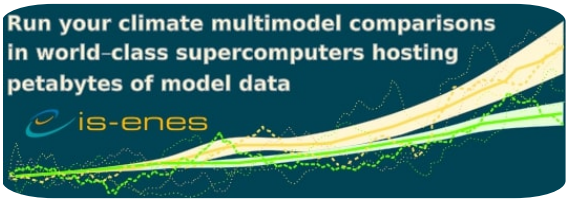
is-enes
INFRASTRUCTURE FOR THE EUROPEAN NETWORK FOR EARTH SYSTEM MODELLING

Newsletter 5
September 2020

IS-ENES3 enters its second Reporting Period!

IS-ENES3 is divided in three periods which require the elaboration of an activity report at the end of each. **The project has achieved its first Reporting Period** (January 2019 - June 2020) and the consortium actively worked over the summer to produce a report that will be reviewed by the European Commission. Although the Covid-19 pandemic impeded some of its planned activities, most of them could happened, or were turned to virtual events or rescheduled for its second reporting period. Stay updated for our upcoming activities through our mailing list and social networks !

IS-ENES3 Ongoing call



Third IS-ENES3 call for Access to Advanced Analysis Platforms for CMIP6 and CORDEX!

Apply for direct access to compute facilities:

1. Discover the model data you are interested in
2. Process your multimodel analyses in the supercomputer
3. Download the results

We are broadening access to world-class supercomputers at the national facilities used by research communities **in Germany, France, Italy and the UK**. These facilities provide **access to significant computational resources located next to extensive data collections, including data from CMIP6 and CORDEX**. Thanks to funding from EU H2020, the IS-ENES3 project is able to provide access free of charge to scientists from anywhere in Europe.

With the new Access to Advanced Analysis Platforms, you will be able to
(a) log onto a server which has direct access to the filesystem containing the data, we can import

additional data on request,
(b) run your own software,
(c) have access to a large collection of software libraries commonly used to analyse climate model output.

The new application deadline is October 31st 2020.
It is possible to perform test activities before the application to get familiar with the High Performance Computing environment !
If you miss the deadline, a new round of application will be opened with deadline on the 31.05.2021.

Find all the information on these new analysis platforms (including a **demo on how to run server side data-near multimodel comparisons**), application procedure, and deadlines here.

IS-ENES3 Upcoming Events

IS-ENES3 First virtual Autumn School on climate data use for impact assessments!

In **November and December 2020** the IS-ENES3 consortium will organize an Autumn School **'Climate data use for impact assessments'**. The course will **explain the developments in the European climate model infrastructure** and **update the participants about the availability of data products and assessment tools**. It will also provide insights in do's and don'ts of impact studies, and discuss the information needs of the participants. It will be organized as a **virtual course with 2 online sessions during six weeks**, combined with self-study and case studies in small groups. There will be **no fee** for participation.

What is the aim of the School? It is to **help researchers make better use of available climate data and knowledge**, in order to produce higher quality research outputs and services. This, in turn, will help to combat and adapt to climate change. It also aims to **develop a network of researchers** who can turn to each other in the future for advice and cooperation. Researchers from **the IS-ENES3 consortium** will interact directly with the participants. The IS-ENES3 consortium is involved in producing the CMIP6 data which will underpin the next IPCC report, expected in 2021-2022. **Through the Schools, the IS-ENES consortium intends to make its knowledge available for scientists all over Europe.**

For who? This virtual School is for **climate scientists, Vulnerability, Impact and Adaptation (VIA) researchers and consultants offering climate services**. We aim to create a mix of these different disciplines so that participants can learn from each other. As a result, climate scientists will better understand what kind of outputs VIA researchers need. VIA researchers will learn how to use the products of climate science in an effective and valid way. Participants can be **PhD students, Postdocs, professionals and consultants, including climate services providers**. An MSc in the natural sciences is required for fruitful participation. The number of participants will be limited to 20 to create a committed group.

