



Federal Agency for
Cartography and Geodesy



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

Thomas Wiatr & Manuel Mayr

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)



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

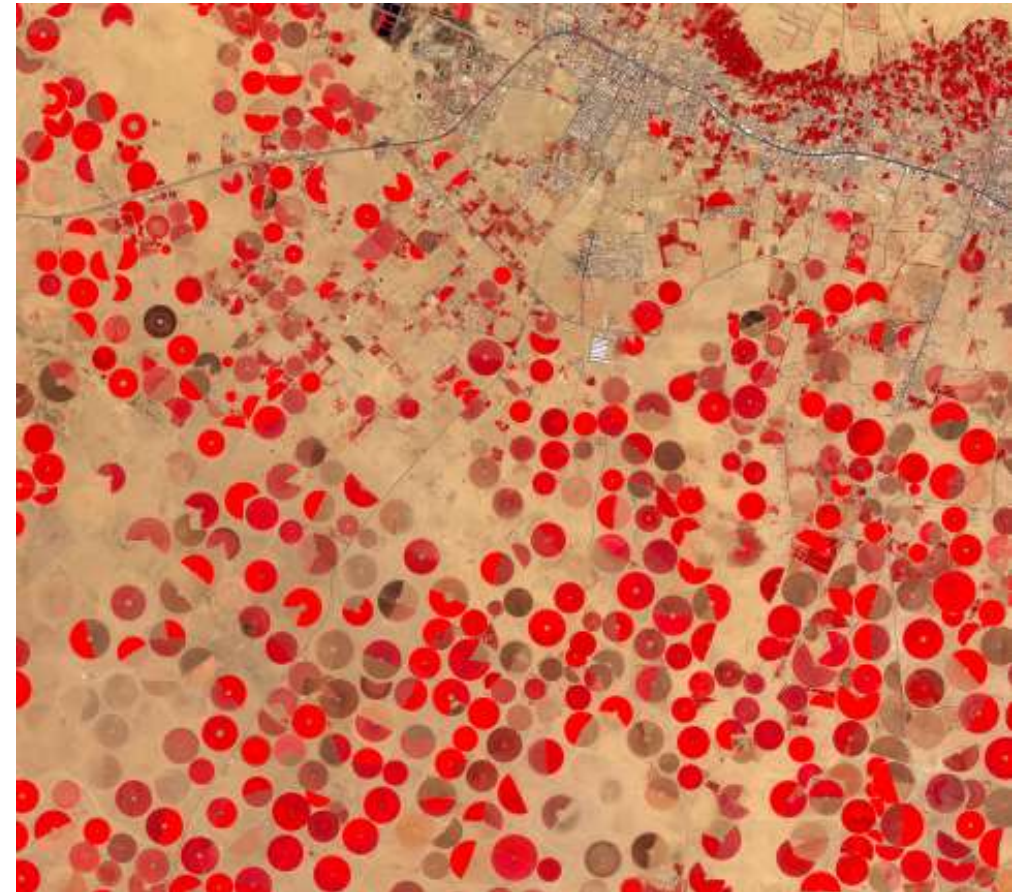
- The services of the **remote sensing part** includes:
- Rapid and responsive mapping system for individual on-demand products to special requirements, like **natural hazards**, **security** or **humanitarian health**
- **Creation of standard products** based on user requirements
- Trainings and knowledge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

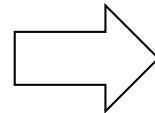
- Copernicus data is **open** and **we want to use it**
- German (federal) **users demand high-quality** imagery and **mosaics**
- We **need showcases and best practice examples** of our mosaicking services
- High-quality mosaics as **uniform reference products** for mapping and visualization purposes



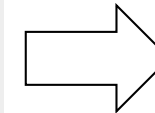
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Operational production of national mosaics at BKG

