



Delivering free, seamless, cloudless mosaic images of Europe to the world

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*EuroGeographics webinar on Open Data (June 18, 2020)*

# What we want to tell you today is about:

- The SKD remote sensing services (Thomas)
- Our motivation to produce mosaics (Thomas)
- Operational mosaic production (Thomas)
- Sen2Europe (Manuel)
- Insights into generation of Sen2Europe (Manuel)
- Future directions (Manuel)



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# Our unite at BKG: Satellite-Based Crisis and Spatial Information Service (SKD)

- We are **16 people** and the unite is dedicated to on-demand geospatial services for eligible users:
  - **Remote sensing**
  - **Mapping and map production**
- The unite has a **12 hours and 7 day** standby availability
- All services are free of charge to Federal Agencies in Germany



# A suite of remote sensing services

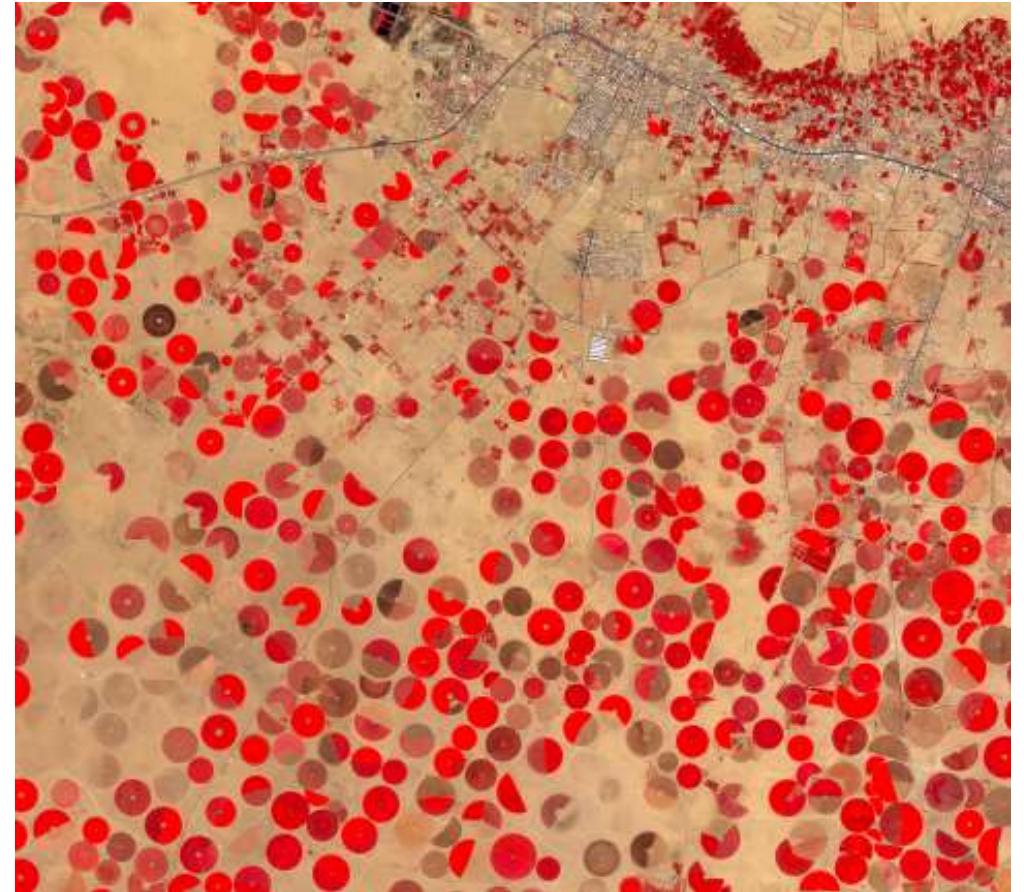
- The services of the **remote sensing part** includes:
- Rapid and responsive mapping system for individual on-demand products to special requirements, like **natural hazards, security or humanitarian health**
- **Creation of standard products** based on user requirements
- Trainings and knowledge transfer about **the potential of remote sensing**
- Consultation and user support for individual solutions

*Image processing is our **every-day's work**, because high-quality images are for us the basis for mapping and analysis products.*



