IS-ENES3 Deliverable D6.5

Second external review of model and tools services
Reporting period: 01/01/2022 – 31/03/2023

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Reviewer(s): Fanny Adloff, Sophie Morellon and Sylvie Joussaume
Release date: 25/08/2022

ABSTRACT

The accessibility and quality of services for European ESMs and software tools, provided collaboratively via the ENES Portal pages, have been assessed for the second time by two external reviewers. The service provided was positively evaluated but recommendations for improvement were proposed. At the end of the process review, the ENES portal pages were rewritten, including the Services section. Main recommendations from the external reviewer were taken into account, such as the need to simplify the section's overall structure.

Revision table			
Version	**Date**	**Name**	**Comments**
0	08/04/2022	Initial draft	EM
1	11/07/2022	Version for internal review	EM: taking into account corrective actions
2	08/08/2022	Version after internal review	
Dissemination Level			
PU	Public	X	

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Executive Summary

During the first external review, some serious issues were highlighted, which negatively affected users in search for services for particular models/tools and the reviewer reported missing responses to service requests and incorrect or missing information on the ENES Portal.

This time, reviewers obtained answers regarding level 1 service (in a request to get CMIP6 data) from all seven groups participating to the IS-ENES service. A reviewer described it as very rapid and helpful. The Level 2 services, although not comprehensively tested, were also available. The evaluation of the quality of the help desk, documentation and FAQ varied depending on the software.

The portal information was assessed as well-detailed. It links the major European ESM groups together and provides one central information point. However, improvements are again requested for a better readability and consistency. This review launches a set of corrective actions that are listed at § 3 and mainly taken during our IS-ENES Portal rewriting.

Overall, the service provided is favorably considered but there is room for improvement. An important critical point is emphasised in conclusion of both reviews and was already mentioned in the first review: the lack of the full public availability of the model sources. As a solution, a reviewer suggested to make available simplified educative versions of the IS-ENES ESMs.

For reference, the complete external review is included in the Appendix.

1- Objectives

The overarching objective for VA1/WP6 is to maintain, extend, and improve level 1 and 2 services around European ESMs, the NEMO ocean model, and related critical infrastructure software tools. These services help to efficiently connect the respective developer and user communities and thus support the usage and development of European ESMs as well as the exploitation of climate model data. Three tasks in VA1/WP6 are responsible for providing level 1 services for models (T1), level 2 services for models (T2), and services for infrastructure tools (T3). The main objective for all services is to provide relevant information to users of the European ESMs and tools, and ensure efficient communication between service providers (modelling groups and tool developers) and their respective user communities. All services provided in WP6/VA1 are continuously monitored (for results from the first and second reporting period, see D6.1 and D6.3).

2. Methodology and results

2.1 External Review of Services

The VA1/WP6 description of work requires an external review of services in order to assess the status and allow for corrective actions, where needed, during the project lifetime. Together with the statistics provided during the first and second reporting periods (D6.1 and D6.3), the review will help to assess the visibility, accessibility, quality, and usefulness of the services offered. Two reports are provided during the course of the project, one at month 24 (see D6.2) and another one at month 40 (this one). More specifically, the external reviews are expected to:

• Assess the level 1 services on ESMs, i.e. verify that ES-DOC metadata is available (at https://search.es-doc.org) through the ENES portal for all European ESMs and that the listed contact points are reachable and reply to specific questions about the use of CMIP6 model output (see https://is.enes.org/smt-european-esms/);

• Interact with at least one group providing level 2 service for one particular ESM or Advanced Users Service for one particular tool and provide feedback about quality of the help received;

• Check NEMO, OASIS, Cylc, XIOS, ESMValTool, and CDO websites and report on the information and help that a user can get directly on these web sites (documentation, tutorials, FAQs, user forums) or via contacts identified on these sites providing additional user support.

2.2 Appointment of External Reviewers

Two external reviewers were appointed with the task of reviewing the WP6/VA1 services described in the previous paragraph. Neither of the external reviewers is directly affiliated with IS-ENES3.

Dr. Ingo Kirchner (hereby IK) is a scientist, lecturer, and scientific software developer at the Institute of Meteorology, Freie Universität (FU) Berlin, Germany, since 2003. He is involved in e-learning, climate modelling and information technologies. He already participated to the first round of external review. His advice will be precious to better quantify the progresses made during the project.