Sentinel2-DE 2018



Semi-automatic processing GUI



Sentinel2-DE 2019



→ https://sgx.geodatenzentrum.de/wms_sentinel2_de

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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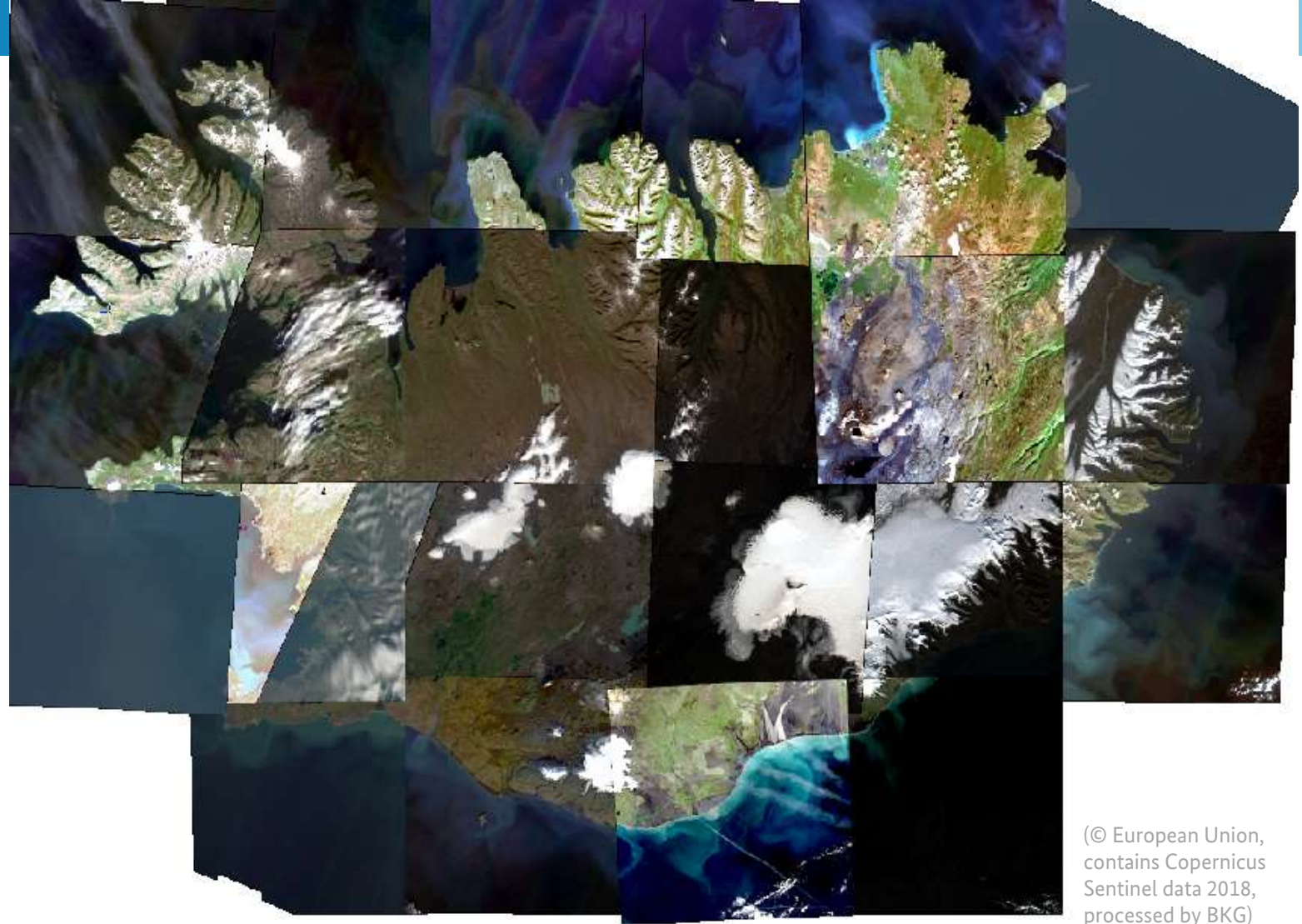


