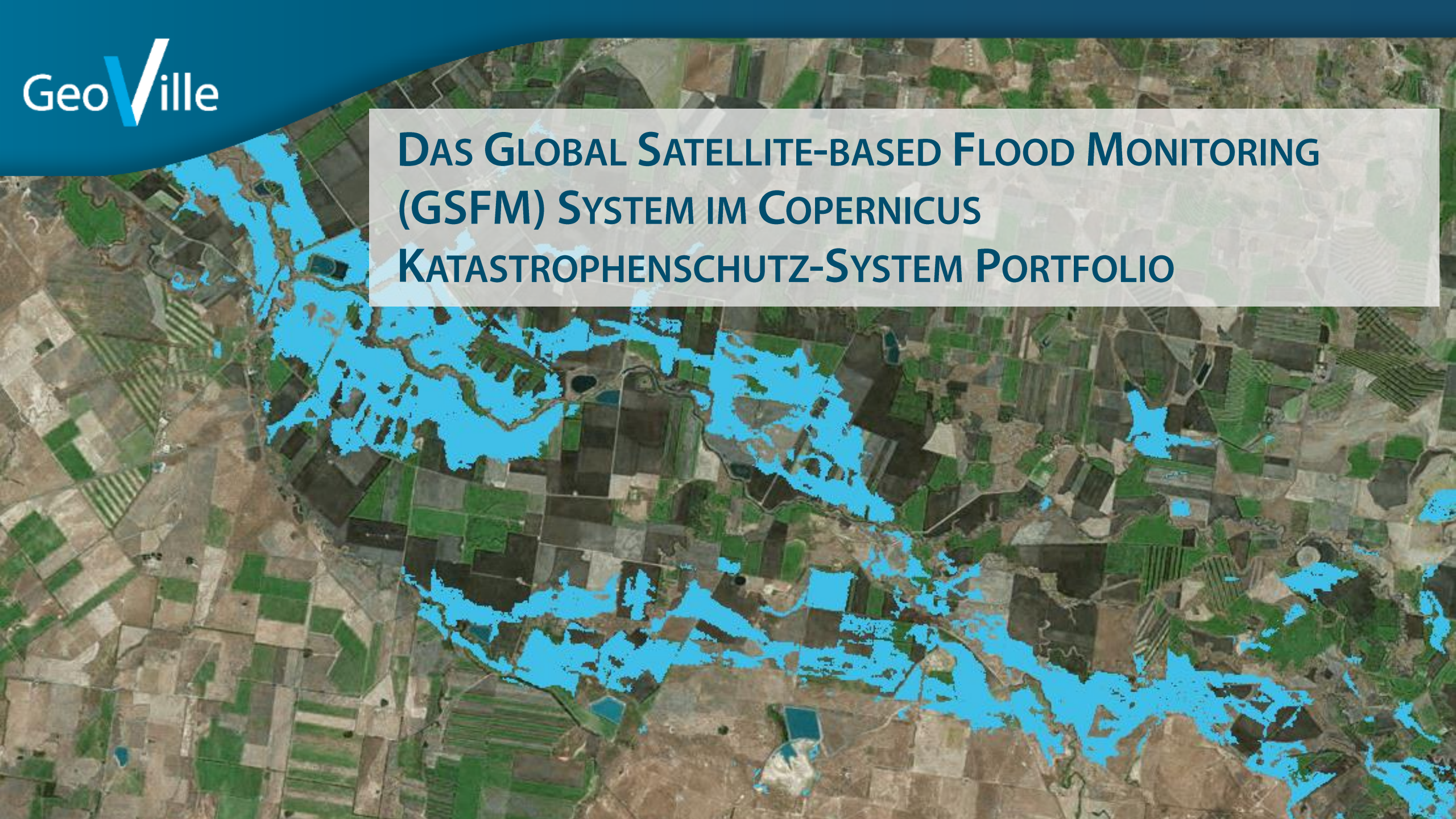


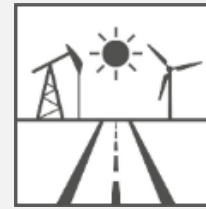
**DAS GLOBAL SATELLITE-BASED FLOOD MONITORING
(GSFM) SYSTEM IM COPERNICUS
KATASTROPHENSCHUTZ-SYSTEM PORTFOLIO**



A LEADER IN SATELLITE-BASED LAND MONITORING



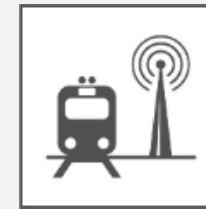
Agriculture & Rural



Energy & Infrastructure



Environment & Natural Resources



ICT & Transport



Urban & Population

✓ > 465 implementations in over 138 countries

✓ “End-to-end” geo-spatial land monitoring applications through 20+ years of business

