What data can remote sensing offer you

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RS can support ecosystem accounting

- Measuring the extent of ecosystems
  - Imaging large and remote areas
  - Change in extent often (not always) result in land cover change
    - Repeatability of objective measures is a key for change detection

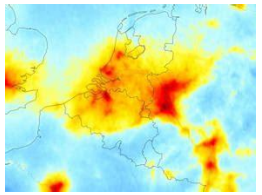
- Measuring the status of ecosystems
  - Direct measure of forest structure with LIDAR
  - Indirect measure of vegetation height by photogrammetry
  - Estimate land use intensity of grasslands with Sentinel-1&2 time series
  - Estimate biophysical variables

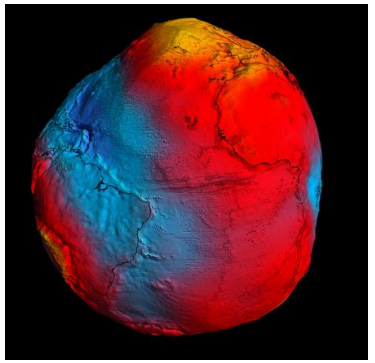
Remote sensing doesn’t make miracles

- A different way to observe
  - Also sees the invisible
    - Infra-red, thermal, microwaves
  - Don’t see everything visible
    - Undercover vegetation, small elements, cloud and shadows
- Energetic compromise
  - Spectral resolution vs spatial resolution
    - ➢no fine resolution for everything
- Cost compromise
  - Many small platforms vs a few big platforms
    - ➢Quality difference
    - ➢Temporal resolution difference

Remote sensing offers a large diversity of scientific and commercial mission

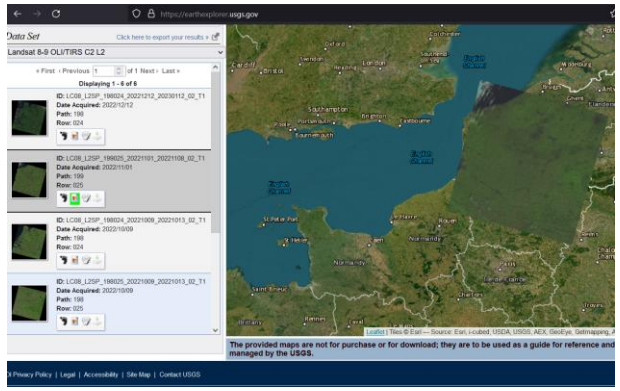
- Very high spatial resolution (better than 1 m)
  - Worldview, Pleiades, Ikonos, Quickbird…)
  - Don’t forget planes and UAVs
- LIDAR (= Measuring distance with a laser beam)
  - On planes
  - On satellite (IceSat, GEDI)
- SAR (= Synthetic Aperture RADAR)
  - Water cloud structure, seeing through the clouds
- Fancy ones
  - Night images, gravity, hyperspectral…

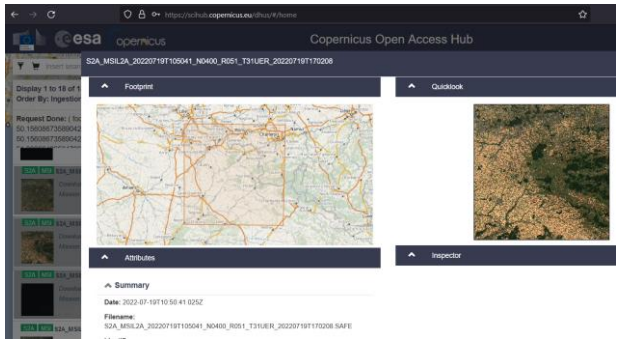




Monitoring relies more on operational missions

- Main high resolution optical missions
  - Landsat 8-9 : 30 m with 8 days revisit (include thermal)
    - https://earthexplorer.usgs.gov/
  - Sentinel-2 : 10 m with 5 days revisit (include SWIR)
    - https://scihub.copernicus.eu/dhus/#/home
  - Planetscope : 3 m with 1 day revisit
    - Not free, but ESA grants access for specific research projects
- Main long term global time series
  - MODIS
  - SPOT VGT/PROBA-V/Sentinel-3





Useful indices available on time series

- Ocean color
  - MODIS-based indices (EarthExplorer)
  - Sentinel-3 OLCI (https://data.eumetsat.int)
- Terrestrial indices
  - Vegetation indices (https://www.wekeo.eu)
  - Several other time series (snow, fire…)