Producing quality mosaics I

Raw imagery (+ pre-processing)

e.g. Iceland:

- total area: 103000 km²
- (max. extent: 300 x 500 km)
- heterogeneous terrain
- 29 Sentinel-2 tiles:
 - 10m-resolution
 - full footprint: 100 x 100 km

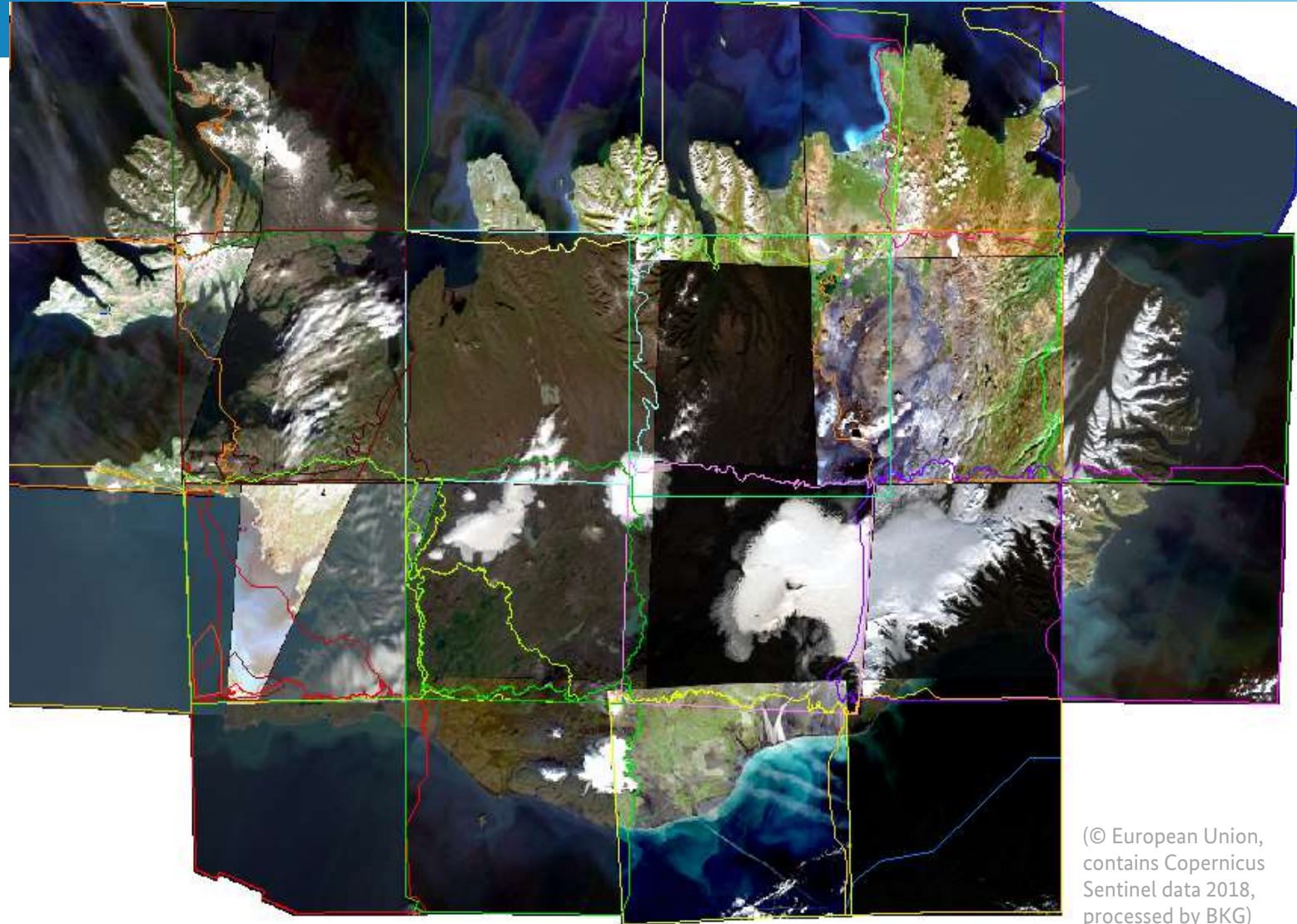


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Producing quality mosaics II