20+ years

of successful research, innovation & operational implementation



GLOBAL FLOOD MONITORING ALLIANCE



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna | Austria

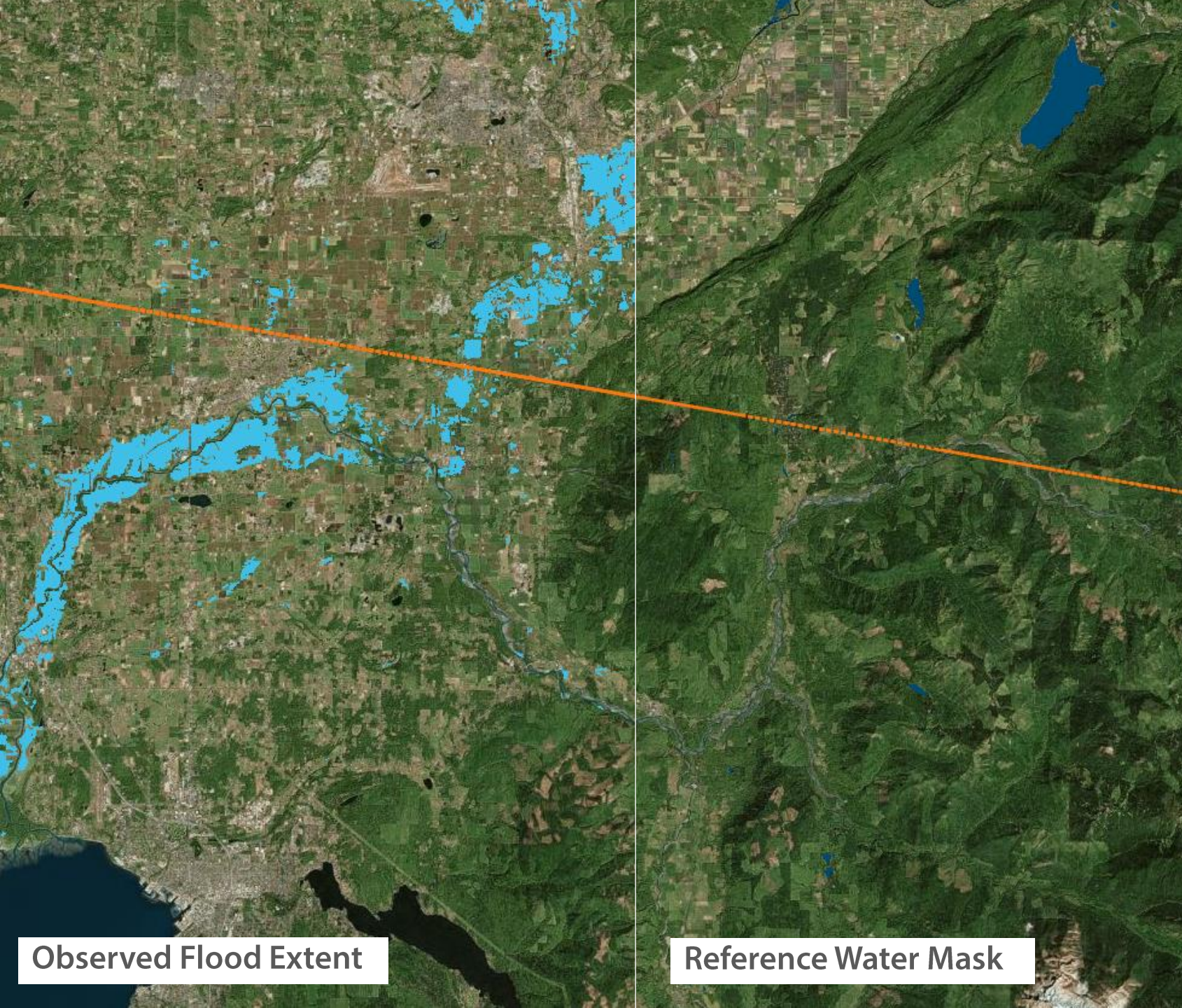


LUXEMBOURG
INSTITUTE OF SCIENCE
AND TECHNOLOGY



SENTINEL-1 SAR ZUR DETEKTION VON FLUTEN

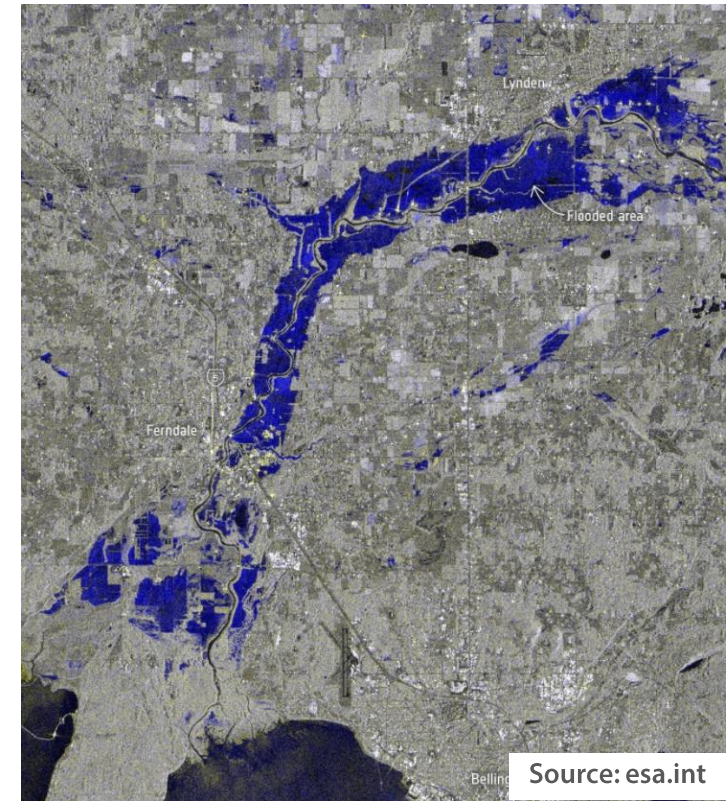
- ✓ Flut-Detektion mit Sentinel-1 Daten
- ✓ Automatisches Prozessieren aller verfügbaren Daten
- ✓ Ensemble aus drei Algorithmen
- ✓ 11 Produkte



