

IS-ENES – WP2/NA1

D2.6 - Final plan for the use and dissemination of foreground

Abstract:

D2.6 gathers information on dissemination activities (publications, talks, posters ...) and on the foreground produced within IS-ENES (software and web portals).

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Table of content

1. LIST OF ALL SCIENTIFIC (PEER REVIEWED) PUBLICATIONS	3
2. LIST OF ALL DISSEMINATION ACTIVITIES.....	4
2.1. PUBLICATIONS.....	4
2.2. TALKS ABOUT IS-ENES	4
2.3. POSTER	5
2.4. OTHER:	6
2.5. WORKSHOPS	6
2.6. WEBSITES/APPLICATIONS	7
2.7. FLYERS	7
2.8. INTERVIEWS	7
3. LIST OF EXPLOITABLE FOREGROUND	8
3.1. STANDARD DOCUMENTS	8
3.1.1. CMIP5 Data Reference Syntax.....	8
3.1.2. CORDEX Facet Mappings.....	9
3.2. SOFTWARE RELATED TO ESGF	10
3.2.1. drslib python library.....	10
3.2.2. ESGF Python client library.....	11
3.2.3. ESGF data download script	12
3.2.4. Synchro-data	13
3.2.5. MyProxyClient python library and script	14
3.2.6. EnesGetCert shell script	15
3.2.7. ESGF Dashboard	16
3.3. OTHER SOFTWARE	17
3.3.1. CDO	17
3.3.2. Web NEMO configuration database	18
3.3.3. OASIS3-MCT	19
3.3.4. Bespoke Framework Generator (BFG) software	20
3.3.5. cdi-pio	21
3.3.6. XIOS	22
3.3.7. Prototype of grid infrastructure	23
3.3.8. Extensions to the GReIC service to support CIM metadata resources	24
3.3.9. CORDEX Writer	25
3.3.10. Chemistry-Climate Model Validation Diagnostic.....	26
3.3.11. HOAPS satellite simulator tool for climate model evaluation.....	27
3.3.12. Aerosol model evaluation tool and web interface	28
3.3.13. MCMS Algorithm for data mining and selected results.....	29
3.4. PORTALS	30
3.4.1. ENES Portal	30
3.4.2. Evaluation Portal	31
3.4.3. climate4impact	32
3.4.4. BFG portal	33

1. List of all scientific (peer reviewed) publications

- ▶ Lémond, J., Dandin, Ph., Planton, S., Vautard, R., Pagé, C., Déqué, M., Franchistéguy, L., Geindre, S., Kerdoncuff, M., Li, L., Moisselin, J.-M., Noël, T., and Tourre, Y.M., 2011: [DRIAS – A step toward French Climate Services.](#) *Adv. Sci. Res.*, 6, 179–186, www.adv-sci-res.net/6/179/2011/ doi:10.5194/asr-6-179-2011
- ▶ Gettelman, A., Eyring, V., Fischer, C., Shiona, H., Cionni, I., Neish, M., Morgenstern, O., Wood, S. W., and Li, Z., [A community diagnostic tool for chemistry climate model validation](#), *Geosci. Model Dev.*, 5, 1061-1073, doi:10.5194/gmd-5-1061-2012, 2012
- ▶ S. Valcke, 2013: *The OASIS3 coupler: a European climate modelling community software*, *Geosci. Model Dev.*, 5, 2139-2178, doi:10.5194/gmdd-5-2139-2012
- ▶ S. Valcke, V. Balaji, A. Craig, C. Deluca, R. Dunlap, R. Ford, R. Jacob, J. Larson, R. O'Kuinghtons, G. Riley, M. Vertenstein, *Coupling technologies for Earth System Modelling*, *Geosci. Model Dev.*, 5, 1589-1596, doi:10.5194/gmd-5-1589-2012
- ▶ Koffi, B., and 23 co authors, [Application of the CALIOP layer product to evaluate the vertical distribution of aerosols estimated by global models: AeroCom phase I results](#), *J. Geophys. Res.*, 117, D10201, doi: 10.1029/2011JD016858. (Funded in part by IS-ENES and in part by Centre National d'Études Spatiales (CNES).)
- ▶ Jean-Claude André, Giovanni Aloisio, Joachim Biercamp, Reinhard Budich, Sylvie Joussaume, Bryan Lawrence and Sophie Valcke, The 2nd IS-ENES Workshop on "High-Performance Computing for Climate Models" Toulouse, Jan.30th-Feb.1st, 2013", *BAMS*, 2013, submitted.

2. List of all dissemination activities

2.1. Publications

- ▶ S. Joussaume, [The European Network for Earth System Modelling](#), Public Service Review: Science and Technology 4, September 2009.
- ▶ S. Joussaume, [Innovation through integration](#), International Innovation, October 2010.
- ▶ ENES [Newsletter #1](#), 29 June 2011
- ▶ ENES [Newsletter #2](#), 13 February 2012
- ▶ COMBINE Quarterly [Newsletter 7](#), 6 February 2012
- ▶ 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
- ▶ Mares C. I. Mares, A. Stanciu, M. Mihailescu, 2012: North Atlantic Oscillation influence on the Danube lower Basin. Online publication in Proceedings of V th International Scientific Conference on Water, Climate and Environment, Balwois 2012, 28 May, 2 June 2012.
- ▶ S. Joussaume, [Earth System Modelling](#), Pan European Networks: Science & Technology 6, April 2013
- ▶ S. Valcke et al, One book chapter of *Brief on “Earth System Modelling – Volume 4 – “Coupling software and strategies”*, R. Budich and R. Redler Eds, Springer, 75 pp.
- ▶ Sylvie Joussaume and Reinhard Budich, [The Infrastructure Project of the European Network for Earth System Modelling: IS-ENES Brief on “Earth System Modelling – Volume 1, Recent developments and projects](#), K. Puri, R. Budich, R. Redler (eds), Springer, 2013, pages 4-8