# Our motivation: high-quality image deliverables and mosaics

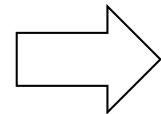
- Copernicus data is **open** and **we want to use it**
- German (federal) **users demand high-quality imagery and mosaics**
- We **need showcases and best practice examples** of our mosaicking services
- High-quality mosaics as **uniform reference products** for mapping and visualization purposes



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# Operational production of national mosaics at BKG

Sentinel2-DE 2018

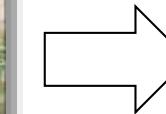


Semi-automatic processing GUI



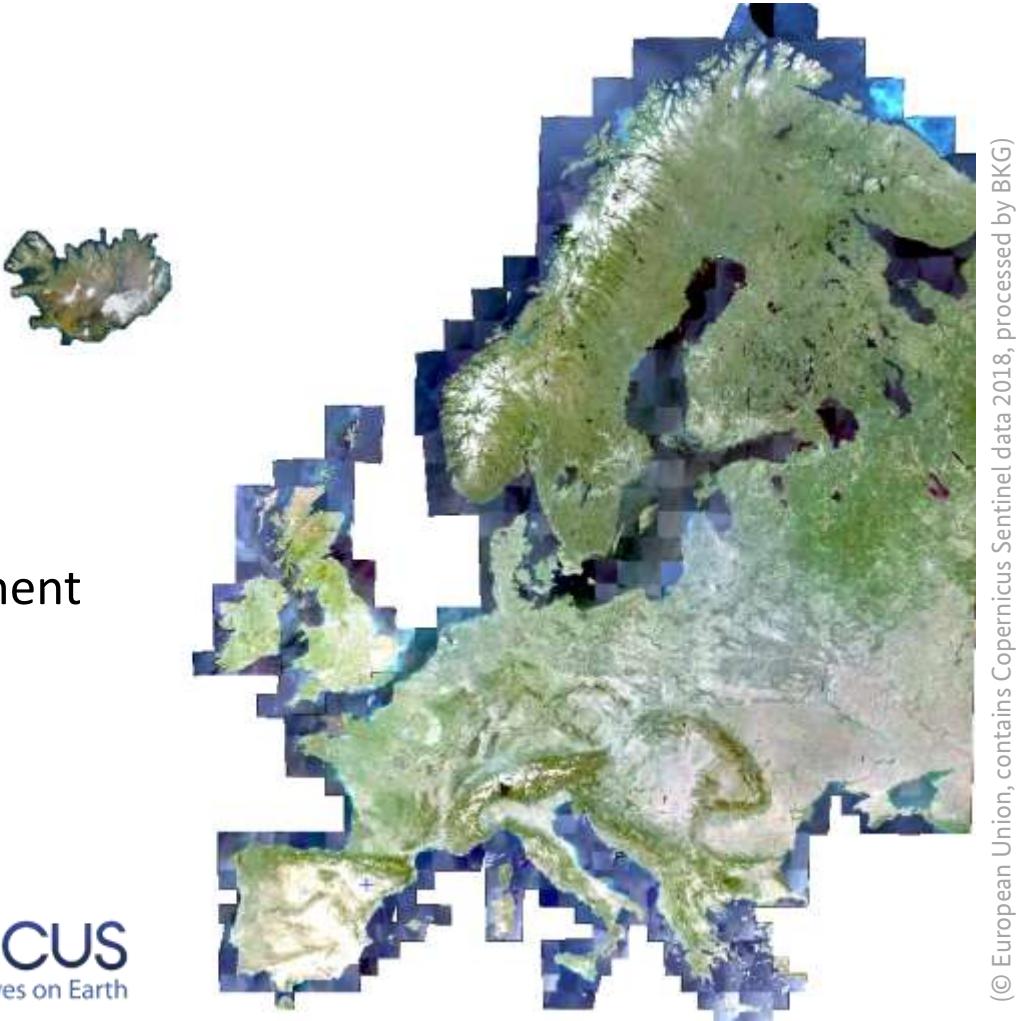
→ [https://sgx.geodatenzentrum.de/wms\\_sentinel2\\_de](https://sgx.geodatenzentrum.de/wms_sentinel2_de)