Dr. Cyril Caminade (hereby CC), is a research associate at the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, where he is working on modeling vector control measures. He previously gave lectures from 2013 to 2021 at the University of Liverpool and studied the impact of climate variability and climate change on the risk posed by several key vector-borne diseases.

The two reviews were received on time and it was possible to take corrective actions based on their conclusions.

2.3 Summarised Results of the External Reviews

2.3.1 General

From our reviewers point of view, the aim of servicing the climate models and tools user community is achieved, by using the adequate ways and means. Both reviewers acknowledge the central role of our Portal. The two levels of service are clearly made available, and even successfully tested by one of our reviewer.

2.3.2 Level 1 services for ESMs (task 1)

CC has contacted all seven modelling groups that provide level 1 services for their respective ESM in VA1/WP6, thereby checking the contact information given on the ENES Portal Model & Tools section. He chose to formulate a typical request on how to download a subset of the CMIP6 data, available through our portal via the ESGF system. The answers came from our reference support in a time range from a few hours to 2 days later. They provided very clear guidelines to download the data. Thanks to these advises, minor technical issues were worked around and the requested data could be downloaded by our reviewer.

2.3.3 Level 2 services for ESMs (task 2)

Due to a lack of time, CC has contacted one group (EC-Earth, how to download the code and install the model) out of the 3 modelling groups that provide level 2 service in VA1/WP6 but did not try to contact past users of this service to evaluate their satisfaction level. The reviewer was too busy to fulfill the requirements needed to follow up. As previously mentioned, EC-Earth3 is subject to ECMWF license agreements and therefore limited to members of the EC-Earth consortium. But he found the reply good enough to reach his goal.

2.3.4 ENES Portal Models & Tools (tasks 1+3)

The reviewers were asked to check the availability, completeness, consistency and clarity of the ENES Portal pages on European ESMs and Modelling groups. From the WP point of view, all pages were updated during the first 3 years of IS-ENES3 and supposed to provide the necessary information to access models and tools services (M6.1). While all pages were indeed updated as planned, the review still brought up a number of critical points.

CC still made a number of critical remarks regarding the clarity and consistency of the Portal pages on models and tools services. However, it was clear that he could have access to all the data (model output) he wanted to get, but also read all the information about the models and tools documented by the IS-ENES services. CC could not only navigate through all the 6 tools (+ NEMO ocean model) websites but also made positive comments about the clarity of the information available there. Even though this checking was not mandatory for the review (the information provided by the different groups on their own website is not entirely funded by the IS-ENES project), the evaluation made by CC is useful to highlight the usefulness of our service, since the users are not only re-directed toward the relevant information but this information itself is relevant for their work, which can be code development, data mining/processing or simply geophysics or computing sciences learning.

The CC review is so detailed that he tried browsing the ES-DOC structure itself. He made recommendations to enhance the structure part he visited. Although irrelevant in the present work, we communicated the remarks to the appropriate administration, hoping that they would help to facilitate the future navigation of the ES-DOC users. In that purpose, the leaders of the IS-ENES3 WP7/VA2 are contacted.

From his side, IK has the same concerns regarding the Portal structure. He suggests different rearrangements that could help to put the stress on the most meaningful information (landing page, service section). From his point of view, the chance to quickly get an answer to the contact points can be maximised by tagging the email request with the appropriate subject and the service should include this advice.

3. Summary of main corrective actions

We list below the several corrective actions needed on the portal:

1- Landing page: https://portal.enes.org/models

- Small discrepancy between the four bullet points and the left side menu. In the menu the model groups and models are visible as one entry together. In the bullet points only the model groups will be highlighted. It would be clearer if there were a consistent separation between ‚model groups‘ and ‚models and components‘. IK recommends again to use the following four groups in general (it is meant for the bullet points on the landing page AND the master menu on the left and also for the all over structure of the provided material) (i) Earth System Modeling Groups, (ii) Earth System Models and Components (NEMO is part of this), (iii) Software Tools, (iv) Services and Support

- In addition the third and fourth paragraph of the introduction on the landing page can be moved down below the bullet points and can be applied as a list which highlights the associated projects (e.g. METAFOR).

2- The sub-landing page of software tools: In these pages, the services are described. This should be moved to the sub-landing page of the services.

3- The services pages:

- the word ‚service‘ is too often repeated. Use more specific wording this makes the information more useful and clear.