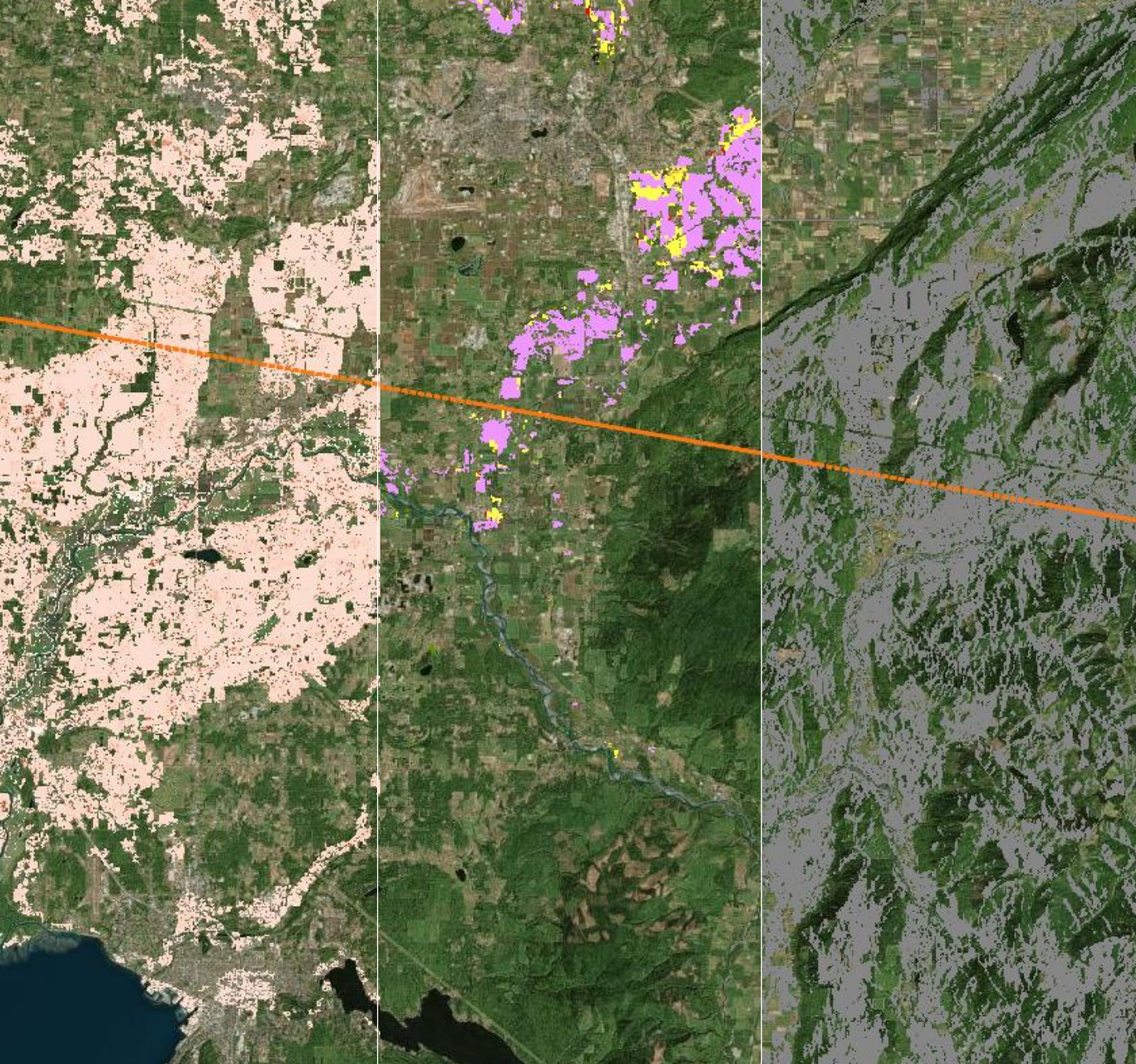
Observed Flood Extent

Reference Water Mask

Washington State, 16.11.2021



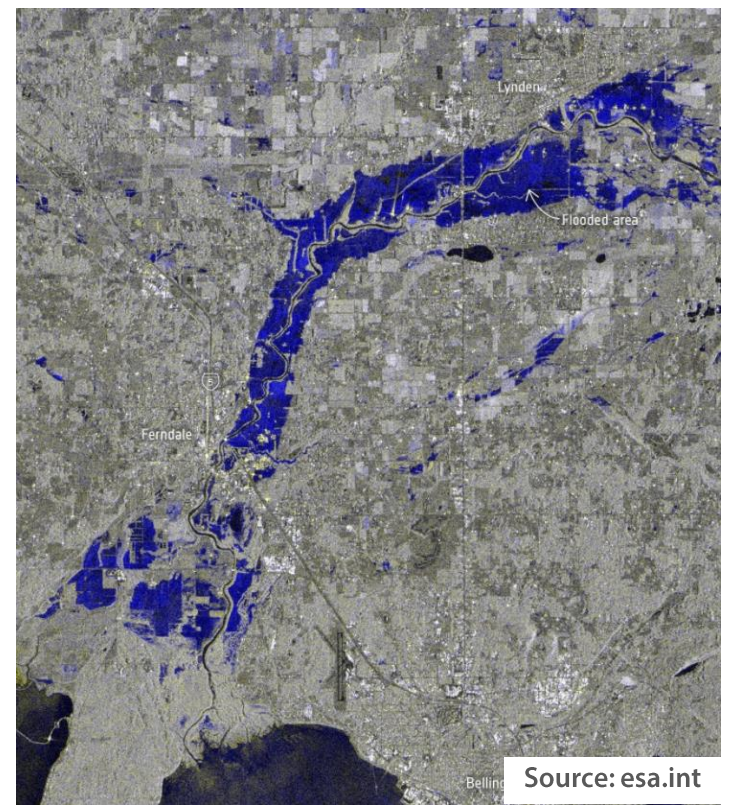
Source: esa.int



Uncertainty Values

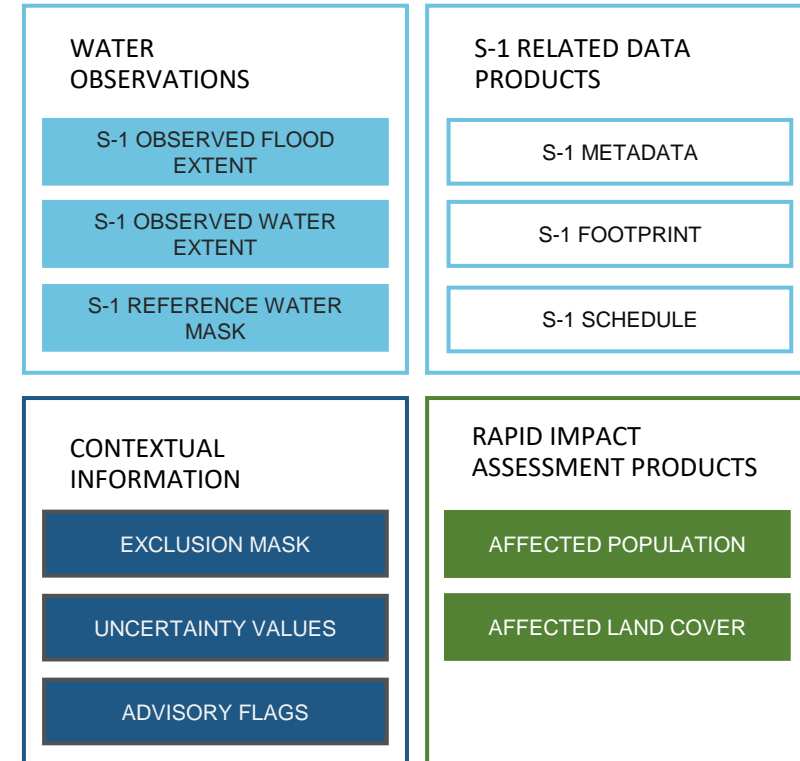
Affected Landcover

Exclusion Mask