Sentinel2-DE 2019



# Sen2Europe: a pan-European mosaic

- Harmonized **Sentinel-2** true-colour composite of **2018**
- **Mapping-/visualization ready** dataset
- *many objects and phenomena “do not stop at country borders”*
- **Open data and pan-European collaboration** as a commitment
- **Large-area processing**



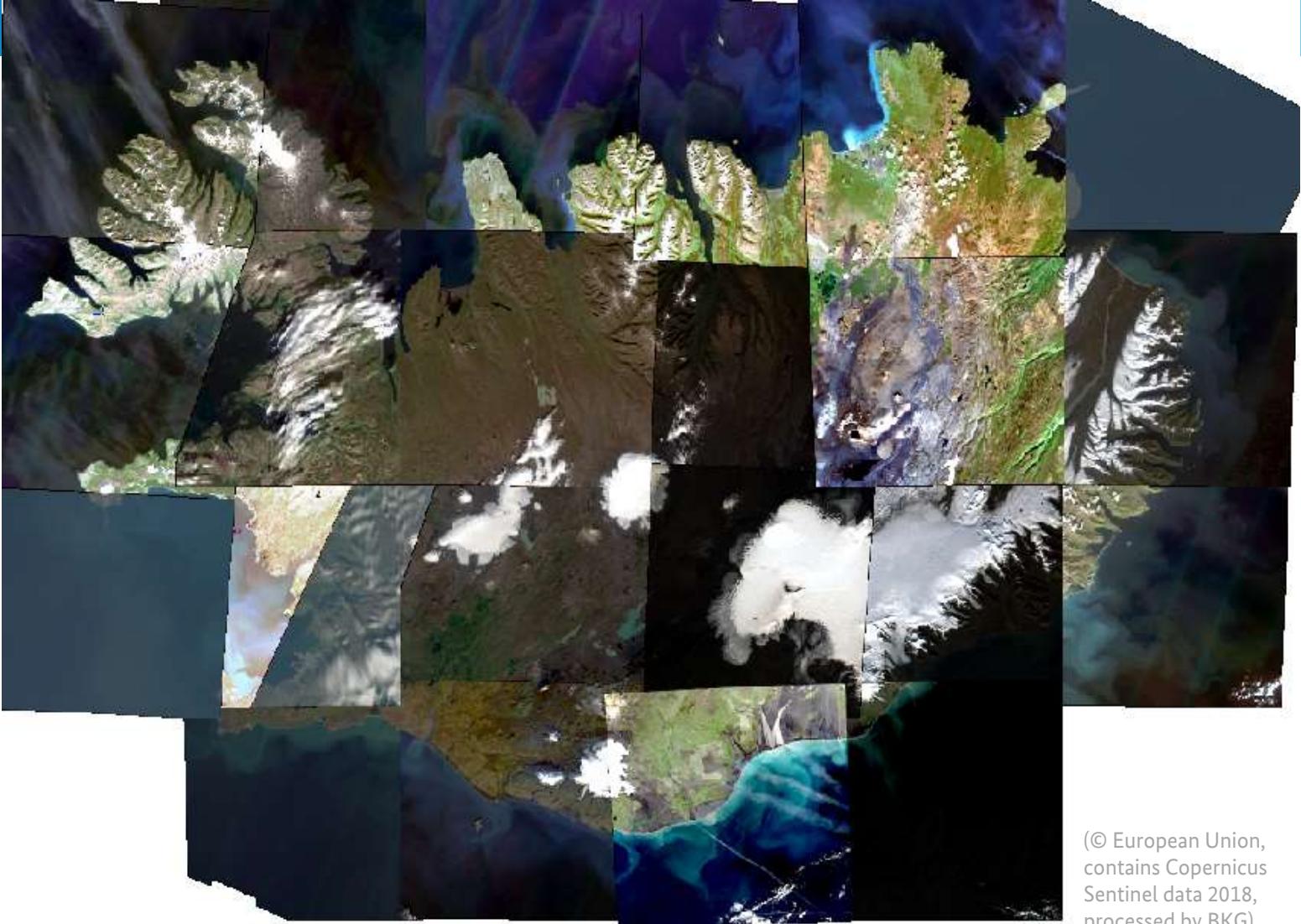
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# Producing quality mosaics I