2.2. Talks about IS-ENES

- ▶ S. Valcke, [IS-ENES, the European Infrastructure project for Earth System Modelling and the OASIS4 coupler](#). Computing in Atmospheric Sciences Workshop organised by NCAR Computational and Information Systems Laboratory, Annecy, 2009
- ▶ Sylvie Joussaume, [IS-ENES: Infrastructure for the European Network for Earth System Modelling](#), EGU 2010, session ESSI5, Vienna, Austria, 7th May 2010.
- ▶ Stephan Kindermann, [E-infrastructure components to support the earth system modeling community in Europe](#), EGU 2010, session ESSI5, Vienna, Austria, 7th May 2010
- ▶ Wim Som de Cerff and Maarten Plieger, [Enabling the use of climate model data in the Dutch climate effect community](#), EGU 2010, session ESSI5, Vienna, Austria, 7th May 2010
- ▶ Wim Som de Cerff and Maarten Plieger, [Enabling the use of climate model data in the Dutch climate effect community](#), EGU 2010, session ESSI5, Vienna, Austria, 7th May 2010
- ▶ S. Joussaume, [Presentation of IS-ENES](#), IS-ENES/CIRCLE/EEA Workshop on Bridging Climate Research Data and the Needs of the Impact Community, - EEA, Copenhagen, Denmark, 11-12 January 2011
- ▶ Céline Déandrés, [Lessons learned from IS-ENES use cases - towards the implementation of an e-impact portal](#), IS-ENES/CIRCLE/EEA Workshop on Bridging Climate Research Data and the Needs of the Impact Community, - EEA, Copenhagen, Denmark, 11-12 January 2011
- ▶ Sylvie Joussaume, [Climate scenarios with global climate models: dealing with uncertainties](#), EEA Scientific Committee seminar on Climate scenarios, impacts and uncertainties, European Environment Agency, March 1st 2011
- ▶ Jean-Claude André with the HPC Task Force, [On the HPC strategy for climate](#), Adhoc-Meeting on European HPC landscape, Munich, Germany, 18th April 2011,
- ▶ S. Joussaume, [e-infrastructure to address frontiers in climate modeling: the IS-ENES initiative](#), CNRS-IPSL, Conference on the Role of e-infrastructures for Climate Change Research, Italy, 18 May 2011
- ▶ Sylvie Joussaume, [The European infrastructure for Earth System Modelling: the IS-ENES project COMBINE](#), General Assembly, Met Office Hadley Center, Exeter, UK, 24-27th May 2011
- ▶ Sylvie Joussaume, [Climate Modelling in Europe](#), GMES and Climate Change, Helsinki, 16-17th June 2011

- ▶ [IS-ENES : Infrastructure for ENES](#), IS-ENES represented by Eric Guilyardi, ESFRI Research Infrastructures and Joint Programming Initiatives in the field of Environmental Sciences, Workshop, Brussels, 17 October 2011
- ▶ Rob Swart, [Outcome of IS-ENES Workshop on Bridging Climate Research data and the Needs of the Impact Community](#), CIRCLE2/JPI Climate Workshop on: Processes for improving the interface between climate research and its application: sharing experiences on climate services development in Europe, Bologna, 8-9 November 2011
- ▶ Swart, R., J., Pagé, C., [Defining climate modeling user needs: which data are actually required to support impact analysis and adaptation policy development?](#) 2010 AGU Fall Meeting, San Francisco, USA, 13-17 December 2010
- ▶ Sylvie Joussaume, [Infrastructure Strategy for the European Earth System Modelling Community 2012-2022](#), JPI Governing Board meeting, Amsterdam, May 10th 2012
- ▶ Sylvie Joussaume, [InfraStructure for the European Network for Earth System modelling](#), Coordination meeting on climate modelling and on science for climate services (organized by EC), Brussels, 7-8 June 2012
- ▶ E. Guilyardi, [ENES and JPI Climate](#), ECRA meeting, Brussels, Belgium, 14-15th June 2012
- ▶ Martin Juckes, [The data deluge: the case of climate modelling](#), Australia – European Union Research Infrastructure Second Workshop, Environment working group, Brussels, 26-27 June 2012
- ▶ Schulz M. and B. Koffi, [What CALIPSO data tell us about vertical distribution in modeling](#), 1th AeroCom workshop, Seattle, September 10-13, 2012
- ▶ Bryan Lawrence, [Exploiting \(high volume\) Climate Simulations and Observations, ESA Climate Change Initiative](#), Frascati (Italy), September 24th, 2012
- ▶ Sylvie Joussaume, [InfraStructure for the European Network for Earth System modelling](#), PCMDI, Livermore (USA) October 1rst, 2012
- ▶ Sylvie Joussaume, [The European InfraStructure for Earth System modeling](#), NCAR (National Center for Atmospheric Research), Climate and Global Dynamics division seminar, Boulder (Colorado, USA) October 9, 2012
- ▶ Sylvie Joussaume, [Modelling the Earth's climate system: data and computing challenges](#), Supercomputing conference 2012, Salt Lake City (USA), 14 November 2012
- ▶ Sylvie Joussaume, [IS-ENES: Infrastructure for ENES](#), EC meeting: Towards an integrated atmospheric observing system in Europe, Brussels, December 3rd 2012
- ▶ Giovanni Aloisio (for ENES), [The efficient use of high-end computing resources for climate: towards a common methodological approach](#), PRACE 2IP WP8 meeting, Lugano, March 7th, 2013
- ▶ Sylvie Joussaume, Bryan Lawrence, Antonio Navarra and Joachim Biercamp and the ENES HPC Task Force, [ENES – PRACE Board of Directors meeting](#), Brussels, March 20th, 2013
- ▶ Maarten Plieger, climate4impact Search, access and work with CMIP5 data EC-Earth workshop, de Bilt, March 21, 2013
- ▶ Sylvie Joussaume, [InfraStructure for the European Network for Earth System modelling](#), EGU 2013, NH1.8 session “ICT-based hydrometeorology science and natural disaster societal impact assessment”, April 8th, 2013 <http://meetingorganizer.copernicus.org/EGU2013/EGU2013-10026.pdf>
- ▶ Wim Som de Cerff, Sylvie Joussaume, Martin Juckes, Christian Pagé, [Climate4impact: Bridging model data to the impact communities](#), EGU 2013, Splinter Session 1.27, talk and demo, April 11th 2013

2.3. Poster

- ▶ [ENES and IS-ENES poster](#) presented at the World Climate Conference n°3, Geneva (Switzerland) – September 2009
- ▶ Participation to the SciTech Europe Event organised in Brussels by PSCA International Ltd. in November 2009 in order to give an overview of the project helped by communication materials (poster and fact sheet on IS-ENES)
- ▶ Ford R., Riley G., [BFG: a Flexible Coupled Modelling tool](#), UK e-Science All Hands conference, Oxford, December 7th-9th, 2009.
- ▶ Martin Juckes, Bryan Lawrence, Stephen Pascoe, Michael Lautenschlager, and Philip Kershaw, [Data IS-ENES \(Infrastructure for European Network of Earth System Modelling\) and the IPCC Climate Projections Archive](#), EGU, Vienna, 2-7 May 2010