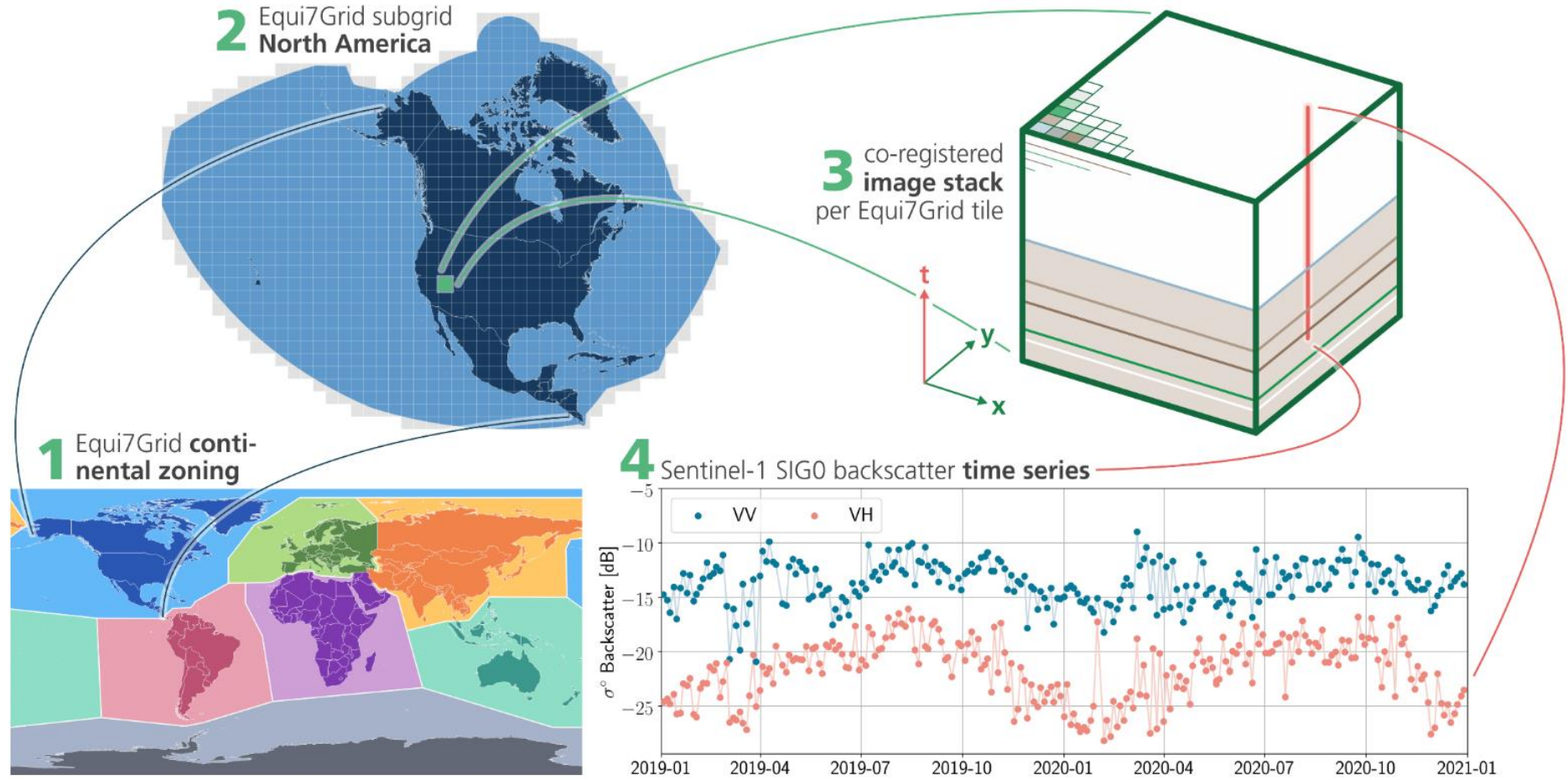
Source: esa.int

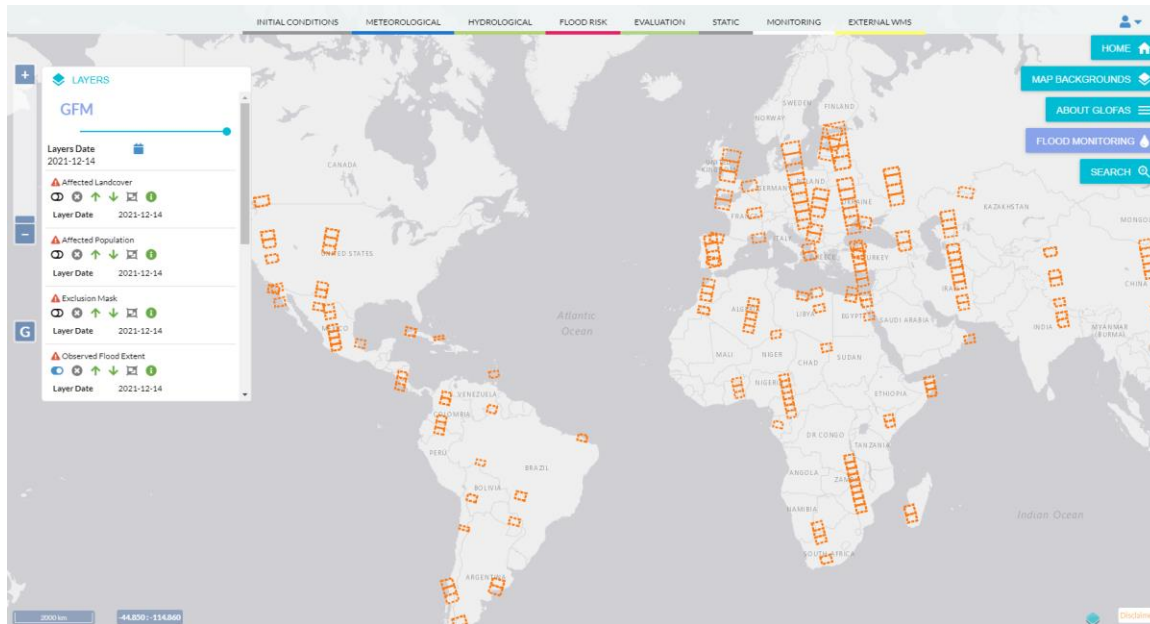
- ✓ Globale geographische Abdeckung
- ✓ 20m räumliche Auflösung
- ✓ Visualisierung ca. 12 Stunden nach Aufnahme der Bilddaten
- ✓ 11 Produkte aus 4 Kategorien



