

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



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PREAMBLE

Introduction

This document describes the reasons for collaboration and information exchange foreseen between beneficiaries participatory and third parties related to the CEASELESS project.

CEASELESS MoA is based on the CEASELESS Description of Work (hereafter DoW) approved by the Commission, which is included as Annex I in this MoA.

It is not the purpose of the MoA to create a legal entity (partnership, company, etc...) independent from the Parties.

ARTICLE 1: SCOPE

The purpose of the MoA is to set-up the preliminary terms of understanding between the parties in order to facilitate the negotiations on a more detailed co-operation scheme between beneficiaries and third parties participating in the CEASELESS project subject to the terms and conditions detailed hereunder.

It is expressly understood and agreed that the provisions of this MoA only constitute the indication of the Parties' common interest to co-operate with each other regarding the subject as described hereunder. Except for the obligations expressly laid down herein, i.e. the Duty of Non-Disclosure of Article 2, nothing contained in this MoA shall be construed either as binding nor as compelling either Party to enter into any contractual relationship. No Party may claim any indemnity from the other Party/Parties should the Parties fail to reach an agreement on the contemplated cooperation.

The parties hereby acknowledge having the following interests with respect to the establishment of a collaboration:

Objectives and collaboration plan on CMEMS coastal extension, spanning research activities, dissemination and spreading of excellence activities

The conflict between environmental sustainability and socio-economic activity, becoming increasingly contentious and politically charged for squeezed littoral zones, will benefit from a more informed/effective management using the locally tailored predictions provided by CEASELESS as a candidate for an extension of Copernicus services towards the coast. The CEASELESS project provides a new level of knowledge for assessing socio-economic/ecosystem impacts and interactions, facilitating the maintenance of environmental status and risk levels in the narrow border between land and sea that is not adequately covered by present RS observations nor operational simulations, but where most of the conflicts and met-ocean impacts take place. This will be achieved by improving the confidence (explicit uncertainty) and social awareness for the proposed Copernicus coastal service, through combined observations/simulations that enable facing the progressively more difficult (population increases in the coast exceed those for other areas) and costly (climatic variability and expected acceleration in change) management of the littoral.

CEASELESS products consider, where relevant, the land discharge as a boundary condition together with 3D river fluxes and the "distributed" continental run-off. Moreover, it considers coastal scale processes, particularly those relevant in geographically restricted domains (coasts with harbours or river mouth areas).

The CEASELESS project aims at providing an improved operational service for coastal areas and to generate added value for shelf and regional scale predictions from GMES Marine Core Services. This will be achieved by the project advances in the following areas:

1. Data related (limitations in satellite coverage/continuity, interruptions of coastal observatories, delays in Sentinel data availability, inconsistent multiple data sources in Copernicus).
2. Model related (shorter than expected memory intervals, inconsistent error metrics, unexpected behaviour in parameterizations, uncertainties in land boundary conditions).
3. Operationality related (contrasting local performance of measurements/products, inertia of operational communities, “insufficient” offshore boundary conditions, compatibility with Copernicus service architecture).
4. Application related (practical constraints to introduce CEASELESS in working users’ working environments, users’ confidence due to insufficient validation / inadequate delivery, delays in CEASELESS production).

CEASELESS has contributed to bridge the gap from shelf predictions to local (river mouth or harbour/beach scales) simulations required at the coastal zone. This will result in a wider demand for operational services and an enhanced use of in-situ and remote observations. Such improvements (services and expertise) will require the progressive application of CMEMS products in coastal research and engineering applications.

CEASELESS proposes introducing in CMEMS the interaction of extreme met-ocean events with coastal infrastructures by incorporating the geometry of coastal/harbour works in the discretizations and, thus, into the predicted fields. This will advance the prediction of coastal vulnerability by combining applications for the emerged (e.g. flooding and erosion) and submerged parts of the coastal profile (e.g. ship routing or aquaculture). CEASELESS will also contribute to link Copernicus to EU and national legislation by promoting the application of data-products to European Union directives such as the Water Framework Directive of 2000/amending acts of 2001 to 2013 (e.g. water quality in the German Bight and in the North Adriatic), the Flood Risk Directive of 2007 (e.g., Catalan coast and North Adriatic), the Marine Environmental Policy Directive of 2008 (all pilot applications), the Aquaculture Directive of 2006 and amending act of 2008 (e.g. Danish coast plus selected areas in the Catalan coast) and the Renewable Energy Directive of 2009 (e.g. Danish coast). This can be illustrated by the use of CEASELESS products in harbour contingency plans or coastal ICZM plans, leading to a further assessment of a Copernicus service evolution and to an integration road map for a coastal dimension in Copernicus. It will address (see sections 1 and 3 also) the feasibility of implementation into the present service architecture (benefits, costs and limits) in incremental steps, prepared in cooperation with Copernicus service providers to minimize costs and considering the possible co-financing by our end users (e.g. harbour authorities or renewable energy companies) based on the quality of our project results.

