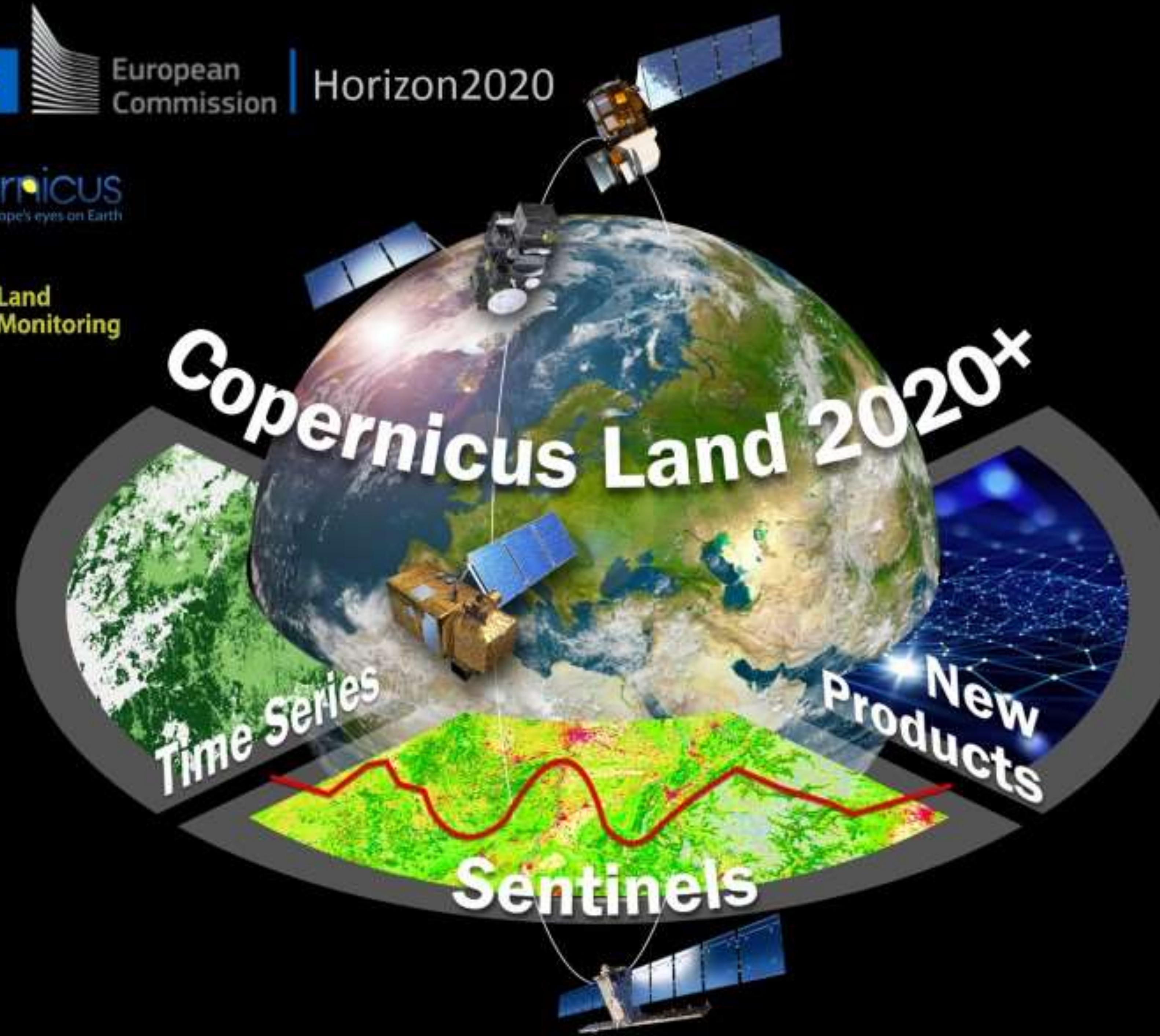
Land Monitoring

European Environment Agency



Credits: Copernicus Land Monitoring Service,
courtesy of the European Environment Agency. *Yet unpublished product





by GAF AG and partners

GAFAG



... there is a solution:

The Horizon2020 project **ECoLaSS**: “**E**volution of **C**opernicus **L**and **S**ervices based on **S**entinel data” aims at developing innovative methods and algorithms for **next-generation prototypes** of improved or novel operational Copernicus Land services from 2020 onwards.

Among them, a **High Resolution Layer (HRL) Forest** prototype is developed.

www.ecolass.eu

Follow us:

@ECoLaSS2020

March 2016

... with dense Sentinel-2 time series

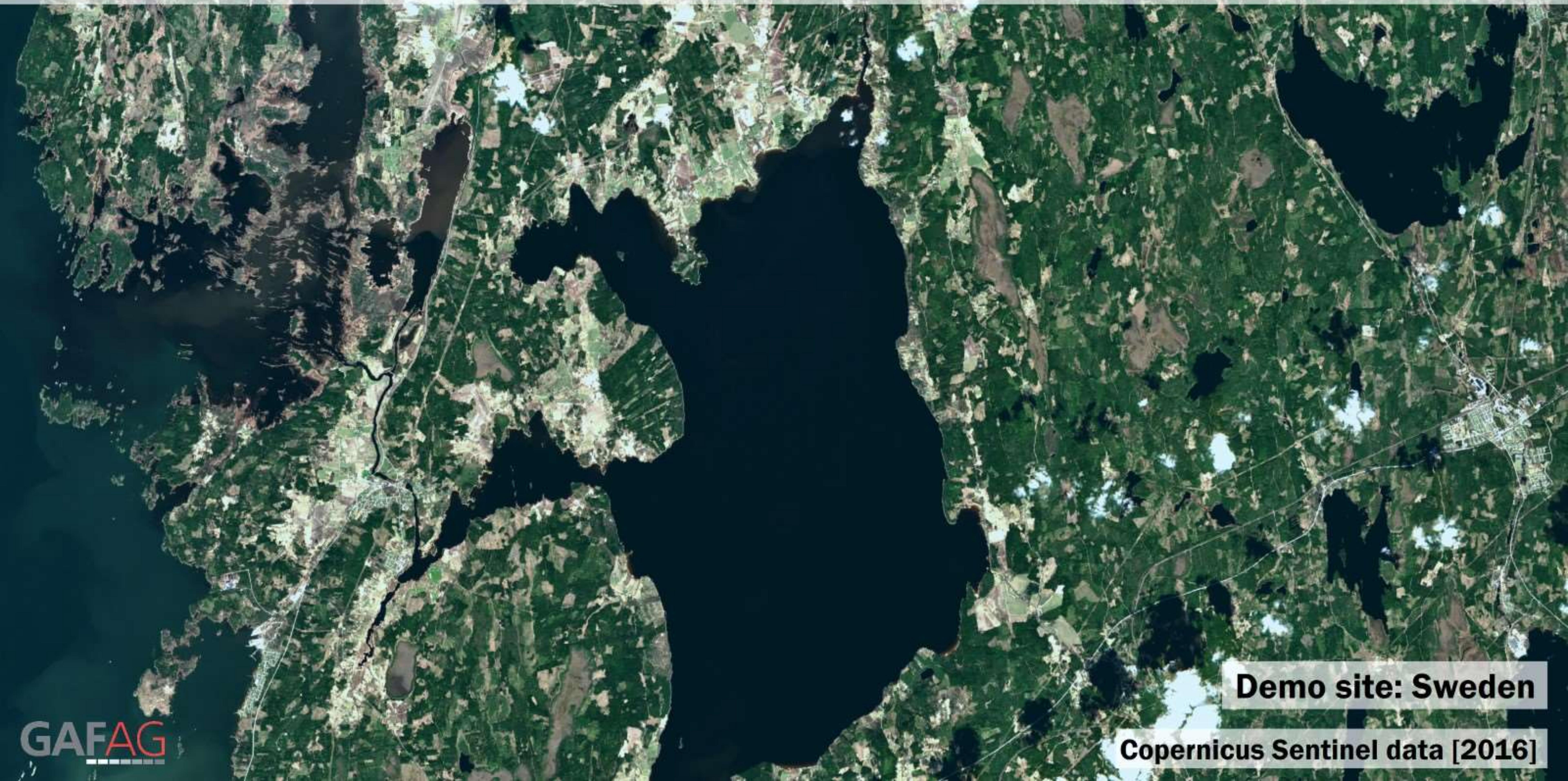


Demo site: Sweden

Copernicus Sentinel data [2016]

April 2016

... with dense Sentinel-2 time series

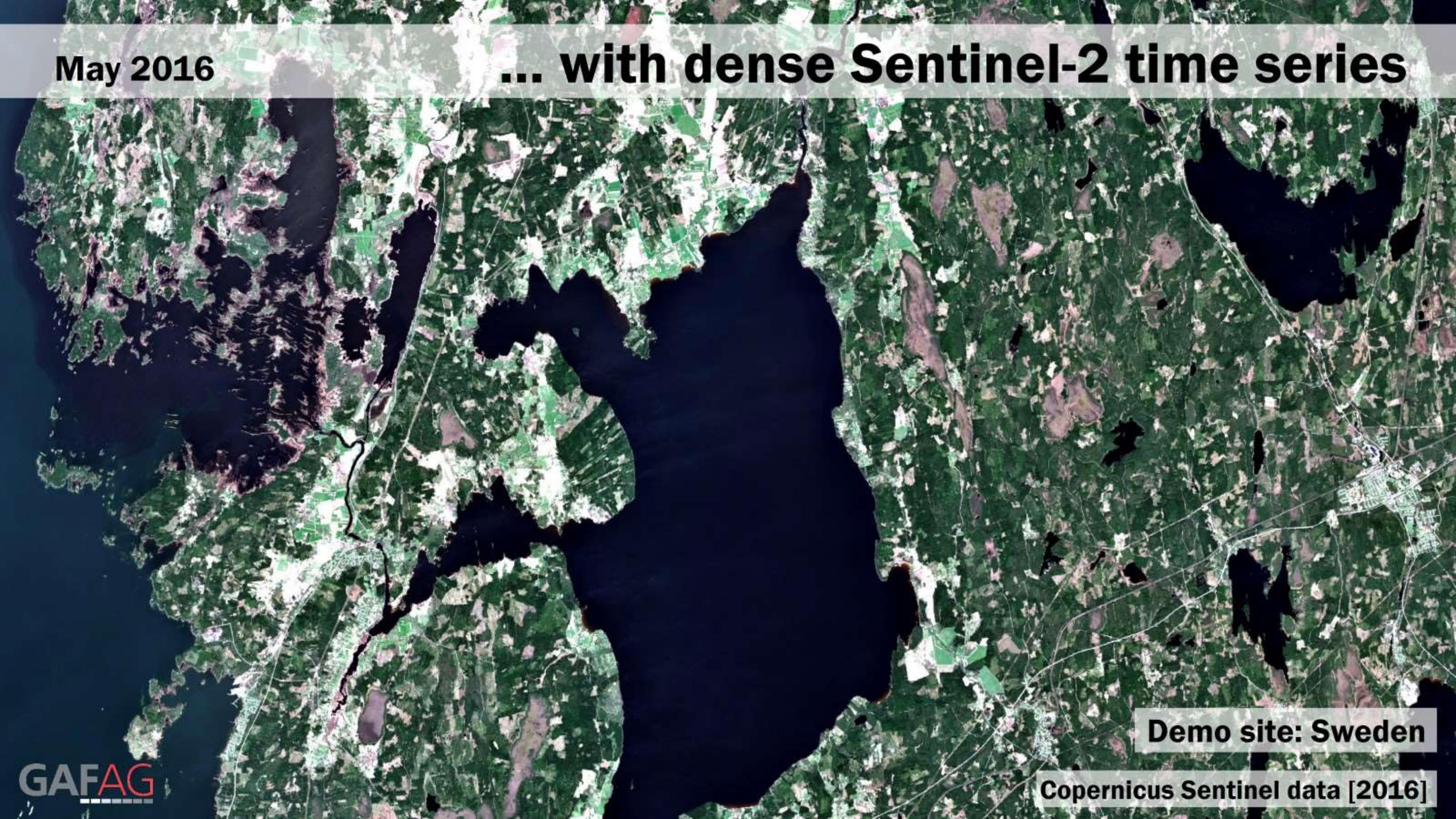


Demo site: Sweden

Copernicus Sentinel data [2016]

May 2016

... with dense Sentinel-2 time series



Demo site: Sweden

Copernicus Sentinel data [2016]

June 2016

... with dense Sentinel-2 time series

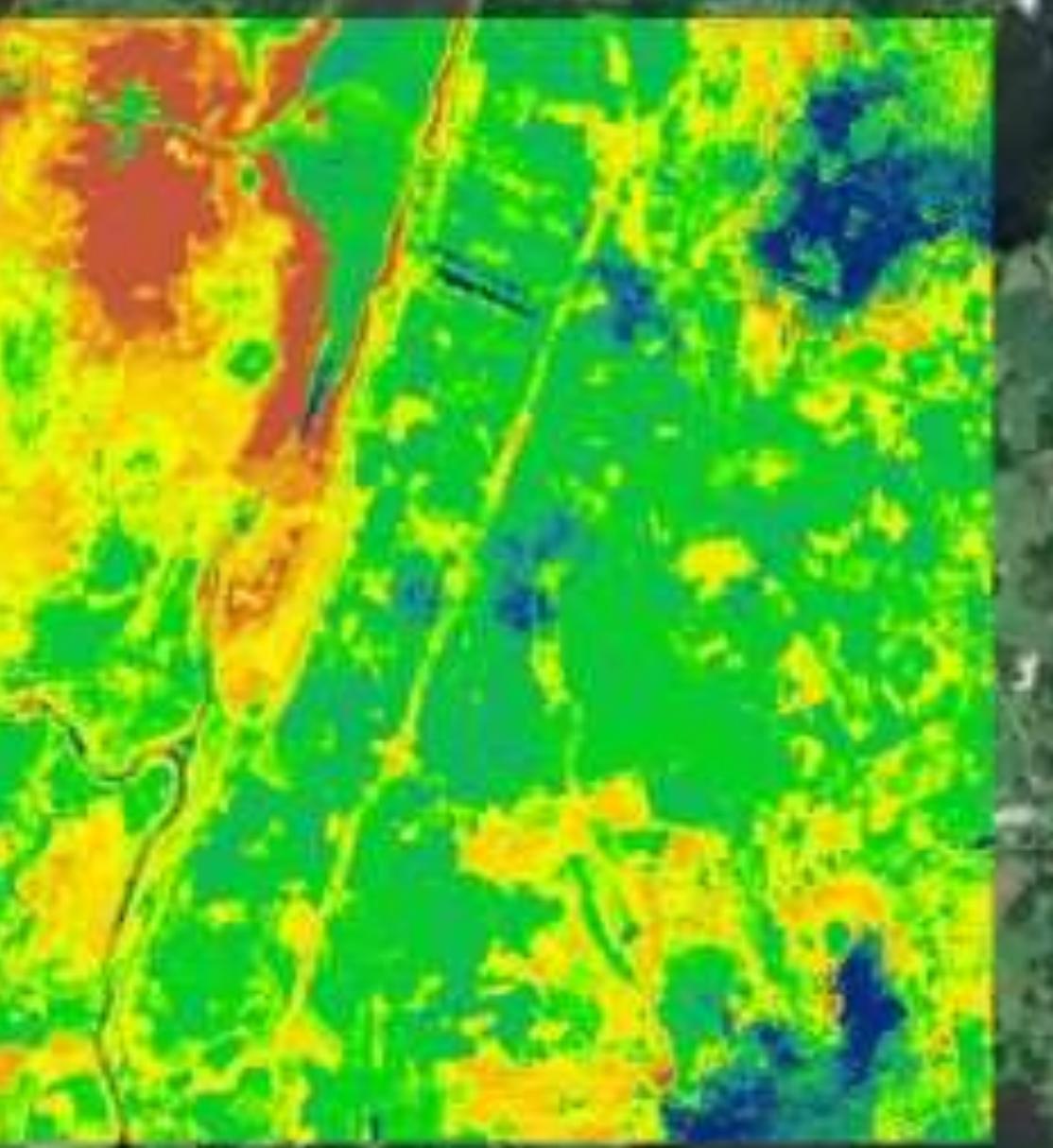


Demo site: Sweden

Copernicus Sentinel data [2016]

August 2016

... with dense Sentinel-2 time series



Dynamics in NDVI time features

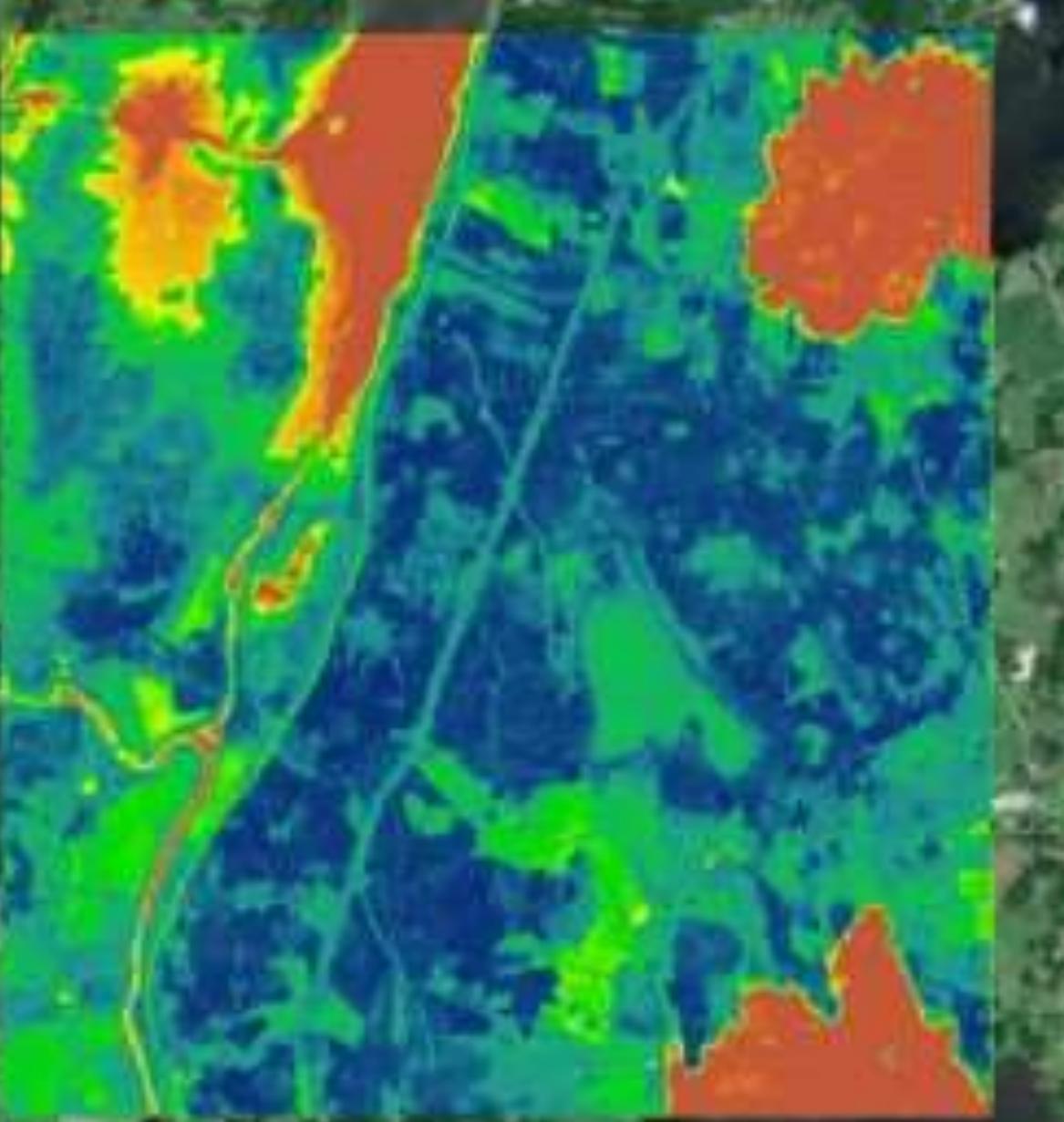
Demo site: Sweden

Copernicus Sentinel data [2016]