- The communication gateway (simply the e-mail tag) with the contact person is in most cases implemented with a predefined subject, but not in all. Without the subject the chance to get an answer is smaller, make all e-mail tags with ‚subject‘.

4- Page: European Earth System Models and Modelling groups

There are too many links for the CNRM-CERFACS models. Ideally, there should be only one link per Earth System Model (ESM) cluster (e.g. CMCC-ESM2, CNRM-CM6 & CNRM-ESM2, EC-Earth3, IPSLCM6, MPI-ESM, NoESM2 and UKESM)

Ideally, all ESMs should be named generically, without a number version for CMIP5 or CMIP6 (like UKESM and MPI-ESM) then details for CMIP5 or CMIP6 versions can be provided on a single web page per ESM. The MPI-ESM example should be followed (with clear links to all sub model components e.g. atmosphere, ocean, land models, link to source code and online

documentation – links to all institutes involved and ES-DOC details included at the bottom of the webpage).

4.1: CMCC-ESM2 page: Hyperlinks for Main Model components to add (if applicable); Block of Text « previous Model version » should be moved before ES-DOC model description (CMIP6)

4.2: CNRM page: Only one link for « CNRM-CM & CNRM-ESM » should be provided (the same for the CNRM and CERFACS institutions) with details about CMIP6 and CMIP5 included in a single webpage (like other modeling centers). Details about CMIP6 Main Model components to add on the webpage. Contact details are missing for CNRM-CERFACS ESMs (but they are available under another webpage copy: https://portal.enes.org/models/earthsystem-models/cnrm-cerfacs-1/copy2_of_cnrm-cm5)

4.3: IPSL-CM6 page: perhaps rename the link « IPSL-CM » then mention CMIP6 and CMIP5 version in the webpage

4.4: MPI-ESM page: Ideally, all ESM should follow the same template web page for consistency.

4.5: NorESM2 page: links to CMIP6 ES-DOC to add (not available at time of review). Hyperlinks to Main Model components to add if available (CAM6-Nor, Blom...)

4.6: UK-ESM page: perhaps add hyperlinks for Model sub-components (MetUm-Hadgem etc)

5. Data portals

[https://portal.enes.org/data/enes%20infrastructure%20isenes/enes_esgf/portals/data-portals]

Link to CEDA ESGF portal is aliased to [http://https//esgf-index1.ceda.ac.uk/projects/esgf-ceda/]; It should be aliased to [https://esgf-index1.ceda.ac.uk/projects/esgf-ceda/]

4. Conclusions

At the end of the external review and for an independent reason (the end of the Content Manager System maintenance by our previous provider), a decision was taken to entirely rewrite the ENES portal pages, including the Services section. Main recommendations of the external reviewer were taken into account, in particular by implementing a menu simplification leading to a decrease of the total number of portal pages. In addition to this menu simplification particularly required in 1, we propose in the new portal the unification of the service description and tool description required in 2, a simplification of the CNRM related model description (4.2), limitation of the IPSL model description to CMIP6 (4.3), the unification of the model description for MPI-ESM (4.4) and a new check of the missing or faulty links.

Unfortunately, it was still impossible at due date to deliver the NorESM2 ESDOC page link, or provide dedicated links to sub-components for the Norwegian and UK ESMs (not available). The new technology (Jekyll) adopted by the portal developers does not allow to define a predefined subject in the contact mail header either.

However, the large improvement of the portal structure should facilitate the readability and browsing to the future users of our service portal.

Appendix 1: External review by Ingo Kirchner, FU Berlin, Germany

This review will reflect my impressions of the IS-ENES model website.

On the landing page https://portal.enes.org/models the model groups, NEMO, tools and services are announced. The main focus is clear and the page is not overcharged. There is a small discrepancy between the four bullet points and the left side menu. In the menu the model groups and models are visible as one entry together. In the bullet points only the model groups will be highlighted. It would be more clear, if there is a consistent separation between ‚model groups' and ‚models and components'. I would recommend again to use the following four groups in general. It is meant for the bullet points on the landing page AND the master menu on the left and also for the all over structure of the provided material:

• Earth System Modeling Groups
• Earth System Models and Components (NEMO is part of this)
• Software Tools
• Services and Support (what means ‚support services?)