Within this context the CEASELESS project has three types of objectives:

1) SCIENTIFIC-ORIENTED

CEASELESS demonstrates the innovation potential of a Copernicus coastal dimension in terms of a) data validation and exploitation (e.g. the side-by-side exploitation of Sentinel-1 products for wind/waves/currents at L-2 with Sentinel-3 products to increase the robustness of a novel product based on the availability of S-1/S-3 measurements), b) modelling parameterizations and calibrations

(e.g. land discharges, wave-current interactions, actual consideration of the free ocean surface rather than an average significantly smaller contact area) and c) assimilation and error metrics (e.g. considering a novel scheme accounting for directional heterogeneities and preferential correlation scales). CEASELESS applies these innovations (user-driven since they constitute the foundation of applications demanded by our selected users) based on an efficient data storage/retrieval/transfer thanks to the concept of dynamic data repositories, regularly updated and supported by a user-friendly “water data portal” (database plus metadata information and post-processing graphic routines). This facilitates coastal applications (proof-of-concept for a coastal CMEMS) by using the derived variables and formats that fit into the working procedures of a wide range of users (e.g. renewable energy companies, harbour authorities and flood management services).

2) OPERATIONAL-ORIENTED

The operational feasibility is considered in terms of a) data availability (different for distinct geographical regions, e.g. coastal observatories and evolving with time, e.g. new Sentinel), b) physical consistency (compatibility in marine/riverine/atmospheric variables or budget constraints imposed by boundary conditions), c) numerical consistency (increasing energy in the simulated fields with high resolution (Warner et al., 2013; Olabarrieta et al., 2012)), d) computational efficiency (hard/software requirements, code compatibility and number/type of processors), e) output suitability (formats, reduction of horizon with increasing spatial resolution). The CEASELESS addresses the different downscaling requirements for wind-wave-current-river models, as a function of model/data availability for the different sites and including the IPR limitations from the participating partners. This allows assessing the application potential of unstructured grids for complex coastal domains and the assimilation/merging protocols for multiple source data in terms of benefits and costs for the selected pilot cases and for an evolution of the existing Copernicus architecture.

3) APPLICATION-ORIENTED

CEASELESS addresses the suitability of the novel Sentinel measurements combined with high resolution simulations for a Copernicus coastal operational service to forecast coastal risks. From in-situ data available and the coupled simulations of wind-wave-current fields for open/shelf waters CEASELESS analyses risks for North Sea and Mediterranean sites, testing the accuracy and resolution of the novel Sentinel-1/Sentinel-3 measurements for regions with complex orography and bathymetry.

CEASELESS explores the suitability of the novel Sentinel measurements combined with high resolution simulations for a Copernicus coastal operational service to forecast energy fields and resource (ecosystem) status. Representative weather patterns have been analysed and characterized considering from mild to high energy conditions, when renewable energy converters can no longer operate and when land discharge can affect aquaculture production. The information derived from high resolution satellite observations, modelled fields and in-situ data provides an unprecedented level of accuracy and robustness evaluating the potential of CMEMS in coastal applications.

CEASELESS considers the suitability of the novel Sentinel measurements combined with high resolution simulations for a Copernicus coastal operational service to forecast optimal ship routing and harbour exploitation under varying met-ocean conditions. The selection and characterization (high resolution) of pulsing events that affect navigation and harbour functionality allows testing the accuracy/resolution/reliability of the novel Sentinel-1 and 3 measurements for wind-wave-current-

surge fields using the full 2D wave spectrum to forecast harbour functionality and ship manoeuvrability again supporting the evaluation of CMEMS extension into the coastal domain.

