Emppirical methods can produce relatively accurate maps of broad benthic habitat types such as red, green or brown macro-algae, live coral, sea grass beds, sand and other bare substrates. Where survey data is limited or not obtained near-simultaneously with the satellite image, inversion may still be relatively reliable, particularly if initial analysis of classification results draws on the experience of local experts familiar with the area. Analytical inversion, based on radiative transfer modelling, can simultaneously retrieve water depth and bottom type from the satellite data alone, but the processing is time consuming, and accuracy may be low and hard to assess in optically complex coastal waters.

The service will be avaiable for selected regions, with priority given to areas where local scientific support can assist with interpretation and/or supporting in situ data. Standard spatial resolution is 10m, but 1-5m resolution is available for specific surveys of patchy environments, where the user agrees to bear the cost of acquiring commercial data and support the mapping with in situ surveys.

Frequency of map updates will depend on the application. For spatial planning a single map showing maxiuum extent of cover by different habitats may be suffient. Updates may produced annually for managment purposes. In regions with strong seasonality two to four products per year may be necessary. Baseline and impact maps may be produced on request for specific events such as tropical storms or periods with high coral bleaching risk.
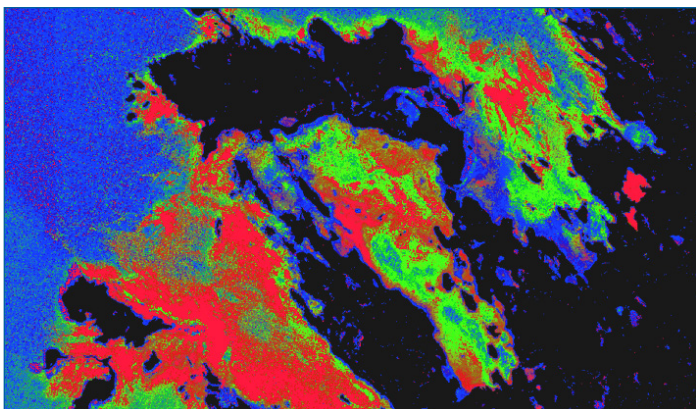
Benthic habitat map of Vilsandi National Park (Estonia) derived from a Sentinel-2A image acquired 13 April 2018, atmospherically corrected with the C2RSS and processed with the SWAM analytical model. Bottom types are presented as probabilities between 0% and 100% where red is sand, green is green algae, and blue is red and brown algae.

DESCRIPTION

Maps of benthic habitat types - macroalgae, live coral, sea grass beds, sand and other bare substrates - are derived from Sentinel-2 data at 10m resolution.

The maps are most reliable when supported by data from in situ surveys. Accuracy decreases with depth and increasing water turbidity.

USE

› Current distribution of shallow water benthic habitats.

› Area and extent, patchiness and density.

› Change detection and status assessment.

› Decision support for management of marine parks.

› Assessing impacts of coral bleaching events or storms.

INPUT PRODUCTS

› Sentinel-2 MSI data.

› If available: bathymetry; water quality; benthic survey data.

SPATIAL RESOLUTION AND COVERAGE

› Local to sub-national at 10m resolution.

› 1-5m resolution on request for specific projects when users covers the cost of commercial data acquisiton.

› Shallow areas to 15m depth (in clear water).

BENEFITS

Improved strategy and decision making:

› Better understanding of coastal habitat dynamics.

› Assess the impact of natural and human forcing.

› Identification of sensitive habitats in need of protection.

DELIVERY FORMAT

› GEO-TIFF, NetCDF

FREQUENCY

› Baseline map with annual updates.

› More frequent for regions with strong seasonality.

› Before and after' maps for environmental impact assessment of specified events.

Sentinel-2 image of Heron and Wistari Reefs taken at June 24, 2017.
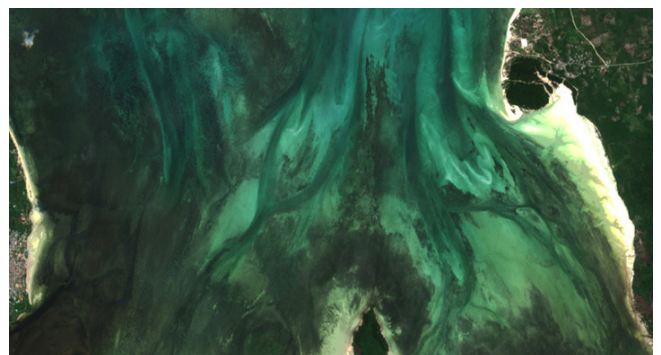
Sentinel-2 image of sea grass beds in Chakwa Bay, Tanzania, 6 June 2018.