In addition the third and fourth paragraph of the introduction on the landing page can be moved down below the bullet points and can be applied as a list which highlights the associated projects (e.g. METAFOR). Therefore the visitor reads first the most meaningful information of the website. Next the structure of the provided information (the four bullet points) is visible and at the end the addons or further informations can be read.

The general and consistent partitioning off the four major topics and the rearrangement of the whole content gives a better structured website. As consequence the visitor will be figure out more clear the provided material and will not confused of the differences in the content tree, e.g some model groups have a subsection with models, some model groups have only one model and no subsection.

On the sub-landing page of software tools in addition the services are described. This should be moved to the sub-landing page of the services.

In the services area the word ‚service' is too often repeated. Use more specific wording this makes the information more useful and clear.

The communication gateway (simply the e-mail tag) with the contact person is in most cases implemented with a predefined subject, but not at all. Without the subject the chance to get an answer is smaller, make all e-mail tags with ‚subject'.

Conclusions

In general, the website links the major European ESM groups together and provides one central information point. The mixing between model groups and models gives confusions therefore a clearer structure is recommended. The idea of such central website as information and support network is commendable, because the ESM landscape in Europe is very heterogeneously. But it is not only the information about the existing groups and models, more essential is the availability of the model codes. Only this makes the ESM science transparent and open. The approach with the second level support is one way, but it will not work, if the model codes are not Open Source. I wish the providers of the portal page a huge audience.

Appendix 2: External review from Cyril Caminade, ECTP, Italy

Review of IS-ENES3 website and services
Dr. Cyril Caminade *31st of March 2022.*

email: ccaminad@ictp.it
The Abdus Salam International Centre for Theoretical Physics (ICTP), Earth System Physics
Department, Leonardo Building, Str. Costiera, 11, 34151 Trieste, Italy.

A] Task 1: Assess the level 1 service on ESMs, i.e. verify that ES-DOC metadata is available for all European ESMs through the ENES portal and that the contact identified for the different ESM is reachable and replies to specific questions on the use of CMIP6 model output (see https://portal.enes.org/models/earthsystemmodels);

A1 - General comments about the IS-ENES3 website available at
https://portal.enes.org/models/earthsystem-models
There are too many links for the CNRM-CERFACS models. Ideally, there should be only one link per Earth System Model (ESM) cluster (e.g. CMCC-ESM2, CNRM-CM6 & CNRM-ESM2, EC-Earth3, IPSL-CM6, MPI-ESM, NoESM2 and UKESM)

Ideally, all ESMs should be named generically, without a number version for CMIP5 or CMIP6 (like UKESM and MPI-ESM) then details for CMIP5 or CMIP6 versions can be provided on a single web page per ESM. The MPI-ESM example should be followed (with clear links to all sub model components e.g. atmosphere, ocean, land models, link to source code and online documentation – links to all institutes involved and ES-DOC details included at the bottom of the webpage).

In further details:
CMCC-ESM2 : Fine, hyperlinks for Main Model components to add (if applicable); Block of Text « previous Model version » should be moved before ES-DOC model description (CMIP6) that should be at the bottom of the webpage for all ESMs
Only one link for « CNRM-CM & CNRM-ESM » should be provided with details about CMIP6 and CMIP5 included in a single webpage (like other modeling centers). Details about CMIP6 Main Model components to add on the webpage. ESDOC details for CMIP6 and CMIP5 version to add at the bottom of the page. Links to CNRM and CERFACS (research institutes) to add on a single webpage.
EC-EARTH: fine and neat, it follows the MPI-ESM standard.
IPSL-CM6: fine, perhaps rename the link « IPSL-CM » then mention CMIP6 and CMIP5 version in the webpage, but fine overall.

MPI-ESM: best example, with clear links to model sub-components – online documentation and source code. Ideally, all ESM should follow the same template web page for consistency.

NorESM2: fine, links to CMIP6 ES-DOC to add (not available at time of review). Hyperlinks to Main Model components to add if available (CAM6-Nor, Blom...)

UK-ESM: fine, perhaps add hyperlinks for Model sub-components (MetUm-Hadgem etc)

A2 - General comments about ES-DOC:

Hyperlinks to older parent models (Genealogy variables) on ES-DOC website would be good (redirection to older model versions in one click). Hyperlinks can be added in ES-DOC (several are available for UKESM).

If some sub-components are not modelled implicitly perhaps the use of a specific string (« NA » - non applicable as not considered in the current GCM or simply « not considered » to discriminate missing inputs using the «-- » string vs effects not considered for a particular GCM).

