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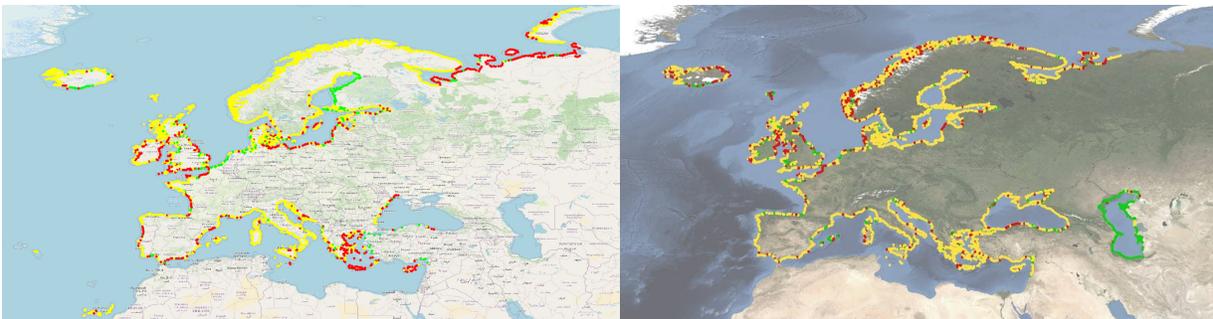
EMODnet Geology

New pan-European shoreline-migration map based on field measurements and aerial photography, for improved planning and decision-making

Our coasts play a key role in Europe's economy, safety, coastal-zone environment and well-being. One of its key characteristics, the ever-changing land-sea interface, has been monitored in the field and from the air for more than a century, and with satellites since the 1970s. This shoreline is continuously shaped by wind, waves, tides, and human influence. Shoreline change is strongly influenced by climate change. Coastal erosion in particular is exacerbated by global sea-level rise, which will put Europe's shorelines – and others around the world – at increasing risk in the coming years. Knowing how, and at what rate, our coasts are changing is a crucial step to their sustainable management, supporting knowledge-based decision-making and thus underpinning the EU Strategy on adaptation to climate¹. This information helps the EU move towards becoming a climate-resilient society.

The new EMODnet Geology shoreline-migration map, released today and freely accessible from the EMODnet Geology portal (<http://www.emodnet-geology.eu>), allows policy makers, together with national and regional coastal managers, to determine large-scale coastal behaviour and identify areas of rapid change. It is based on field measurements and aerial photography, and covers time periods up to decades. The map is particularly valuable for cliffs, which are prevalent along European coastlines, particularly since state-of-the-art satellite-monitoring methods aren't yet suitable for imaging erosion of non-sandy types of coastline.

"Effective planning for adaptation to climate change must be underpinned by high-quality data. The new EMODnet shoreline-migration map provides the most up to date and comprehensive information for coastal and marine industries, decision-making bodies and scientific research. Providing pan-European, regional and local data, it helps enable efficiencies in planning and decision-making processes for a sustainable future", stated Cherith Moses, Professor of Geomorphology at Edge Hill University (UK).



Pan-European overview maps of shoreline migration (red = landward; yellow = stable; green = seaward). Left, the updated map based on field data and aerial photography. Right, the 2019 map based on satellite monitoring. The map on the right has more complete coverage but tends to overestimate erosion of cliffed coasts.

This important data product allows users to visualise pan-European coastal behaviour at different spatial scales. A built-in search and zoom functionality enable online users to distinguish areas of

¹ <https://climate-adapt.eea.europa.eu/eu-adaptation-policy/strategy>

landward migration (erosion or submergence), stability, and seaward migration (accretion or emergence). The underlying downloadable dataset offers additional information on measured or derived annual migration rates. The map is an update of the 2004 EUROSION map, now with additional spatial coverage. It should be seen as a companion product to the EMODnet [shoreline-migration map based on satellite data](#), published in 2019.

The map also provides the general public with a useful insight into one of Europe's most obvious climate-change effects: loss of land through coastal erosion. Most importantly, field and satellite data can now be compared on a pan-European scale, highlighting corresponding spatial patterns as well as prominent discrepancies that require further work to optimise and align the respective methodologies.

"This new EMODnet map adds real value for understanding cliffed coasts as well as muddy shorelines. Whilst the holy grail for consistent and reliable shoreline-migration mapping has yet to be found, this is a great step in the right direction, complementing pan-European satellite-coverage data products", commented Sytze van Heteren from the Geological Survey of the Netherlands.

Background information

Seventeen years after the publication of the much-used EUROSION map, the EMODnet Geology team is releasing a second update of this important data product on shoreline migration. The new map released today is almost complete, with only the Caspian Sea, much of the Black Sea and small parts of the Mediterranean Sea still forthcoming. Also, many older datasets have been replaced by more recent or accurate information. At a local scale, results are rendered in their original format, as line segments. At regional to pan-European scales, these line data are simplified into point data by averaging values for shoreline stretches of increasing length.

The original spatial resolution of classified map segments depends on the method used to analyse shoreline change. Where aerial photos were used, the scale can be as fine as 1:5000. Where field-monitoring data were used, the distance between profile lines may be tens of kilometres. For many rocky areas, data are absent altogether and geological expert knowledge was used for making informed assessments of shoreline change.

Visualising pan-European shoreline change means making choices, like defining when a shoreline is classified as stable. Using zero change or a small range of values is more appropriate for hard rocky coasts, while a larger range of values is preferable for naturally dynamic sandy barrier islands that may recover following an erosion event. As a compromise for the web service, annual change rates of +/- 0.5 m were selected for the stable category. The new map can also be downloaded as a GeoPackage, providing users with the capability to adjust this range.

The EMODnet Geology consortium hopes that by releasing this updated companion product to the 2019 earth-observation dataset, coastal experts and other end users will be able to discover and communicate possibilities and limitations of both maps, and to help raise awareness of cliff erosion in particular.

To access the shoreline-migration map, visit the EMODnet Geology portal:
www.emodnet-geology.eu

Please note that EMODnet is in the process to provide a central access point to its data and data products through the Central Portal in the coming months. More information will be provided soon.

Source and information:

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