Letters of Support

The support letters within this document are used to convey more than just an endorsement of the ESGF. They provide substantive information regarding the proposed partnerships, as well as the means and appropriateness of knowledge-user support. The also highlights the fundamental role that ESGF plays in the success of global community efforts. Since ESGF's focus is primarily on supporting and demonstrating broad-based commitments to projects such as **CMIP** and **ACME**, it was appropriate to solicit current letters of support from the community, including the World Climate Research Programme (WCRP), the BER funded Accelerated Climate Modeling for Energy (**ACME**) project, and the BER funded Program for Climate Model Diagnosis and Intercomparison (PCMDI). These letters do not commit any financial or in-kind support. They are merely to indicate to our sponsors that ESGF has established substantial connections within the climate community and subject matter scientists who are familiar with our mission, share our values, and have significant investments in the continued success of our mission to sustain and deliver new capabilities for a globally federated data ecosystem.

Past letters of recommendation can be found on the ESGF public facing website (https://esgf.llnl.gov/letters-of-recommendation.html).

Support Letters. *Highlighting acknowledgments and continued support from and for the community.*

World Climate Research Programme (WCRP)

World Climate Research Programme
c/o World Meteorological Organization
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CH-1211 Geneva 2 – Switzerland

Tel.: +41 (0)22 730 82 46
Fax: +41 (0)22 730 80 36
wcrp@wmo.int

Geneva, 12 April 2017

Subject: WCRP support to the Earth System Grid Federation (ESGF)

To whom it may concern:

On behalf of the World Climate Research Programme (WCRP), I write this letter to express the Programme's support to continuous development of the Earth System Grid Federation (ESGF).

ESGF's primary goal is to facilitate advancements in Earth System Science through a tailored software infrastructure for the management, dissemination, and analysis of model output and observational data. Over the last decade, ESGF has become a critical science enabler, providing the research community a common infrastructure to archive and disseminate large volumes of data. ESGF is widely used within WCRP, such the WCRP Coupled Model Intercomparison Project (CMIP) - which is starting its 6th phase - for global climate historical simulations and projections, the Coordinated Regional Climate Downscaling Experiment (CORDEX) for regional simulations, obs4MIPs serving gridded observations (Earth Observations primarily but also a growing number of in-situ data sets), and ana4MIPs serving reanalyses data sets from numerous producing centres. The Intergovernmental Panel on Climate Change (IPCC) has enjoyed substantial benefit of ESGF in its endeavour for climate assessment through these key WCRP activities.

It should also be emphasized that the EU Copernicus Climate Change Service (C3S) is adopting and supporting operational ESGF nodes to serve global and regional climate projections for Europe, thereby adopting the Federation as a fit-for-purpose service tool beyond the pure research realm.

WCRP sincerely appreciates and congratulates the Department of Energy (DOE) of USA on its leading effort to develop ESGF, and the international partners for their co-sponsorship; National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), and international laboratories such as the Max Planck Institute for Meteorology (MPI-M) German Climate Computing Centre (DKRZ), the Australian National University (ANU) National Computational Infrastructure (NCI), Institut Pierre-Simon Laplace (IPSL), and the British Atmospheric Data Center (BADC). The collective contribution of all these entities has offered the fundamental and necessary support to the simulations-observations-reanalyses climate research information nexus.

WCRP therefore looks forward to further development of ESGF for the benefit of climate research and services. I will be at your disposal to provide any additional detail, if needed, on its importance for the Programme.

Yours sincerely,

David Carlson
Director, WCRP

Accelerated Climate Modeling for Energy (ACME)

Lawrence Livermore National Laboratory

Physical and Life Sciences

April 14, 2017

Dr. Justin, Hnilo, Program Manager

Office of Biological and Environmental Research

US Department of Energy

Washington, DC

Dear Dr. Hnilo,

I am writing to express my strong endorsement for the proposal "Earth System Grid Federation," (ESGF, Dean Williams, PI).

The Accelerated Climate Modeling for Energy (ACME) project will produce an estimated 0.5 PBYTES of Earth System Model simulation output over the next few years. The project is counting on the tools and processes developed by the ESGF project to manage and curate this data, facilitate its analysis and make it available to a global research community. The ACME project has neither the resources nor the expertise to tackle these challenges independently.

We intend to work collaboratively with ESGF staff to define requirements and provide an early user community for the ESGF tools. Of particular importance is the server-side tools envisioned for multiple communities, including ACME and CMIP.

Please contact me should you have any further questions.