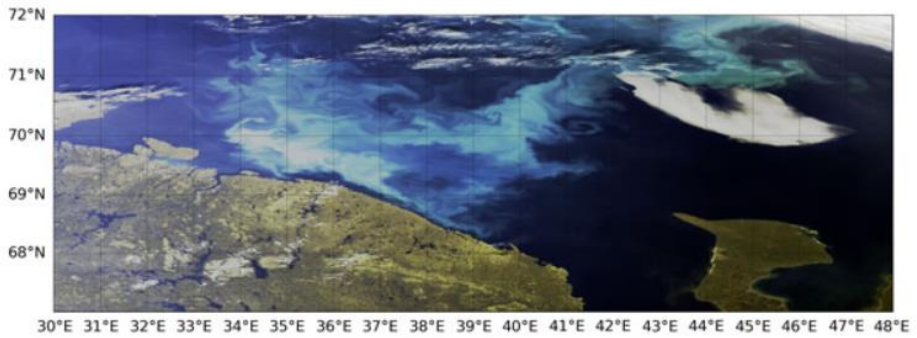
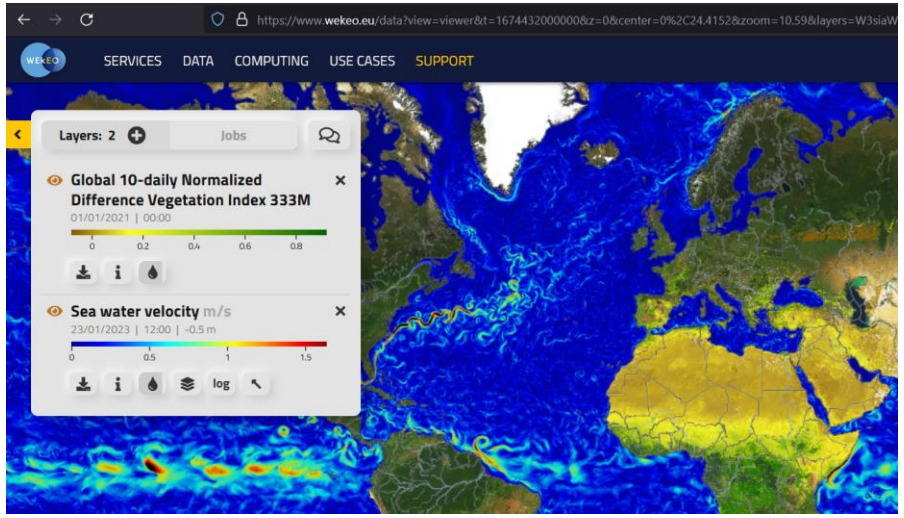


Figure 1: Coccolithophores in the Barents Sea, using Sentinel-3A OLCI Level 1 data from 30 July 2018.



Global datasets give you the choice

- More and more data flows
  - From single products to near real time maps
- Usually with a limited thematic precision
- Not always designed for change detection

Copernicus services provide a large array of European datasets

- Corine Land Cover
  - Legacy product
  - CLC + (currently only the backbone is available)
- Thematic layers
  - Wetlands, water, grasslands, imperviousness, forest
- High resolution layers
  - Riparian, coastal, urban, Natura 2000

Regional portals provide high resolution data

- WalOnMap
  - https://geoportail.wallonie.be/walonmap
- Geopunt
  - https://www.geopunt.be/
- URBIS
  - https://datastore.brussels/web/urbis-download

- Orthophotos
- LIDAR
- Thematic data

Do it yourself solutions for specific tasks

- Google Earth Engine
  - https://earthengine.google.com/
- Sepal
  - https://docs.sepal.io/en/latest/
- Wekeo
  - https://www.wekeo.eu/
- Terrascope

Validation is the hidden cost of map production

- There is no perfect product
- Don’t assume that you know what the legend means
- Key quality indices are necessary to manage uncertainty
  - Overall accuracy : the probability that any pixel of the map is well classified
  - User acc. : the probability that a pixel with a given label is well classified
  - Producer acc. : the probability that an item of the legend is well classified

Lifewatch products integrate several information

- Uclouvain.be/lifewatch
- Ecotopes and 2m land cover for Belgium
- Ecopatches and 10 m land cover for Europe