**At a glance:**

**Title:**
Copernicus Evolution and Applications with Sentinel Enhancements and Land Effluents for Shores and Seas

**Instrument:**

H2020

**Total Cost:**

1.999.332’50 €

**Duration:**

36 months

**Start Date:**

2016 – 11 – 01

**Consortium:**

9 partners from 5 countries

**Project Coordinator:**

Prof. Agustín Snchez-Arcilla

**Project Web Site:**

ceaseless.barcelonatech-upc.eu

**Key Words:**

Satellite data, Sentinel, Assimilation, High resolution modelling, Coupling

## Summary of the context

The main settings for the CEASELESS project are:

a) New wealth of satellite data becoming available (with emphasis on the Sentinel family), that cover a wider range of oceanographic and even coastal processes.
b) New (higher) resolution and prediction capabilities for met-ocean variables, that allow coupling and assimilation at unprecedented scales.
c) New coastal zone requirements (e.g. wind profiles for renewable energy) or applications (e.g. coastal water quality) that prompt new advances for coastal oceanography.

## Overall objectives of the project

The potential of new products derived from CMEMS data (simulated and observed), incorporating a wide range of coastal processes, assimilation and metrics is at the core of CEASELESS, where the main overall objectives are:

- Recovery and application of new Sentinel data (S-1 winds, S-2 visible/infrared products related to water colour and bathymetry and S-3 altimetry) to derive a spatial structure for coastal processes.
- Assimilation strategies that better condition data in coastal areas, necessarily limited in spatial scales and therefore with limited “memory” effects for assimilation.

Actual application of met-ocean predictions for selected users in the four pilot sites considered: Danish coast, German Bight, Catalan coast and North Adriatic. This should allow a proof of concept for the new prediction capabilities, highlighting application limits and providing feedback to CMEMS for further developing their coastal dimension.

## Work performed

The CEASELESS project has applied Sentinel data to the selected pilot sites plus North Sea and global oceans, prompting in some cases a demand for new data sets not offered initially (e.g. such as the wind fields in the central Mediterranean, together with high resolution models existing at the participating institutions). This has allowed an efficient testing of unstructured grids so as to better capture coastline irregularities and sea bed geometry and forms. Combining flexible meshes with coupled wind-wave-current models provides a challenge that can only be solved with a joint support of in-situ observations and the new Sentinel data, with horizontal resolution going down to10m (e.g. in Sentinel-2) and a much higher frequency for revisit times (order 1 week), when compared to previously available remote sensing information.

The new Sentinel data, together with other existing satellite measurements (e.g. Jason-2, Jason-3, CryoSat-2, SARAL/AltiKa or Envisat) are supporting a much needed spatial structure to complement the temporal variability captured by in-situ (pointwise) time series. The CEASELESS project is analysing the most efficient approaches for a) Global, b) North Sea and c) Mediterranean met ocean conditions to reduce and make explicit the error level associated to coastal predictions and how this varies with distance to the shore and with prediction horizon.

These new coastal products are being tested and interactively adapted to suit the practical requirements for a number of selected applications:

- Risk assessment in the North Sea (e.g. under the impact of Atlantic storms) and also for the Mediterranean (e.g. under Medicanes for the North Adriatic).
- Offshore wind farms covering the meteo-oceanographic components (e.g. wind or wave loads, supply operations, etc) and even looking at the bed interactions (e.g. scouring in front of structures).
- Search and rescue applications considering meteorological and oceanographic factors and how they affect trajectories, boat operations or safety.
- Water quality applications including aquaculture in the North Sea and Mediterranean but also bathing water quality in areas conditioned by land discharges.

## More information

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| Geographic Resources Analysis & Science – GRAS | DK |
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