## Raw imagery (+ pre-processing)

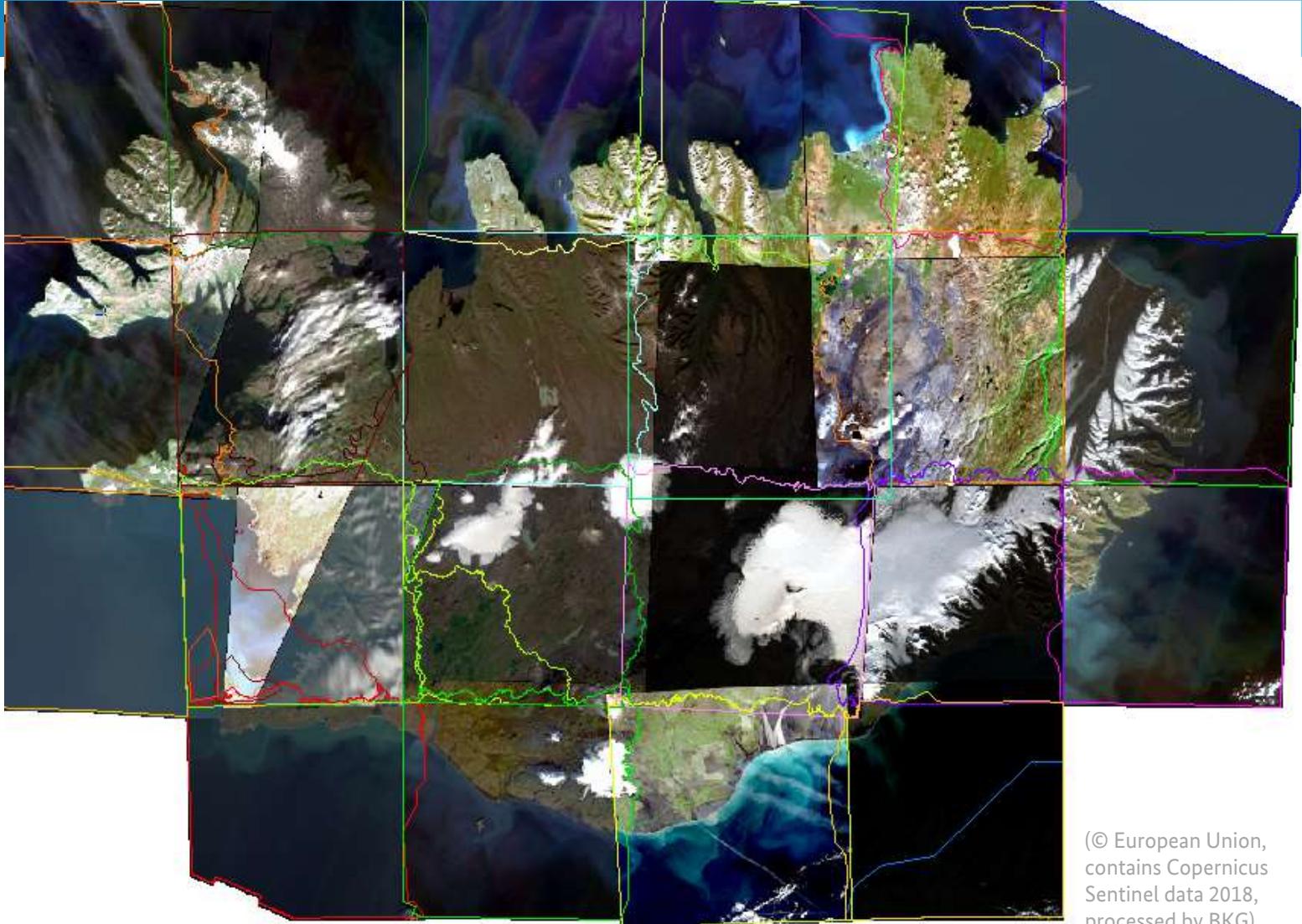
e.g. Iceland:

- total area: 103000 km<sup>2</sup>
- (max. extent: 300 x 500 km)
- heterogeneous terrain
- 29 Sentinel-2 tiles:
  - 10m-resolution
  - full footprint: 100 x 100 km



## Cutline generation (automated and manual)

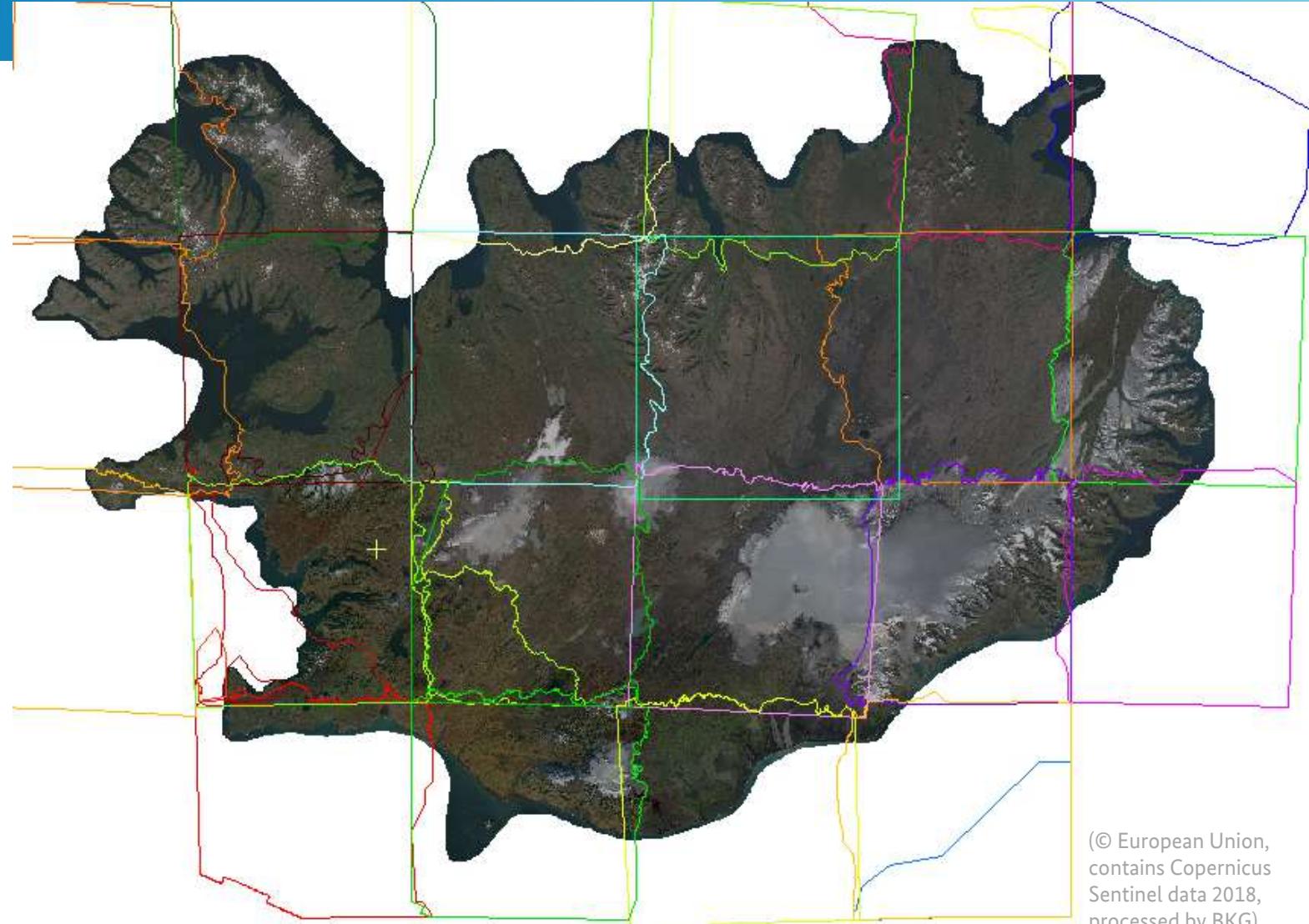
- Segment boundaries as input for in-depth image adjustment and harmonization