Thank you,

David C Bader

David C. Bader, Principal Investigator and Chair of the governing Council

Accelerated Climate for Modeling for Energy Project

Program for Climate Model Diagnosis and Intercomparison (PCMDI)

Program for Climate Model Diagnosis and Intercomparison
Lawrence Livermore National Laboratory
Mail Code L-103, 7000 East Avenue, Livermore, CA, U.S.A 94550
Telephone +1 925 424 3623 • Facsimile +1 925 422 7675

Dr. Gary Geernaert
Director
Climate and Environmental Sciences Division
DOE Biological and Environmental Research
13th April 2017

REF: Earth System Grid Federation (ESGF) Proposal Plan (Dean Williams *et al.*)

Dear Dr. Geernaert,

We wholeheartedly endorse the Earth System Grid Federation (ESGF) Proposal Plan by Dean Williams and co-authors. The Plan proposes a coherent strategy for the continuation and expansion of this internationally recognized program. Dean and his team are international leaders in the Scientific Focus Area of Climate Change Data Management. Over the past two decades, they have enabled a broad international community of Earth system researchers to make significant progress in the field of climate research. The efforts of Dean and his team provide the foundation for a significant number of international assessments, including all phases (1-5) of the Coupled Model Intercomparison Project (CMIP). These projects constitute much of the scientific backbone of all 5 assessment reports of the United Nations' Intergovernmental Panel on Climate Change (IPCC), dating from 1990 to 2013. The team is currently preparing for the sixth phase (CMIP6), which will inform the next IPCC Assessment, due for publication in 2020.

The DOE-led Earth System Grid Federation (ESGF) has moved the climate science community towards a fully distributed computational working environment. This has significantly accelerated progress in climate modeling research. This rapidly advancing collaborative way of working underpins the Program for Climate Model Diagnosis and Intercomparison's (PCMDI) multi-model research, and enables PCMDI to assume a leadership role in fostering scientific collaboration via community-based numerical experimentation (such as CMIP and related efforts).

Via a longstanding collaboration strengthened through proximity, PCMDI has worked with the ESGF team to ensure that carefully developed data standards are applied in CMIP. These standards enable unprecedented data discovery, accessibility and usability. The collaboration between LLNL computer and climate scientists has guided the development of software infrastructure tuned to the needs of the community. This close working relationship has been a key to the success of CMIP. More recently, it has been key to the successful development of obs4MIPs, input4MIPs and the PCMDI metrics package (PMP), all of which will ultimately be available via ESGF. Progress on all of these fronts is transforming the ability of climate scientists to address important questions, both at LLNL and throughout the international research community.

ESGF is essential to our mission and we look forward to a strong continuing collaboration with Dean's outstanding team.

Yours sincerely,

Karl E. Taylor
taylor13@llnl.gov

Paul J. Durack
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Peter J. Gleckler
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Benjamin D. Santer
santer1@llnl.gov

• Program for Climate Model Diagnosis and Intercomparison
• Lawrence Livermore National Laboratory
• Mail Code L-103, 7000 East Avenue, Livermore, California, U.S.A. 94550

Infrastructure for the European Network for Earth System Modeling (IS-ENES)

Sylvie Joussaume
CNRS/Institut Pierre Simon Laplace
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91191 Gif sur Yvette cedex
France
Sylvie.joussaume@lsce.ipsl.fr

Saclay, April 13th 2017

To: Dean Williams

Subject: Letter of support to the 2017 DOE ESGF proposal

With this letter, I express strong support to the Earth System Grid Federation DOE proposal. I express this interest as coordinator of the Infrastructure for the European Network for Earth System modelling (ENES), IS-ENES, as Chair of ENES and on behalf of its Data Task Force.

ESGF plays an essential role to support the data distribution of model output from the World Climate Research Program (WCRP) international coordinated experiments (CMIP). This has been successfully demonstrated within the 5th phase of CMIP (CMIP5) and will be essential for the upcoming 6th phase with a very large amount of data (over 20 PB) expected in 2017-2019. The European community supported by the IS-ENES first and second phase projects (2009-2017), has been very proactive in supporting ESGF development in collaboration with DOE, co-leading about half of its working teams. We do plan to continue this strong collaboration for CMIP6 with both national and European supports. Indeed, we are preparing a third phase IS-ENES project and benefit from support from the Copernicus Climate Change program.

The role of DOE is essential in leading the overall ESGF process and would not work without its strong support. The whole CMIP process, led by the Working Group on Coupled Models and its Infrastructure panel (WIP), is counting on ESGF. Thanks to the international governance put in place in 2015, ESGF is organised to face the big data challenge of CMIP6 and to interface with the scientific community through the WIP.

With my colleagues from the ENES Data Task Force, we strongly support this ESGF proposal and do count to continue our strong collaboration for the benefit of climate science and its essential support to climate policy.

Yours faithfully,

Sylvie Joussaume
Coordinator of IS-ENES and on behalf of the ENES Data Task Force

National Aeronautics and Space Administration (NASA)

National Aeronautics and Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of: SMD/Earth Science Division

To: Dean Williams
Program for Climate Model Diagnosis and Intercomparison
Lawrence Livermore National Laboratory
Mail Code L-103
7000 East Avenue
Livermore, California 94550

April 12, 2017

RE: DOE ESGF Proposal

As the high-end computing program manager and weather focus area lead at NASA Headquarters Center, I am delighted to express NASA's significant interest in the development, operation and maintenance of the Earth System Grid Federation (ESGF).