Some variables are missing (example Model Long Name – Model version etc) depending on the ESM.

For some model sub-components – scientific references are provided in Overview (example: Vegetation→overview – references to Decharme et al & Delire et al are provided for CNRM-CM6-1) but for others no information is provided (Land Surface→Carbon Cycle). Similar comment applies to other ESMs; scientific references for key model sub-components should be provided for all ESMs when applicable.

Minor typos to double check « separation » instead of « sepration » in Deep Convection > Scheme Method (cnrm-cm6-1). There might be others

Some of the EC-Earth models are poorly defined (example for ec-earth3-cc for which almost no details on the associated ES-DOC webpage)

MPI-ESM: more details to add in Ocean and Land Surface variables (ES-DOC)

Nor-ESM2: only links to older CMIP5 ES-DOC were available

UKESM: Great job on the ES-DOC (most detailed version with references and citations if applicable etc)

A3 – Other comments:

Data portals available at [https://portal.enes.org/data/enes%20infrastructure%20is-enes/enes_esgf/portals/data-portals]

Link to CEDA ESGF portal is aliased to [http://https//esgf-index1.ceda.ac.uk/projects/esgf-ceda/]; It should be aliased to [https://esgf-index1.ceda.ac.uk/projects/esgf-ceda/]

Support Service Webpage available at [https://portal.enes.org/models/support-service-for-model-users-1/support-services-for-earth-system-models]

Contact details are missing for CNRM-CERFACS ESMs (but they are available under another webpage copy: https://portal.enes.org/models/earthsystem-models/cnrm-cerfacs-1/copy2_of_cnrm-cm5)

Links to external portals and URLs to double check carefully and to update if needed.

B] Task 2: Service 1 Level verification

I sent the following email to all ESM contacts:

Email sent on Mon, March 21, 2022 4:34 pm to piergiuseppe.fogli@cmcc.it ; shuting@dmi.dk ; arnaud.caubel@lsce.ipsl.fr ; michael.botzet@mpimet.mpg.de ; noresm-ncc@met.no ; ukesm@ncas.ac.uk ; contact.cmip@meteo.fr

« Hello,

I am an ecological modeler and I would like to download 2m temperature data for the newest CMIP6 models I found on the ENES portal at

https://portal.enes.org/models/earthsystem-models

Eg: CMCC-ESM2, EC-Earth3-LR, IPSL-CM6A-LR, MPI-ESM-1-2-LR, NorESM2-LM and UKESM1-0-LL.

I tried to use the ESGF node at IPSL:

https://esgf-node.ipsl.upmc.fr/search/cmip6-ipsl/

I logged in, then I selected the models (Source Id) and I used *tas* in the search bar (for 2m temperature) but I could not find the associated temperature files. I would like to download daily data for 2050-2070 for the RCP4.5 and RCP8.5 climate scenarios (unsure about the associated SSPs) to run some ecological models.

Could you please help me navigate through & advise me on how to get wget scripts to retrieve the data? Can I use the GCM outputs to run my impact model directly?

Thanks in advance for your help.
Best regards
Cyril Caminade»

The first answer came from CNRM-CERFACS a few hours later. The IPSL-CM6 group answered the day after. Both replies were very helpful (with very detailed step-by-step guidelines from the IPSL contact) and I managed to easily download the IPSL and CNRM-ESM2-1 temperature files for the ssp2-45 & ssp5-85 scenarios. Two days later, I had replies for NorESM2, UKESM and MPI-ESM. They both provided very clear guidelines to download the data. The NoRESM contact kindly uploaded the data on a repository while the contact at UKMO also sent detailed step-by-step guidelines. The MPI-ESM contact replied the same day and did not add much as my questions were already addressed by the other contacts.

I faced some minor issues with ESGF portals though: wget script on any ESGF-DKRZ portal did not return wget.sh file if selected model = «UKESM1-0-LL». Connection timed out for NorESM2; some model outputs and streams were unavailable on the DKRZ and IPSL ESGF portals (work in progress). The most complete portal was ESGF-LLNL, with access to most ESMs, variables and

scenarios. However, I managed to download all requested temperature files following Level 1 service advises.