NDVI produced using Copernicus Sentinel data [2016]

August 2016

... with dense Sentinel-2 time series



Dynamics in NDVI time features

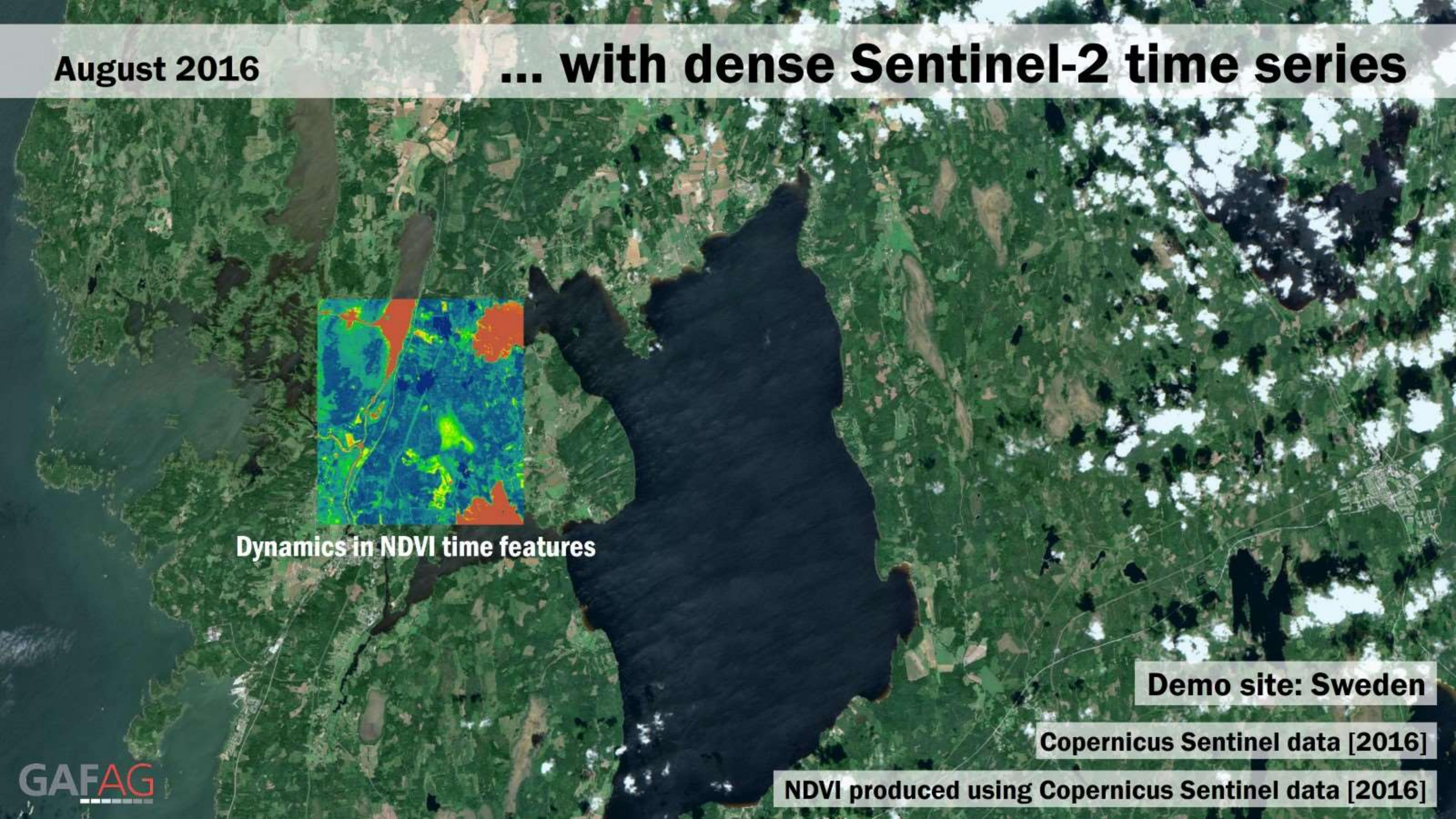
Demo site: Sweden

Copernicus Sentinel data [2016]

NDVI produced using Copernicus Sentinel data [2016]

August 2016

... with dense Sentinel-2 time series



Dynamics in NDVI time features

A satellite map of Sweden showing agricultural fields and water bodies. A rectangular inset in the lower-left corner provides a detailed view of a specific area, likely a river valley, where agricultural land is being monitored. The inset shows a color-coded map of NDVI values over time, with red and orange areas indicating vegetation growth or health.

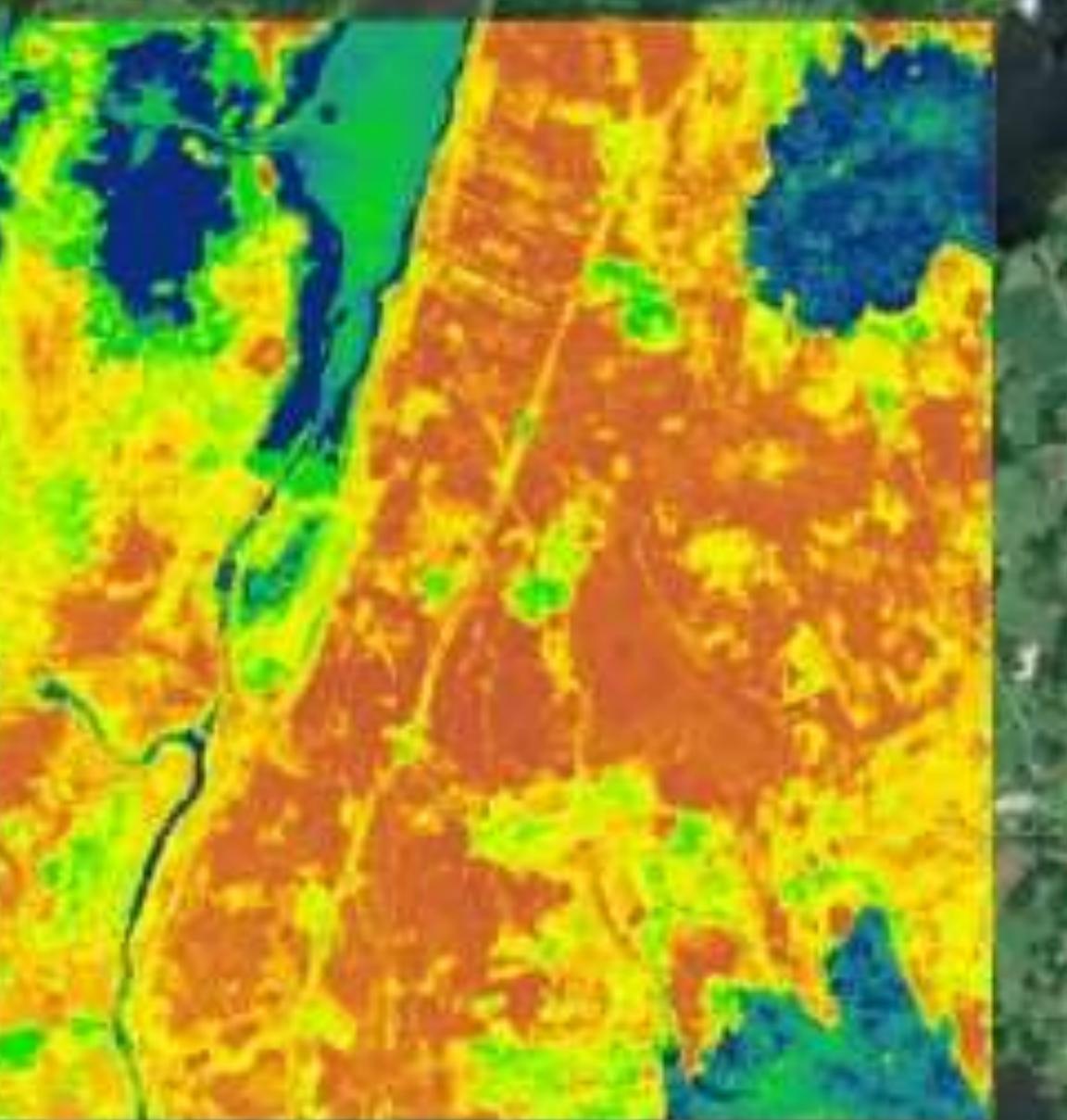
Demo site: Sweden

Copernicus Sentinel data [2016]

NDVI produced using Copernicus Sentinel data [2016]

August 2016

... with dense Sentinel-2 time series



Dynamics in NDVI time features

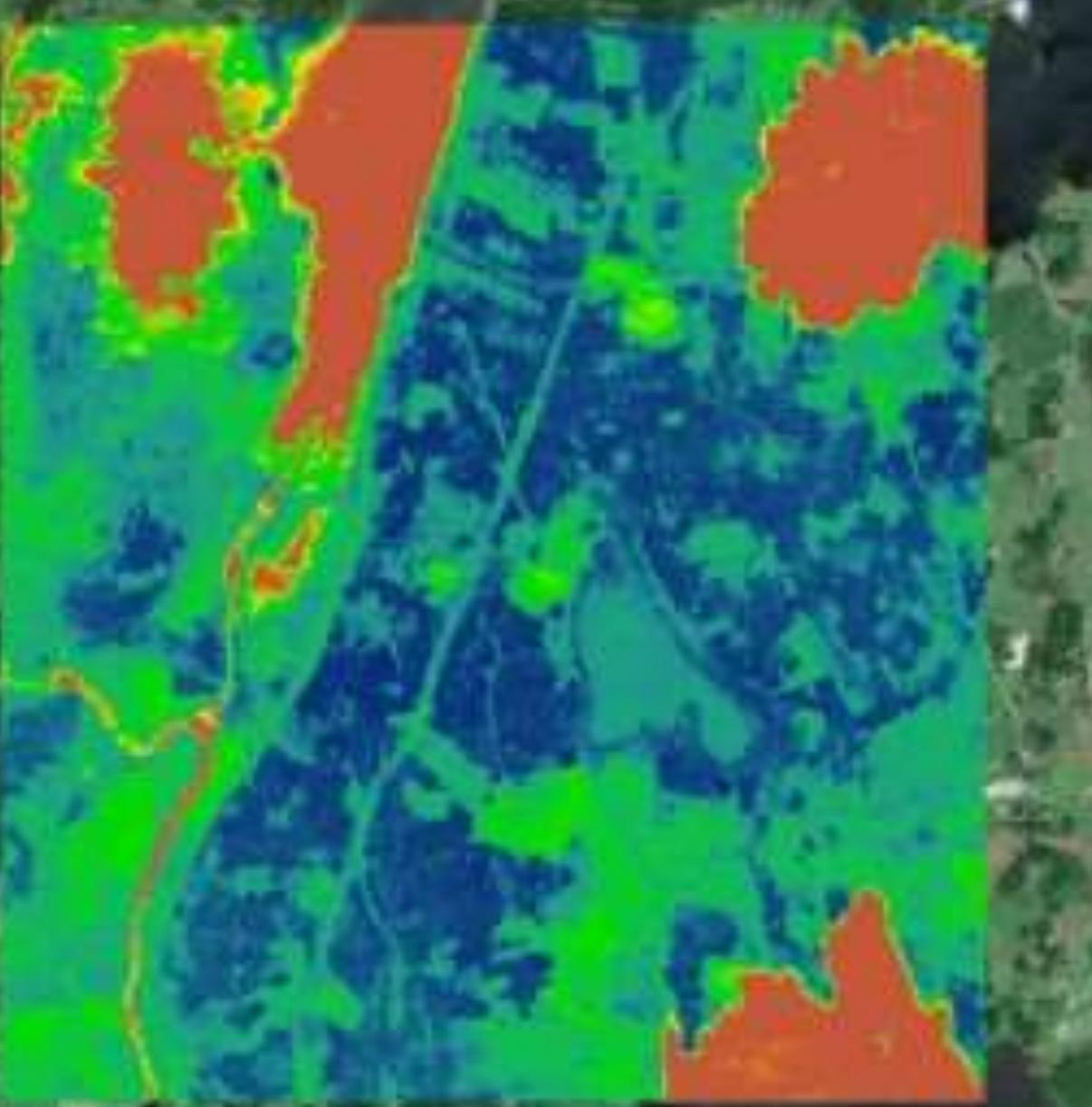
Demo site: Sweden

Copernicus Sentinel data [2016]

NDVI produced using Copernicus Sentinel data [2016]

August 2016

... with dense Sentinel-2 time series



Dynamics in NDVI time features

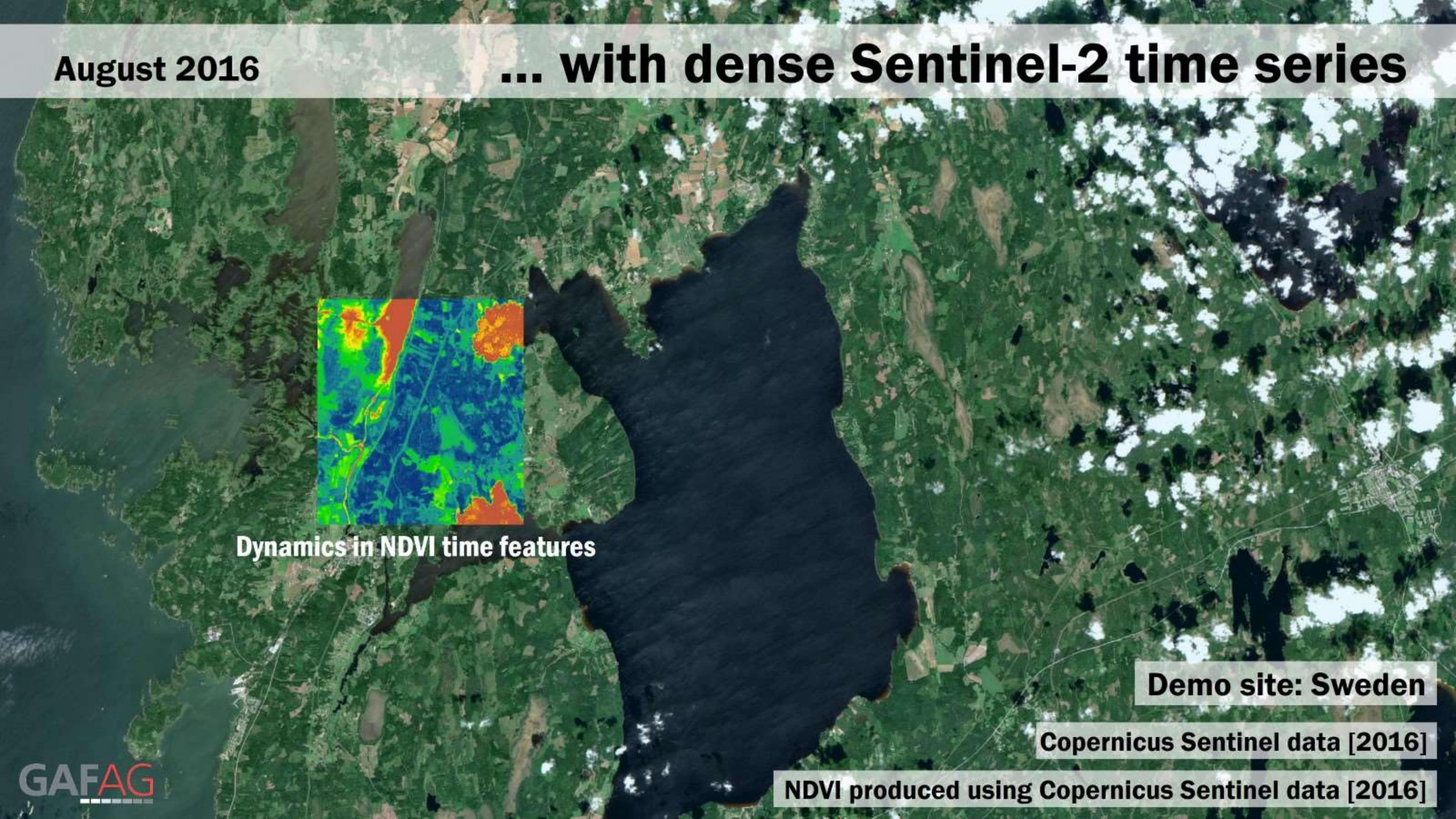
Demo site: Sweden

Copernicus Sentinel data [2016]

NDVI produced using Copernicus Sentinel data [2016]

August 2016

... with dense Sentinel-2 time series



Dynamics in NDVI time features

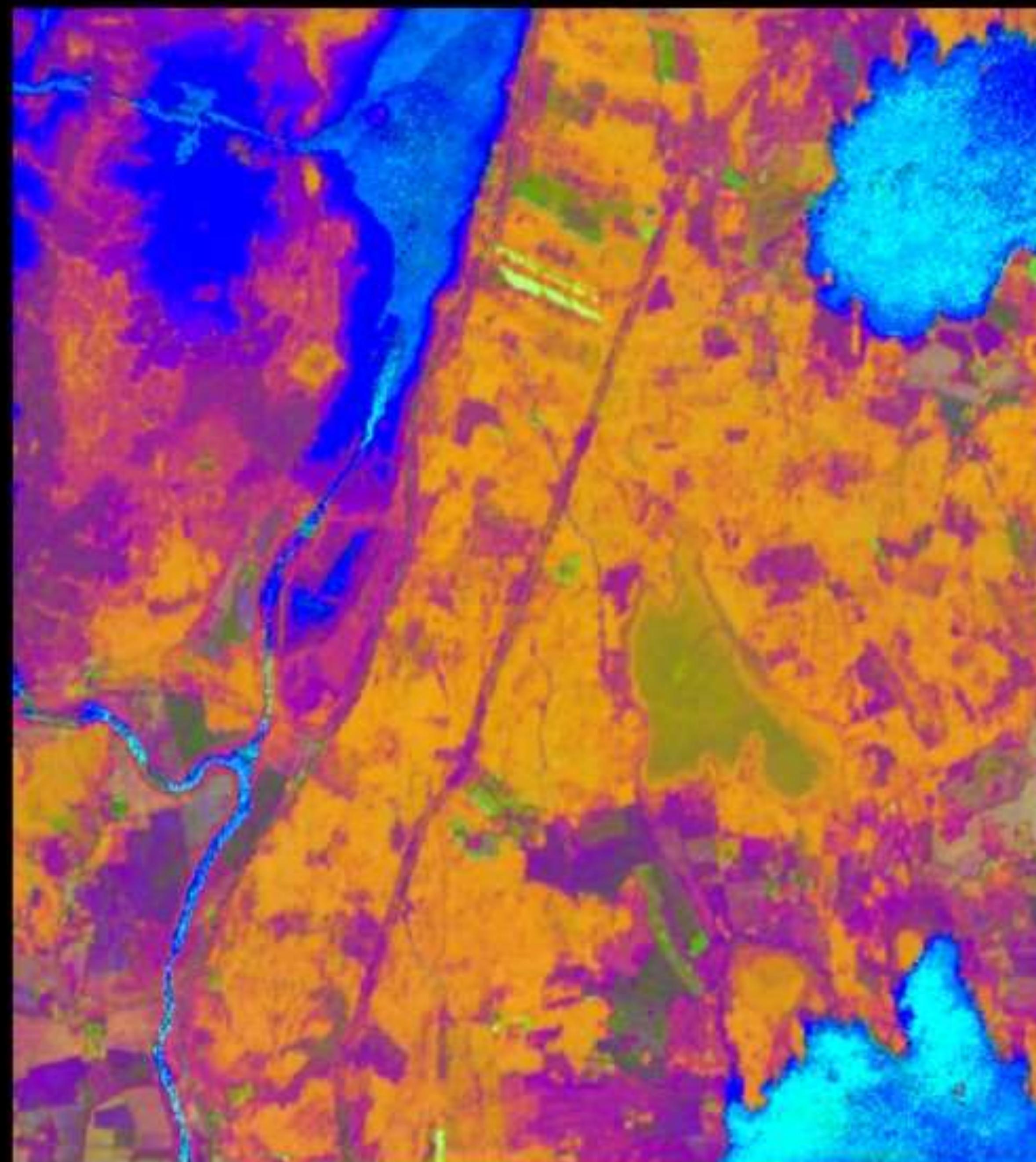
Demo site: Sweden

Copernicus Sentinel data [2016]