ESGF is used by the international climate modeling community as a main mechanism to disseminate model outputs. NASA is an active participant of the Coupled Model Intercomparison Project (CMIP). In addition, my program has been leveraging the ESGF infrastructure to support many NASA sponsored projects: Observation for Model Intercomparison Projects (obs4MIPs), Analysis for Model Intercomparison Projects (ana4MIPs), and Collaborative REAnalysis Technical Environment (CREATE). Needless to say, the success and the continuation of the ESGF is highly important to the success of these NASA projects and the climate modeling data user community.

ESGF offers a unique resource to advance CMIP and engage a global community. We look forward to continuing collaboration with you and your team on this exciting project.

Regards,

Dr. Tsengdar Lee
High-End Computing Program Manager
Weather Focus Area Lead
NASA Headquarters

Geophysical Fluid Dynamics Laboratory (GFDL)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration/OAR
GEOPHYSICAL FLUID DYNAMICS LABORATORY
Princeton University Forrestal Campus
201 Forrestal Road
Princeton, New Jersey 08540

April 17, 2017

Dean N. Williams
Chairman, Earth System Grid Federation
Lawrence Livermore National Laboratory
Department of Energy
7000 East Ave, Livermore, CA 94550

Mr. Williams,

The Geophysical Fluid Dynamics Laboratory (GFDL) supports the efforts of Earth System Grid Federation (ESGF) and their role in the coupled inter-comparison model project (CMIP).

The CMIP activity is an organized effort by the world's climate modeling community to freely provide climate information to other scientists and anybody who is able to download and process the data. These data sets are being used for analysis and increased scientific understanding. They provide the scientific basis for many of the international climate reports, including the released Intergovernmental Panel on Climate Change (IPCC) 3rd and 5th Assessment reports. The scientific findings in the IPCC reports provide input to climate policy negotiations between and among countries. The CMIP database is therefore of extremely high value to society both inside the U.S. and the world.

The total amount of data under CMIP Panel oversight is about 5 PB and is one of the larger databases in the world. This data does not reside on any one server but is distributed around the world across 10's of data servers. ESGF provides the infrastructure which allows the data to be useful to those who try to obtain data from the CMIP database. This software is extremely complex as in involves allowing various servers to access information on each other across the internet and the security issues associated with that process.

There is an urgent need for more funding support for the ESGF activity. Without the support, it is possible that serving the CMIP database as outlined above will no longer be possible which will greatly hinder the advancement of climate science.

Therefore, I strongly support the ESGF proposal.

Whit Anderson
Deputy Director, Geophysical Fluid Dynamics Laboratory
Oceanic and Atmospheric Research
National Oceanic and Atmospheric Administration

National Computational Infrastructure (NCI) Australian National University (ANU)

Australian National University

17 April 2017

Dr Ben Evans
Associate Director (Research Engagement and Initiatives)
National Computational Infrastructure

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Canberra ACT 0200 Australia
www.anu.edu.au
www.nci.org.au

CRICOS Provider No. 00120C

Re: Letter of Support for the Earth Systems Grid Federation (ESGF)

Dear Sir or Madam,

The Earth Systems Grid Federation (ESGF) is a unique global organisation and infrastructure that underpins the management, publishing and sharing of internationally significant reference datasets. In particular, the ESGF underpins the Coupled Model Intercomparison Project (CMIP) as the main repository for the model data for the climate community. As the largest federated repository of its kind, it provides the major underpinning collaborative infrastructure that supports reproducible research and contestable outcomes. With the data volumes escalating, the international federated model of the ESGF allows for each major country to contribute the costs of their required infrastructure as well as working in a coordinated fashion for a single distributed archive.

The technical challenges and advancement in global-scale data management and analysis at this scale requires a major effort to bring the best practice to bear. The ESGF includes many of the international major facilities involved in Environmental and Earth systems data. This spans a wide range activities: managing and delivering large-scale data efficiently in a timely fashion over international research networks; ensuring that the data is held and citable using modern citable methods suitable for third party analysis and publication; and how to ensure that the data is ready for analysis next to modern computational systems and capability.

NCI is a major Australian national infrastructure supporting the research community in high performance computing, data management and data analysis. It has a national focus to assist the research community in Earth systems, Earth observation, climate, weather, water management and hydrology and geophysics, which supports collaboration between the university research community and the national agencies. The major national activity in computation and data analysis takes place at the facilities managed at NCI. This includes a top 100 supercomputer (Raijin), cloud systems, and storage infrastructure. As the major coordination point for this data, NCI supports a major ESGF node to make the Australian model data available internationally for the international model intercomparison projects (MIPs), and to replicate international data for local analysis.

I strongly support the ongoing need for the ESGF, which we will continue to contribute to its development and operation for the value of our research community.

Yours Sincerely,