Cutline generation (automated and manual)

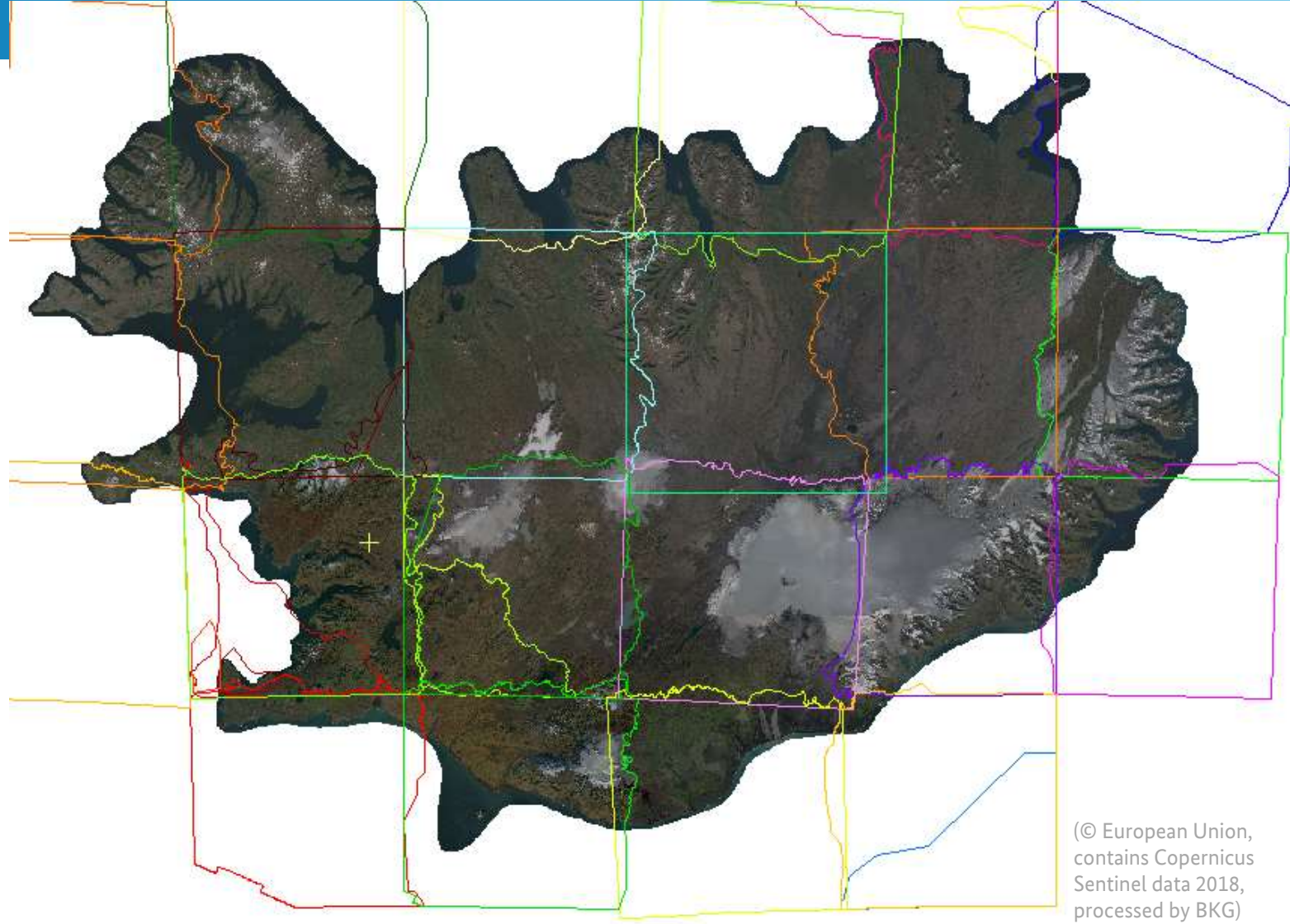
- Segment boundaries as input for in-depth image adjustment and harmonization



