



## IS-ENES2 DELIVERABLE (D -N°: 2.1)

### *Update of ENES governance rules*

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V2	13/10/15	B. Lawrence, R. Budich, J.C. André	
V3	17/03/17	SJ, FG	Intermediate version
V4	18/04/17	J.C. André, M. Lautenschlager, B. Lawrence	Comments showing need to delay the revision of MoU beyond IS-ENES2
V5	29/05/17	SJ, FG	Version targeting the two task forces in support to the infrastructure

### Abstract

In support to its infrastructure activities, ENES Board has created two task forces. These task forces advise ENES on all issues relevant to High Performance Computing and to data infrastructure, to support and exploit climate simulations in Europe. This document presents their terms of reference and membership as of March 2017.

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#### Dissemination Level

PU	Public	<b>X</b>
PP	Restricted to other programme participants including the Commission Services	
RE	Restricted to a group specified by the partners of the <b>IS-ENES2</b> project	
CO	Confidential, only for partners of the <b>IS-ENES2</b> project	

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## Executive Summary

The European Network for Earth System modelling (ENES) was established in 2001 and is an umbrella organisation for the European climate modelling community working on “the understanding and prediction of climate variability and change”. ENES provides a venue for addressing the strategic issues associated with developing, running, analysing, and archiving simulations of the Earth’s climate system on high performance computing systems. As of March 2017, ENES counts 47 members among university departments, research centres, meteorological services, computer centres and industry partners.

In support to its infrastructure activities, the ENES Board has created two task forces. These task forces advise ENES on all issues relevant to High Performance Computing and to data infrastructure, to support and exploit climate simulations in Europe. This document presents their terms of reference and membership as of March 2017.

As the landscape in Earth system modelling is evolving, ENES will need to revisit the ENES Board composition and revise its Memorandum of Understanding.

## 1. Objectives

This document aims at illustrating the governance structure of the European Network for Earth System modelling (ENES). We start by introducing ENES and give some elements about its history. The document proceeds describing the current governance structure and discusses its possible evolution.

## 2. ENES

### 2.1 ENES mission

The European Network for Earth System modelling (ENES) was established in 2001 in response to the 1998 recommendation from the Euroclivar concerted action to “*better integrate the European modelling effort with respect to human potential, hardware and software*”<sup>1</sup>.

ENES provides an umbrella organisation for the European climate modelling community working on “the understanding and prediction of climate variability and change”. Although centred on the community working with global Earth’s climate system models, it also aims to support the regional climate modelling community, with whom it shares common scientific objectives and issues. ENES members include university departments, research centres, meteorological services, computer centres, and industrial partners.

The primary motivation for ENES is to provide a venue for addressing the strategic issues associated with developing, running, analysing, and archiving simulations of the Earth’s climate system on high performance computing systems. In doing so, ENES aims to accelerate progress in climate system modelling in Europe, in part by developing and sustaining European software and high-performance computing (HPC) environments suitable for advanced high-resolution climate science.

ENES is intended to:

- (1) Help in the development and evaluation of state-of-the-art Earth’s climate system models,
- (2) Facilitate international model intercomparisons to assess and improve these models,
- (3) Encourage sharing of software
- (4) Enable the dissemination of model results, especially within internationally coordinated experiments
- (5) Promote the use and development of high performance computing facilities suitable for running long multi-model ensemble integrations of high-resolution and/or high-complexity models, and providing an environment for analysing, evaluating and archiving those simulations.
- (6) Develop and grow the community of scientists and engineers necessary to support model development and infrastructure

While remaining relatively informal over the last 16 years, ENES has increased the visibility of the community, in particular regarding HPC issues, and has supported, through its

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<sup>1</sup> Komen, G. (Ed.) (1998). Climate variability and predictability research in Europe, 1999-2004: Euroclivar recommendations. Euroclivar: De Bilt. ISBN 90-369-2146-5. XXIV, 119 pp.

infrastructure projects IS-ENES<sup>2</sup>, the elaboration of a common infrastructure strategy for 2012-2022 (Mitchell et al., 2012)<sup>3</sup>, revised in 2017<sup>4</sup>.