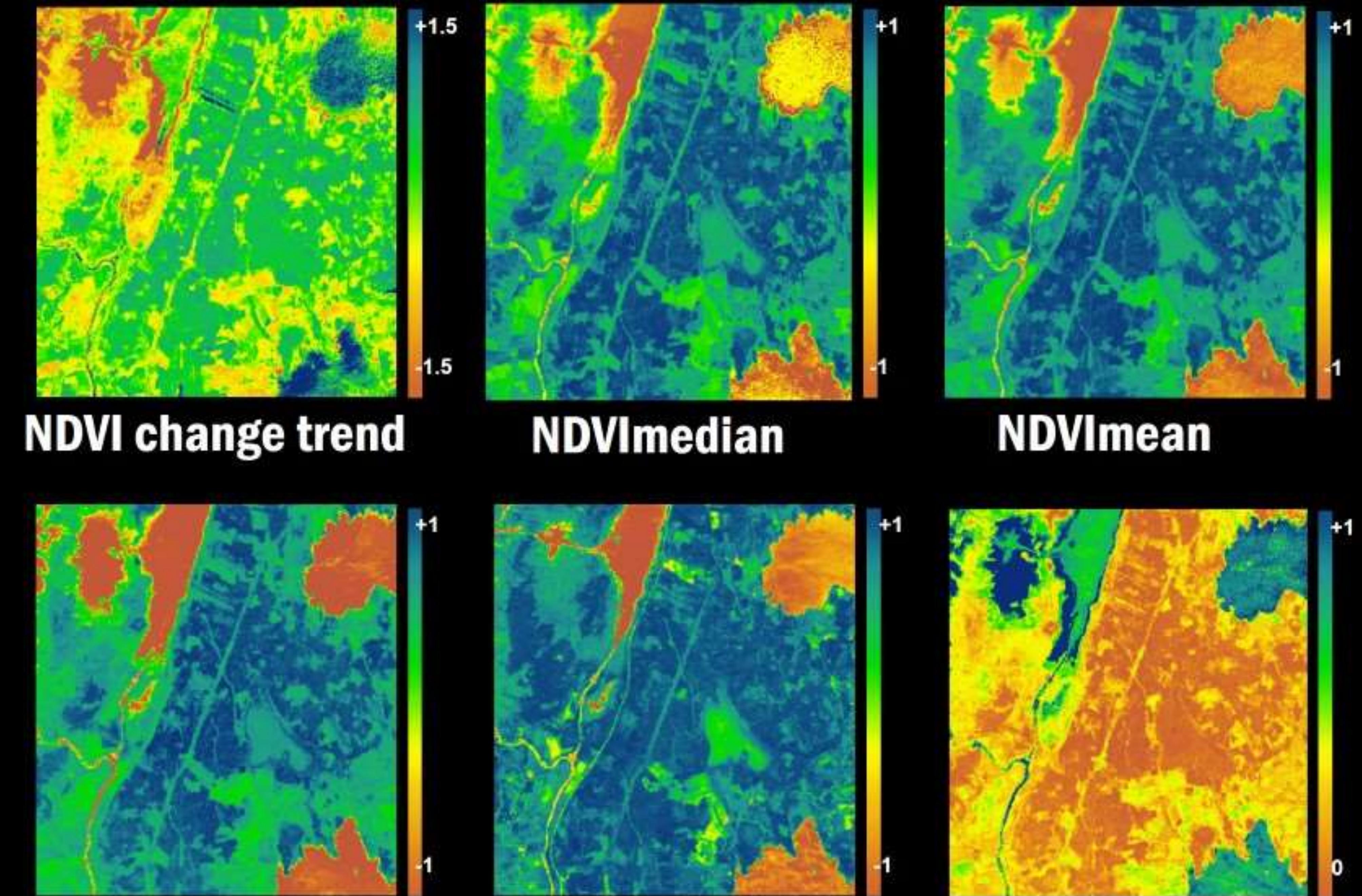
NDVI produced using Copernicus Sentinel data [2016]

... and by calculating temporal indices and statistics

Normalized Difference Vegetation Index (NDVI) Time Features



RGB composite: NDVImean -
NDVI change trend - NDVIstdv

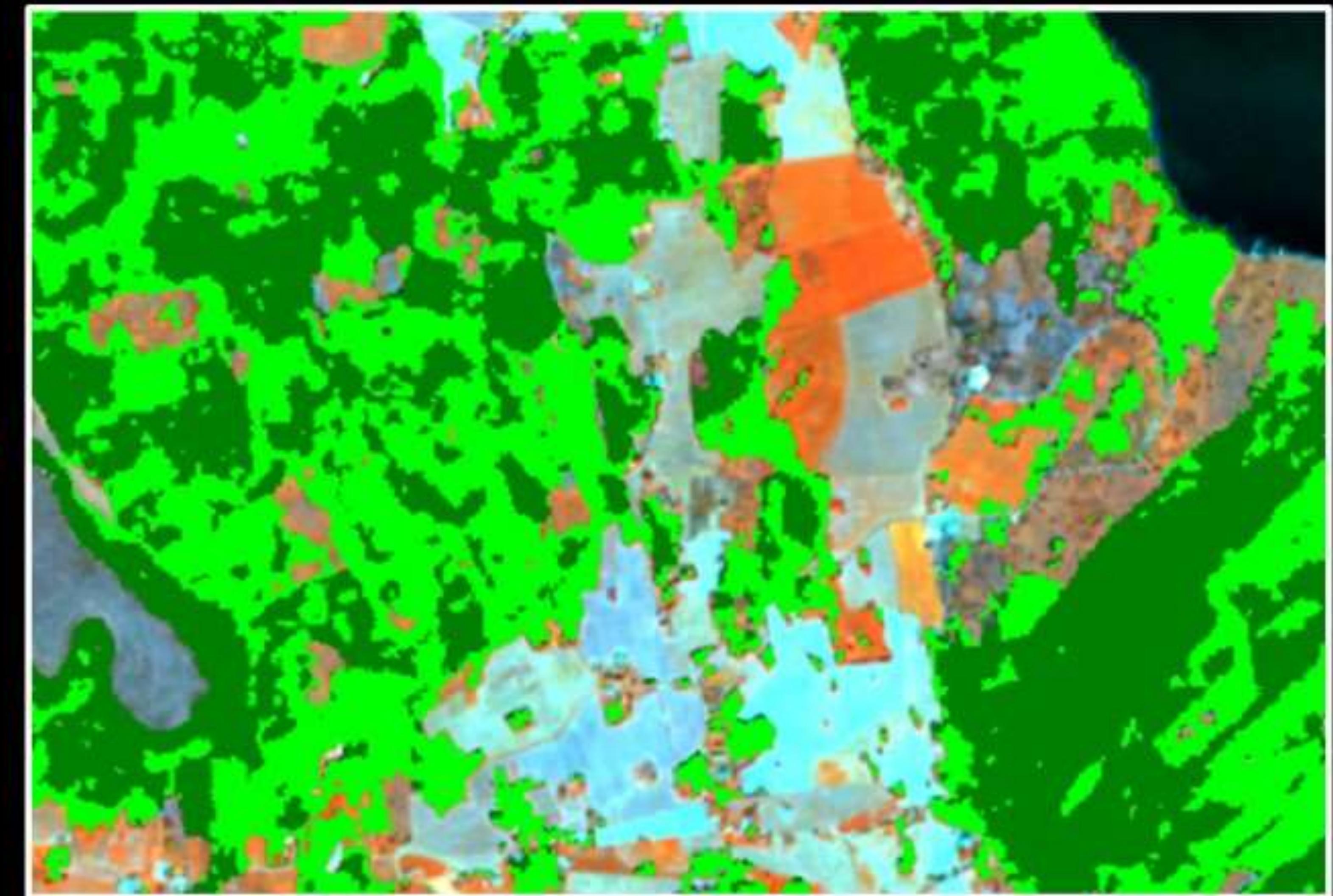
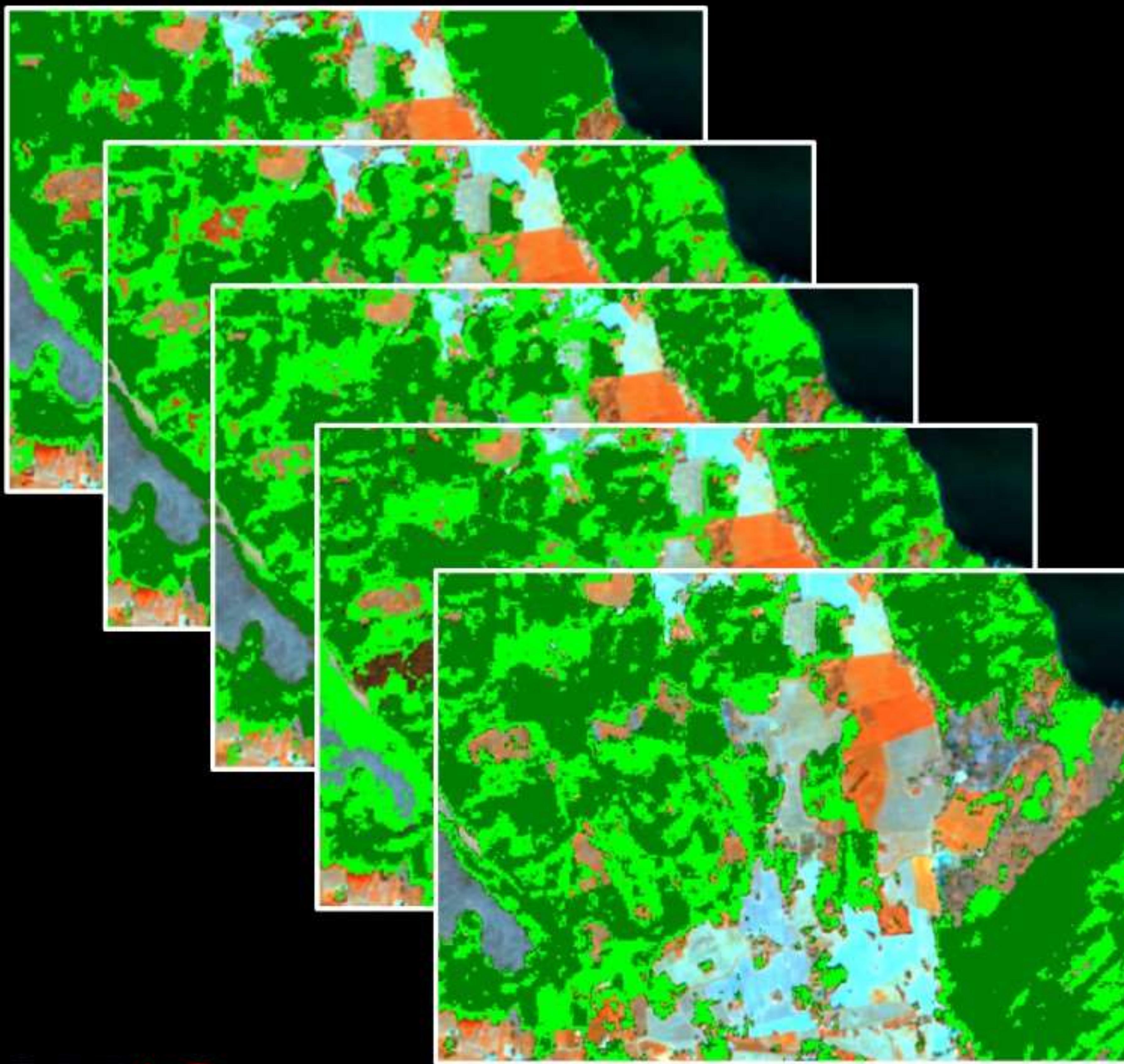


NDVImin

NDVImax

NDVIstdv

... to create European forest maps from time series of Sentinel-2



Broadleaved Forest
 Coniferous Forest

Credits: Copernicus Land Monitoring Service, courtesy of the European Environment Agency. *Yet unpublished product

**... to create European forest maps from time series of Sentinel-2
Vegetation activity is shown in red (high Near Infrared reflectance!)**



Demo site: Sweden

Copernicus Sentinel data [2016]

... to create European forest maps

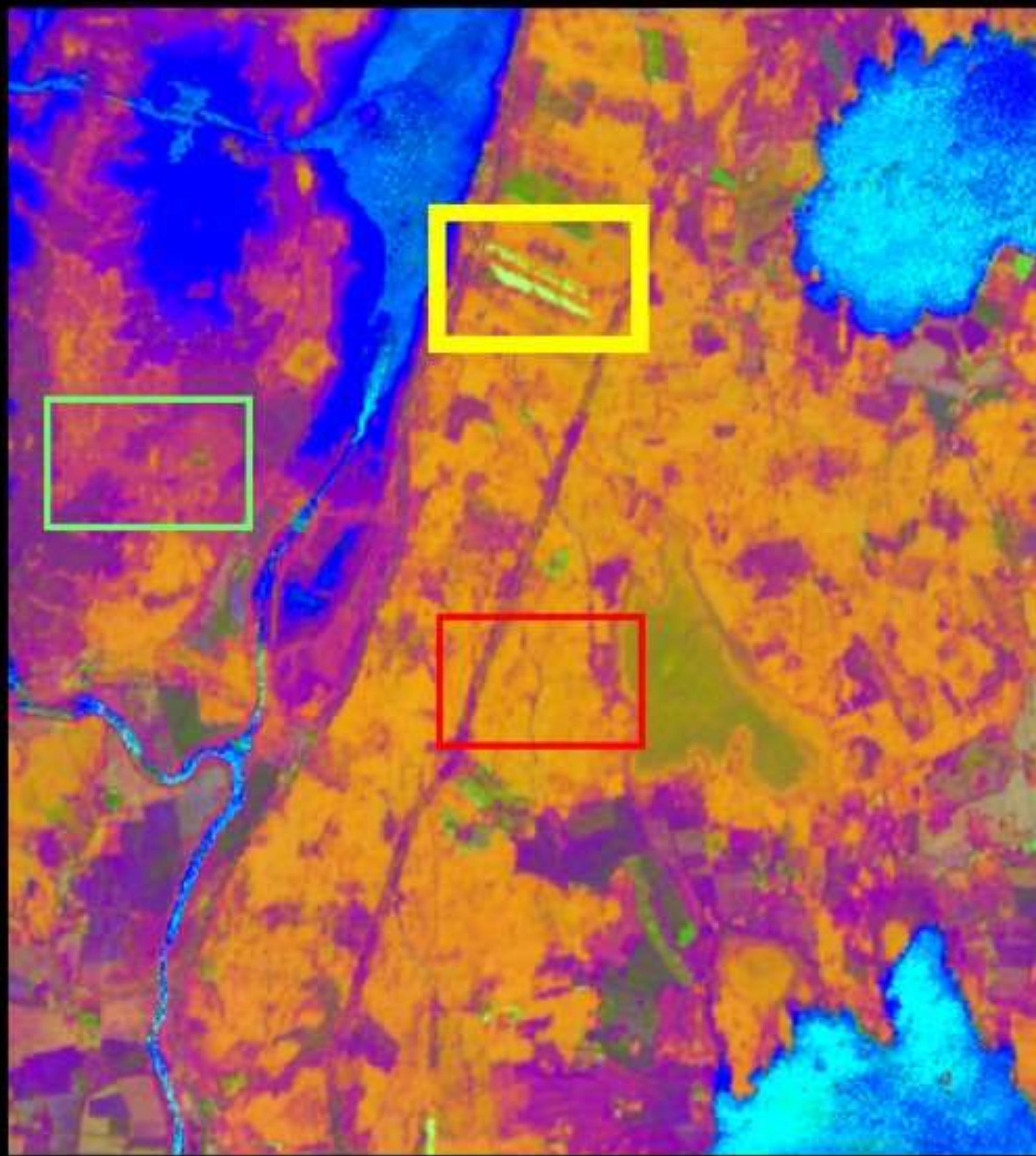


... to create European forest maps and forest density information

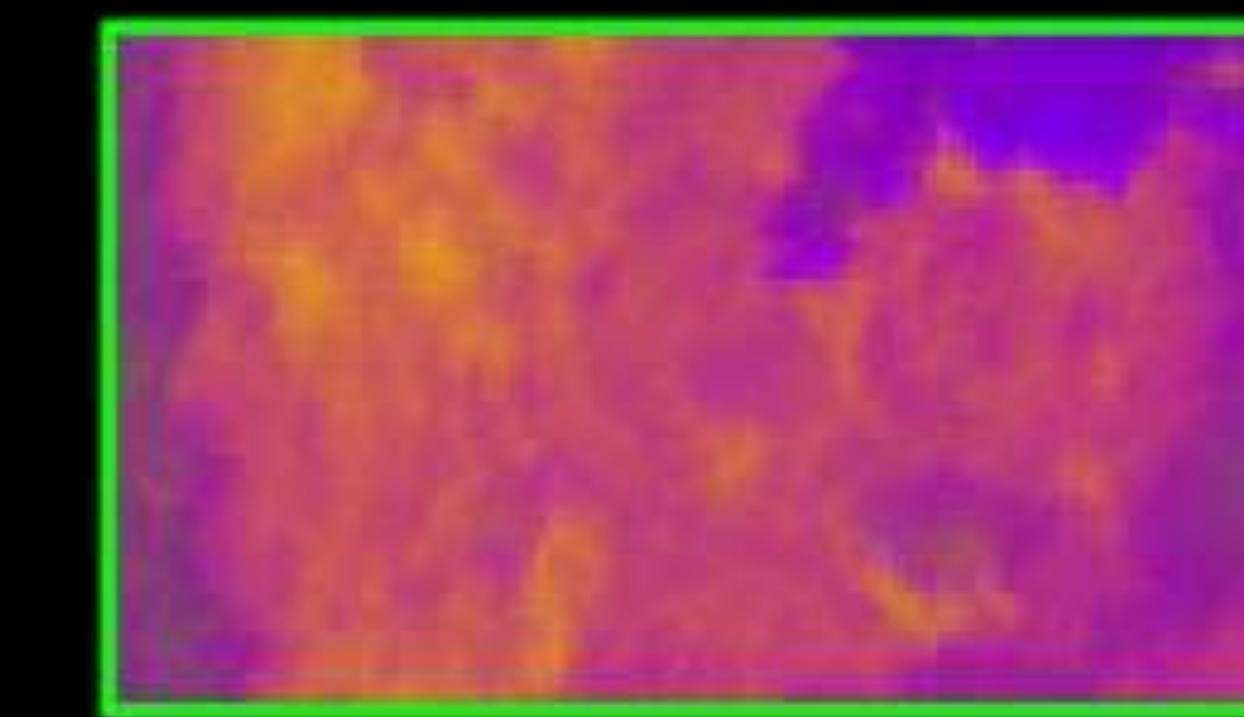


Credits: Copernicus Land Monitoring Service, courtesy of the European Environment Agency. *Yet unpublished product