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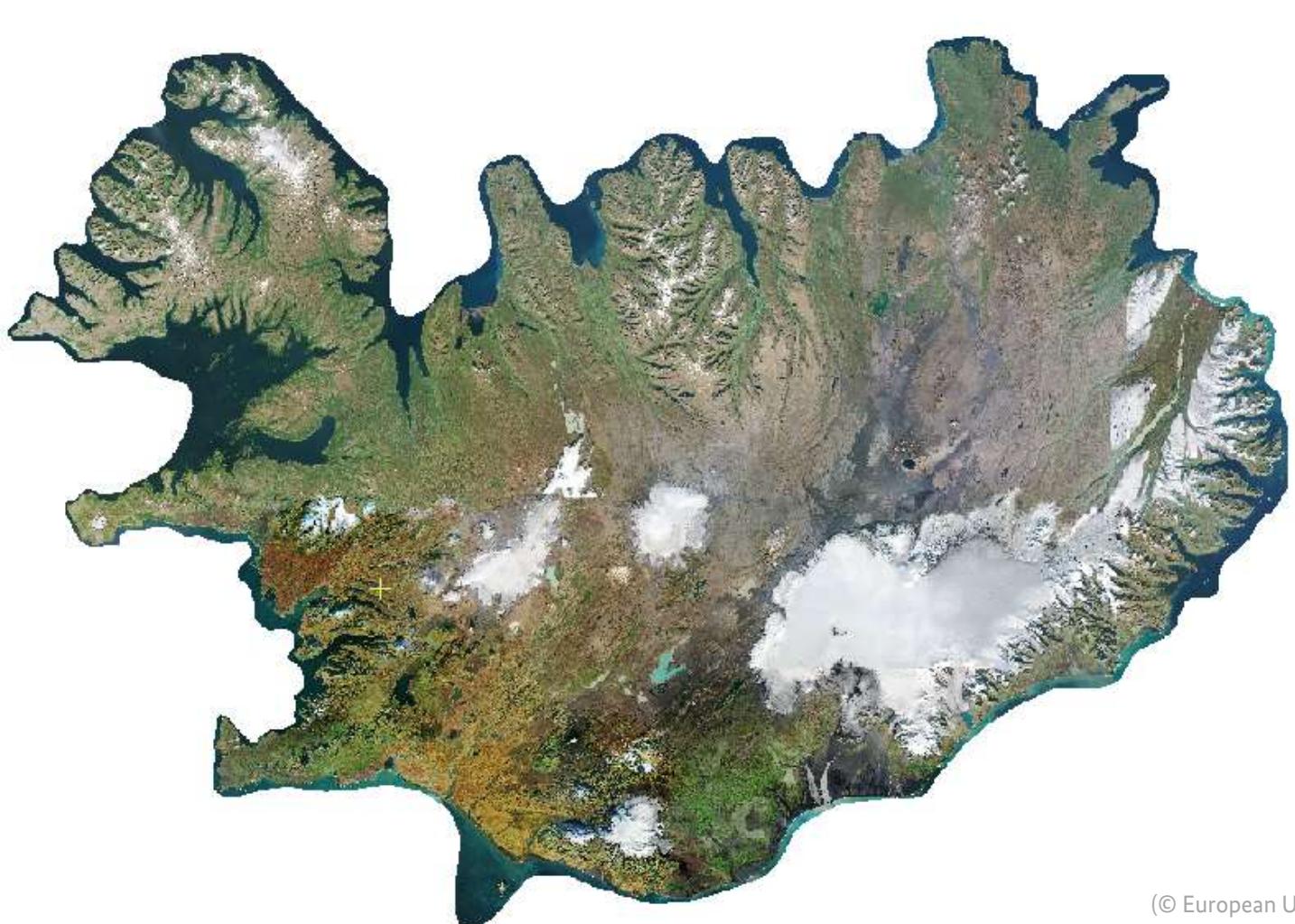
## Radiometric harmonization

- Adjustment based on local compensation functions
- Accounts for radiometric variation between acquisitions
- „uniform appearance“



## Global scaling

- Scale global histogram to local tiles (transformation to 8-bit)
- Manual quality checks
- Flexible tiling