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Radiometric harmonization

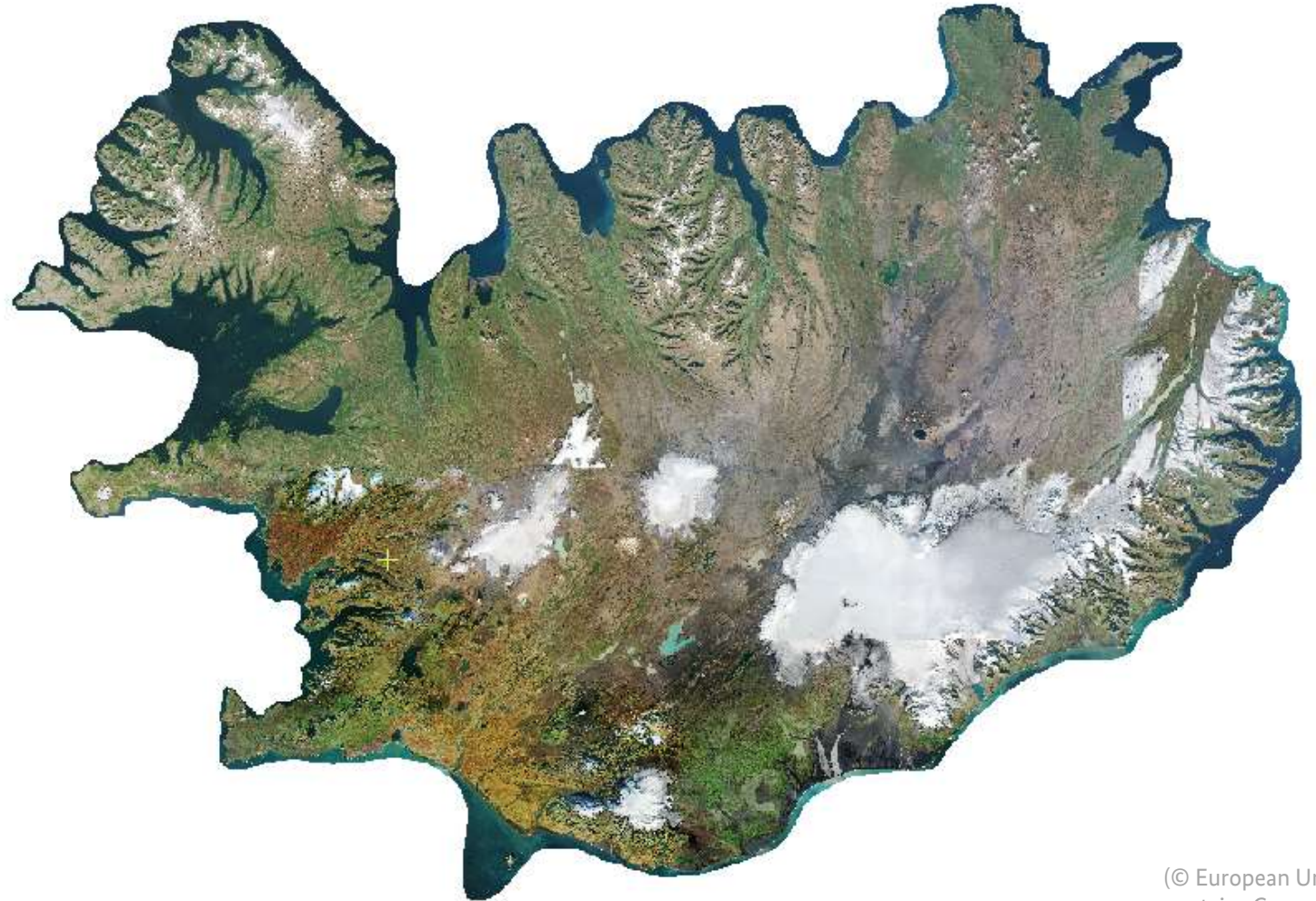
- Adjustment based on local compensation functions
- Accounts for radiometric variation between acquisitions
- „uniform appearance“