What is the programme? The total length of the Autumn school is **six weeks**. In the first three weeks, **2-3 hour virtual meetings** will be held on Wednesday and Friday mornings. Interactive lectures on climate models, data, impact modelling and climate services are provided. Participants can bring in their **own case study** and will work on these in **groups of 2-3 persons during the last three weeks**. During these weeks, teachers from IS-ENES will be available for questions and help.

Find the detailed agenda and all information on the application procedure (before **October 15th**) on the IS-ENES3 official website.
If you have any questions, please send an email to judith.klostermann[a]wur.nl

Fifth Workshop on Coupling Technologies for Earth System Models

The 5th Workshop on Coupling Technologies for Earth System Models (CW2020)

The 5th Workshop on Coupling Technologies for Earth System Models (CW2020) will be held virtually on **September 21st-24th** 2020, **with one session of 3.5 hours each day, starting at 3:00pm CEST.**

The workshop aims to bring together leading researchers and practitioners in the field of coupling infrastructure for Earth System Models. This workshop is the fifth in the series, started in 2010 in Toulouse and followed by Boulder USA (2013), Manchester UK (2015), and Princeton USA (2017).

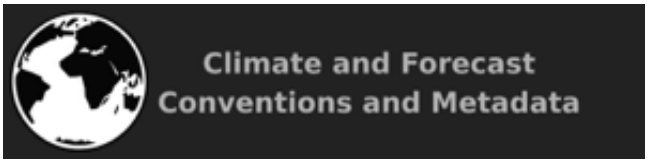
Find the program, the registration form and more information here.

IS-ENES3 Recent Activities

IS-ENES3@EGU2020!

Find **here** all the talks presented by the consortium members at EGU2020, held virtually from 4-8 May 2020.

The 2020 Climate and Forecast metadata Convention (9-11th June 2020)



The 2020 Climate and Forecast metadata Convention was held virtually from June 9th to June 11th 2020.

The Climate and Forecast (CF) metadata convention for netCDF **is a community-developed standard first released in 2003**. The CF conventions were originally developed to represent climate and forecast model output encoded in the netCDF binary format, with the specific goal of facilitating comparison of output from different models. Subsequent development of the convention has broadened its scope to include observational data and derived products.

Find the wrap-up and conclusions here and all the presentations here.

IS-ENES3 Webinar on the Access on CORDEX and CMIP6 climate data (15th June 2020)

Find on our YouTube channel **the recording of the IS-ENES3 webinar on the Access on CORDEX and CMIP6 climate data** that was organized by KNMI, CERFACS and CMCC on June 15th 2020.

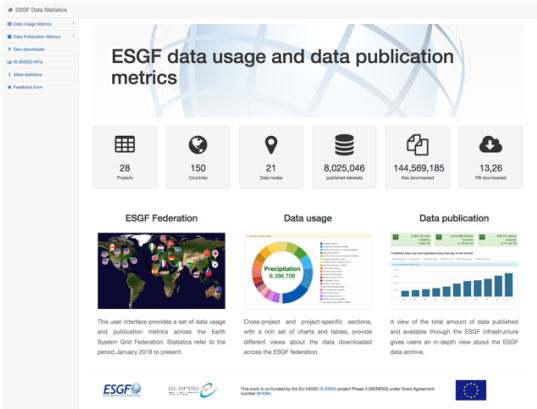
The objective of the webinar was to demonstrate how to access and analyze climate data available through the Earth System Grid Federation (ESGF), which is an international open-source effort that disseminates climate model data, observational and reanalysis data free of charge.

The program of the webinar was the following:

- **ESGF: A practical overview for users** - Christian Pagé (CERFACS)
- **Search and download of CMIP6 and CORDEX data through ESGF** - Paola Nassisi (CMCC)
- **ECAS Environment and climate data analysis** - Paola Nassisi (CMCC)
- **IS-ENES Climate4impact (C4i): Ease Access to Climate Model Data** - Christian Pagé (CERFACS)

ESGF Data Statistics Service: New version!