## 2.2 ENES Organisation

Institutions originally joined ENES by signing the ENES Memorandum of Understanding. A first version was issued in 2001 and revised in 2005. Although the formal MoU is now in abeyance, the ENES community has continued to “work together and cooperate towards the development of a European network for Earth system modelling” which was the original main principle of the MoU. ENES now (March 2017) includes 47 groups among climate modelling centres, computing centres and vendors (list in Annex I).

The ENES governance structure originally encompassed solely a scientific steering Board, constituted of representatives of European global climate modelling groups<sup>5</sup>, and a Chair. Through time, the infrastructure dimension of ENES has considerably grown, supported by a succession of projects (FP5 PRISM, FP7 IS-ENES, FP7 METAFOR, FP7 IS-ENES2, H2020 ESIWACE). This has led to the need to create dedicated ENES task forces, the ENES High-Performance Computing (HPC) Task Force (dating back to IS-ENES1) and the Data Task Force (set up within IS-ENES2). These task forces help address the main challenges posed by high performance computing and by the archiving, storage, processing, and related services needed nowadays for an efficient climate modelling infrastructure. These task forces advise ENES on all issues of their respective competence areas and network, within and beyond the community, to support and exploit simulations. They have grown to have a key role in ENES governance beyond the duration of European projects.

In future, other components of the infrastructure, such as the physical network, or further specific issues, may require the constitution of additional task forces.

## 3. ENES HPC Task Force

### 3.1 Terms of Reference

ENES has set up an HPC Task Force (HPC-TF) to gather and express community needs and to organize the community around HPC issues.

The ENES HPC Task Force aims to advise the ENES Board on all issues relevant to High Performance Computing for the European climate modelling community, such as those related to the use of the European HPC ecosystem, in particular with regards to the PRACE European facility, and issues related to software developments. The ENES Task Force is also serving ENES infrastructure projects related to HPC. It has been extended in 2016 to include

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<sup>2</sup> IS-ENES2: FP7 infrastructure project (2013-2017), following IS-ENES FP7 project (2009-2013) (<http://is.enes.org>)

<sup>3</sup> Mitchell J., Budich R., Joussaume S., Lawrence B. and Marotzke J. (2012), Infrastructure strategy for the European Earth System Modelling community 2012-2022, ENES Report Series 1, 33 pp, available on <http://enes.org>

<sup>4</sup> IS-ENES deliverable D2.6 “Update of the ENES infrastructure strategy” (<https://is.enes.org/Documents/deliverables>)

<sup>5</sup> CNRS-IPSL, Met Office Hadley Centre, MPI-M, CMCC, NCAS, University of Oxford.

members from the Numerical Weather Prediction (NWP) community so that issues in common can be addressed.

The ENES HPC-TF is consulted on issues such as:

- Providing input on HPC requirements for the update of the ENES infrastructure strategy
- Proposing ENES responses to PRACE requests on needs
- Developing the ENES-PRACE collaboration
- Following and advising on ENES involvement in HPC projects (e.g., EU or G8 calls)
- Advising on ENES letters of support related to projects dealing with HPC

The HPC-TF also:

- Follows the PRACE projects involving the ENES community
- Helps develop technology tracking with regards to future computing
- Follows exascale international issues
- Helps develop collaboration with vendors

### 3.2 Members of ENES HPC-TF (2017):

Jean-Claude André	(ENES Board, Chair)
Giovanni Aloisio	(CMCC)
Peter Bauer	(ECMWF)
Joachim Biercamp	(DKRZ, ESiWACE coordinator)
Reinhard Budich	(MPI-M, ENES Board)
Mick Carter	(MetOffice)
Francisco Doblás-Reyes	(BSC-IC3)
Uwe Fladrich	(SMHI)
Marie-Alice Foujols	(IPSL)
Oliver Fuhrer	(Meteo Swiss)
Francesca Guglielmo	(IPSL, ENES Scientific Officer)
Sylvie Joussaume	(IS-ENES coordinator, ENES Chair)
Bryan Lawrence	(NCAS, ENES Board)
Antonio Navarra	(CMCC, ENES Board, PRACE SSC member)
Graham Riley	(U. Manchester)
Sophie Valcke	(CERFACS)
Pier Luigi Vidale	(U. Reading)

## 4. ENES Data Task Force

### 4.1 Terms of Reference

The Data Task Force of the European Network for Earth Simulation (ENES) aims to advise and represent the ENES Board on all issues relevant to data infrastructure necessary to support and exploit Earth's climate system simulation in Europe.