DATAcube SYSTEM & EQUI7GRID

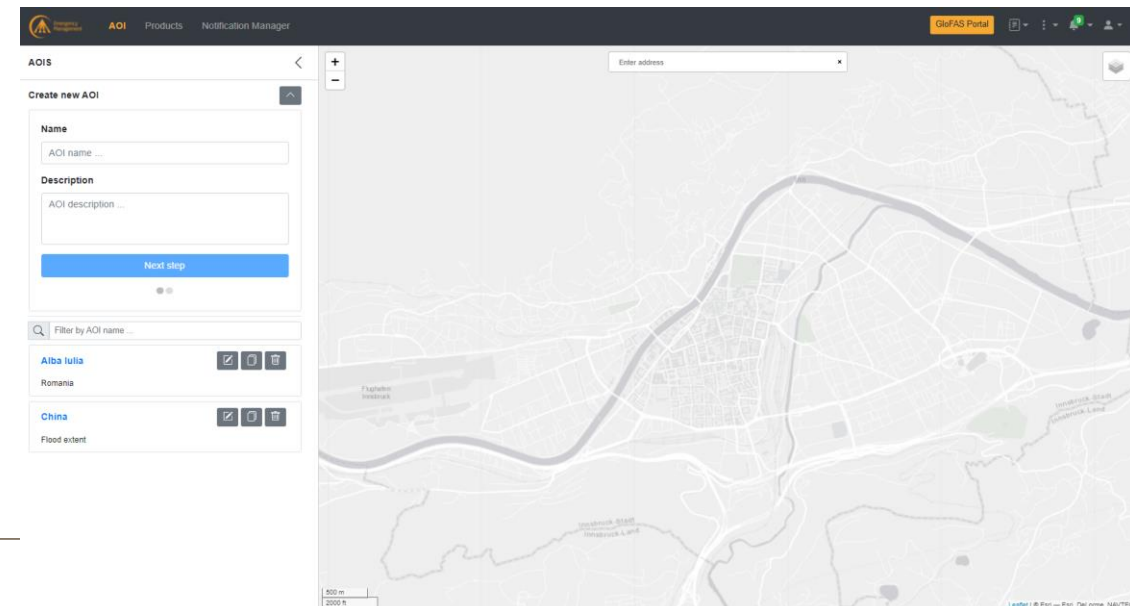
Sentinel-1 ARD datacube: Concept of **Equi7Grid data structure** & **time series access** | Example for T3-tile over the USA



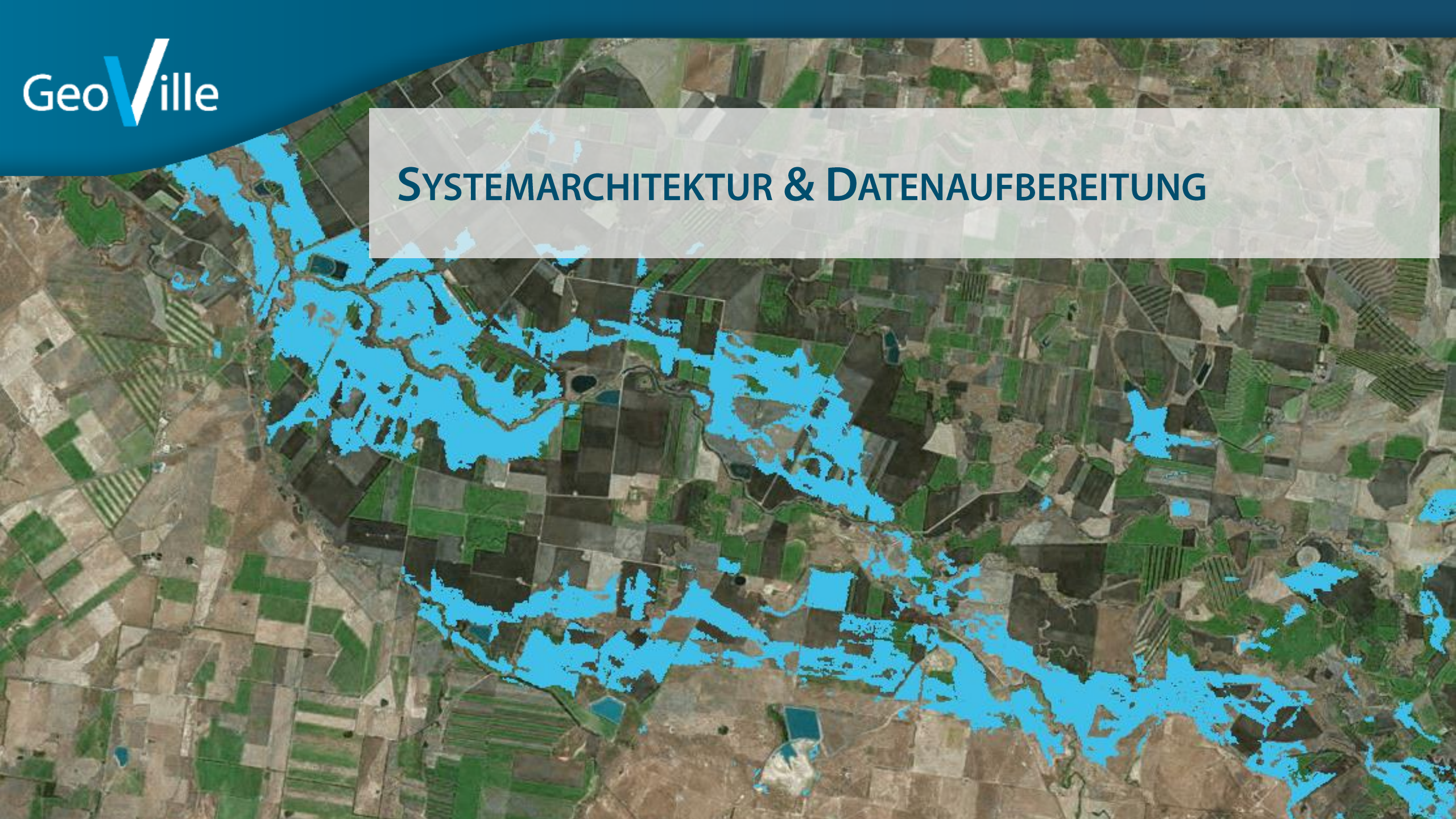


✓ Web Map Service mit zeitlicher Ebene (WMS-T)