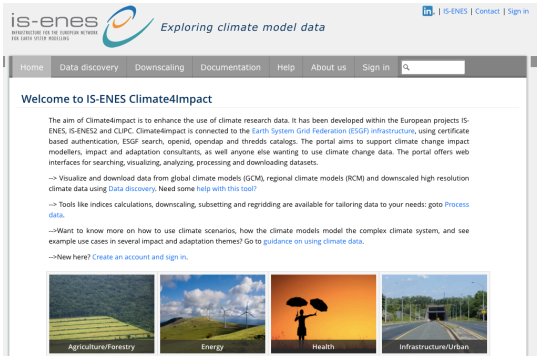
The **ESGF Data Statistics service is a distributed system responsible for collecting federating and reporting data usage metrics and data archive information about the ESGF Federation**. The service provides useful insights into the downloaded data, the most downloaded data, data published in the federation and other information on data exploitation at IS-ENES and ESGF level.



A new version of the service has recently been released, during the last months, including, among others, information about:

- **Data download statistics related to the data nodes** included so far (BSC (Spain), CMCC (Italy), CNRM (France), DKRZ (Germany), IPSL (France), LLNL (United States), NCI (Australia), UKRI (United Kingdom), UNICAN (Spain));
- **Data published statistics, related to the overall ESGF data archive and to some key projects** in detail;
- **Geo-download statistics**, showing the distribution of the clients that performed downloads, grouped by continents and, country and by project;
- **A specific page dedicated to the IS-ENES3 project KPIs** including statistics starting from 2018.

A **feedback form** has also been added to get feedback from users about their experience with the ESGF Data Statistics User Interface.
Come visit the page and leave your feedback too!



3rd Climate4Impact Coding Sprint

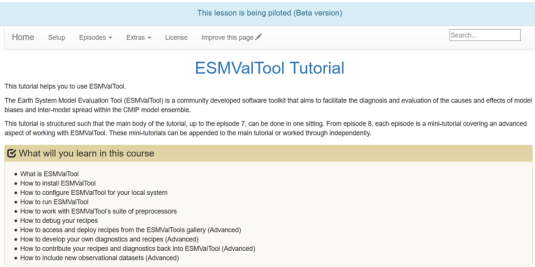
A third IS-ENES3 technical workshop, organized by CERFACS, took place virtually from June 16th to June 17th, 2020, dedicated to the development of **the** Climate4impact portal **(C4I) and the Compute Services**. The main objective of this workshop was to enable partners, involved in the development of Compute Services of the ENES Climate Data Infrastructure and especially on climate4impact, to work together on specific items, with high collaboration and dedicated full time.

Specifically, discussions and development work took place for the following subjects:

- Provenance support for Web Processing Services
- Download manager Service
- Generic Datasets Repackaging Web Processing Service
- Simple climate indice support using the birdhouse framework
- Climate4impact front-end: new search, documentation and sign-in; automated selection of variables when a climate indice is selected by the user.

ESMValTool tutorial

The Earth System Model Evaluation Tool (ESMValTool) is a community developed software toolkit that aims to facilitate the diagnosis and evaluation of the causes and effects of model biases and inter-model spread within the CMIP model ensemble.



An introductory tutorial on how to use ESMValTool is available in beta state here**.**
Any feedback from users on the tutorial is welcome here or via the ESMValTool user mailing list.

2nd Cylc 8 preview release available!

The second “alpha” preview release of Cylc 8 is available for testing by interested users from Conda Forge.

Find more information here**.**

Recent IS-ENES3 Deliverables and Milestones

New deliverable and milestones achieved!

