Plan Overview

A Data Management Plan created using DMPTool-Stage

Title: EUREC4A-OA

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Funder: JPI Climate and JPI Oceans

Template: Digital Curation Centre

Project abstract:

The exchange of heat, water and gas at the air/sea interface is key to regulating the state and evolution of our climate. Sizeable air-sea exchanges of energy and ocean-atmosphere boundary layer processes can occur on short time and small spatial scales. To initiate and support societal actions as a response to climate change, future projections of the climate system require high-resolution coupled climate model simulations. A generic challenge for high-resolution modelling is the need to resolve processes that have typically been parameterized in coarse-grid simulations. Thus, it is becoming evident that a clear lack of process understanding exists to quantitatively evaluate model predictions and projections, and to understand why different models give different answers. EUREC4A-OA will address this issue thorough advancement of understanding of non-linear and small-scale ocean-atmosphere exchanges processes and, in parallel, investigate their representation in coupled climate models of the CMIP Earth System Models (ESMs) family. EUREC4A-OA will leverage from, and contribute to, the ElUcidating the RolE of Clouds- Circulation Coupling in ClimAte (EUREC4A) initiative (Bony et al. 2017) that aims to advance understanding of the interplay between clouds, convection and circulation, and their role in climate change. The core of EUREC4A is a one-month (Jan/Feb 2020) field study in the western tropical North Atlantic Ocean where high-resolution, synchronized observational data will be collected using cutting-edge technology on airplanes, ships, autonomous vehicles, augmented with the Barbados Cloud Observatory time series. EUREC4A-OA will add the ocean component to EUREC4A by investigating heat, momentum and CO2 exchange across the air/sea interface using innovative high-resolution ocean observations and a hierarchy of numerical simulations. Our focus is on meso- and submesoscale ocean dynamics and related atmospheric

boundary layer processes. EUREC4A-OA is focused on the tropics where the primary external time scale affecting air-sea exchange is the diurnal cycle. However, the internal ocean and atmosphere dynamics convolute the diurnal, seasonal and longer time scales to climate variability. EUREC4A-OA will make use of significant observing infrastructure investments from the participating countries, augmented with cutting edge third-party autonomous observing platforms (Saildrone(c)), to enable sampling of the air/sea interface at temporal and spatial resolutions far higher than could be achieved through traditional observational approaches. Likewise, we will use an unparalleled hierarchy of numerical simulations ranging from Large Eddy Simulations (LES), including coupled ocean-atmosphere LES, to global high-resolution ocean-atmosphere simulations and Earth System Models (ESMs). The LES simulations will resolve the ocean and the ocean-atmosphere systems explicitly at scales as small as 10 meters and thus allow the direct interactions of the ocean-atmosphere systems to be studied. These will be used to inform the development and evaluation of the global, coupled Earth System Models. EUREC4A-OA will connect European specialists of ocean, atmosphere physical and biogeochemical observations and numerical modelling as well as scientists working on numerical parameterization and future projections to address four key objectives: 1) Assessing the impact of the diurnal cycle on energy, water and CO2 ocean-atmosphere exchanges and quantifying the modification of diurnal cycle and the related exchanges by meso- and submesoscale features; 2) Identifying and quantifying the processes ruling the ocean- atmosphere exchanges and uptake of heat, momentum and CO2 at the ocean sub-mesoscale; 3) Identify the various surface ocean processes (diurnal cycle, ocean nonlinear small scales, boundary layer aerosols) responsible for the atmosphere shallow convection and cloud formation; 4) Providing improved models metrics and parameterizations for the above processes to be applied to ESMs. EUREC4A-OA will deliver novel knowledge for better climate simulation and will have a significant impact on science and society.

Start date: 05-31-2020

End date: 05-29-2023

Last modified: 01-06-2021

Copyright information:

EUREC4A-OA

Observational and modelling data will be collected or created in the project.

The observational data collection has been outlined in Stevens et al. (to be submitted).

Examples of well-established formats and protocols that may be used during EUREC4A-OA are OGC (Open Geospatial Consortium), CF (Climate Format), WMO-TD No 1186, OASIS etc.

1) OGC: Standards that are made through a consensus process and are freely available for anyone to use to improve sharing of the world's geospatial data. They are used in a wide variety of domains including Environment, Defense, Health, Agriculture, Meteorology, Sustainable Development and many more.

2) CF: Originally framed as a standard for data written in netCDF format, with model-generated climate forecast data particularly in mind. However, it is equally applicable to observational datasets, and can be used to describe other formats. It is a standard for “use metadata” that aims both to distinguish quantities (such as physical description, units, and prior processing) and to locate the data in space–time

3) WMO-TD No 1186: Document provides a series of guidelines on climate metadata and homogenization

4) OASIS: OASIS promotes industry consensus and produces worldwide standards for security, Internet of Things, cloud computing, energy, content technologies, emergency management, and other areas. OASIS open standards offer the potential to lower cost, stimulate innovation, grow global markets, and protect the right of free choice of technology

Data preservation and sharing has been defined in the EUREC4A-OA data policy

EU JPI-Climate initiative[1], adopted the so-called "transparency principle", committing itself with the growing demand on more openness in many aspects of public life (politics, economics, culture, and also science and research). The Guidelines on Open Knowledge [3] contribute to increase climate (change) research activities’ societal impact and credibility by making them more transparent. They establish a set of recommendations to boost a more effective climate knowledge management policy in terms of openness (and particularly accessibility). These recommendations are thought for the JPI community in its widest sense.

In summary these are:
1) Internal accessibility.
2) Open licensing, based on the use of the Creative Commons (CC) “public domain” license (CC0) Open formats.
3) Open Access publishing.
4) Open Data.
5) Publishing costs

Question not answered.

Question not answered.

Question not answered.

Question not answered.

We will make data products available through the ***EUREC^{4}A-OA*** website, and we plan to lodge data syntheses created during the project with the EUREC^{4}A and national/European databases (e.g., CORIOLIS, AERIS, ODATIS,...) – these are the major data repositories for the scientific community potentially interested in the ***EUREC^{4}A-OA*** new developments.

Model outputs created during the project will be archived in a dedicated data clouds following the FAIR rules. The results from the experiments performed with the NorESM will be archived on the UNINETT Norwegian national resource which follows the FAIR data archiving policy and will be accessible to the whole community. For the regional simulation the nomenclature and request will follow the HiResMIP PRIMAVERA protocol and be accessible first to the project members and then to the whole community. Reference simulations will be completed by the end of the second year of the project, and fully archived with these repositories by month 30. All the experiments will be archived by month 36. A documentation of the simulations performed by the different groups in ***EUREC^{4}A-OA*** will also be available.

Question not answered.

All partners will be responsible for sharing their data

Resources have been already included in the project staff time.