ARTICLE 2: DUTY OF NON-DISCLOSURE

Protection of Confidential Information

- 1 As used in the MoA the term "Confidential Information" shall mean any information whether of financial, commercial, scientific, or technical nature disclosed by a Party ("the disclosing Party") to a Party receiving the Confidential Information ("the receiving Party") under the MoA, provided, however, that information disclosed by the disclosing Party hereunder shall not be Confidential Information if and in so far as the Recipient can show that:
 - (a) It is already in the public domain by publication or otherwise or becomes available to the public through no breach of the MoA by the receiving Party;
 - (b) It is in the receiving Party's possession prior to receipt from the disclosing Party as proven by its written documents;
 - (c) It is disclosed to the receiving Party by a third party without breach of any obligation of confidentiality;
 - (d) Was or is developed by or for the Receiving Party or any of its Affiliates independently from the disclosing Party's Confidential Information, as proven by contemporaneous written evidence; or
 - (e) It had to be communicated to comply with applicable laws or regulations or with a court of administrative order provided that insofar as reasonably possible the receiving Party shall have informed the disclosing Party of such need and shall have complied with the disclosing Party's reasonable instructions designed to protect the confidentiality of such information.

- 2 Nothing in the MoA shall be construed as compelling a Party to disclose any Confidential Information to the other Party(ies).

- 3 The Confidential Information, all copies thereof and all rights thereto, shall remain the exclusive property of the disclosing Party.
All Confidential Information, whether original or copies thereof shall be promptly returned to the disclosing Party on receipt of the disclosing Party's written request.
The parties undertake to comply with all obligations and policy in respect of confidentiality, publications and dissemination as may be contained in their consortium agreement(s) and other undertakings in the framework of the CEASELESS project.

- 4 The receiving Party undertakes during the term and following the termination of the MoA:
 - to safeguard Confidential Information as it would use for its own proprietary information of like importance (but no less than a reasonable degree of care),
 - to divulge Confidential Information to its personnel for internal evaluation purposes only and on a "need to know" basis and to impose no less stringent confidentiality obligations as those contained herein,
 - not to duplicate or otherwise reproduce Confidential Information except for such copies as the receiving Party may require for internal purposes as aforesaid, provided that all copies shall contain the same proprietary and confidential notices and legends as appear on the original Confidential Information,

- not to use Confidential Information for other purposes than those of the MoA,
 - not to divulge Confidential Information to any other Party to the MoA for any other purpose than the purpose stated in this MoA and/or not to divulge Confidential Information to any other third party, unless and until expressly authorized in writing to do so by the disclosing party.
- 5 The Parties agree that Confidential Information shall be used solely for the purpose for which it was submitted. The receiving Party undertakes not to claim any property right on the Confidential Information of the disclosing Party on the basis of this MoA.
- 6 For each item of Confidential Information, the period of confidentiality shall exist during and following the termination of the MoA unless one of the exceptions as detailed above can be invoked by the receiving Party with regard to the item of Confidential Information concerned.
- 7 For the avoidance of doubt, ownership of Background IPR and Results, as defined in the Grant Agreement, will be governed in accordance with the previously agreed Consortium Agreement and any future agreements as decided between the parties.

Publications and communications

In cases where gained confidential information is to be included in a specific deliverable or other public documents of any kind, prior written authorization must be obtained by the Parties of which the information will be so disclosed.

ARTICLE 3: DURATION AND MISCELLANEOUS

- 3.1. The MoA shall come into force on the date of approval by the Commission.
- 3.2. The MoA shall remain in force until the CEASELESS products require it. The obligation of secrecy as set out in the Article 2, and the provisions provided in the articles 3.2, 3.3 and 3.4 shall however survive termination for a period of 1 year.
- 3.3. Disputes that might arise concerning the MoA shall be settled amicably. In case of disputes for which no amicable solution is possible, settlement will exclusively take place by arbitration in Brussels (Belgium) under the Rules of Arbitration of the International Chamber of Commerce by three arbitrators, or such lower number of arbitrators as the Parties concerned may agree upon in writing, to be appointed under the terms of those Rules. In any arbitration in which there are three arbitrators, the chairperson shall be of juridical education. The award of the arbitration will be final and binding upon the Parties concerned.
- 3.4. The MoA and its effects are subject to and shall be construed and enforced in accordance with the laws of Belgium, without reference to its conflict of law principles.
- 3.5. Each Party shall bear its own costs, fees or other expenses incurred during the term and in connection with the MoA. No financial compensation whatsoever shall be due by either Party to the other Party(ies) under the MoA.

ANNEX I DoW