3 Deliverables and 5 Milestones has been released between **April 2020** and **June 2020**!

D6.1 - First periodical report on service statistics for models and tools

IS-ENES services for European ESMs (Earth System Models) and Software Tools have been provided to the user community for the first 18 months of the IS-ENES3 project. The services are continuoulsly monitored and KPIs are collected every 6-month from the groups that run the service endpoints. This deliverable compiles the results of the first three KPI reporting periods and evaluates the outreach of services based on

these findings. **Read it** here.

D7.1 - First KPI and TA report for ENES CDI data services

The ENES CDI services encompass data search, access, and support services (Task1), associated processing services (Task2 - VA and Task3 - TA), data standards services (Task4), and support for CMIP6 documentation (Task5). In this deliverable we summarize characteristic usage information for each service category and provide associated statistics. The service provisioning is based on eleven installations distributed across Europe. The evolution of the services is coordinated in cooperation with WP5/NA4 and WP10/JRA3. Sustainability aspects of the services are contributed and discussed further in the sustainability work package WP2/NA1. **Read it** here**.**

D10.1 - Architectural document of the ENES CDI software stack

This document provides a comprehensive description of the design activities performed through the first 18 months of the IS-ENES3 project. Taking into account the requirements collected with the milestone M10.1, it proposes an overall architectural view of the ENES Climate Data Infrastructure software stack and it goes into the details of each single component. This work will lead the development of the ENES CDI software stack architecture during the project timeframe and it will be periodically revised to include emerging needs and ensure full compliance with the users' requirements. **Read it** here**.**

M3.1 - Report on user requirements

This report gives an overview of the information on user requirements collected until June 2020 (first 18 months of the project). It is part of the work done under Task 4 in WP3-NA3. In order to work on widening the user base, nurturing existing users/stakeholder communities, improving mutual understanding between users and developers and expanding community standards) information on user requirements for the various services and tools developed by IS-ENES3 are needed. This report also described the various user groups that this project focuses on and the methods used to collect information on user requirements related to data, models and tools. Collection of information on user requirements will continue afterwards and at the end of the project a complete overview will be given in D3.6. **Read it** here**.**

M5.1 - Draft Architecture Design

This document describes draft architectural plans for the ENES software infrastructure with specific consideration to its interaction and evolution alongside external collaborations in the European context and broader international efforts. These include the European Open Science Cloud, European Space Agency related initiatives, the Copernicus Climate Data Store and the Earth System Grid Federation. These plans will be developed over the course of the project and will feed into the deliverable D5.3 Architecture Design Plans at month 36. **Read it** here**.**

M5.2 - ESGF CMIP6 Summary

This report provides a summary of the status of the ESGF involvement from the ENES partners to establish the operational CMIP6 ESGF infrastructure. **Read it** here**.**

M6.1 - ENES ESM resources updated

The ENES Portal (https://portal.enes.org) pages about Euopean ESMs were updated with respect to CMIP6 version of the models. The substructure for Models and Tools on the Portal and the actual model pages were redesigned from scratch. **Read it** here**.**

M6.2 – Reviewer for services appointed

A review board is established for services on models and tools and given the task to report on the quality of the services offered. The board includes experts on ESMs and climate data management from the international community. **Read it** here**.**

Recent IS-ENES3 Publications

The Future of Sea Ice Modeling – Where Do We Go From Here ?

The Future of Sea Ice Modeling: Where Do We Go from Here? was published on the **24th of August 2020** in the **Bulletin of the American Meteorological Society** open-access journal.

Abstract: The summary of the meeting "Toward Defining a Cutting-Edge Future for Sea Ice Modeling: An International Workshop", which reunited sea ice model developers and expert users met to discuss the future of sea ice modeling on September 23-26 in Laugarvatn, Iceland.

Earth System Model Evaluation Tool (ESMValTool) v2.0 – an extended set of large-scale diagnostics for quasi-operational and comprehensive evaluation of Earth system models in CMIP

Earth System Model Evaluation Tool (ESMValTool) v2.0 – an extended set of large-scale diagnostics for quasi-operational and comprehensive evaluation of Earth system models in CMIP was published on the **30th of July 2020** in the **Geoscientific Model Development** open-access journal.