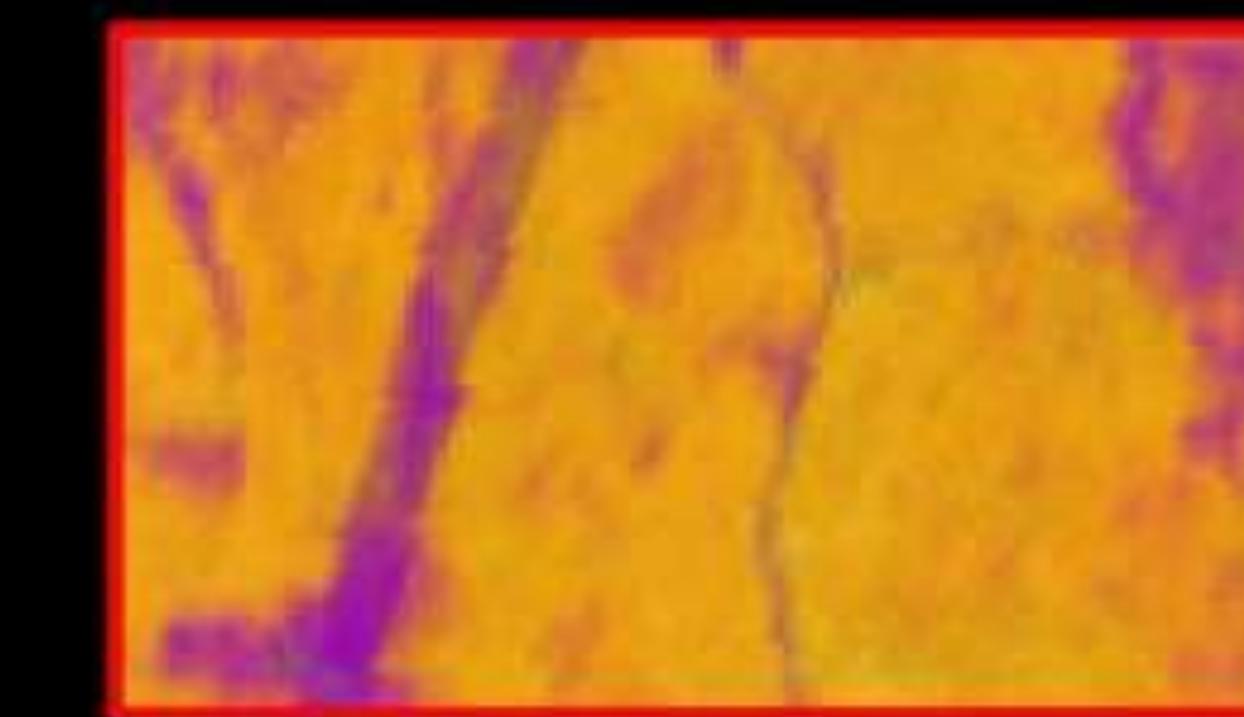
... to see how the forest changes over the year



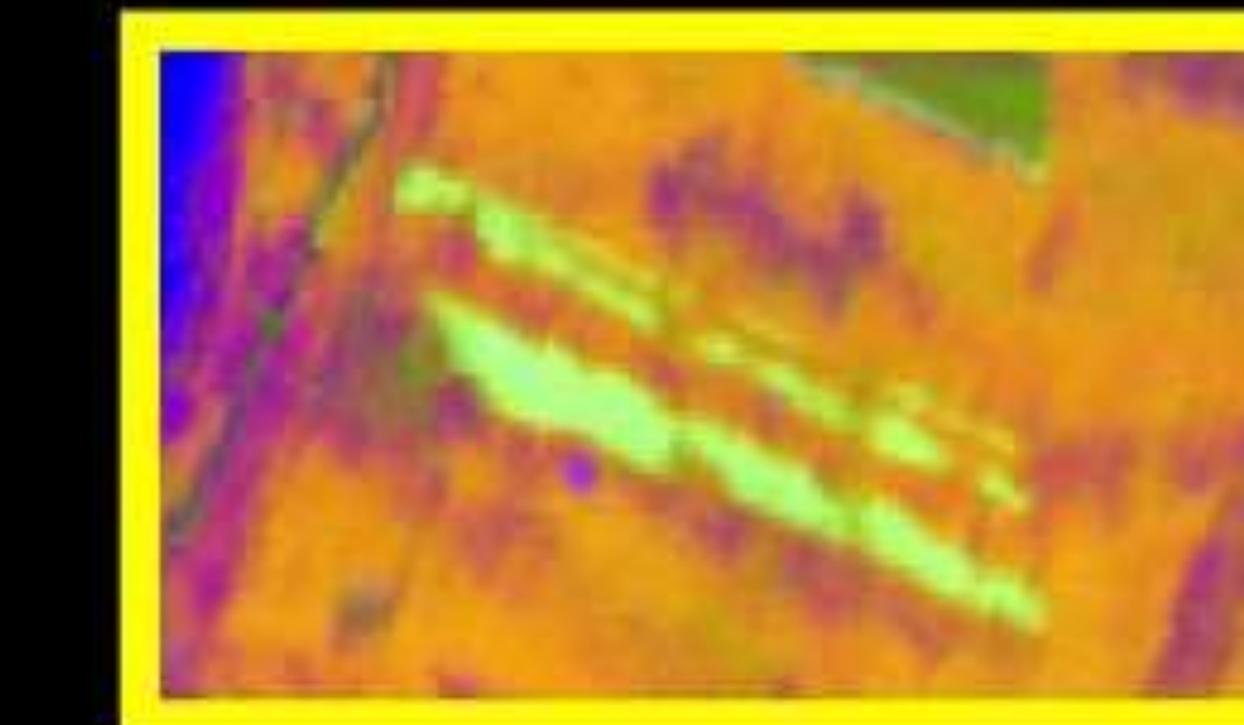
RGB composite: NDVI_{mean} -
NDVI change trend - NDVI_{stdv}



Broadleaved Forest



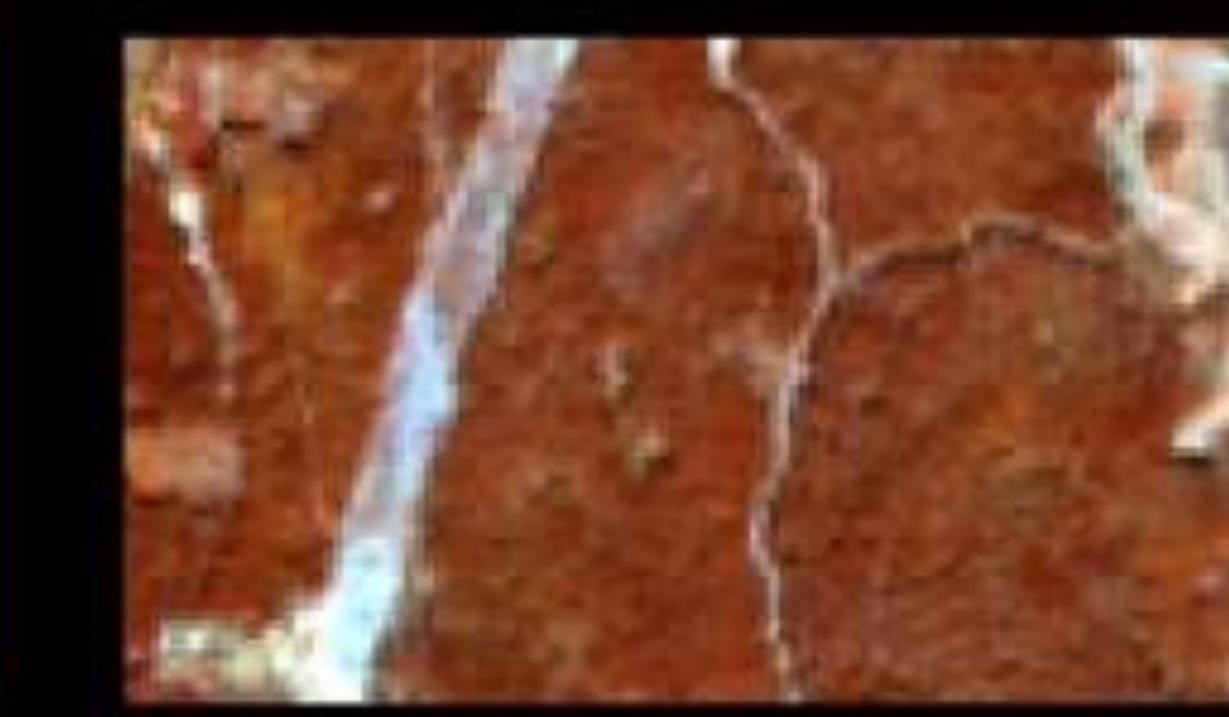
Coniferous Forest



Clear-cuts



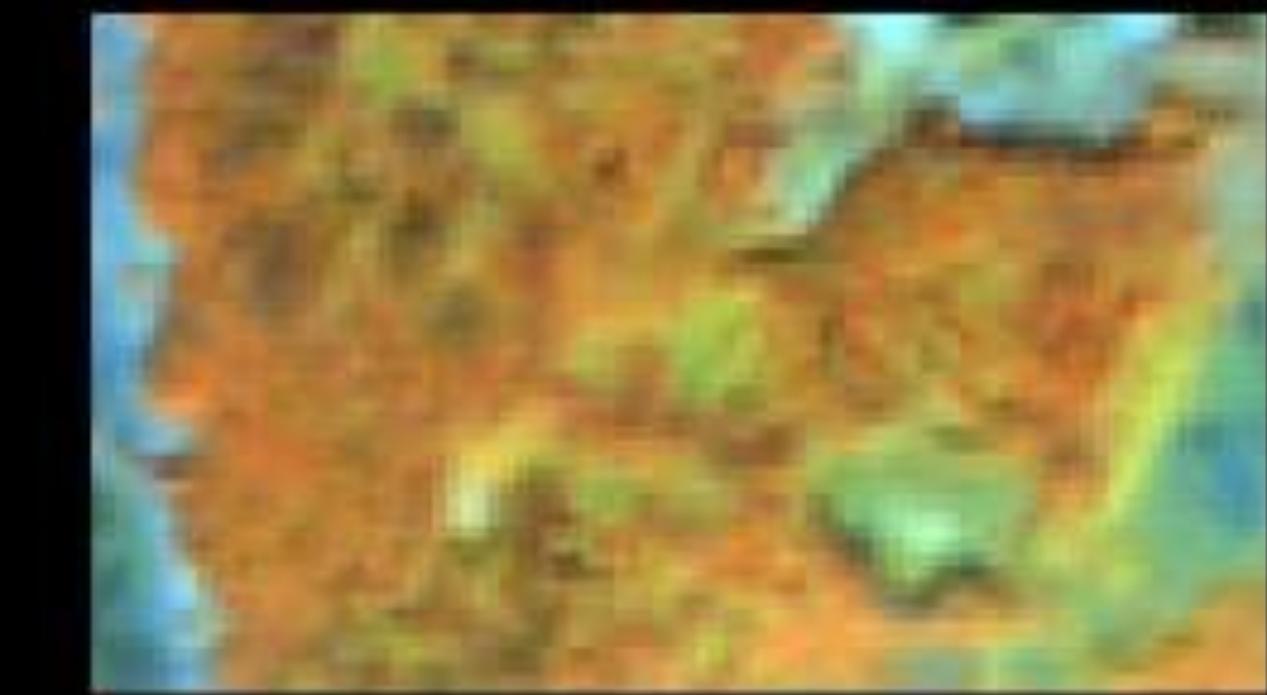
May (S-2)



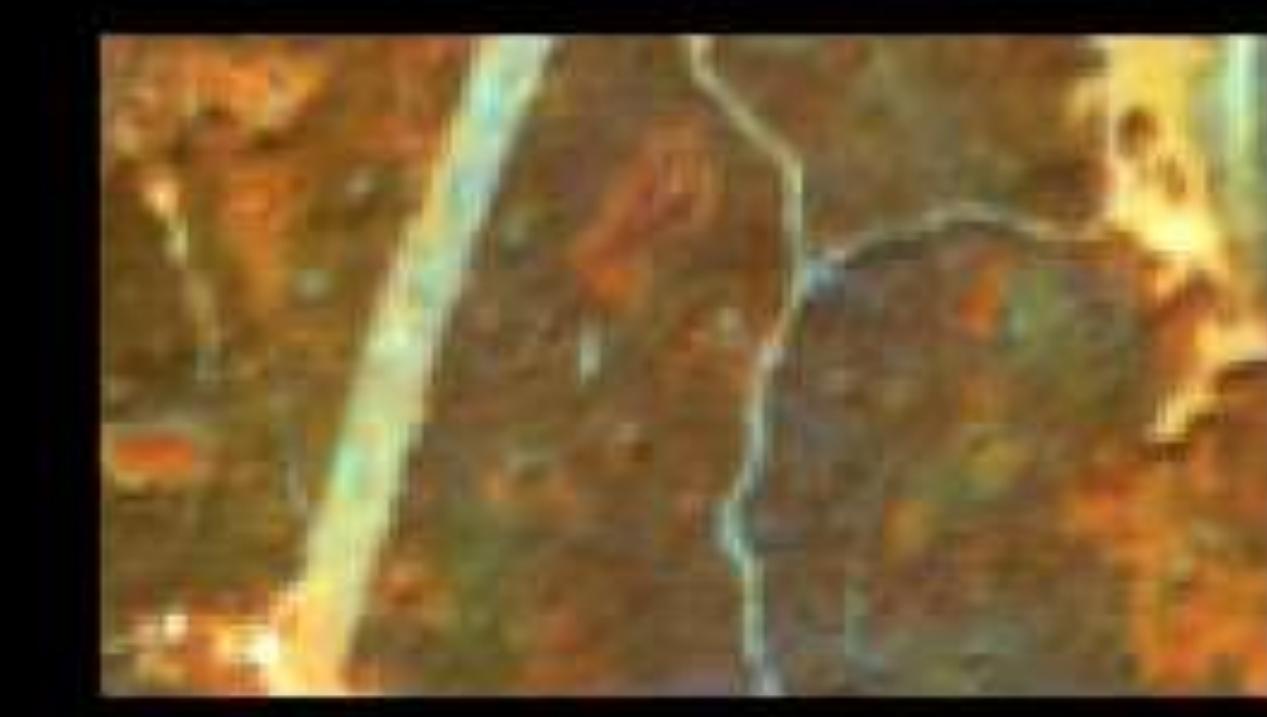
May (S-2)



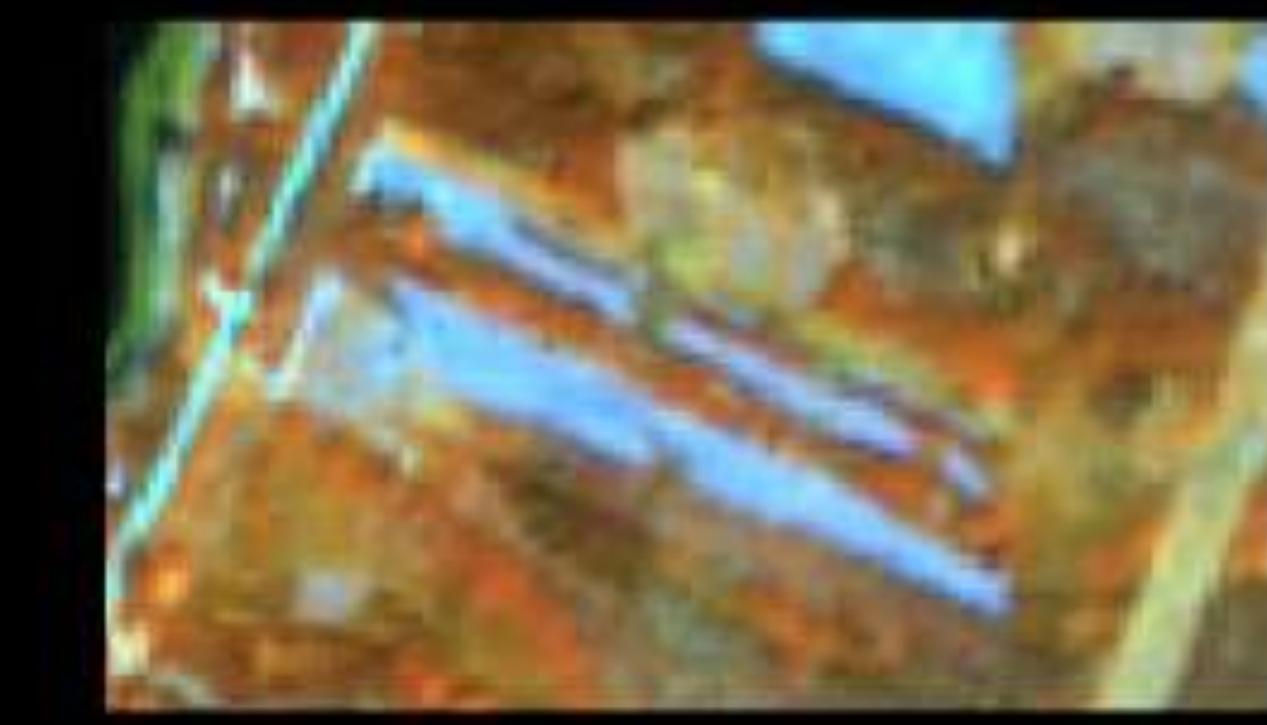
May (S-2)



Jun (S-2)



Jun (S-2)



Jun (S-2)

... you'll need a **powerful processing system** to access & process these very large data volumes: the Data and Information Access Service – **DIAS!**

A powerful European consortium:

Atos



GAFAG



EOX



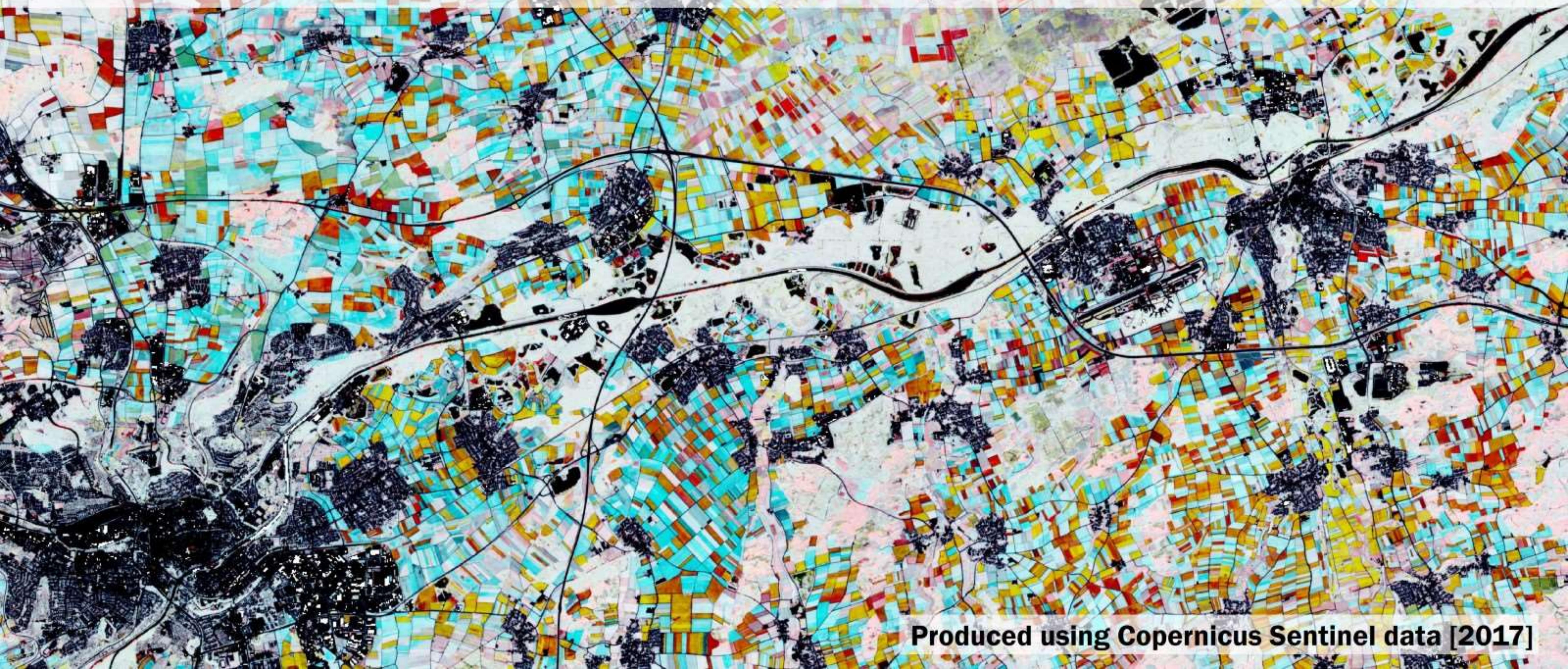
T-Systems

ThalesAlenia Space
A Thales / Finmeccanica Company

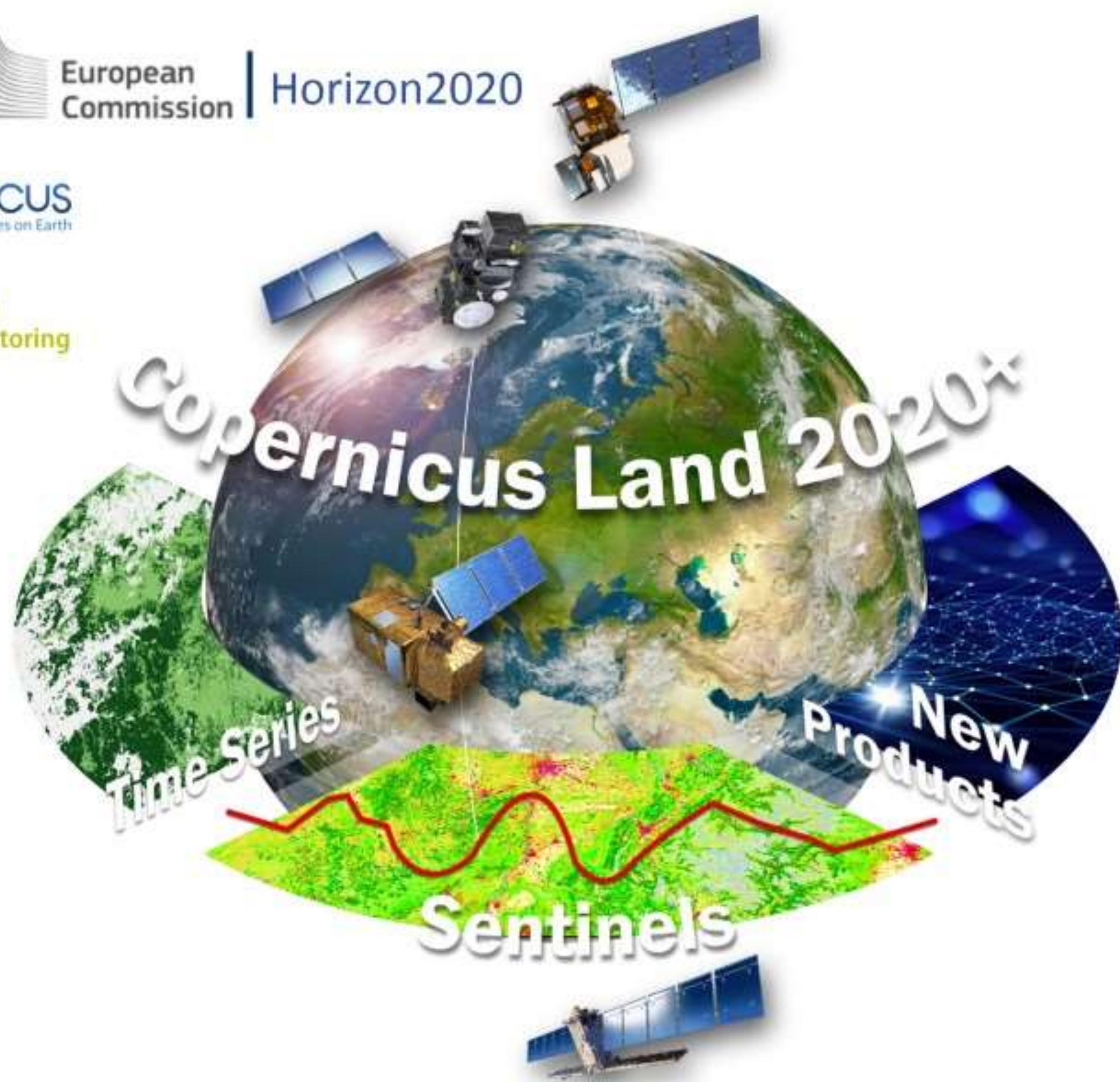
e-geos
AN ASI / TELESPAZIO COMPANY

Spacematic

If you want to map crop area and crop types
all over Europe...



Produced using Copernicus Sentinel data [2017]



by GAF AG and partners

GAFAG



JOANNEUM
RESEARCH



... there is a solution:

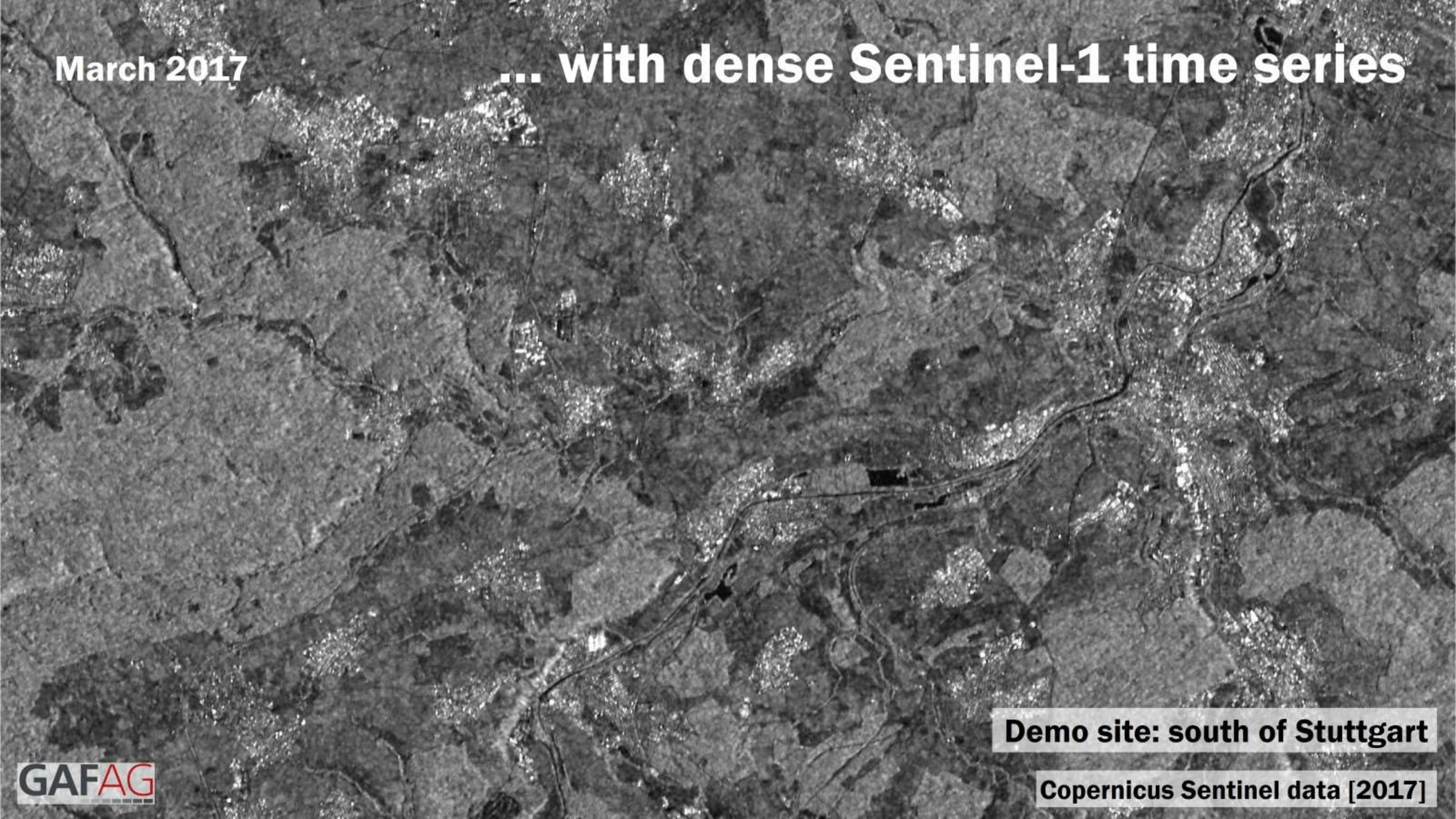
The Horizon2020 project **ECoLaSS**: “**E**volution of **C**opernicus **L**and **S**ervices based on **S**entinel data” aims at developing innovative methods and algorithms for next-generation prototypes of improved or novel operational Copernicus Land services from 2020 onwards.

Among them, a potential High Resolution Layer (HRL) Agriculture is developed as prototype.

www.ecolass.eu

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@ECoLaSS2020



March 2017

... with dense Sentinel-1 time series

Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

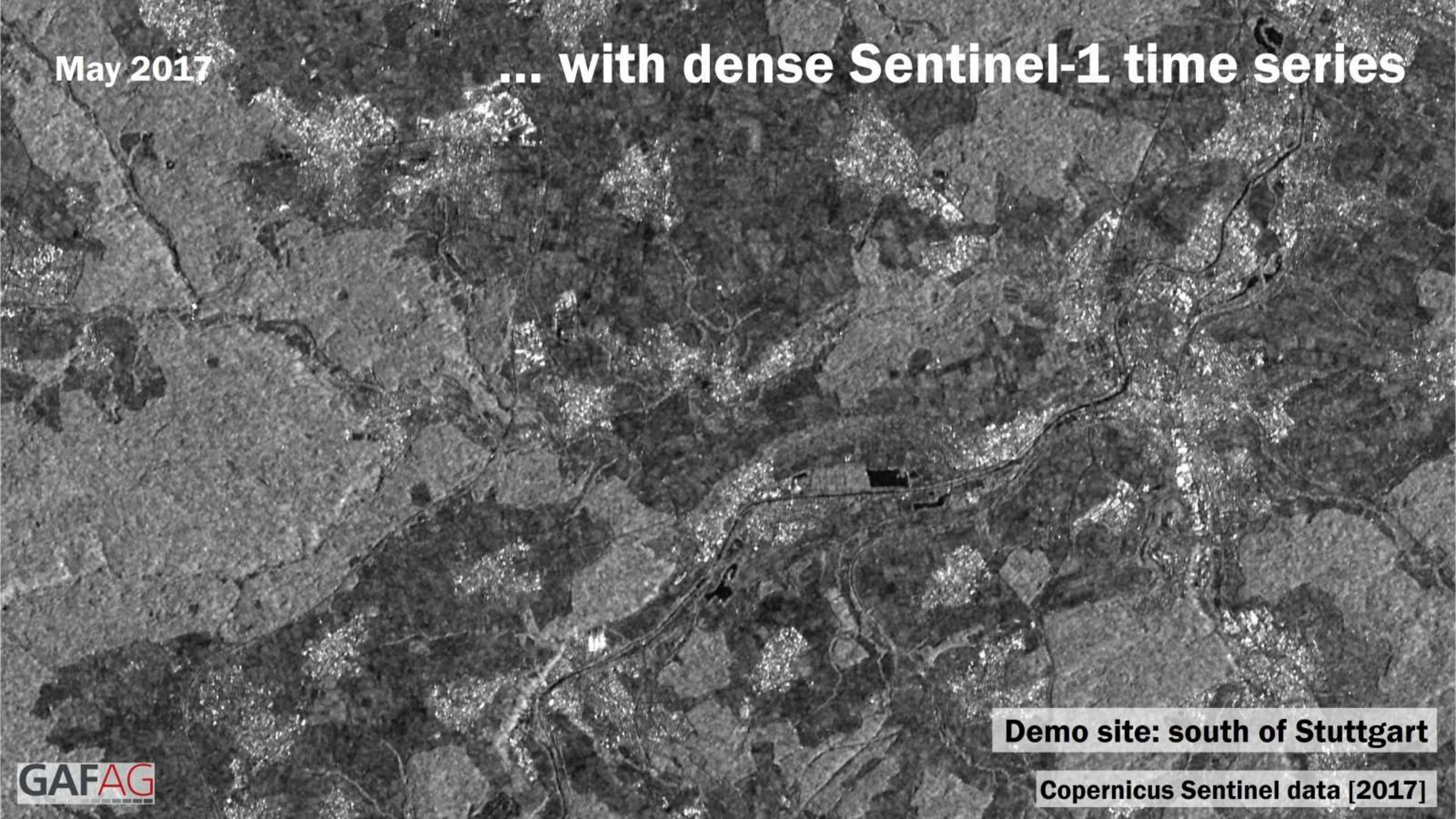
A grayscale satellite image showing a dense forest with a small, irregular clearing in the center. A winding river or stream bed is visible on the right side. The terrain appears rugged and uneven.

April 2017

... with dense Sentinel-1 time series

Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

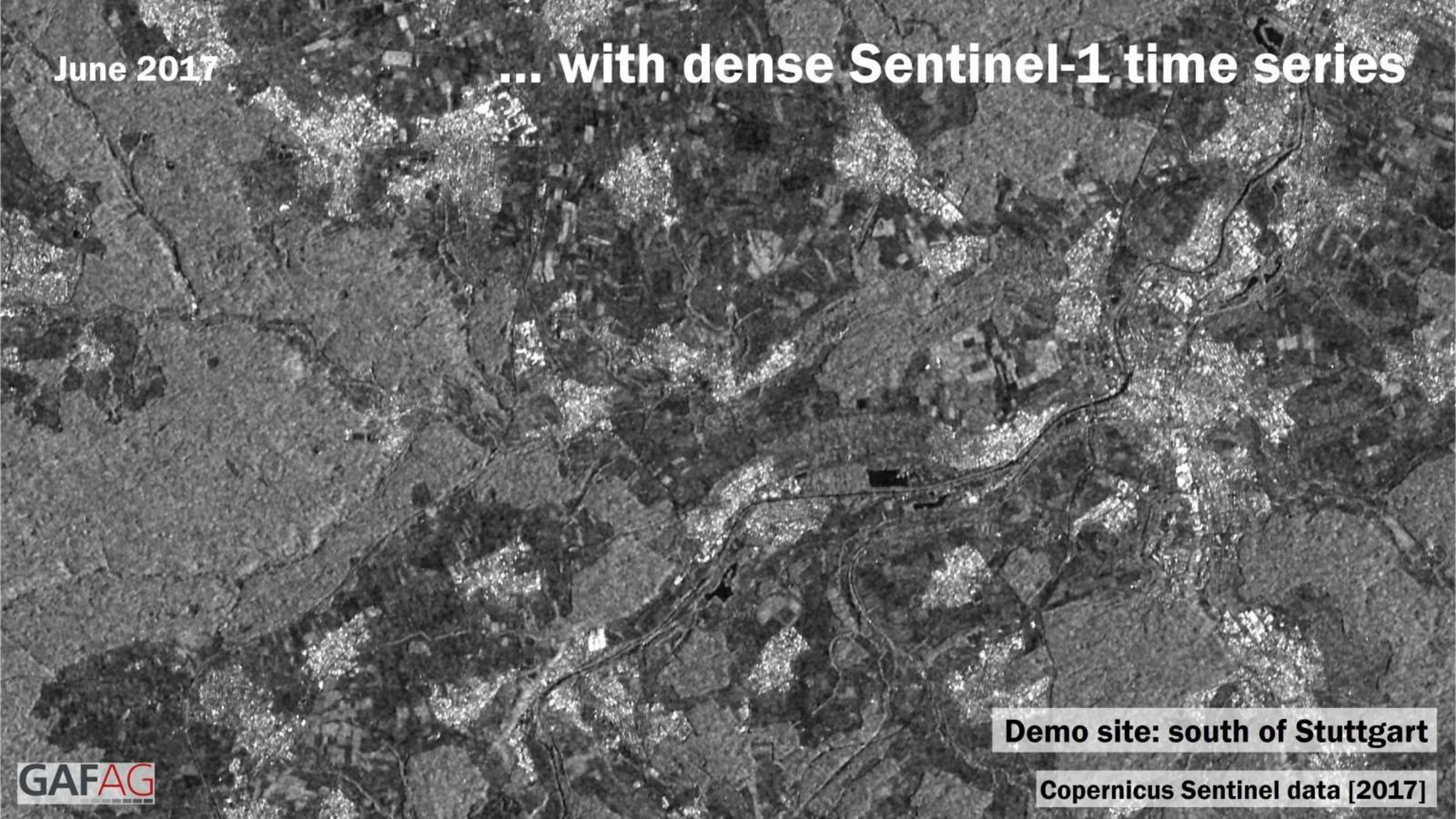
A grayscale Synthetic Aperture Radar (SAR) image showing a dense forest landscape. A small, lighter-colored clearing or agricultural area is visible in the center-left. A network of dark, winding lines, likely representing roads or paths, cuts through the terrain. The overall texture is grainy and mottled.