Within the scope of ENES, it deals with data and metadata standards, and the computing and services necessary to exploit Earth's climate system simulation (and related) data and information within both the simulation and wider communities. Responsibilities include advising on, and where possible, organising computing and network infrastructure, software tools, procedures, standards, related quality control and assurance, and data citation, as these apply to European collaboration and European participation in global activities.

The ENES Data TF is consulted on strategic issues such as:

- Providing input on the ENES data infrastructure strategy.
- Coordinating European climate simulation data infrastructures: identifying gaps and possible synergies, providing a forum for data providers and users, overseeing the sustainability of the joint European data infrastructures.
- Advising and representing ENES in international data coordination activities, international standards activities, and the deployment of international data infrastructure – both within Europe and beyond.
- Establishing and promulgating common European positions dealing with data, metadata services and the necessary software and services.

The ENES Data TF is expected to be instrumental in:

- Coordinating the relevant European data infrastructure: defining and assigning responsibilities, agreeing on common rules and procedures, and maintaining a living roadmap listing actions and priorities.
- Providing a forum for data providers and users to interact with the European data strategy.
- Promoting interoperability of climate model data archives within Europe and promoting those interfaces necessary to maximise their impact beyond the modelling community.
- Coordinating the development and deployment of software tools to enhance climate model data services and efficiency of service delivery.
- Coordinating common European activities supported by EU projects, such as IS-ENES2, with national activities.
- Coordinating the European and ENES response to data infrastructure requirements arising from international activities convened under the auspices of the World Climate Research Programme.

The ENES data task force is expected to fulfil these responsibilities through active funded projects.

#### 4.2 Members of ENES DataTF (2017)

Michael Lautenschlager	(DKRZ – Chair)
Sylvie Joussaume	(CNRS-IPSL, ENES Board)
Stephan Kindermann	(DKRZ)
Frank Toussaint	(DKRZ)
Martin Jukes	(NCAS & CEDA)
Christian Page	(CERFACS,)
Sebastien Denvil	(CNRS-IPSL)
Michael Kolax	(SMHI)
Sandro Fiore	(CMCC)
Wim Som de Cerff	(KNMI)

## 5. Conclusions and Outlook

ENES has in recent years confirmed its role in representing and integrating the Earth's climate modelling community in Europe and fostering the advancement of science, furthermore gaining due acknowledgement of its essential infrastructure dimension.

ENES has a common goal to work towards minimizing duplication in development, while providing up-to-date infrastructure and advancing science in climate modelling. To achieve this goal, ENES has put in place a governance structure at different levels to foster synergies and agree strategies. In particular, in view of the ever-increasing relevance – or perhaps the ever-increasing community acknowledgement of the ENES infrastructure dimension – the task forces play a key role, alongside the ENES Board, in networking within and beyond the community. These task forces advise ENES on all issues relevant to High Performance Computing and the data infrastructure necessary to support and exploit simulations of the Earth's climate in Europe. These task forces work separately or jointly, as for example is needed to address big data produced by climate simulations. Should emerging new aspects or pressing issues require special focus, further specific, task forces will be established.

In comparison to 2001, ENES is now a community with a long experience of cooperation, acknowledging the added value of joint efforts in science and the necessity of a solid infrastructure. The landscape of climate modelling is also evolving: more groups are getting engaged in climate modelling, intercomparison projects also encompass regional climate modelling, collaboration with numerical weather prediction is increasing, and climate services are emerging.