- ▶ Pagé, C., Sanchez, E., Terray, L., 2010. [Weather Typing Statistical downscaling with dsclim: diagnostics, and uncertainties in data provision for the impact community](#). 2010 AGU Fall Meeting, San Francisco, USA, 13-17 December 2010
- ▶ Denvil Sébastien, [Prodiguer project : data burden, workflow and climate modeling group](#), WCRP Open Science Conference: "Climate research in service to society" 24-28th October 2011, Denver, Colorado, USA
- ▶ Pagé, C., Deandreas, C., Dandin, P., Lemond, J., Plieger, M., Som de Cerff, W., Franchistéguy, L., Kerdonkuff, M., Geindre, S., [Initiatives toward Climate Services in France and in the European Community](#). WCRP Open Science Conference, Denver, CO, USA, 24-28 October, 2011
- ▶ Koffi B., M., Schulz, B. M., Steensen, J., Griesfeller, F.-M., Bréon et al., (2012b), [Application of the CALIOP Layer Product to evaluate the vertical distribution of aerosols estimated by global models](#), CALIPSO, CloudSat, EarthCARE Joint Workshop, Paris, 18-22 June.
- ▶ Koffi B., and 28 co authors, *An evaluation of the aerosol vertical distribution in global transport models through comparison against CALIOP layer products*, 11th AeroCom workshop, Seattle, September 10-13
- ▶ C. Déandreas, P. Braconnot, C. Pagé, S. Joussaume, [Bridging the gap between the impact and climate communities: lessons from the IS-ENES use cases](#), EGU 2013, Poster, Session CL5.8 "Climate services – underpinning science", April 12th 2013
- ▶ <http://meetingorganizer.copernicus.org/EGU2013/EGU2013-11866.pdf>
- ▶ Wim Som de Cerff, Maarten Plieger, Christian Page, Ronald Hutjes, Fokke de Jong, Lars Bärring, Elin Sjökvist, [The climate4impact portal: bridging CMIP5 data to impact users](#), EGU 2013, Session CL5.8 "Climate services – underpinning science", Vienna (Austria), April 12th 2013
- ▶ Martin Juckes, Michael Lautenschlager, Stephanie Legutke, Ole Christensen, Michael Kolax and Sébastien Denvil, [The CORDEX archive in ESGF: a global archive for regional data](#), EGU 2013, Session CL5.3 "Regional climate modelling including cordex", Poster, April 11th 2013
- ▶ Maarten Plieger, Wim Som de Cerff, Christian Page, Ronald Hutjes, Fokke de Jong, Lars Bärring, and Elin Sjökvist, [Demonstrating the climate4impact portal: bridging the CMIP5 data infrastructure to impact users](#)
- ▶ EGU 2013, [Bridging CMIP5 data to impact users climate4impact](#), Session ESSI2.12 Real Use of Standards and Technologies - Live Demonstrations, April 8th, Vienna (Austria)
- ▶ Maarten Plieger, Wim Som de Cerff, and Ernst de Vreede, [Generic visualization of OpenDAP data resources using OGC services](#), EGU 2013, session ESSI3.1 Techniques and tools for effective visualization in the geosciences, Vienna (Austria), April 1st
- ▶ Maarten Plieger, Wim Som de Cerff, Christian Page, Ronald Hutjes, Fokke de Jong, Lars Bärring, and Elin Sjökvist, [The climate4impact portal: bridging the CMIP5 data infrastructure to impact users](#), EGU2013, session SM1.3/ESSI2.13/GD8.6/GMPV44/TS9.11 "Integrated Research Infrastructures and Services to users: supporting excellence in a science for society"

2.4. Other:

- ▶ S. Joussaume, [Earth System Modelling. Pan European Networks: Science & Technology 6](#), April 2013
- ▶ 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.
- ▶ IS-ENES was promoted during the ESOF event (Euroscience Open Forum 2012, Dublin, 11-15th July) organized by the Eurorisnet + Network.

2.5. Workshops

- ▶ IS-ENES Scoping Meeting, Montvillargennes, France, 29-31 March 2010
- ▶ Martin Juckes, The European Network for Earth System Modelling (ENES) Strategy and Resource Centre, EGU 2010, Townhall meeting (TM3), 6 May 2010
- ▶ IS-ENES/PrACE meeting, Paris 30 November - 1 December 2010

- ▶ Workshop on "Coupling Technologies for Earth System Modelling: Today and Tomorrow" - CERFACS, Toulouse (France) - 15t-17th December 2010
- ▶ IS-ENES/CIRCLE/EEA User Needs workshop, EEA, Copenhagen, Sweden 11-12 January 2011
- ▶ IS-ENES Foresight meeting, Hamburg, Germany 2-4 February 2011
- ▶ Workshop on dynamical cores for climate models, Lecce, Italy, 15-16 December 2011
- ▶ Workshop: Scalable IO in climate models, Hamburg, Germany, 27-28 February 2012
- ▶ ENES Summer School E2SCMS, Kos Greece, June 2012
- ▶ IS-ENES workshop on Statistical downscaling of climate scenarios for the impact communities. A CMIP5 perspective, Paris, 16-17th October 2012
- ▶ 2nd IS-ENES Workshop on HPC for climate models, Toulouse, France, 30 January - 1st February 2013
- ▶ Second Workshop on Coupling Technologies for Earth System Models (CW2013), Boulder, USA, 20-22 February 2013
- ▶ Climate Data Access: Ways Forward, Wageningen University Research Centre, Wageningen, Netherlands, 11-12 February 2013
- ▶ Wim Som de Cerff, climate4impact: Bridging Climate Model data to the impacts communities (public), EGU 2013 SPM1.27 11 April 2013

2.6. Websites/applications

- ▶ <https://is.enes.org>
- ▶ <https://enes.org>
- ▶ <http://climate4impact.eu>

2.7. Flyers

- ▶ [Factsheet presenting the project](#)
- ▶ [Flyer for E2SCMS](#)
- ▶ [GEOSS for Climate brochure, 2010](#)

2.8. Interviews

- ▶ S. Joussaume, [Encouraging connections in climate change research](#), International Innovation, October 2010

3. List of exploitable foreground

3.1. Standard documents

3.1.1. CMIP5 Data Reference Syntax

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>CMIP5 Data Reference Syntax:</i> vocabularies and specifications for file formats in the Coupled Model Intercomparison Project, Phase 5.
Confidential	No
Foreseen embargo date	None
Exploitable product(s) or measure(s)	Standards document
Sector(s) of application	J62.0.1 computer programming activities
Timetable for commercial use or any other use	Not applicable.
Patents or other IPR exploitation (licenses)	None
Owner & other beneficiary (s) involved	Developed jointly with PCMDI and DKRZ

Its purpose	Provide a uniform file structure which is robust and transparent to facilitate management of the archive and exploitation by users.
How the foreground might be exploited, when and by whom	The CMIP5 DRS is in use as a key element of the operational Earth System Grid Federation archive distributing the data. The data files formatted according to the DRS (data where provided in a DRS compliant format by all modelling groups contributing to the CMIP5 archive, with the help of software provided by PCMDI) form the basis of the climate model assessment input into the IPCC 5 th Assessment Report.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	The CMIP5 DRS has been extended to CORDEX, and will be adapted to other data collections. A more formal structure is needed to streamline the process of adapting the standard to new experimental requirements.
Potential/expected impact (quantify where possible)	The DRS is an essential component of peta-scale climate data archives. Without this level of standardisation and uniformity across data provided by globally distributed modelling centres it would be impossible for scientists to tackle the huge data volumes produced by the climate modelling centres.