May 2017

... with dense Sentinel-1 time series

Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

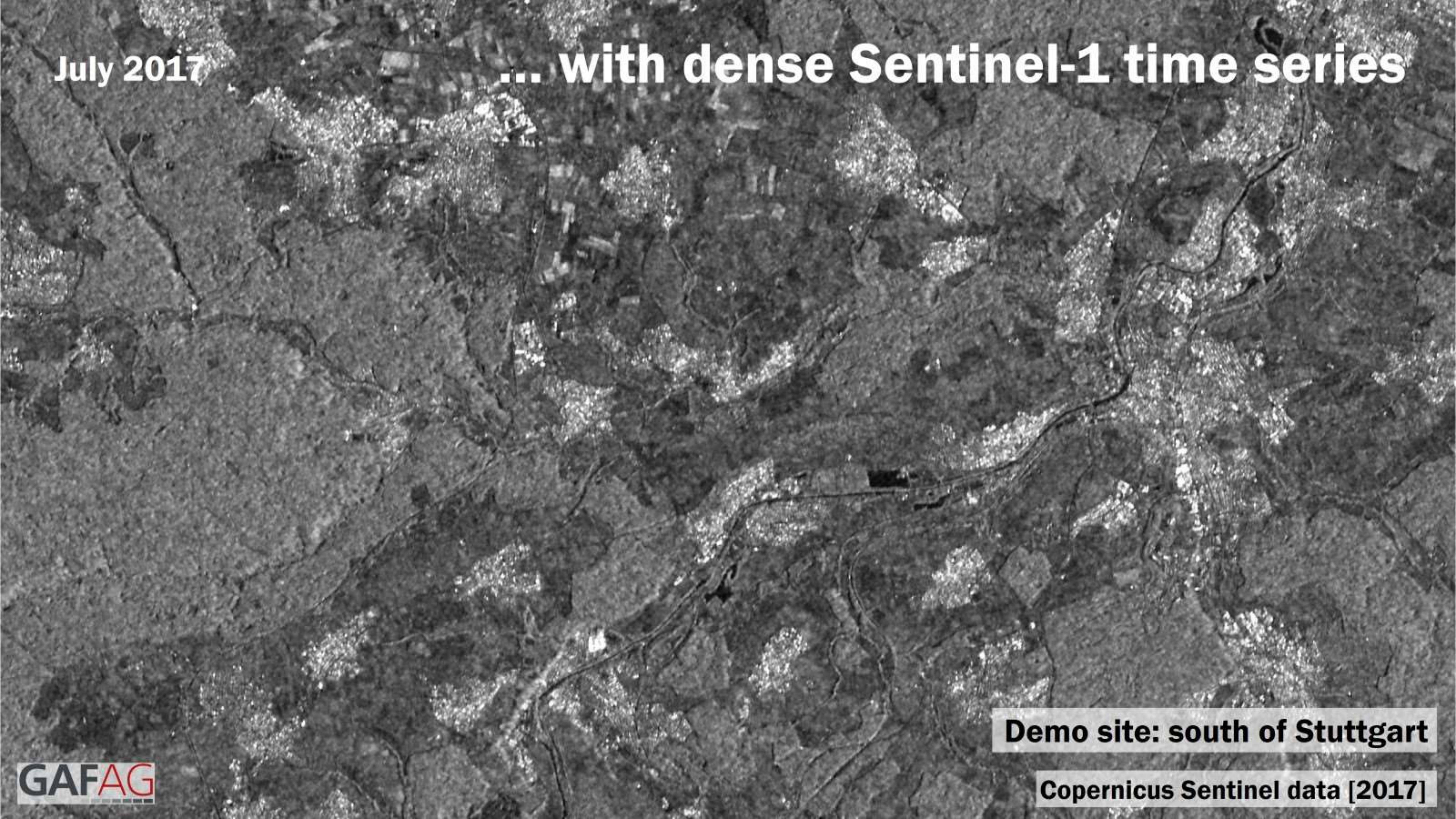
A grayscale satellite image showing a dense forest in the foreground and a small town with several buildings and roads in the middle ground. The image has a grainy, textured appearance typical of Sentinel-1 radar imagery.

June 2017

... with dense Sentinel-1 time series

Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

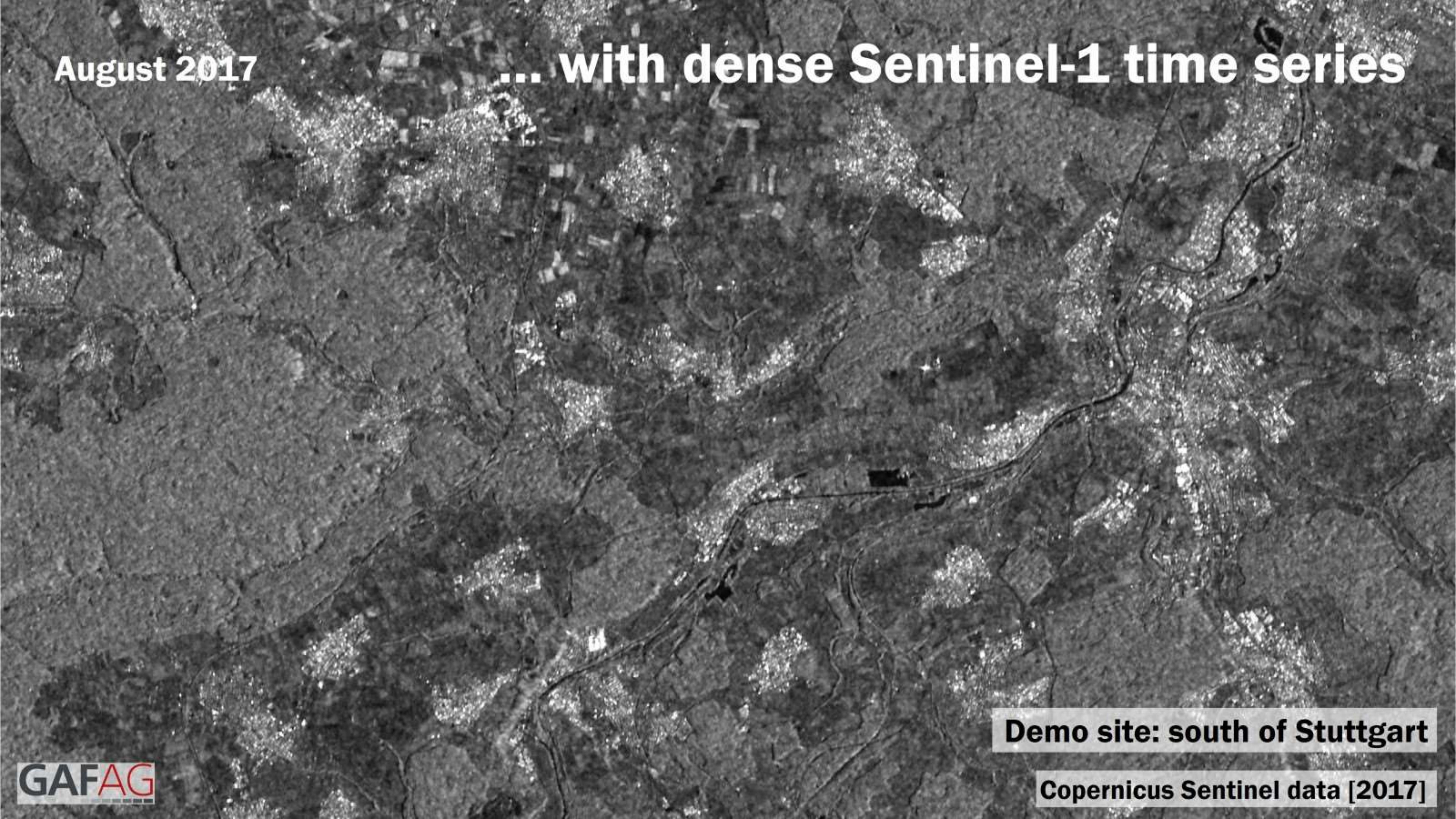
A grayscale Synthetic Aperture Radar (SAR) image showing a dense urban area, likely the south of Stuttgart, Germany. The image is characterized by a high density of linear and curved features, such as roads, railways, and buildings, which appear as bright or dark lines against a darker background. The terrain is rugged, with many small depressions and ridges visible.

July 2017

... with dense Sentinel-1 time series

Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

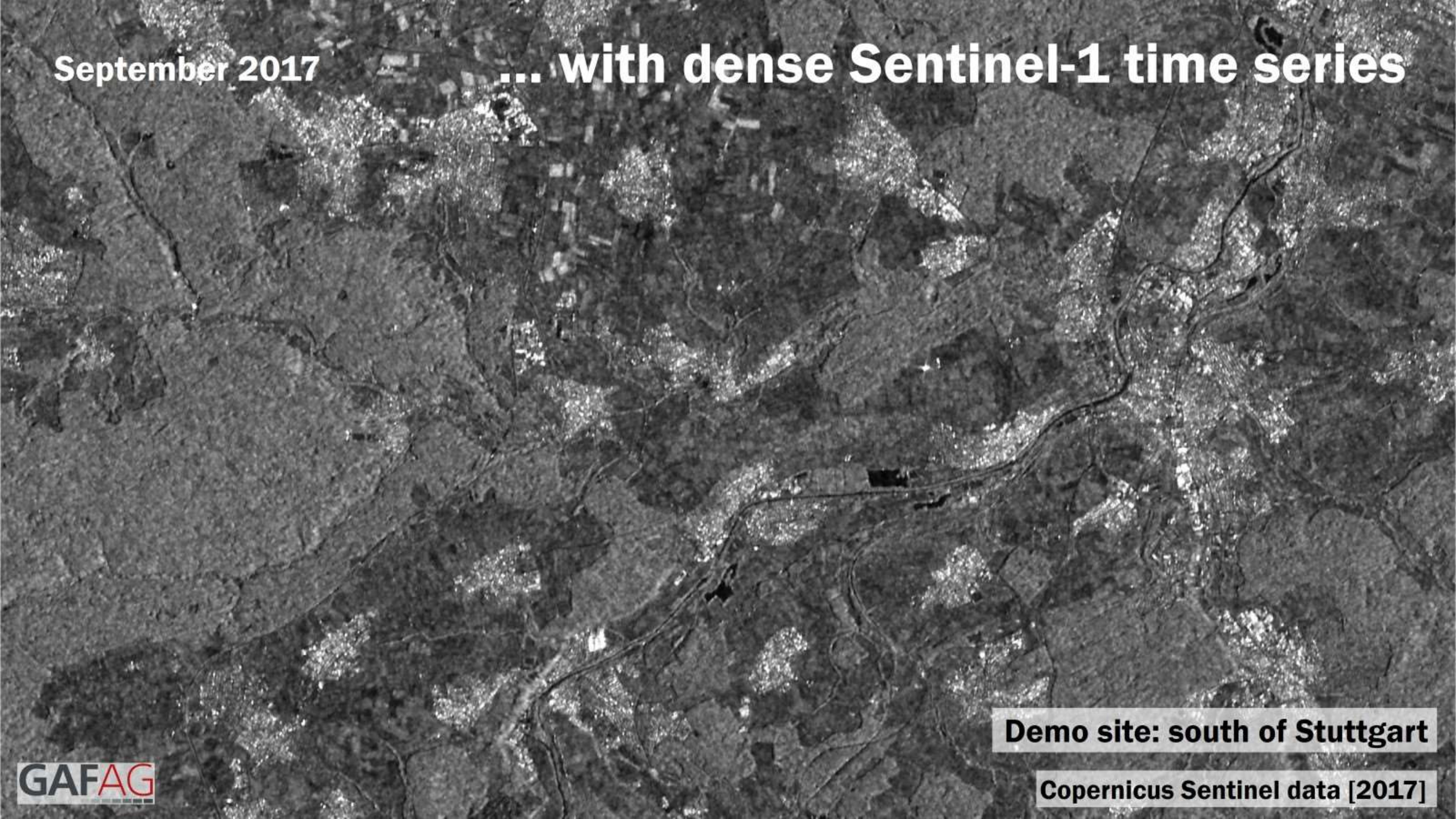
A grayscale Synthetic Aperture Radar (SAR) image showing a landscape with various terrain features, roads, and buildings. The image is heavily textured due to the radar signal.

August 2017

... with dense Sentinel-1 time series

Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

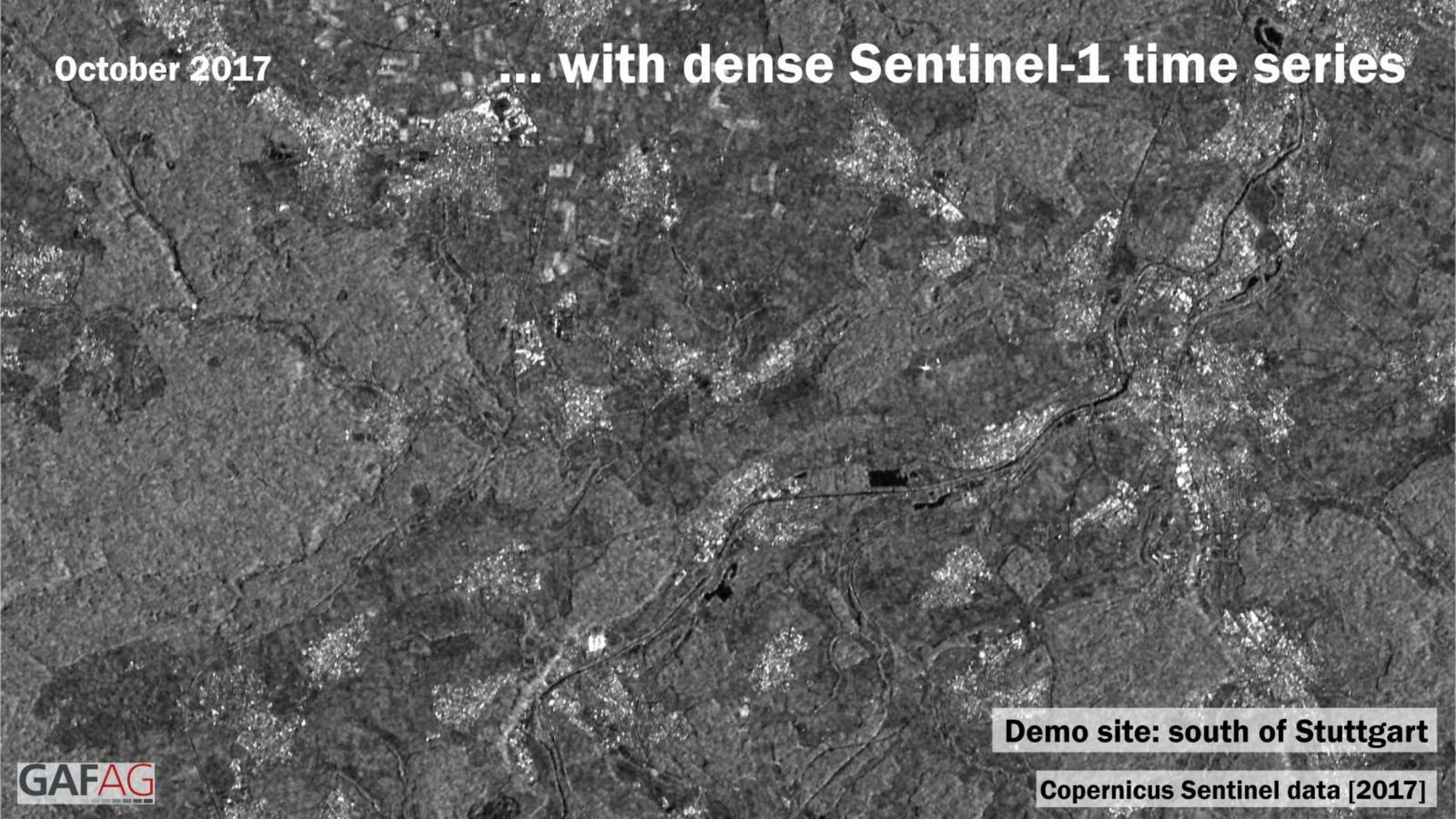
A grayscale Synthetic Aperture Radar (SAR) image showing a dense urban area, likely the south of Stuttgart, Germany. The image is characterized by various shades of gray representing different terrain types and structures. A prominent feature is a large, dark, irregular shape in the center-left, possibly a reservoir or a large industrial facility. Numerous thin, dark lines represent roads and streets. In the bottom right corner, there is a small white rectangular area containing text.

September 2017

... with dense Sentinel-1 time series

Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

A grayscale satellite image showing a dense urban area with numerous buildings, roads, and green spaces. The image has a distinct grainy texture typical of Sentinel-1 radar imagery.

