Water Bodies Detection

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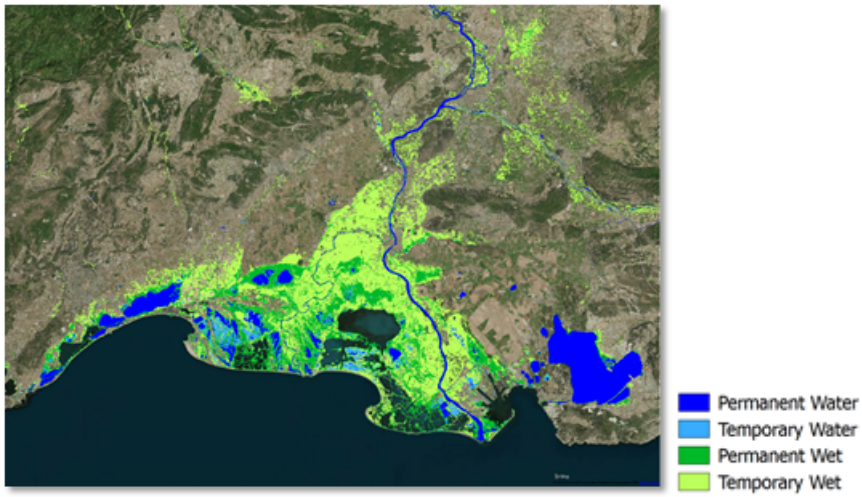

Detailed water and wetness classification (Source: GeoVille)

Category

☑ Product Development	☐ Product Sales	☑ Underwriting	☑ Loss Adjustment	☐ Claims Handling

PRODUCT DESCRIPTION

This product identifies open water bodies, including natural lakes as well as man-made reservoirs such as ponds or lakes and wide rivers showing their extent. Furthermore, changes in water body outline can be monitored over a period of time to detect seasonal changes.

Analysing the frequency in periodical water masks based on time series allows to monitor any changes of water body extents over time as well as the frequency of water occurrence. High accuracy is reached due to the contrast in radar backscatter from open water surfaces and land.
This service may be used for product development, underwriting and loss adjustment purposes.

PRODUCT SPECIFICATIONS

Main processing steps

The product is derived by applying a suite of dynamic water detection processing chains optimized for various target areas. The production workflows mainly operate on Sentinel-2 time-series imagery (optical) and Sentinel-1 Synthetic Aperture Radar (SAR) data but can also applied to many other optical and SAR data for historical analysis. Individual processing chains are applied to these data inputs and their results are combined using a rule-based fusion algorithm that ensures the detection strengths of each sensor are incorporated into the final product.

Input data sources

Optical: Landsat-8, Sentinel-2, VHR imagery

Radar: Sentinel-1

Supporting data:

Spatial resolution and coverage

Spatial resolution: 10 – 500 m

Coverage: global

Availability: globally available

Accuracy / constraints

Thematic accuracy: > 95% accuracy / limitations for densely forested areas

Spatial accuracy: Absolute geolocation is constantly monitored for S2A and S2B. The long-term performance is close to 11 m at 95% for both satellites.

Limitations

Topography is a major issue in mountainous regions due to geometric and radiometric effects causing radar shadow and thus false detections.

Frequency / timeliness

Frequency: monthly to multi-annual; observation may be required over a specified period

Timeliness: within 3 days after last satellite pass

Delivery / output format

Data type: raster and vector formats

File format: GeoTIFF, Shapefile

Accessibility

Near real time water and wetness information is commercially available on demand from EO service providers. A water and wetness layer for Europe for the status years 2015 and 2018 taking into account the occurrence of water and wet surfaces over the period from the last 7 previous years is publicly available through the Copernicus Land Monitoring Service (https://land.copernicus.eu/pan-european/high-resolution-layers/water-wetness).

CHALLENGES ADDRESSED - USE CASE(S)

Product Development:

- Market analysis
- Elaboration of crop profile: Field crops, vegetables, horticulture, greenhouses
- Elaboration of livestock profile: Cows, sheep, pigs, poultry
- Radar data (eliminated cloud cover effects)

Underwriting:

- Seasonal portfolio monitoring
- Online platforms or easy-to-use interfaces integrating various data sources (e.g. vegetation stress, field boundary changes, comparison, etc.)
- Risk / crop zoning
- Crop calendar and practices
- Regular assessment of risk pricing and product rating

Loss Adjustment:

- Regularly updated consistent long-time series of reliable data for index insurance
- Benchmark physical field observations against yield loss detection (e.g. product calibration)