3.1.2. CORDEX Facet Mappings

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>CORDEX Facet Mappings:</i> an outline of how file level meta-data in the CORDEX archive will be mapped onto data selection facets shown in the archive search interface.
Confidential	No
Foreseen embargo date	None
Exploitable product(s) or measure(s)	Standards document
Sector(s) of application	J62.0.1 computer programming activities
Timetable for commercial use or any other use	Not applicable.
Patents or other IPR exploitation (licenses)	None
Owner & other beneficiary (s) involved	STFC

Its purpose	Ensure that the transformation from user requirements in terms of a clear search interface to file meta-data requirements is well understood.
How the foreground might be exploited, when and by whom	The document will provide a reference for the configuration of publication software when publication of CORDEX data in the ESGF archive starts in 2013.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	Not applicable.
Potential/expected impact (quantify where possible)	The facet mappings are one component of archive planning for CORDEX. They will contribute to efficient distribution of the CORDEX data and hence to efficient exploitation of this new and valuable resource for climate impacts research.

3.2. Software related to ESGF

3.2.1. drslib python library

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>drslib python library.</i>
Confidential	No
Foreseen embargo date	None
Exploitable product(s) or measure(s)	Software
Sector(s) of application	J62.0.1 computer programming activities
Timetable for commercial use or any other use	<i>Not applicable.</i>
Patents or other IPR exploitation (licenses)	<i>None</i>
Owner & other beneficiary (s) involved	STFC

Its purpose	The software supports the publication of CMIP5 data in the Earth System Grid Federation (ESGF) archive by implementing the version control system and organising the data in the recommended directory structure.
How the foreground might be exploited, when and by whom	The software is part of the standard distribution of ESGF software and can be used by archive node managers as part of their data publication work flow. It is a key component of the ENES distributed archive service infrastructure.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	None.
Potential/expected impact (quantify where possible)	The software enables implementation of the version control system which was a key requirement for the data archive, a requirement which was not implemented in earlier climate model archives because technical barriers out-weighed user requests. The implementation in the current climate model archives gives greater credibility to the science derived from those archives.

3.2.2. ESGF Python client library

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>ESGF Python client library</i>
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	A software library providing a client-side application programming interface to ESGF web services for dataset search and authentication.
Sector(s) of application	J63.9.9 - Other information service activities n.e.c. M72 - Scientific research and development
Timetable for commercial use or any other use	févr-13
Patents or other IPR exploitation (licenses)	Software is made available under an open source licence so could be exploited by others.
Owner & other beneficiary (s) involved	Science & Technology Facilities Council (STFC), UK.

Its purpose	ESGF Pyclient allows users to search ESGF data holding programmatically through the Python programming language and can be used as a component of other tools and services needing to interface with ESGF services.
How the foreground might be exploited, when and by whom	ESGF Pyclient can be used to build search and download systems for ESGF. It is suitable for use by end users with basic programming experience and by developers of tools and services. It is already used by the UK Met. Office as part of their operational data product service to their scientists. It is also used by a data search and download tool developed for the ExArch project.
IPR exploitable measures taken or intended	Software is made available under an open source licence so could be exploited by others.
Further research necessary, if any	The features of ESGF pyclient may be expanded to encompass more ESGF services when the demand exists.
Potential/expected impact (quantify where possible)	Expected to be used by scientists, tool developers and institutions managing ESGF data. Expected to be a central component in future ESGF software.

3.2.3. ESGF data download script

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>ESGF data download script for end user data download from the ENES data federation</i>
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	ENES ESGF index node
Sector(s) of application	J63.9 - Other information service activities
Timetable for commercial use or any other use	Software is part of the ESGF index node and used in production in ENES federation since 2012
Patents or other IPR exploitation (licenses)	the software is part of the ESGF open source software stack
Owner & other beneficiary (s) involved	DKRZ, ESGF software team (owners), beneficiaries - all institutions deploying ESGF P2P intex nodes (portals)

Its purpose	The ESGF download script facility enables secure, reliable data download from ESGF P2P data nodes and is integral part of the ESGF index node. It provides: download and storage of security credentials, secure data node acces with credentials, multi-file download with checksumming, retry possibility in case of transfer problems.
How the foreground might be exploited, when and by whom	The ESGF download script can be exploited by every researcher wanting to download data from the ENES federation and integrat eENES data access into own data analysis scripts.
IPR exploitable measures taken or intended	software is released as part of the ESGF open source software stack under the ESGF / BSD open source license
Further research necessary, if any	operational improvements aligned with technological advancements in the ESGF ENES data federation
Potential/expected impact (quantify where possible)	used by more than 900 users of the ENES federation in 2012 to download more than 600 Tbyte of Data. Also used by non-european users worldwide.

3.2.4. Synchro-data

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>Synchro-data</i> is a Python program managing discovery / authentication / certificate / download processes from the 5th Climate Model Intercomparison Project archive (CMIP5 archive) in an easy way.
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	A command line tool designed to facilitate the download of files hosted by the distributed digital repositories of the ESGF Federation.
Sector(s) of application	J63.9.9 - Other information service activities n.e.c. M72 - Scientific research and development
Timetable for commercial use or any other use	
Patents or other IPR exploitation (licenses)	Software is made available under an open source licence so could be exploited by others.
Owner & other beneficiary (s) involved	Centre National de la Recherche Scientifique (CNRS) FR

Its purpose	Ease access and keep precise track of downloaded files and versions from the ESGF system.
How the foreground might be exploited, when and by whom	As an ESGF download scheduler synchro-data has been used by several power users so as to keep a significant subset of the ESGF content in sync with the distributed archive. Interested parties are all parties using ESGF data (CMIP5, CORDEX, obs4MIPs, ...)
IPR exploitable measures taken or intended	Software is made available under an open source licence so could be exploited by others.
Further research necessary, if any	Better handling of replicas so as to target the closest files. Also leveraging gridFTP endpoints when available.
Potential/expected impact (quantify where possible)	Has been used by a large number (>100) of scientific and climate impacts-related users. Their analyses will be reported in the scientific literature and IPCC reports. For example ETH, GFDL, NOAA, IPSL made extensive use of synhcro-data serving more than 100 researchers and scientifcs.