October 2017

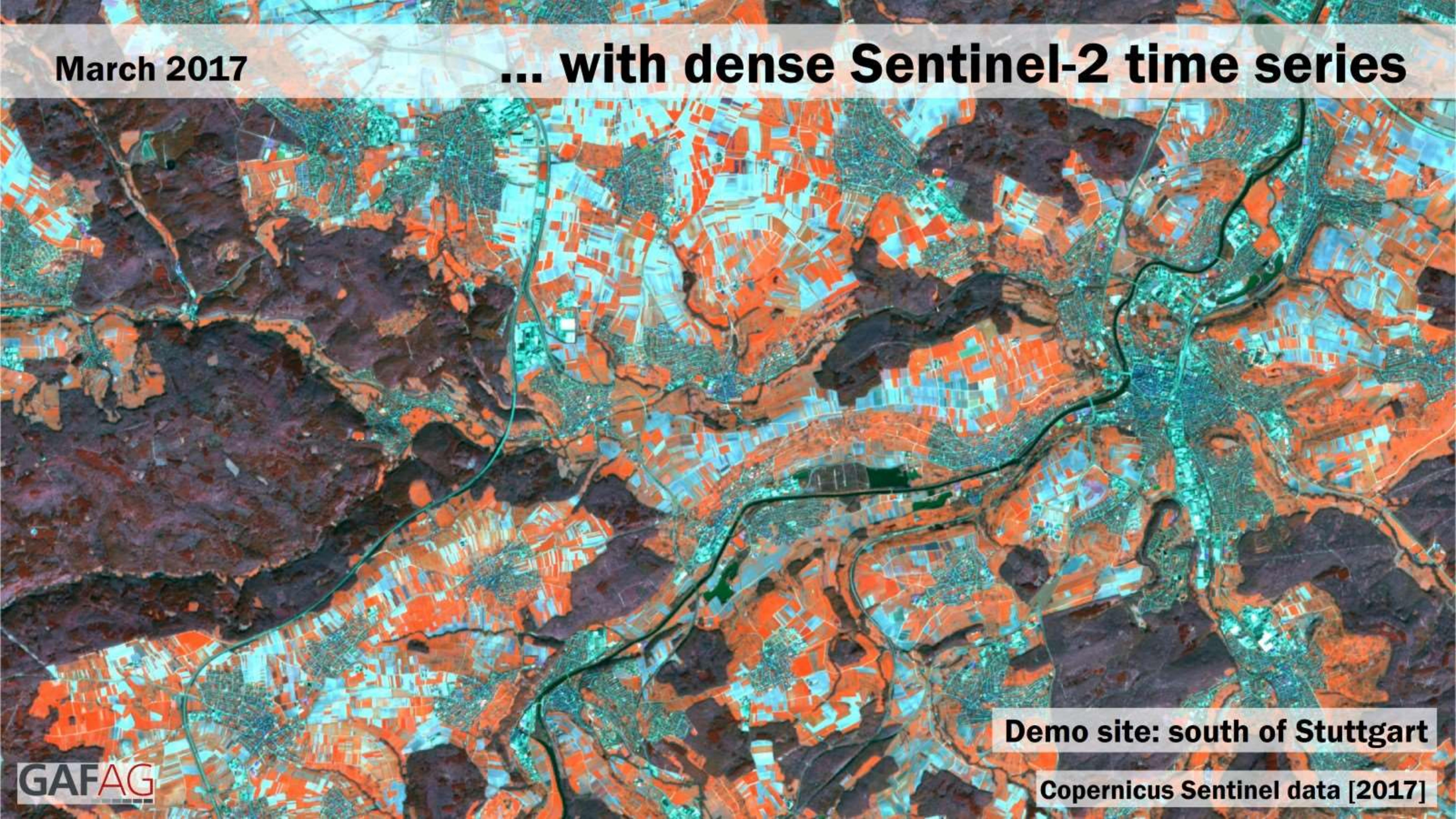
... with dense Sentinel-1 time series

Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

March 2017

... with dense Sentinel-2 time series

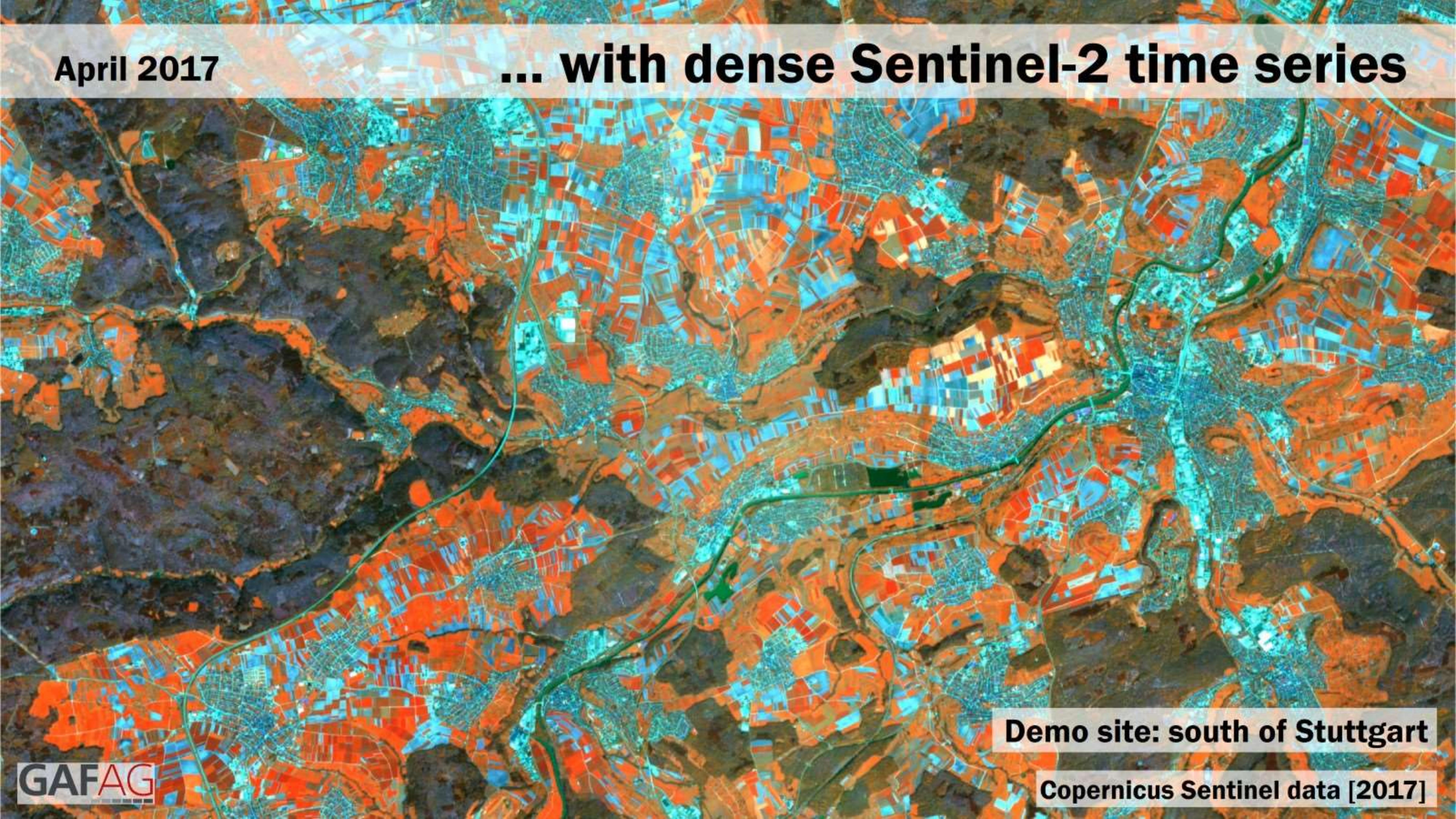


Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

April 2017

... with dense Sentinel-2 time series



Demo site: south of Stuttgart

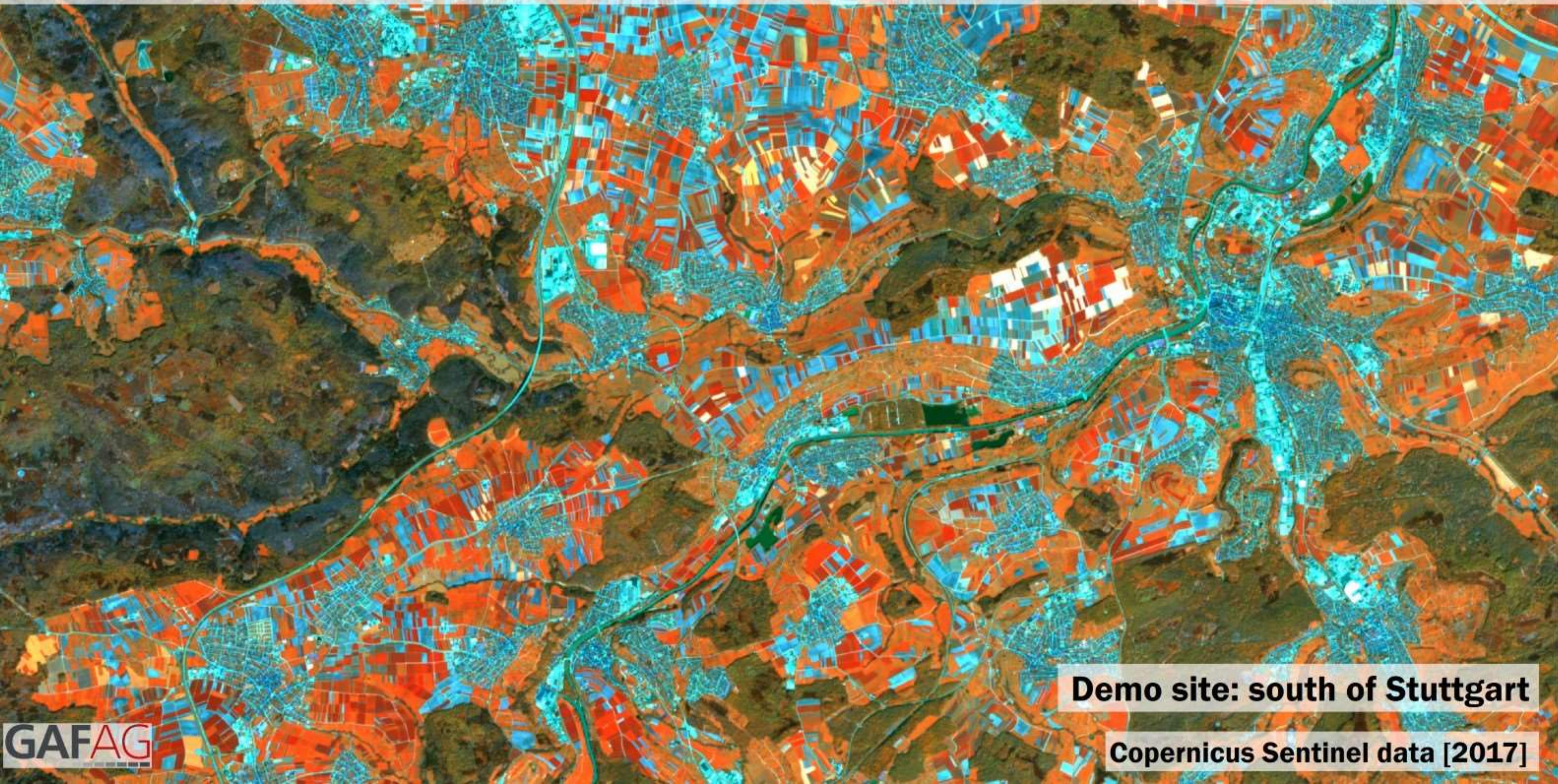
Copernicus Sentinel data [2017]

May 2017

... with dense Sentinel-2 time series

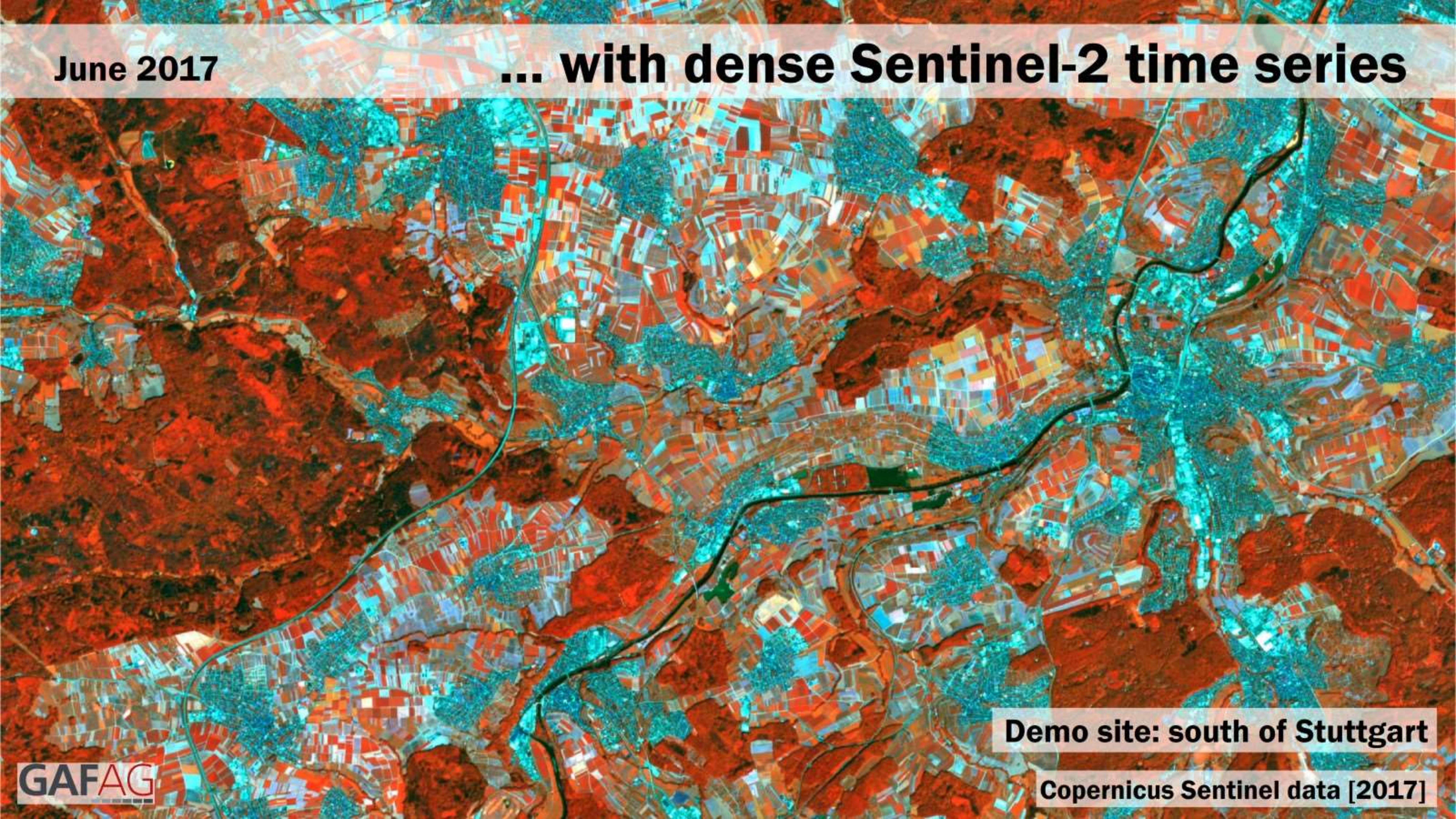
Demo site: south of Stuttgart

Copernicus Sentinel data [2017]