Abstract: The Earth System Model Evaluation Tool (ESMValTool) is a community diagnostics and performance metrics tool designed to improve comprehensive and routine evaluation of Earth system models (ESMs) participating in the Coupled Model Intercomparison Project (CMIP). It has undergone rapid development since the first release in 2016 and is now a well-tested tool that provides end-to-end provenance tracking to ensure reproducibility. It consists of (1) an easy-to-install, well-documented Python package providing the core functionalities (ESMValCore) that performs common preprocessing operations and (2) a diagnostic part that includes tailored diagnostics and performance metrics for specific scientific applications. Here we describe large-scale diagnostics of the second major release of the tool that supports the evaluation of ESMs participating in CMIP Phase 6 (CMIP6). ESMValTool v2.0 includes a large collection of diagnostics and performance metrics for atmospheric, oceanic, and terrestrial variables for the mean state, trends, and variability. ESMValTool v2.0 also successfully reproduces figures from the evaluation and projections chapters of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) and incorporates updates from targeted analysis packages, such as the NCAR Climate Variability Diagnostics Package for the evaluation of modes of variability, the Thermodynamic Diagnostic Tool (TheDiaTo) to evaluate the energetics of the climate system, as well as parts of AutoAssess that contains a mix of top–down performance metrics. The tool has been fully integrated into the Earth System Grid Federation (ESGF) infrastructure at the Deutsches Klimarechenzentrum (DKRZ) to provide evaluation results from CMIP6 model simulations shortly after the output is published to the CMIP archive. A result browser has been implemented that enables advanced monitoring of the evaluation results by a broad user community at much faster timescales than what was possible in CMIP5.

Documenting numerical experiments in support of the Coupled Model Intercomparison Project Phase 6 (CMIP6)

Documenting numerical experiments in support of the Coupled Model Intercomparison Project Phase 6 (CMIP6) was published on the **6th of May 2020** in the **Geoscientific Model Development** open-access journal.

Abstract: Numerical simulation, and in particular simulation of the earth system, relies on contributions from diverse communities, from those who develop models to those involved in devising, executing, and analysing numerical experiments. Often these people work in different institutions and may be working with significant separation in time (particularly analysts, who may be working on data produced years earlier), and they typically communicate via published information (whether journal papers, technical notes, or websites). The complexity of the models, experiments, and methodologies, along with the diversity (and sometimes inexact nature) of information sources, can easily lead to misinterpretation of what was actually intended or done. In this paper we introduce a taxonomy of terms for more clearly defining numerical experiments, put it in the context of previous work on experimental ontologies, and describe how we have used it to document the

experiments of the sixth phase for the Coupled Model Intercomparison Project (CMIP6). We describe how, through iteration with a range of CMIP6 stakeholders, we rationalized multiple sources of information and improved the clarity of experimental definitions. We demonstrate how this process has added value to CMIP6 itself by (a) helping those devising experiments to be clear about their goals and their implementation, (b) making it easier for those executing experiments to know what is intended, (c) exposing interrelationships between experiments, and (d) making it clearer for third parties (data users) to understand the CMIP6 experiments. We conclude with some lessons learnt and how these may be applied to future CMIP phases as well as other modelling campaigns.

News from our neighbours

Announcements from ESiWACE2

- ESiWACE2 will offer an **8-hour online training on High Performance Data Analytics (HPDA) and Visualisation** in October 2020. For more details see here.

- ESiWACE2 will offer a **one week online training on Domain Specific Languages (DSLs)** on November 23-27, 2020. For more details see here.

- Find the **ESiWACE2 Newsletter of July 2020** here, with highlights on the Virtual 6th ENES HPC Workshop and ESiWACE2 annual meeting (May 2020) and the ESiWACE2 Virtual Workshop on Emerging Technologies for Weather and Climate Modelling (June 2020).

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824084 (IS-ENES3)

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