3.2.5. MyProxyClient python library and script

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>MyProxyClient python library and script.</i>
Confidential	No
Foreseen embargo date	None
Exploitable product(s) or measure(s)	Software
Sector(s) of application	J62.0.1 computer programming activities
Timetable for commercial use or any other use	Not applicable.
Patents or other IPR exploitation (licenses)	None
Owner & other beneficiary (s) involved	STFC

Its purpose	The software allows users to download Earth System Grid Federation security certificates to their local computer.
How the foreground might be exploited, when and by whom	This will allow more flexible access to the data held within the ENES data archives.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	None.
Potential/expected impact (quantify where possible)	More advanced and user friendly tools are needed to enable wider exploitation of ENES data services. Problems associated with obtaining and managing security certificates have been a barrier to progress. MyProxyClient provides a functional implementation of the security interface in a widely used python language.

3.2.6. EnesGetCert shell script

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>EnesGetCert shell script.</i>
Confidential	No
Foreseen embargo date	None
Exploitable product(s) or measure(s)	Software
Sector(s) of application	J62.0.1 computer programming activities
Timetable for commercial use or any other use	Not applicable.
Patents or other IPR exploitation (licenses)	None
Owner & other beneficiary (s) involved	STFC

Its purpose	The software allows users to download Earth System Grid Federation security certificates to their local computer.
How the foreground might be exploited, when and by whom	This will allow more flexible access to the data held within the ENES data archives.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	None.
Potential/expected impact (quantify where possible)	More advanced and user friendly tools are needed to enable wider exploitation of ENES data services. Problems associated with obtaining and managing security certificates have been a barrier to progress. enesGetCert provides a simple but robust foundation on which to build further tools. Its role is as a component of a larger system.

3.2.7. ESGF Dashboard

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>ESGF Dashboard: a new software system for the monitoring of the IS-ENES infrastructure</i>
Confidential	No
Foreseen embargo date	
Exploitable product(s) or measure(s)	ESGF node
Sector(s) of application	J63.9 - Other information service activities
Timetable for commercial use or any other use	Timetable for research purposes: 2011-2017 (2017 is the end of the IS-ENES2 project, but the software could be potentially part of the IS-ENES infrastructure after 2017 as well)
Patents or other IPR exploitation (licenses)	The software is going to be released under an open source license.
Owner & other beneficiary (s) involved	Beneficiary CMCC (owner), Beneficiaries - all the institutions deploying a P2P ESGF node
Its purpose	The software supports the publication of CMIP5 data in the Earth System Grid Federation (ESGF) archive by implementing the version control system and organising the data in the recommended directory structure.
How the foreground might be exploited, when and by whom	The software is part of the standard distribution of ESGF software and can be used by archive node managers as part of their data publication work flow. It is a key component of the ENES distributed archive service infrastructure.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	None.
Potential/expected impact (quantify where possible)	The software enables implementation of the version control system which was a key requirement for the data archive, a requirement which was not implemented in earlier climate model archives because technical barriers out-weighed user requests. The implementation in the current climate model archives gives greater credibility to the science derived from those archives.

3.3. Other software

3.3.1. CDO

Type of Exploitable Foreground	General Advancement of knowledge
Exploitable Foreground (description)	CDO is a collection of command line Operators to manipulate and analyse Climate and NWP model Data.
Confidential	No
Foreseen embargo date	None
Exploitable product(s) or measure(s)	Software freely available via ENES portal, forum on the software available on the portal
Sector(s) of application	J62.0.1 computer programming activities
Timetable for commercial use or any other use	Not applicable
Patents or other IPR exploitation (licenses)	GPL
Owner & other beneficiary (s) involved	MPG/MPI für Meteorologie

Its purpose	The software allows users to manipulate and analyse Climate and NWP model Data. Supported data formats are GRIB 1/2, netCDF 3/4, and others. There are more than 600 operators available.
How the foreground might be exploited, when and by whom	Users can immediately start to use the software for the purposes indicated above.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	none
Potential/expected impact (quantify where possible)	The software is used by more than 250 institutions world-wide. It is a quasi-standard in climate science. Easier understanding of the data at hand and faster time to solution than with self-developed software is granted.

3.3.2. Web NEMO configuration database

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	Web NEMO configuration database
Confidential	No
Foreseen embargo date	
Exploitable product(s) or measure(s)	Source code of more than 50 diagnostics
Sector(s) of application	Ocean and climate modeling
Timetable for commercial use or any other use	Available
Patents or other IPR exploitation (licenses)	None
Owner & other beneficiary (s) involved	None

Its purpose	Illustrating the different aspects and impacts of the different physical packages available in NEMO
How the foreground might be exploited, when and by whom	Source code can be downloaded on NEMO source code repository. Users have then to follow the documentation available on the report 4.5
IPR exploitable measures taken or intended	No IPR
Further research necessary, if any	This work will continue with IS-ENES2
Potential/expected impact (quantify where possible)	Helping the users to select the most appropriate physical packages for their own applications of NEMO

3.3.3. OASIS3-MCT

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>The OASIS3-MCT parallel coupling software</i>
Confidential	No
Foreseen embargo date	none
Exploitable product(s) or measure(s)	Number of software downloads; number of coupled climate models using the software
Sector(s) of application	Climate modelling; numerical weather prediction
Timetable for commercial use or any other use	The first official version of OASIS3-MCT was released in August 2012.
Patents or other IPR exploitation (licenses)	The software is released under an LGPL license.
Owner & other beneficiary (s) involved	Owner: CERFACS (Fr); other beneficiaries: currently, the Met Office (UK), IPSL (Fr), MPI-M (De), BTU-Cottbus (De), LEGOS (Fr), the BoM (Au) are using OASIS3-MCT in their coupled system.

Its purpose	OASIS3-MCT is a software implemented as a parallel coupling library that performs the interpolation of the coupling fields as a parallel matrix-vector product and a parallel redistribution of the coupling fields directly from the source to the target component processes.
How the foreground might be exploited, when and by whom	It is expected that most climate modelling groups currently using the OASIS3 coupler will shortly migrate to the new parallel version OASIS3-MCT to benefit from its increased performance on massively-parallel platforms.
IPR exploitable measures taken or intended	OASIS3-MCT is released under an LGPL licence and with a CERFACS copyright
Further research necessary, if any	The development of OASIS3-MCT will be pursued during the IS-ENES2 project to add few functions although no major evolutions are foreseen.
Potential/expected impact (quantify where possible)	First measures on HPC platforms (Curie Bullx at CEA, Fr) shows that the new parallel coupler OASIS3-MCT is about 10 times faster than its predecessor OASIS3 for the exchanges of the coupling fields in a ocean-atmosphere coupled model at relatively high resolution (0.5 degree) when a high number of cores ($O(1000)$) is used to run the coupled system.