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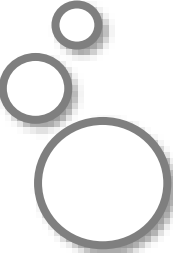
Global scaling

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



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Facts on BKG mosaics

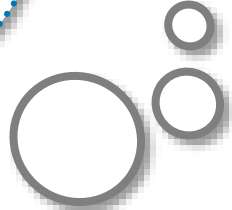


**>1 Mill.
accesses**
within one year
(Sentinel2-DE)

**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)

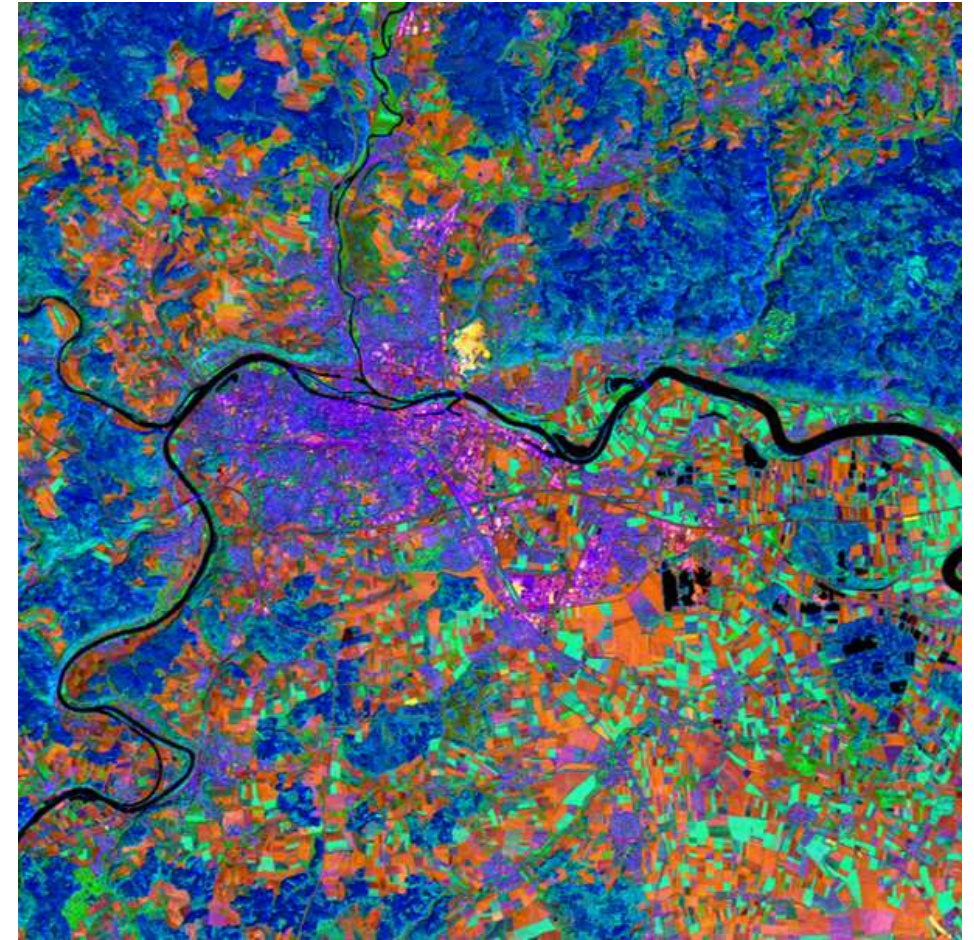
Coming up

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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