As a consequence, there will be a need to revisit the ENES Board composition and update the Memorandum of Understanding, to be signed by ENES current members and by all European institutions (from academia and industry) interested in joining ENES. The new document will, besides confirming ENES role and stating its objectives, spell out role and functions of the ENES bodies and their interconnections, and elucidate the relation of ENES with its infrastructure projects and with adjacent communities (e.g. NWP, climate services etc.).



## Annex I: List of members of ENES as of 2017

Institution	Country	Logo
Sun Microsystems n.v./s.a.	Belgium	
Université Catholique du Louvain - Institut d'Astronomie et de Géophysique Georges Lemaître	Belgium	
Национален институт по метеорология и хидрология (National Institute of Meteorology and Hydrology)	Bulgaria	
Danmarks Meteorologiske Institut	Denmark	
Comparex Holding	Europe	
Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique	France	
Institut Pierre-Simon Laplace - Université Pierre et Marie Curie	France	
Meteo-France - Centre National de Recherches Météorologiques	France	
<a href="#">Alfred-Wegener-Institut - Helmholtz-Zentrum für Polar- und Meeresforschung</a>	Germany	
Verein zur Förderung des Deutschen Forschungsnetzes e.V. - DFN-Verein	Germany	
Deutsches Klimarechenzentrum	Germany	
IBM Deutschland GmbH - Scientific and Technical Computing EMEA	Germany	
Institut für Energie- und Klimaforschung (IEK-8) – Troposphäre - Jülich	Germany	
Institut für Meereskunde an der Universität Kiel	Germany	
Freie Universität Berlin - Institut für Meteorologie	Germany	
Hewlett Packard GmbH	Germany	

Max-Planck-Gesellschaft - Max-Planck-Institut für Biogeochemie	Germany	Max-Planck-Institut für Biogeochemie 
Max-Planck-Gesellschaft - Max-Planck-Institut für Meteorologie	Germany	 Max-Planck-Institut für Meteorologie
NEC Deutschland GmbH - European Supercomputer Systems	Germany	
NEC Europe Ltd. - NEC Laboratories Europe - IT Research Division	Germany	
Pallas GmbH	Germany	
Silicon Graphics GmbH	Germany	
T-Systems Solutions for Research GmbH	Germany	
Universität Hamburg - Forschungsstelle Nachhaltige Umweltentwicklung	Germany	
<a href="#">Konrad-Zuse-Zentrum für Informationstechnik Berlin</a>	Germany	
Ακαδημία Αθηνών - Κέντρον Ερεύνης Φυσικής της Ατμοσφαιρας και Κλιματολογίας (Academy of Athens - Research Centre for Atmospheric Physics and Climatology)	Greece	
European Centre for Medium-Range Weather Forecasts	International	
<a href="#">Irish Centre for High-End Computing</a>	Ireland	
Istituto Nazionale di Geofisica e Vulcanologia	Italy	
Centro Euro-Mediterraneo sui Cambiamenti Climatici	Italy	
Koninklijk Nederlands Meteorologisch Instituut	Netherlands	
Bjerknessenteret for klimaforskning	Norway	
Nansen Environmental and Remote Sensing Center	Norway	
Uniwersytetu Warszawskiego - Interdyscyplinarne Centrum Modelowania Matematycznego i Komputerowego	Poland	
Academia de Stiinte Tehnice din Romania	Romania	

<a href="#">Academia Romana - Institutul de Geodinamica Sabba S. Stefanescu</a>	Romania	
Institut Català de Ciències del Clima	Spain	
Universidad de Alcalá - Departamento de Física y Matemáticas	Spain	
Universitat de Barcelona - Departament d'Astronomia i Meteorologia	Spain	
Lunds Universitet - Institutionen för Naturgeografi och ekosystemvetenskap	Sweden	
Sveriges meteorologiska och hydrologiska institut	Sweden	
Centro Svizzero di Calcolo Scientifico	Switzerland	
Scottish Alliance for Geosciences, Environment and Society - Centre for Earth System Dynamics	United Kingdom	
Cray UK Limited	United Kingdom	
Met Office - Hadley Centre	United Kingdom	
University of East Anglia - Climatic Research Unit - School of Environmental Sciences	United Kingdom	
UK National Centre for Atmospheric Science (NCAS)	United Kingdom	