3.3.4. Bespoke Framework Generator (BFG) software

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>Bespoke Framework Generator (BFG) software supporting the generation of 'wrapper' framework code to support flexible composition and deployment of coupled models</i>
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	N/A
Sector(s) of application	J58.2.9 Other software publishing
Timetable for commercial use or any other use	N/A
Patents or other IPR exploitation (licenses)	Currently free non-commercial license. Agreement reached to release under LGPL in near future
Owner & other beneficiary (s) involved	No

Its purpose	The BFG supports the rapid construction of coupled models. BFG takes as input a description of the models to be coupled, what data they need to exchange and how the models are to be mapped to programs for execution and generates the required 'wrapper code' required to build the coupled model using a specified exiting coupling technology, such as OASIS-MCT or ESMF.
How the foreground might be exploited, when and by whom	BFG is freely available to coupled model developers.BFG is available from the ENES portal.
IPR exploitable measures taken or intended	N/A
Further research necessary, if any	BFG is a research prototype tool and development is constantly under review as the requirements of the currently targetted user communities become clear.Currently, the target user communities are Earth System Modelling and Integrated Assessment modelling.
Potential/expected impact (quantify where possible)	The ability to rapidly build and explore coupled models out of existing and new models from the (world-wide) community of model developers (in the ESM community, for example) is key to making rapid scientific progress in understanding climate change etc.

3.3.5. cdi-pio

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>cdi-pio</i> is an cdi (https://code.zmaw.de/projects/cdi) internal client/server infrastructure for allowing to allow for running cdi asynchronous on dedicated hardware. This is implementing one possible low level architecture for parallel output of climate and NWP models. It could be used for analysis tools as well.
Confidential	No
Foreseen embargo date	none
Exploitable product(s) or measure(s)	Software is integral part of cdi and distributed with cdi. It is freely available
Sector(s) of application	J62.0.1 computer programming activities
Timetable for commercial use or any other use	Not applicable
Patents or other IPR exploitation (licenses)	GPL
Owner & other beneficiary (s) involved	MPG/MPI für Meteorologie

Its purpose	The software is an abstraction layer on top of grib1/2 and netcdf 3/4 and allows transparent write and read of these formats (support for several legacy formats is available as well). It provides a common I/O interface for models and analysis tools like cdo.
How the foreground might be exploited, when and by whom	Experienced developers can immediately start to use the software for the purpose indicated above. The implementation in models requires excellent knowledge of the used parallel decomposition to be able to setup the abstract description used in cdi-pio.
IPR exploitable measures taken or intended	Not applicable
Further research necessary, if any	Depending on HPC computer architecture development this needs to be updated starting from 2015 by a new approach. As the future architecture is not known now, we have to closely follow the development and redesign the used schemes if necessary.
Potential/expected impact (quantify where possible)	Allows for at least one more HPC computer architecture generation to scale (maybe till 2018).

3.3.6. XIOS

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	Highly configurable parallel out system with client-server mode
Confidential	No
Foreseen embargo date	None
Exploitable product(s) or measure(s)	Software
Sector(s) of application	J62.0.1 computer programming activities
Timetable for commercial use or any other use	Not applicable.
Patents or other IPR exploitation (licenses)	None
Owner & other beneficiary (s) involved	IPSL (CNRS-CEA)

Its purpose	Embedded in Earth system models, the software allows to output model fields to disks during a climate simulation. It uses a client-server system with parallel communications and parallel file systems for performance. It uses a versatile XML configuration file.
How the foreground might be exploited, when and by whom	It is presently used in some Earth system models.
IPR exploitable measures taken or intended	Not applicable
Further research necessary, if any	Adaptation to future super computers. Improvement of functionalities to follow the development of Earth system models.
Potential/expected impact (quantify where possible)	The performance of the software will fully benefit to the global performance of Earth system models on parallel super computers. The XML configuration system will speed-up the set up phase of future climate simulations.

3.3.7. Prototype of grid infrastructure

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	Prototype of grid infrastructure for running and monitoring ensemble experiments through web interfaces
Confidential	NO
Foreseen embargo date	
Exploitable product(s) or measure(s)	Basic grid services provided by Globus Toolkit
Sector(s) of application	J58.2.9 other software publishing
Timetable for commercial use or any other use	The software package can be adopted by companies that provides cloud computing resources, but it requires one year to be ported and validated in a cloud computing environment
Patents or other IPR exploitation (licenses)	No
Owner & other beneficiary (s) involved	CMCC software team (owner)

Its purpose	The main goal is to provide a high level environment for climate simulations in a grid environment. The grid environment prototype exploits already available grid services, namely GRB services and Globus middleware. A web services based system allows the brokering and scheduling of jobs in a distributed environment. Web based interfaces have been developed for accessing the infrastructure. The prototype allows the submission and monitoring of ensemble climate experiments.
How the foreground might be exploited, when and by whom	The foreground can be exploited by any research center on climate change, and more in general for any kind of simulations that require ensemble experiments.
IPR exploitable measures taken or intended	No
Further research necessary, if any	The software package represents a complete set of functionalities for running and monitoring ensemble experiments. It can be extended to support also management of a whole climate workflow starting from data preprocessing, to data publishing and archiving
Potential/expected impact (quantify where possible)	The potential impact is foreseen in the improvement of the scientific production of climate simulations and a better exploitation of computational resource distributed in a grid environment.

3.3.8. Extensions to the GReIC service to support CIM metadata resources

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>Extensions to the GReIC service to support CIM metadata resources</i>
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	GReIC service
Sector(s) of application	J63 - Information service activities
Timetable for commercial use or any other use	Not applicable
Patents or other IPR exploitation (licenses)	The software is going to be released under an open source license.
Owner & other beneficiary (s) involved	Beneficiary CMCC (owner)

Its purpose	Provide access to CIM metadata in a grid environment
How the foreground might be exploited, when and by whom	It could be used to get access, query and index CIM metadata (and more in general XML documents) in a grid environment. The provided support is fine both Globus and gLite middleware.
IPR exploitable measures taken or intended	The software is going to be released under an open source license.
Further research necessary, if any	OpenID-based security infrastructure support for GReIC
Potential/expected impact (quantify where possible)	The GReIC service provides access, indexing and querying functionalities related to CIM metadata. Unfortunately the GReIC service and the IS-ENES infrastructure uses two different security paradigms at the user level (GSI vs OpenID). This security mismatch is a barrier for a stronger adoption of this service to manage CIM metadata documents.