C] Task 3: Interaction with level 2 services

I sent the following email to the EC-EARTH3 contact on *March 28, 2022 at 11.11 CET:*
"Dear Mr/Mss
I would like to run a snowball Earth experiment using a simplified ocean-atmosphere coupled version of EC-EARTH 3 for educational purposes. I used EdGCM4D in the past to discuss long-term climate change with my students.
Could you provide me with first step guidelines to install the model and set up parameters (GHG and solar constant values?).
I know this is a very generic question but a bit of help will be greatly appreciated.
Best wishes
Cyril Caminade"

I had a prompt reply the following day on *March 29, 2022 3:27 pm:*
"Dear Cyril,
You may find information regarding the installing and running the EC-Earth3 model on the development portal: https://dev.ec-earth.org/projects/ecearth3/wiki
If you have not had access to the development portal, you may contact Uwe Fladrich at SMHI (uwe.fladrich@smhi.se).
On the behalf of the EC-Earth Steering Group (SG), I would like to inform you that the SG is asked all consortium institutes that joins the consortium before 2020 to renew their membership by signing the new Letter of Intent for 2020-2025 (as attached here). May I therefore ask you to kindly forward this message to the management/responsible person in your institute? Alternatively, you may send me the contact of your institute, so that I can contact him/her on this matter. Many thanks in advance!
Best wishes,
Shuting"

As I was too busy and my head of department was unavailable, I did not follow up; but his reply was very useful. I did not have time to "Interact with at least one group having received level 2 services on one particular ESM or Advanced Users Service on one particular tool and get their feedback on the quality of the help received" as I did not have a list of such user group.

D] Task4: Navigate through Software and documentations (NEMO, OASIS, Cylc, XIOS, ESMValTool & CDO)

CDO: Very well, detailed web site, style looks a bit spartan, but install, help, doc, FAQ and guidelines are extremely clear. Very good examples per operator. Python and Ruby version available (with related docs). Software easy to install on most systems; extremely fast and efficient tool to process large netcdf files.
Cylc: Very pro looking software, well detailed website with examples and documentation – associated DOI. Cylc is a task scheduler for complex modeling chains (weather forecasting with

assimilation schemes and other applications). Forum available (categories could be improved). FAQ not accessible from main website but available on ACCESS website.

ESMValTool: Interesting software to plot and analyze climate data. Links to source, documentation, support, FAQs on the IS-ENES website. Main webpage mentions « A community diagnostic and performance metrics tool for routine evaluation of Earth system models in CMIP » - I think the word « graphics » or « diagnostics » should appear, as this tool is mostly a post-processing and plot package. The « recipe » approach is very interesting and powerful. Only negative point, the software seems to be built on a suite of R, NCL and python scripts that can yield very different graphical outputs. Ideally, everything could be packaged in a standalone Python package (with a R standalone package version as well).

NEMO: Very well detailed website, dedicated github space with clear instructions for downloading the code (GNU GPL compatible license), install and details about the code are available. Code is linked to netcdf libraries, XIOS and OASIS. Contact for support on the main webpage. Documentation included.

XIOS: Tool to manage I/O for climate outputs. Source code well detailed, documentation looks fine. A short synopsis / description of the aim of such tool should be make clearer (available on the IS-ENES website but a short description should also be added on the XIOS website at http://forge.ipsl.jussieu.fr/ioserver/wiki). Website was lacking basic information and a short description of what it does (I could found this information in an attached powerpoint presentation though).

OASIS: Source Code can be accessed after filling a registration form. Documentation can be accessed as pdf file, html documentation did not load on Google Chrome. Forum available; No FAQs. Training available with link to registration and to past events.

Conclusion

In general, the website links the major European ESM groups together and provides one central information point. Webpages need to be harmonized in some places (see my detailed comments) as I spotted differences across ESMs. Hyperlinks to external portals should be double-checked carefully. ES-DOC were filled for all ESMs with however significant differences in content and details provided. Level 1 service was very rapid (reply within 48h) and helpful as I managed to download the requested IPCC temperature files. Level 2 service was also very rapid (reply within 24h) but I could not follow up at time of review. Overall Software were well detailed with links to source codes and install (or procedure to retrieve the code). Quality of Help, Doc and FAQ varied depending on the software. Overall, IS-ENES3 did a good job but there is still room for improvement. Most critical point I think: all softwares and ESM model codes should be made available on a public repository (like github or docker) following registration. A simplified Educative version of ESMs (like the EdGCM project hosted at Columbia University) could also be made available for teachers and students (target audience seemed to be research scientists).