June 2017

... with dense Sentinel-2 time series

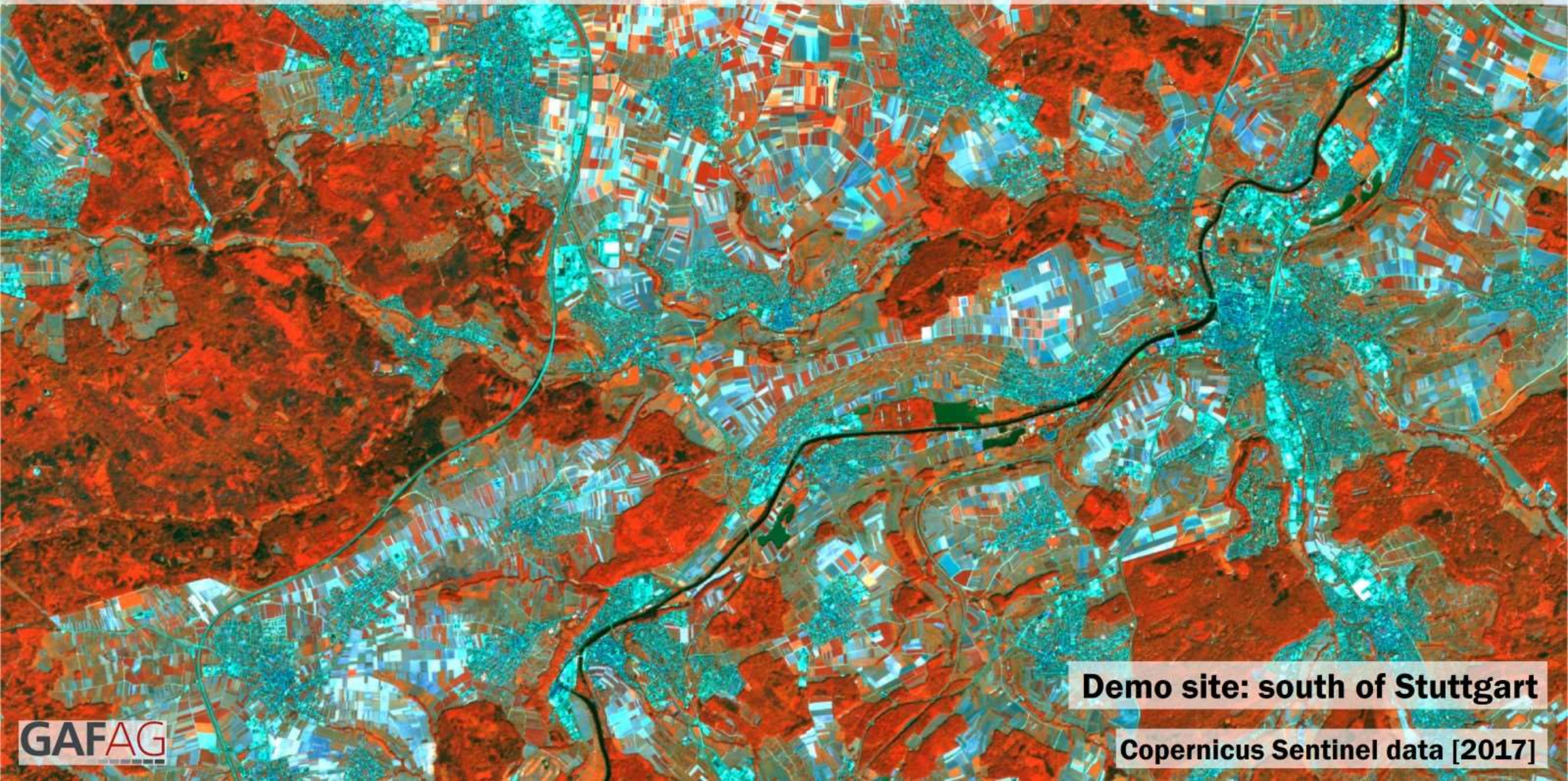


Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

July 2017

... with dense Sentinel-2 time series

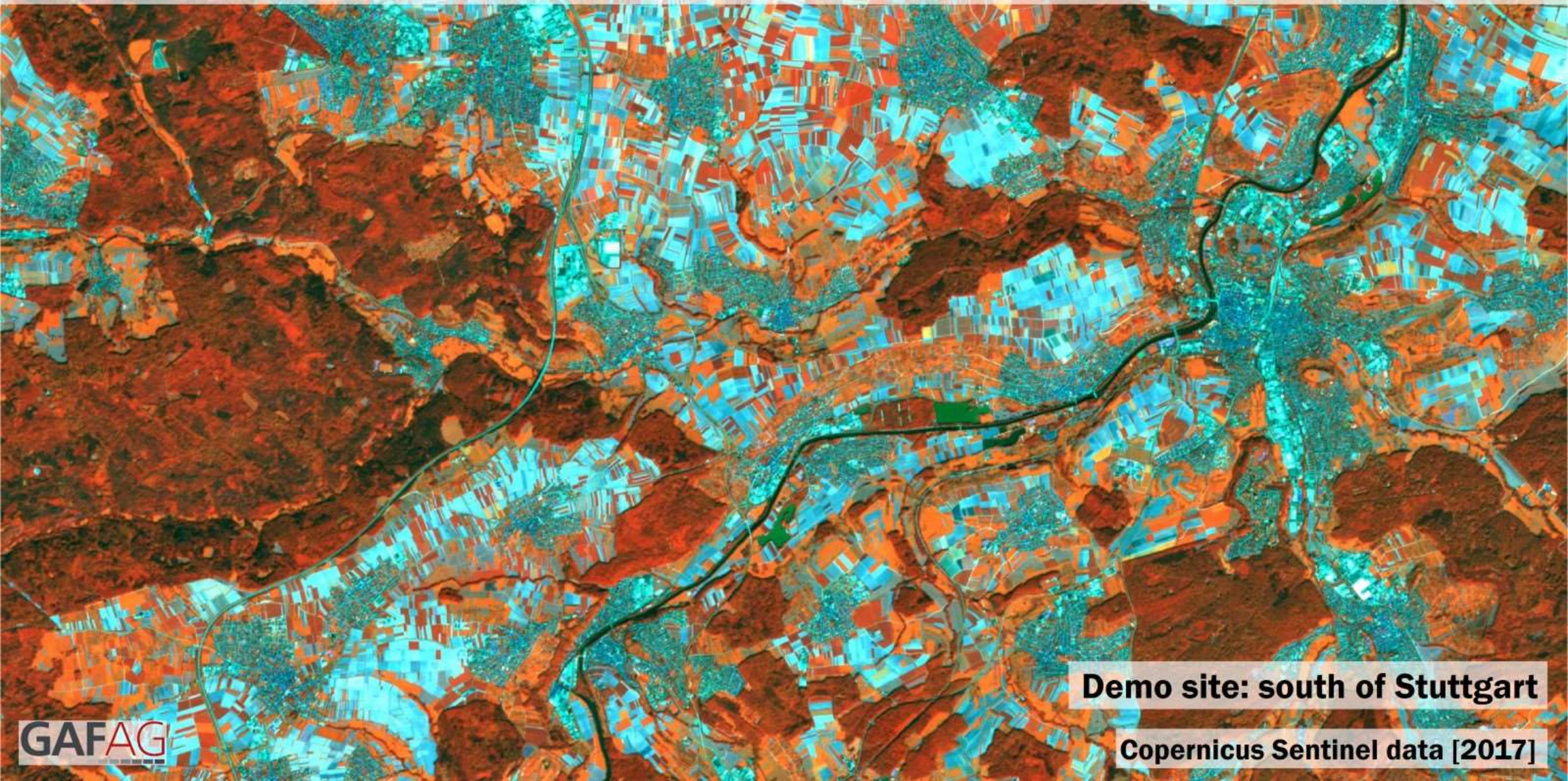


Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

August 2017

... with dense Sentinel-2 time series

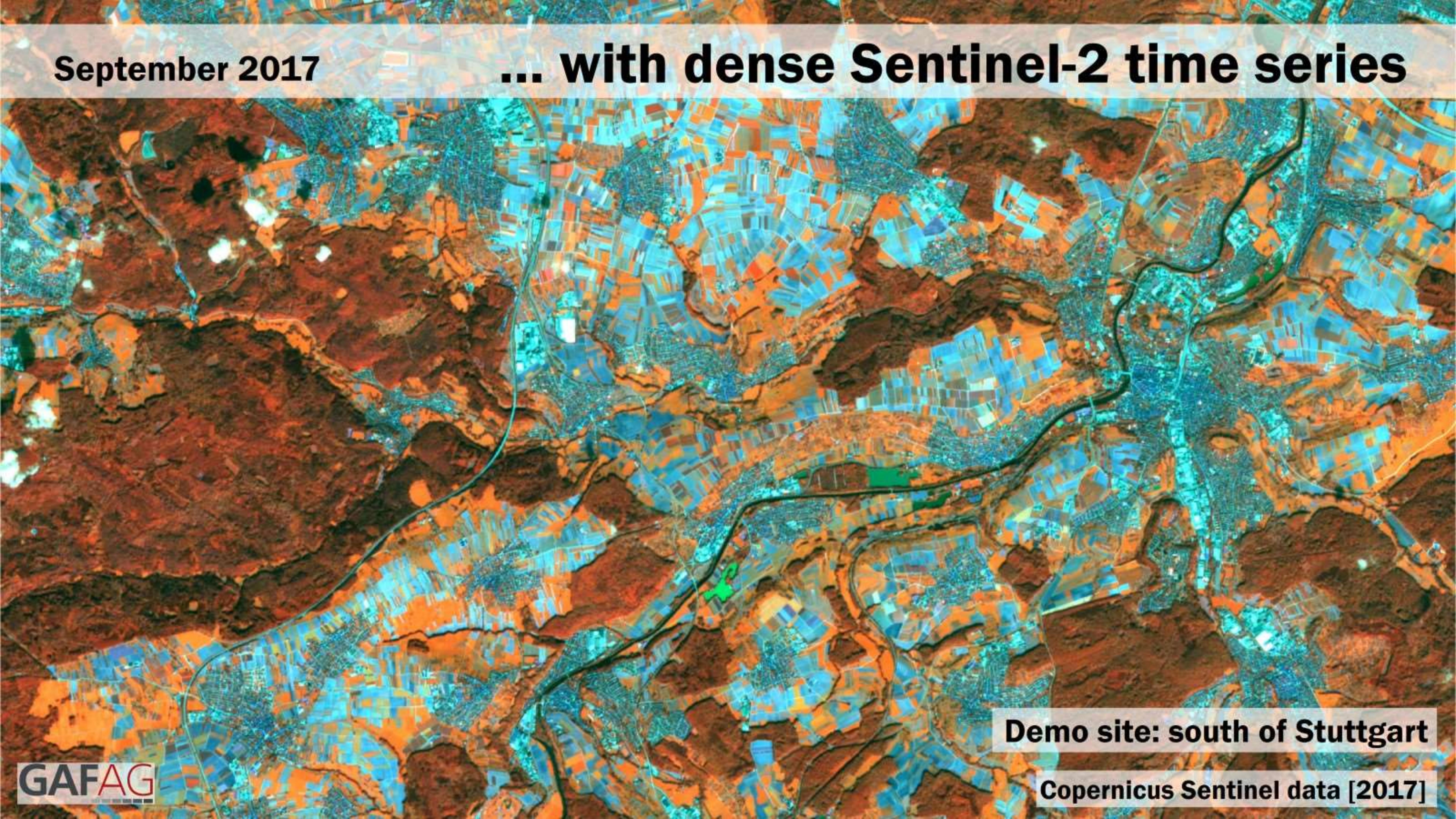


Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

September 2017

... with dense Sentinel-2 time series

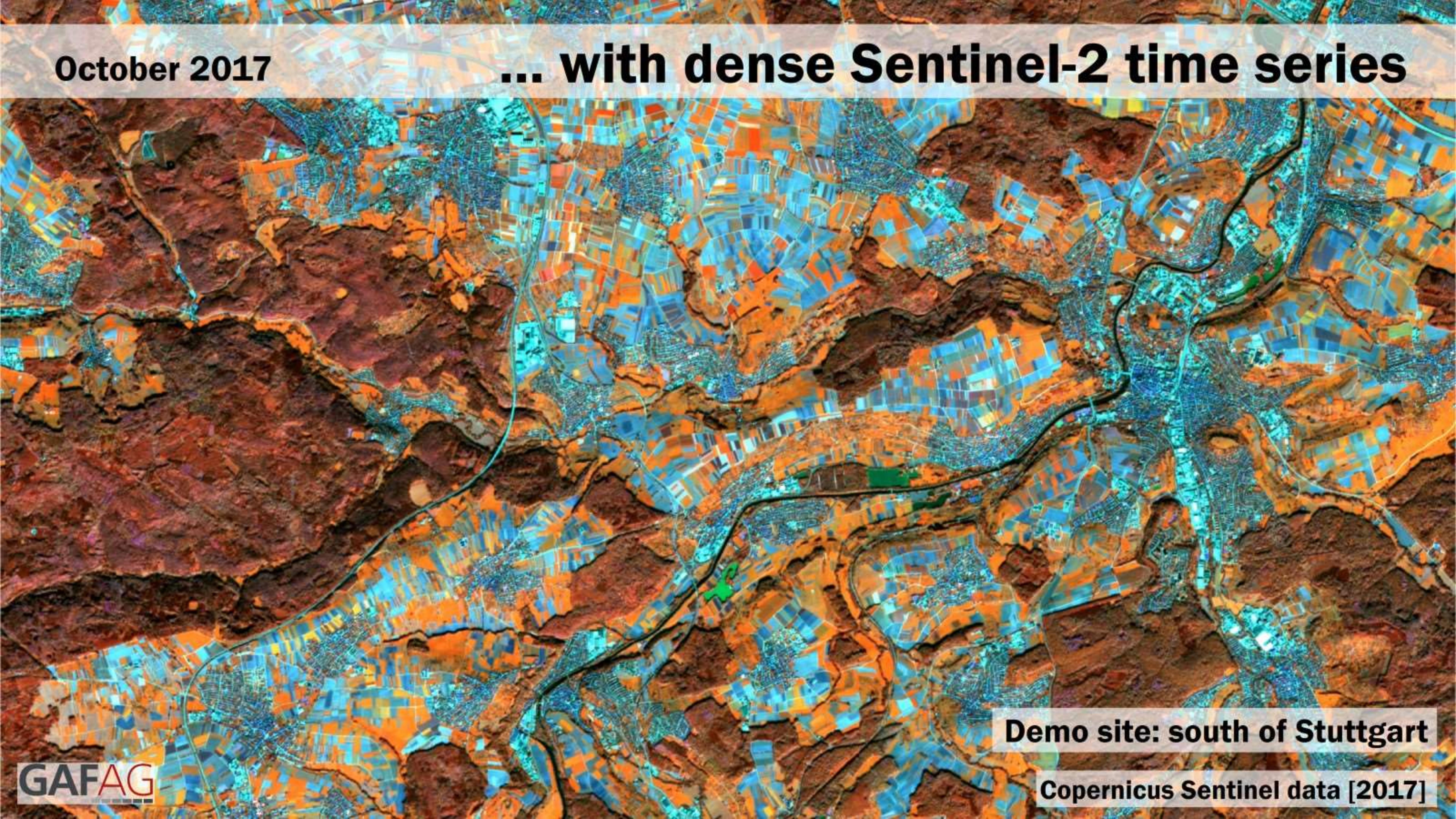


Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

October 2017

... with dense Sentinel-2 time series



Demo site: south of Stuttgart

Copernicus Sentinel data [2017]

... and by the help of temporal indices and statistics:
e.g. **maximum NDVI** of different time periods – showing agricultural dynamics ...

... which can be interpreted:

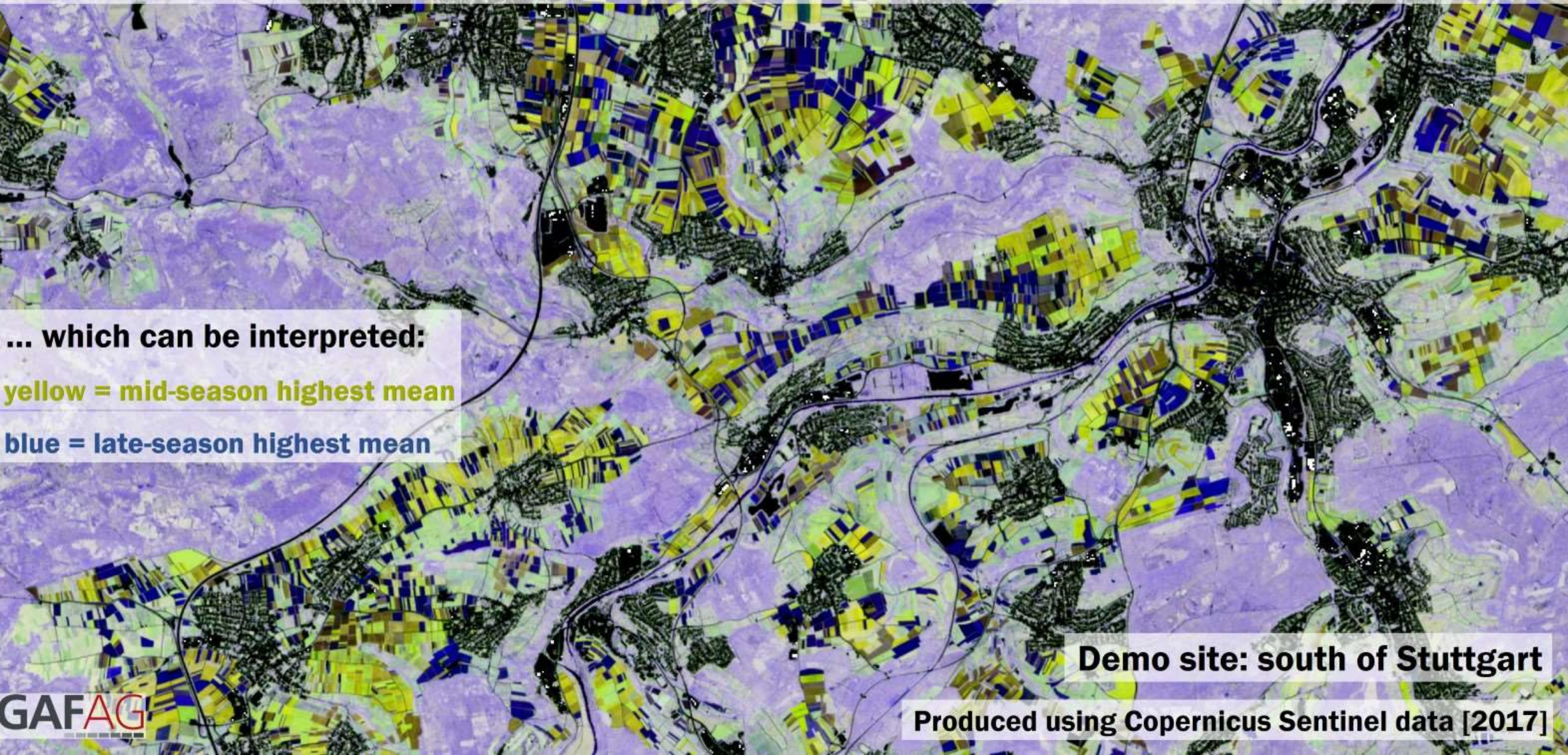
yellow = mid-season highest max

red = late-season highest max

Demo site: south of Stuttgart

Produced using Copernicus Sentinel data [2017]

... and by the help of temporal indices and statistics:
e.g. mean NDVI of different time periods – showing agricultural dynamics ...



... to detect features using their temporal signal ...
RGB composition: NDVI std – NDVI min – Brightness median

... which can be interpreted:

pink = agricultural fields

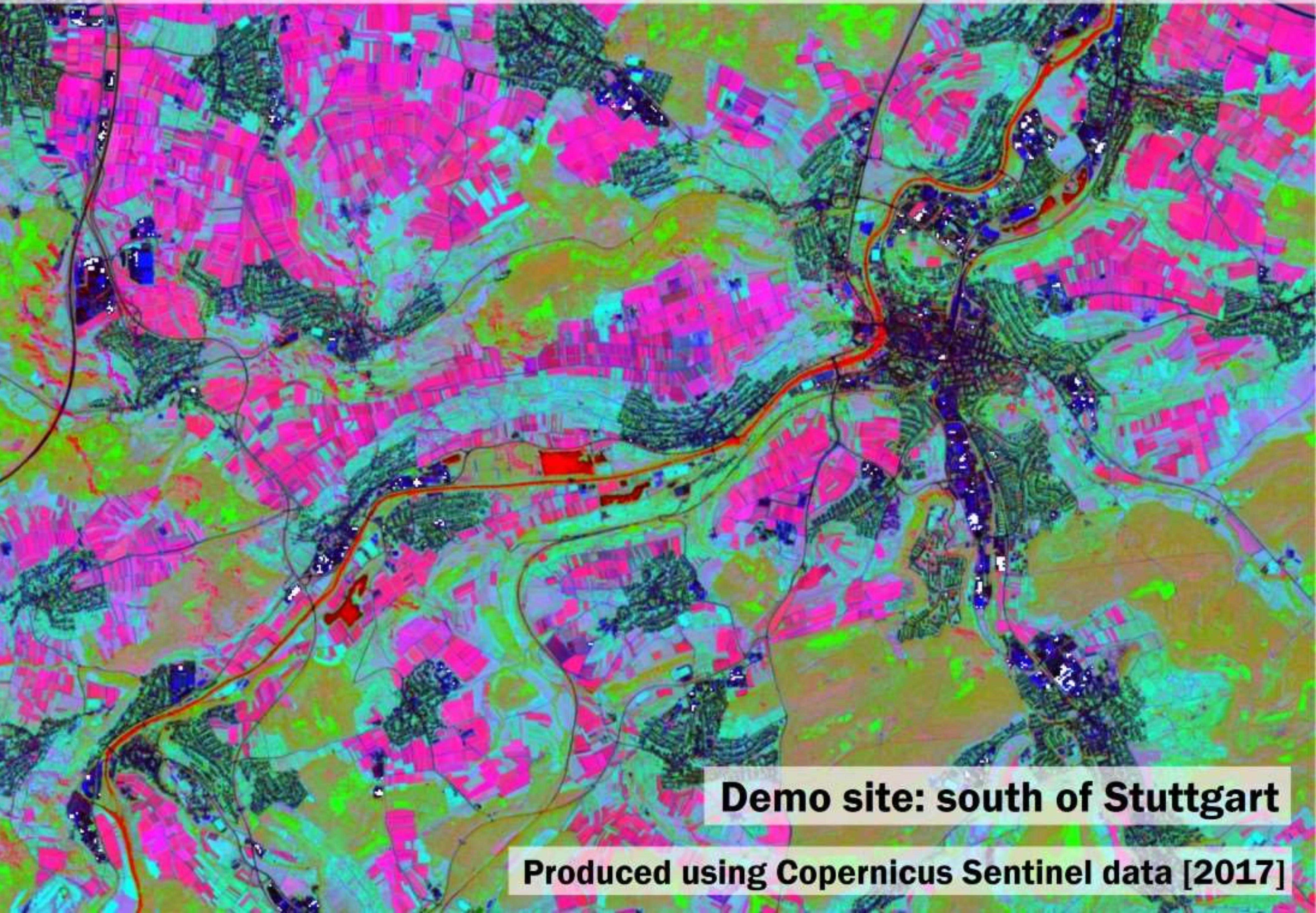
yellow = conifer forest

green = broadleaved forest

red = water

turquoise = grassland

blue/black = urban areas



Demo site: south of Stuttgart

Produced using Copernicus Sentinel data [2017]

... to create European grassland ...

 HRL Grassland 2015

GAFAG

 Copernicus
Europe's eyes on Earth

 Land
Monitoring

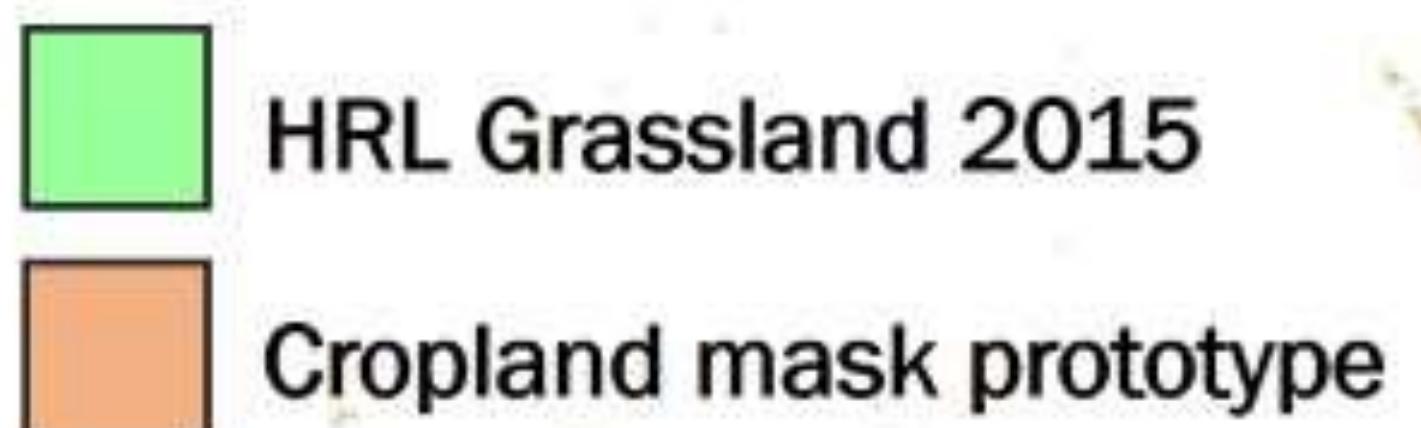
European Environment Agency



Demo site: south of Stuttgart

Credits: Copernicus Land Monitoring Service, courtesy of the European Environment Agency. *Yet unpublished product

... to create European grassland and cropland maps ...



GAFAG

Copernicus
Europe's eyes on Earth

**Land
Monitoring**

European Environment Agency

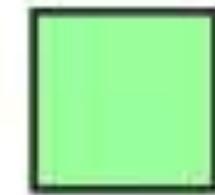


Demo site: south of Stuttgart

Credits: Copernicus Land Monitoring Service, courtesy of the European Environment Agency. *Yet unpublished product

... and distinguish different crop types ...

- winter oilseed rape
- fallow
- potatoes
- winter bread wheat
- spring bread wheat
- winter rye
- winter barley
- spring barley
- spring oat
- silage maize
- winter triticale
- agrarian grassland
- meadows
- peas

 HRL Grassland 2015

GAFAG

 Copernicus
Europe's eyes on Earth

 Land
Monitoring

European Environment Agency



Demo site: south of Stuttgart

Credits: Copernicus Land Monitoring Service, courtesy of the European Environment Agency. *Yet unpublished product

... you'll need a **powerful processing system** to access & process these very large data volumes: the Data and Information Access Service – **DIAS!**

A powerful European consortium:

Atos



GAFAG



Eox



T-Systems

ThalesAlenia Space
A Thales Finmeccanica Company

e-geos
AN ASI / TELESPAZIO COMPANY

Spacematic