3.3.9. CORDEX Writer

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>CORDEX Writer</i> : a software package for producing CORDEX compliant netcdf files for regional climate models
Confidential	No
Foreseen embargo date	No
Exploitable product(s) or measure(s)	CORDEX Writer
Sector(s) of application	J63.1.1 data processing, hosting and related activities
Timetable for commercial use or any other use	no timetable for any use
Patents or other IPR exploitation (licenses)	an open source license
Owner & other beneficiary (s) involved	Beneficiary SMHI (owner)

Its purpose	The CORDEX writer has been developed for converting output from regional climate models to netcdf files accordingly to the CORDEX specifications (variable names, units, attributes etc.).
How the foreground might be exploited, when and by whom	The CORDEX writer can be exploited by any Regional Climate Modelling Centre for post-processing regional climate model output. The CORDEX writer is available from February 2013 and can be used as whole or by parts. Limited support can be provided.
IPR exploitable measures taken or intended	An open source license
Further research necessary, if any	Some modifications/improvements might be introduced in order to make the CORDEX writer easier to use.
Potential/expected impact (quantify where possible)	Potential impacts of the CORDEX writer are: a) an unified and simplified way for post-processing regional model output, b) the post-processed netcdf files fulfil requirements for publishing via the ESGF system.

3.3.10. Chemistry-Climate Model Validation Diagnostic

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>Chemistry-Climate Model Validation Diagnostic (CCMVal-Diag) tool for model evaluation</i>
Confidential	No
Foreseen embargo date	0
Exploitable product(s) or measure(s)	CCMVal-Diag tool software package
Sector(s) of application	J63.9 - Other information service activities
Timetable for commercial use or any other use	The software package has been released in July 2012 and is freely available since then.
Patents or other IPR exploitation (licenses)	The software package has been released under a BSD open source license.
Owner & other beneficiary (s) involved	NCAR, DLR

Its purpose	The CCMVal-Diag tool is a flexible and extensible open source package that facilitates the complex evaluation of global models. Models can be compared to other models, ensemble members (simulations with the same model), and/or many types of observations. The initial construction and application is to coupled chemistry-climate models (CCMs) participating in CCMVal, but the evaluation of climate models that submitted output to the Coupled Model Intercomparison Project (CMIP) is also possible.
How the foreground might be exploited, when and by whom	The CCMVal-Diag tool can be exploited by every researcher wanting to analyse multiple or individual models in comparison to observations.
IPR exploitable measures taken or intended	Software is released at the CCMVal webpage (http://www.pa.op.dlr.de/CCMVal/) under a BSD open source license.
Further research necessary, if any	Extension of the tool with further diagnostics, performance metrics and observations that are important for chemistry-climate coupling; extension of the tool to more complex Earth System models; technical improvements; operational use directly on model output and observations that are stored on the ESGF.
Potential/expected impact (quantify where possible)	The CCMVal-Diag tool has been used to assist with analysis of simulations for the 2010 WMO/UNEP Scientific Ozone Assessment, the SPARC Report on the Evaluation of CCMs, and ozone and associated climate impacts in CMIP5 simulations. A wide use of the extended tool is envisaged, which can facilitate the complex evaluation of Earth System models with observations.

3.3.11. HOAPS satellite simulator tool for climate model evaluation

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>HOAPS satellite simulator tool for climate model evaluation</i>
Confidential	No
Foreseen embargo date	None
Exploitable product(s) or measure(s)	HOAPS satellite climatology data products
Sector(s) of application	J63.1.2 web portals
Timetable for commercial use or any other use	n. a.
Patents or other IPR exploitation (licenses)	None
Owner & other beneficiary (s) involved	MPG/MPI für Meteorologie

Its purpose	The HOAPS tool is a simulator package for SSM/I satellite retrievals that allows generating bias corrections of turbulent surface fluxes in climate model output under consideration of uneven satellite sampling.
How the foreground might be exploited, when and by whom	The HOAPS satellite simulator tool can be used by any researcher in need for evaluating climate model output of turbulent surface fluxes through the link provided on the services page of the ENES portal
IPR exploitable measures taken or intended	n. a.
Further research necessary, if any	None
Potential/expected impact (quantify where possible)	Improved climate model output evaluation with satellite data due to improved consideration of satellite sampling statistics

3.3.12. Aerosol model evaluation tool and web interface

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>Aerosol model evaluation tool and web interface</i>
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	Web interface to multi-model evaluation diagnostics
Sector(s) of application	J63.9 - Other information service activities
Timetable for commercial use or any other use	The diagnostics are freely available
Patents or other IPR exploitation (licenses)	no patents planned
Owner & other beneficiary (s) involved	Met.No, IPSL, MPI, NASA Goddard have contributed to development

Its purpose	The AeroCom tools and associated web interface allow for the consistent evaluation of global aerosol models. Models can be compared to other models and/or many types of observations. Model versions can be inspected to see model progress. Communication in the AeroCom model comparison initiative is facilitated by the open access to the results. Aerosol models shall be improved to reduce uncertainty in aerosol radiative forcing.
How the foreground might be exploited, when and by whom	The AeroCom web interface can be exploited by every researcher wanting to analyse multiple or individual models in comparison to observations.
IPR exploitable measures taken or intended	AeroCom web interface is available under the webpage http://aerocom.met.no/data.html .
Further research necessary, if any	Diagnostic development for new observational data, black carbon, aerosol composition, new satellite data. Aggregated diagnostics for rapid feedback on quality of aerosol models of different maturity. Automatization of model upload, analysis and storage.
Potential/expected impact (quantify where possible)	The AeroCom tool has been used to support the 4th and 5th IPCC assessment reports, and individual European research projects. Development of the MACC model, ESA satellite retrievals and EMEP assessments is currently supported. Further usage in assessment reports of international level is foreseen.

3.3.13. MCMS Algorithm for data mining and selected results

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>Algorithm for data mining and selected results</i>
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	Scientific research
Sector(s) of application	J62.0.1 - Computer programming activities
Timetable for commercial use or any other use	N.A.
Patents or other IPR exploitation (licenses)	No
Owner & other beneficiary (s) involved	No

Its purpose	An algorithm for the objective recognition and tracking of mid-latitude low-pressure systems (storms) as well as for the recognition of the area attributed to the storm and for the objective calculation of parameters concerning the storms. The input consists in gridded sea surface pressure time-series. The algorithm may be used with input from re-analysis datasets or from climate model simulations. Selected results generated using re-analysis input are given.
How the foreground might be exploited, when and by whom	The algorithm is available on-line. It may be used by the climate model groups in order to assess the similarity of the storminess features in their model results and the re-analysis data. MCMS may also be used as a weather sensitive filter for any sort of model or data parameter.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	The work concerning the algorithm will continue. More results may be uploaded in the future.
Potential/expected impact (quantify where possible)	Contribution to a more holistic evaluation of climate models' performance.

