SHORELINE MAPPING AND CHANGE DETECTION

DESCRIPTION

Shoreline maps at 10m resolution for selected locations, with estimated locations for high and low water lines. In areas with a flat topography, a second map of intertidal bathymetry will be available.

For locations where the coastline changes rapidly, maps may be updated annually. 'Before and after' maps for specific locations are available on request, as part of a wider environmental impact assessment service.

USE

› Updates to existing charts and maps.

› Defining legal and other boundaries.

› Assessment of coastal change dynamics.

› Risk mapping for coastal hazard management.

› Coastal zone planning and development.

› Monitoring impacts of coastal defence initiatives.

INPUT PRODUCTS

› Sentinel-1 SAR and Sentinel-2 MSI data

› Tidal model output

› Sea level data from altimetry and tide gauges

SPATIAL RESOLUTION AND COVERAGE

› 10m resolution for up to 100km coverage per map

› Coverage determined in consultation with stakeholders

BENEFITS

Improved strategy and decision making:

› Safety of navigation

› Understanding of shoreline change dynamics

› Informed planning of coastal defences

› Safety for coastal populations

› Reduced risk to buildings, business and infrastructure

DELIVERY FORMAT

› GEO-TIFF, NetCDF

FREQUENCY

Frequency of the mapping is determined in consultation with stakeholders to meet local needs.

› Baseline mapping.

› Annual update to maps for rapidly changing coastlines.

› Seasonal maps where change dynamics indicate a need.

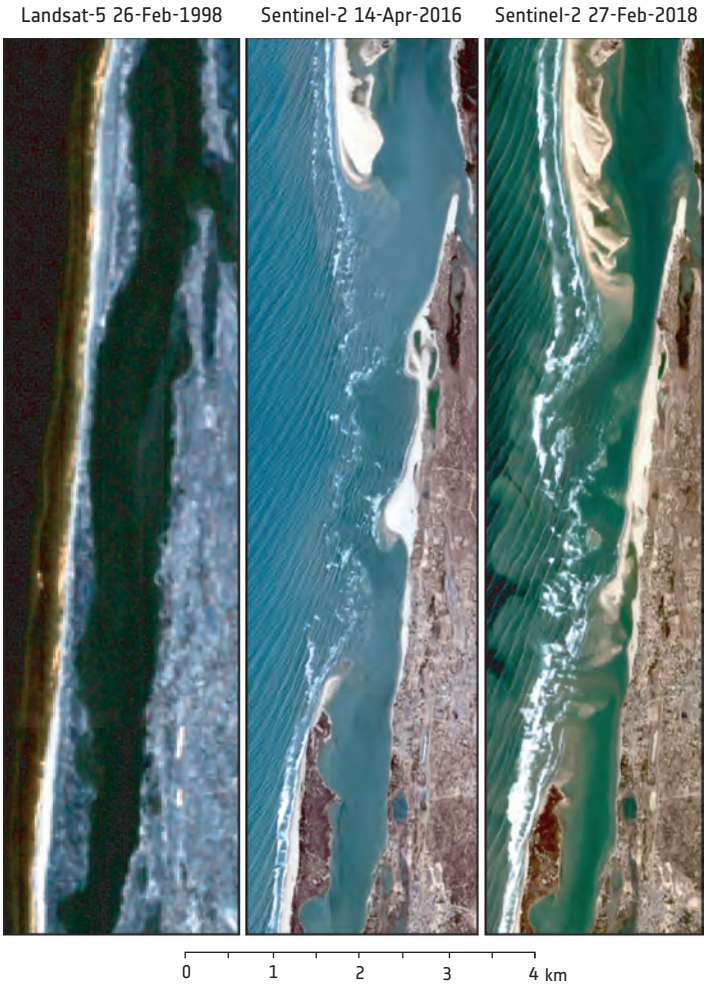
Right: Coastline changes in Saint-Louis, Senegal. After the flood of October 2003, an artificial breach was opened in Langue de Barbarie in order to release flood water. Since then the city has not been flooded by the river because the wide breach allows the water to escape, but tidal range has risen sharply. Currents and waves now erode the coast south of the breach, while sediments are deposited to the north, moving the breach southward at a rate of around 1km per year.

Coastal erosion can cause flooding, rock falls, landslides, loss of land and damage to infrastructure. Sediment deposition and moving sandbanks obstruct port inlets and reduce maritime safety. Regular monitoring of shoreline changes allows a better understanding of the processes involved and helps to identify susceptible locations, so that measures may be taken to reduce risk to people, businesses and infrastructure.

This service will deliver coastline maps for selected regions identified in consultation with stakeholders and local experts. The method works by identifying land-water boundaries in time series of SAR data and high-resolution optical images. Tidal correction will be necessary, in order to establish locations for high and low water shorelines, and the location of mean sea level. This is particularly important for locations with flat topography. In such locations, the data processing may yield a secondary map of intertidal bathymetry. The tidal correction will be based on available tidal models, supplemented with available tide gauge data and sea level measurements from coastal altimetry.

The coastline maps will be updated annually. A comparison with the baseline map will reveal locations of shoreline change due to coastal erosion or sediment deposition. The maps may thus be used to monitor regions that are known to suffer rapid shoreline change, for example to establish annual erosion/deposition rates, and also to identify new locations where shoreline changes occur.

Langue de Barbarie, Senegal



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