✓ Web-Applikation für Produkt-Download und Konfigurationen



SYSTEMARCHITEKTUR & DATENAUFBEREITUNG



| GFM Backend API | GFM GeoServer | GFM Frontend | GFM Datenaufbereitung |
|--|---|---|---|
| RabbitMQ <ul style="list-style-type: none"> • API logs read / write | GeoServer <ul style="list-style-type: none"> • Visualisierung der Produktdaten als WMS-T | VueJS <ul style="list-style-type: none"> • Frontend Technologie | Python Skript 1 <ul style="list-style-type: none"> • Update der Produktdatenbank • Notification & Twitter |
| PostgreSQL Database <ul style="list-style-type: none"> • Benutzerdaten • Produktdaten • Logs | PostgreSQL Database <ul style="list-style-type: none"> • Image Mosaic Daten • Sentinel-1 Daten | Nginx <ul style="list-style-type: none"> • Web Server für VueJS Deployment | Python Skript 2 <ul style="list-style-type: none"> • Tägliche Erstellung einer akkumulierten Darstellung von Flutevents |
| OwnCloud <ul style="list-style-type: none"> • File sharing • Link generation | Traefik Proxy Server <ul style="list-style-type: none"> • Zertifizierung der Domains • Proxy | Traefik Proxy Server <ul style="list-style-type: none"> • Zertifizierung der Domains • Proxy | |
| Flask Python API <ul style="list-style-type: none"> • OpenAPI Definition | | | |
| Traefik Proxy Server <ul style="list-style-type: none"> • Zertifizierung der Domains • Proxy | | | |

Docker & Docker Compose & BitBucket Pipelines für Deployment

ÜBERBLICK SYSTEMARCHITEKTUR

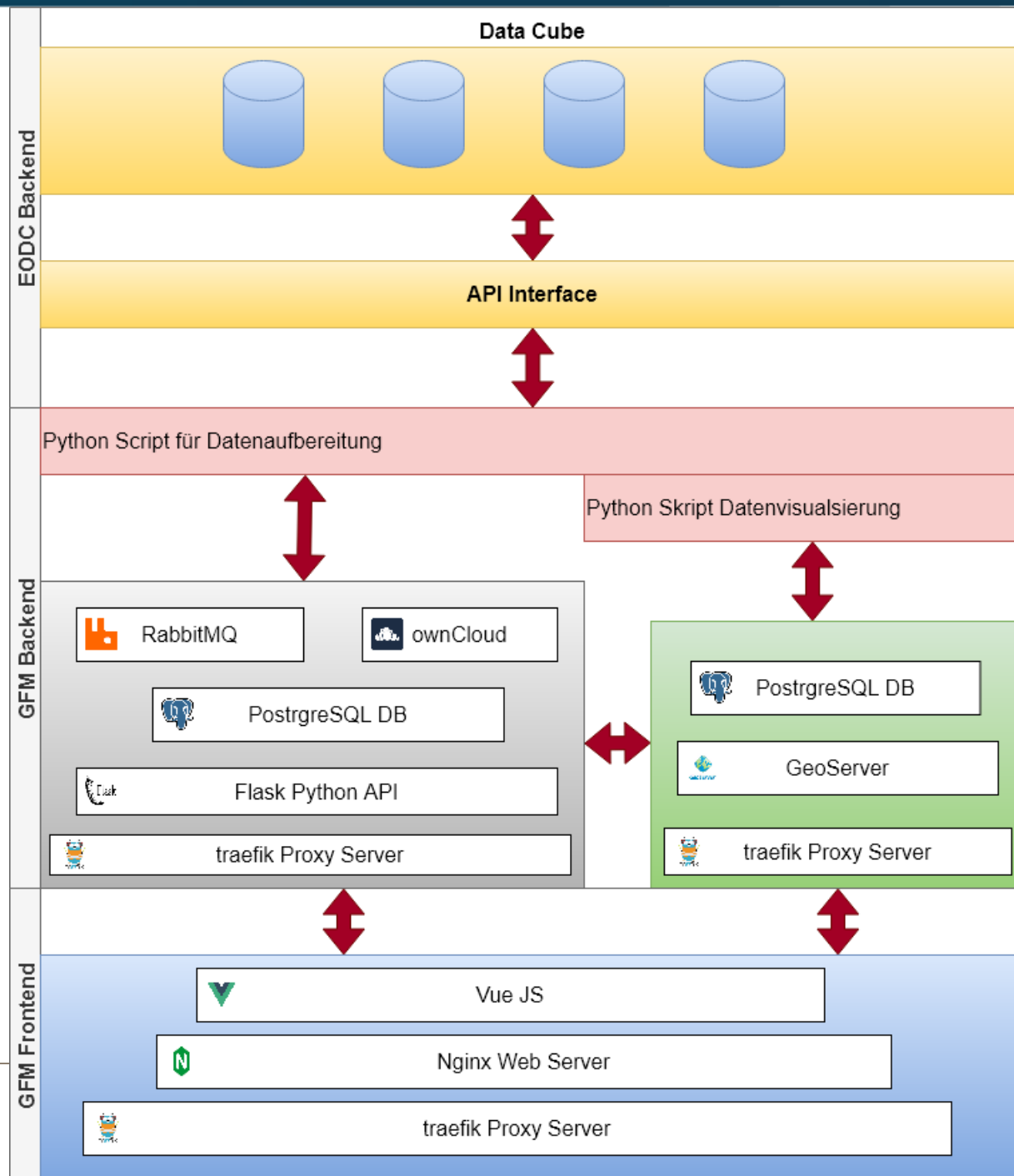






Image Mosaic Store:

- ✓ Für alle Raster WMS-T Layer
- ✓ Konfiguriert mit PostGIS JNDI Verbindung

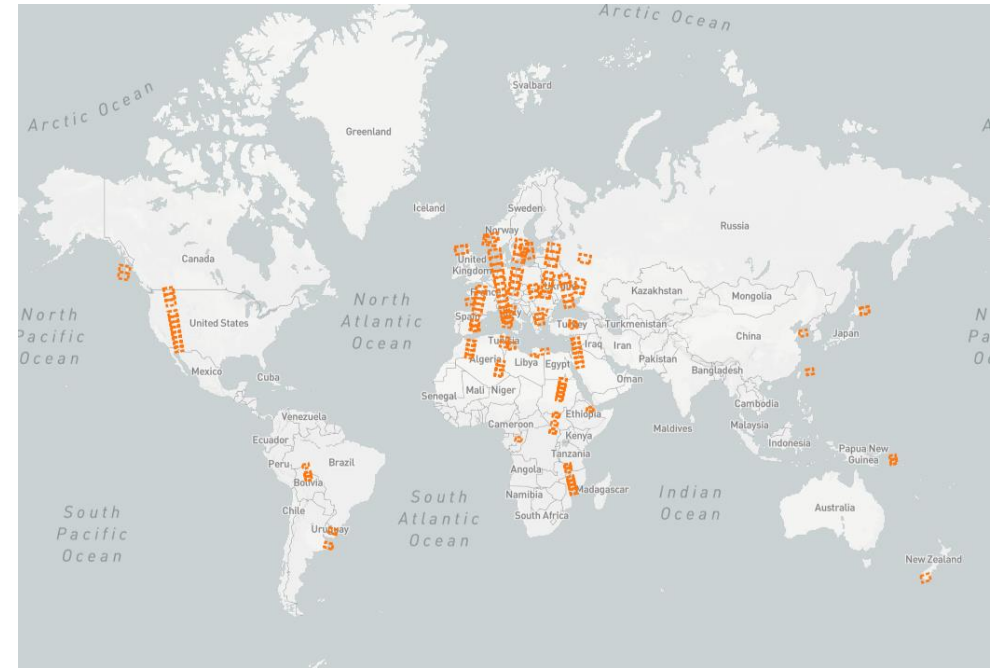
PostGIS JNDI Store:

- ✓ Für alle Vektor WMS-T Layer
- ✓ Auch für zusätzliche Layer zur Visualisierung genutzt

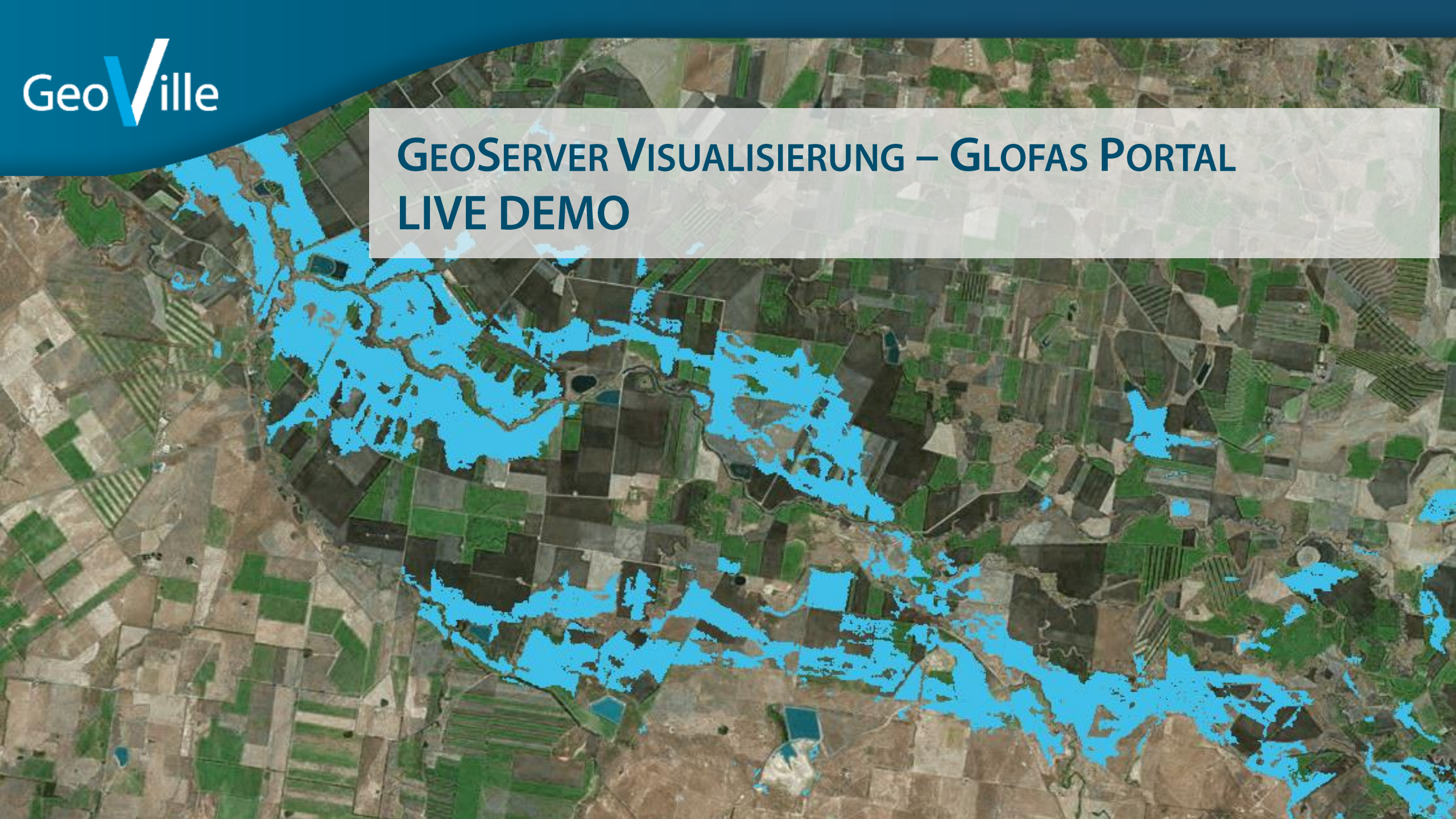
| | |
|----------------------------|----------------|
| affected_landcover | ImageMosaic |
| affected_population | ImageMosaic |
| dlr_observed_flood_extent | ImageMosaic |
| exclusion_mask | ImageMosaic |
| exclusion_mask_test | ImageMosaic |
| geoserver_database | PostGIS (JNDI) |
| list_observed_flood_extent | ImageMosaic |
| observed_flood_extent | ImageMosaic |
| observed_water_extent | ImageMosaic |
| reference_water_mask | ImageMosaic |
| tuw_observed_flood_extent | ImageMosaic |
| uncertainty_values | ImageMosaic |

| | | | | | |
|---|---|---|---------------------|---|-----------|
|  | Affected Population | gfm:affected_population | affected_population | ✓ | EPSG:4326 |
|  | Affected Population Equi7 Bounding Box | gfm:affected_population_equi7_bbox | geoserver_database | ✓ | EPSG:4326 |
|  | Affected Population Footprint | gfm:affected_population_footprint | geoserver_database | ✓ | EPSG:4326 |
|  | Affected Population Stacked Points Overview | gfm:affected_population_stacked_points_overview | geoserver_database | ✓ | EPSG:4326 |