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# Facts on BKG mosaics

>1 Mill.  
accesses  
within one year  
(Sentinel2-DE)

4  
libraries  
used within BKG  
mosaic software

1338  
input tiles  
(Sen2Europe)

0.9  
terabyte  
input data volume  
(Sen2Europe)

2 – 4  
weeks  
for production  
(Sentinel2-DE)

3 – 5  
band  
composite  
selectable

2  
persons  
developing and  
producing mosaics

8.3 Mill.  
sq. km  
coverage area  
(Sen2Europe)

440,756  
km  
length of cutlines  
(Sen2Europe)

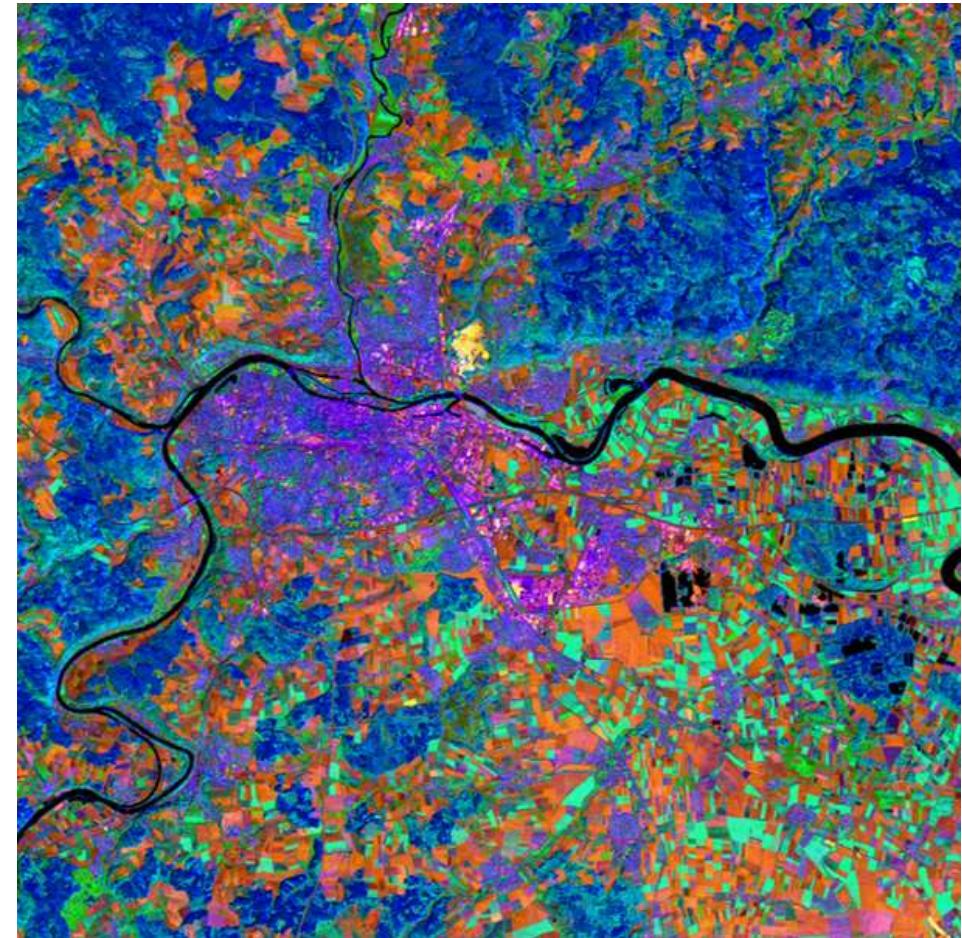
# Coming up

## Production

- **Sen2Europe** production to be finished  
**(publication as open data WMS: Autumn 2020)**
- Open data → Open products
- Kick-off of next annual mosaic production for Germany  
(Sentinel2-DE) and conceivably for Europe (Sen2Europe)

## Development

- Evaluation of demand for **VHR** (Very-High-Resolution) mosaics of Germany (data and processing volume!)
- **Multi-sensor mosaics + multi-temporal composites**



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**We believe that pan-European open data products keep up the European  
idea - especially during these times**

Thank you for your kind attention!

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