3.4. Portals

3.4.1. ENES Portal

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>Webportal as central entry point and community platform for the Earth System Modelling community</i>
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	N.A.
Sector(s) of application	J63.1.2 web portals
Timetable for commercial use or any other use	N.A.
Patents or other IPR exploitation (licenses)	No
Owner & other beneficiary (s) involved	No
Its purpose	The ENES portal (https://enes.portal.org) was designed to be the single central portal, which acts not only as a common entrance point to the ESM infrastructure built within IS-ENES, but also as a presentation and virtual meeting point of the ESM community. The objective was to collect, integrate and link (IS-ENES) services and information in a coherent fashion, providing an overview of community resources and to offer a communication platform for the ESM community
How the foreground might be exploited, when and by whom	The portal can be accessed by the entire public via the Internet 7/24.
IPR exploitable measures taken or intended	No
Further research necessary, if any	the continuity and expansion of the portal as a community platform for IS-ENES 2 and beyond is no longer a technical but an organizational and political issue and has to be integrated in the overall strategy of the ENES community. This is reflected in the structure of IS-ENES 2 by integrating the portal into the strategy work package and by giving responsibility for the quality and relevance of the portals content and services to the ENES scientific officer.
Potential/expected impact (quantify where possible)	The portal is increasingly being noticed and used by the community, as reflected by 3800 visitors per month (average 2012) as well as support, contribution and support requests send via the contact form of the portal. The promotion of standardized tools in the community by improving their visibility and strengthening their support services via the portal shows its success in the experienced increase of users and their support with help of the services supported by the IS-ENES project (see als Milestone M5.7 "Report of v.E.R.C. services on OASIS, NEMO and CDO").

3.4.2. Evaluation Portal

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>Evaluation Portal - Database and website for the dissemination of the data.</i>
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	Scientific research
Sector(s) of application	J63.1.2 web portals
Timetable for commercial use or any other use	N.A.
Patents or other IPR exploitation (licenses)	No
Owner & other beneficiary (s) involved	No

Its purpose	It is a web portal featuring a collection of information on ways, data and methods used for the development of climate models, more specifically for the part of evaluating the performance of models. It can be used as an one-shop-stop for modelers as well as for anyone interested in the evaluation process of climate models.
How the foreground might be exploited, when and by whom	The portal is available on-line 24/7. The groups responsible for the development of climate models may use the portal to facilitate the process of evaluating their models, which is an integral part of the developing of the models. The users of the model results may use the portal in order to assess the quality of the evaluation procedure of each model. People creating observational datasets and tools that can be used in the model evaluation process may notify the modeling community through this portal about their work.
IPR exploitable measures taken or intended	Not applicable.
Further research necessary, if any	The database will eventually be deprecated if not updated.
Potential/expected impact (quantify where possible)	Facilitation of the burden of evaluating the climate models for the developing groups and acceleration of the interaction between the different modeling groups. Facilitation of assessment of model quality by people interested in model results but less interested in model themselves.

3.4.3. climate4impact

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	<i>climate4impact</i>
Confidential	No
Foreseen embargo date	N.A.
Exploitable product(s) or measure(s)	N.A.
Sector(s) of application	J63.1.2 web portals
Timetable for commercial use or any other use	N.A.
Patents or other IPR exploitation (licenses)	No
Owner & other beneficiary (s) involved	No

Its purpose	<p>The climate4impact portal (http://climate4impact.eu) is oriented towards climate change impact modellers, impact and adaptation consultants, as well as other experts using climate change data. Here you will find access to data and quick looks of global climate models (GCM) scenarios, as well as some regional climate model (RCM) and downscaled higher resolution climate data. The portal provides data transformation tooling for tailoring data to your needs and mapping & plotting capabilities. All using standardised interfaces and common data processing tools to access and process data, properly described with standardised metadata.</p> <p>Guidance on how to use climate scenarios, documentation on the climate system, frequently asked questions (FAQ) and examples in several impact and adaptation themes (Use Cases) are presented and described, along with the steps required to go from the GCM data to the impact model input data (workflow).</p>
How the foreground might be exploited, when and by whom	The portal is 24/7 publically available for usage via the Internet. The target groups are the climate change impact modellers, impact and adaptaiton consultants as well as other experts using climate change data.
IPR exploitable measures taken or intended	No
Further research necessary, if any	The current portal is a prototype which will be made operational in the IS-ENES2 project. A development roadmap for the portal has been set up, together with the users. Research will focus on: 1) improving the search capabilities 2) improving the data (pre)processing capabilities (downscaling, time series, bias calculations) 3) making more data available (e.g. CORDEX)
Potential/expected impact (quantify where possible)	The current version is a prototype in development, but the usage is promising and comments received are very encouraging. The portal was evaluated by the users and their suggestions for improvements are part of the roadmap. Other EU projects have shown interest in the poratl and it is foreseen others will use this portal to disseminate their data (ECLISE, CLIMRUN, SPECS, EUPORIAS).

3.4.4. BFG portal

Type of Exploitable Foreground	General advancement of knowledge
Exploitable Foreground (description)	The <i>BFG portal</i> is a portal supporting the use of the Bespoke Framework Generator, a flexible coupling technology. (see: http://bfg.cs.man.ac.uk/)
Confidential	No
Foreseen embargo date	-
Exploitable product(s) or measure(s)	N/A
Sector(s) of application	J63.1.2 web portals
Timetable for commercial use or any other use	N/A
Patents or other IPR exploitation (licenses)	No
Owner & other beneficiary (s) involved	No
Its purpose	The BFG portal makes available information and examples of the BFG flexible coupling system. Users may also upload coupling descriptions (metadata) and run BFG to produce coupling source code and various other BFG utilities (validation and visualisation of metadata descriptions, for example).
How the foreground might be exploited, when and by whom	The portal is available to the entire user community.
IPR exploitable measures taken or intended	N.A
Further research necessary, if any	The portal facilities are constantly under review in response to the requirements of the user community, in particular, the Earth System Modelling and Integrated Assessment communities.
Potential/expected impact (quantify where possible)	The portal is expected to help to increase the exchange of knowledge and working practices in the target communities (Earth System Modelling and Integrated Assessment Modelling).