TEMPORALER ASPEKT BEI DER VISUALISIERUNG



**GEO SERVER VISUALISIERUNG – GLOFAS PORTAL
LIVE DEMO**



Storage:

- ✓ Täglich 250-500 erfasste Events
- ✓ Ca. 1 TB an Daten pro Monat
- ✓ Vorgeschlagener Kompressionsalgorithmus nicht mit jeder GDAL Version verfügbar

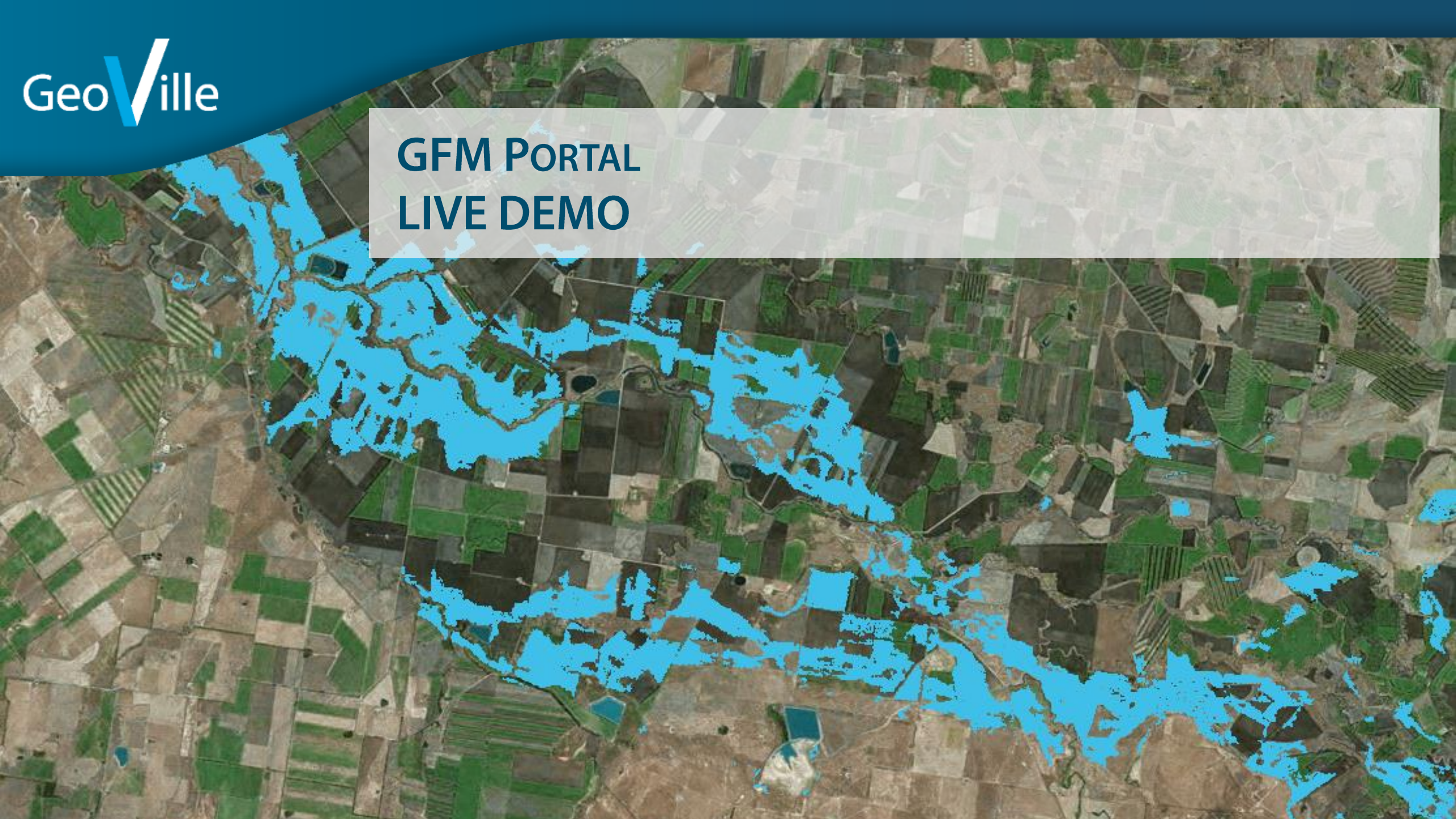
Equi7 Koordinatensystem & Pixel Shift:

- ✓ GeoServer Image Mosaic Plugin

Beta-Version Status:

- ✓ Noch keine konkrete Strategie, wenn Copernicus/Sentinel Hub keine Daten liefern

**GFM PORTAL
LIVE DEMO**



An aerial satellite view of a rural landscape, likely a valley or floodplain, showing a grid of agricultural fields in various shades of green and brown. A prominent cyan-colored overlay indicates a flooded area, following a winding path through the fields. In the center of the image, there is a semi-transparent white rectangular box containing two lines of blue text, each preceded by a checkmark symbol.

✓ <https://www.globalfloods.eu/>
✓ <https://gfm.portal.geoville.com/>

An aerial photograph of a river delta, showing a complex network of channels and distributaries. The water is a light blue-green color, and the surrounding land is a mix of green and brown. A semi-transparent blue overlay covers the top-left and bottom-right corners of the image.

Thank you!

For further information please visit our website or contact us: seewald@geoville.com or geoville.com

GeoVille

Information Systems and
Data Processing GmbH