

WP debriefings Session 2: Model Evaluation

(WP3-NA2, WP5-NA4, WP6-VA1, WP7-VA2, WP9-JRA2)

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WP3-NA2

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

- **Task 3: Community standards**
 - **Task 3.2: New standard on scientific provenance of model evaluation**
 - Provenance information recorded in the ESMValTool using the W3C PROV standard
 - Scientific provenance is in stand-by. Waiting for UKRI to coordinate the rest of the work (deliverable due December 2021)
- **Task 4: User feedback and requirements**
 - **Task 4.2: Specific user requirements (model evaluation survey, CMIP documentation – ES-DOC)**
 - Community survey to review the needs and expectations conducted by Assimila
 - See presentation by Jérôme and Zofia on the survey
 - Presentation in EGU “Model evaluation expectations of European ESM communities: results from a survey”
 - Community feedback gathered for the collection of ES-DOC CMIP6 Machine and Performance documentation
 - ES-DOC extensions for other projects (e.g. CORDEX, obs4mips) delivered, with limited functionality vs. CMIP6

Next steps with focus on key issues to be addressed

Next steps and issues to be addressed by the end of RP2 (December 2021)

- Complete the work about the scientific provenance
 - Added the topic to discuss in the evaluation break-out group

Next steps and issues to be addressed during RP3 (January 2022 - December 2022)

- BSC to complete the implementation of ENSO package in ESMValTool
- Specific user requirements of CMIP documentation and ES-DOC should be completed
- Buggfixing and maintenance of recording provenance information in the ESMValTool

WP5-NA4

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

• Task 5: Technical standards and an architecture for plugin diagnostic tools

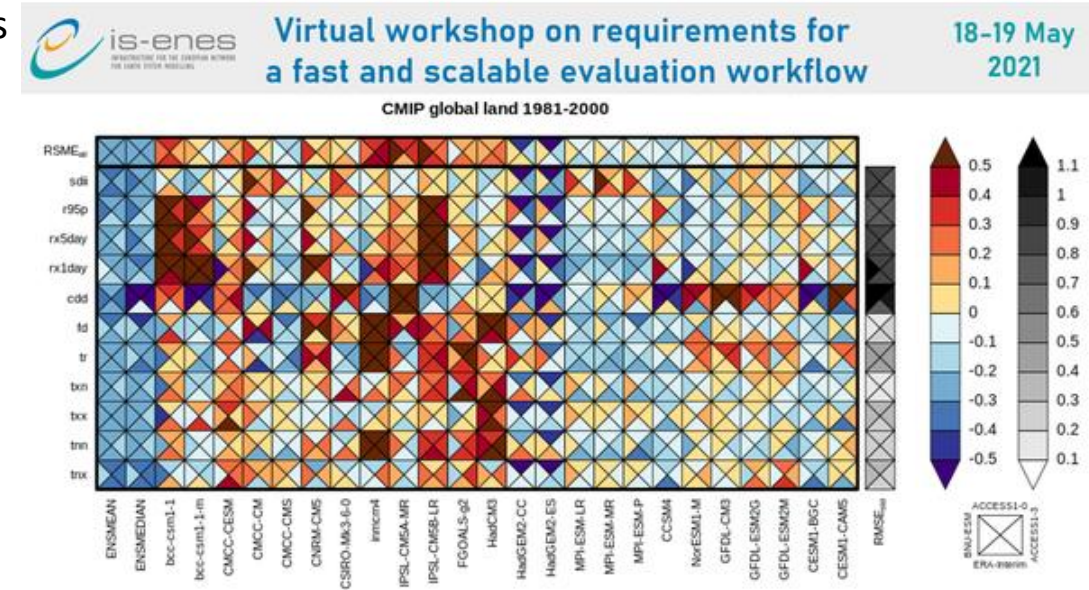
- Workshop on the requirements for a fast and scalable evaluation workflow (May 2021).
- 30 participants, 12 presentations and 4 break-out groups

- Define the technical architecture required to plug other diagnostic packages to existing evaluation software frameworks

- Javier Vegas will present the work in a few minutes

- Develop a framework for coding standards, which will be defined to improve code integration, code distribution between developers, reusability, maintenance and readability

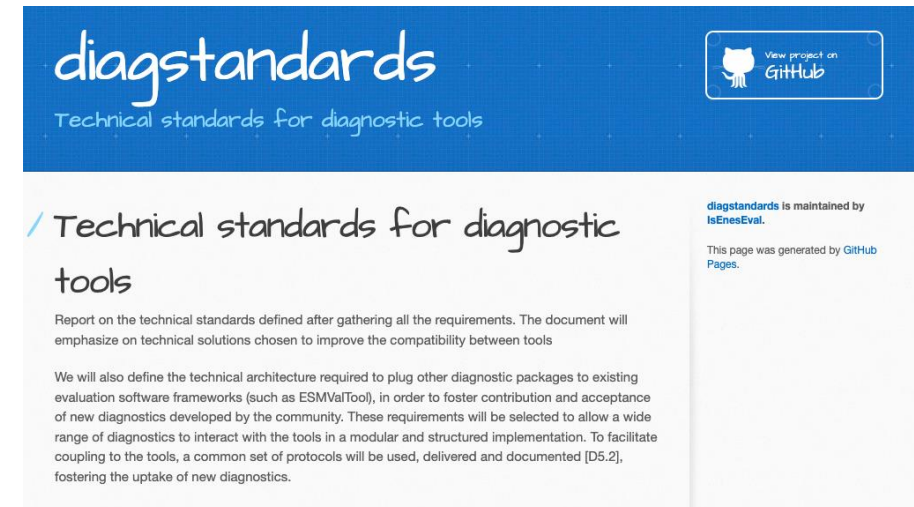
- Work at IPSL on installing ESMValtool, adapting to IPSL model outputs
- Pilot work : ESMValtool diagnostic adapted to CLIMAF to test interface



Next steps with focus on key issues to be addressed

Next steps and issues to be addressed by the end of RP2 (December 2021)

- Integrate generally applicable bits and pieces of the ESMValTool and ESMValCore style guides into the [web page on technical standards](#)



Next steps and issues to be addressed during RP3 (January 2022 - December 2022)

- Finish and deliver D5.2
 - Report on the adaptability of the standard interface to the CliMAF framework (January 2022) - IPSL
- Try to find a better location for the web page/better integration into existing pages, so the standards are easier to find for a larger audience

WP6-VA1

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

• Task 3: Services for European infrastructure tools

- Updated ENES portal with ESMValTool:

<https://portal.enes.org/models/software-tools/esmvaltool>

- ESMValTool Active User Support (AUS):

- Code available on GitHub at:

- <https://github.com/ESMValGroup/ESMValTool>
- <https://github.com/ESMValGroup/ESMValCore>

- Sphinx documentation on readthedocs.io:

- <https://docs.esmvaltool.org>

- Installation with conda:

- <https://anaconda.org/conda-forge/esmvaltool>
- <https://anaconda.org/conda-forge/esmvalcore>

- Issues available at:

- <https://github.com/ESMValGroup/ESMValTool/issues>

- F.A.Q. (Q&A, new users, best practices, etc.):

- <https://github.com/ESMValGroup/ESMValTool/discussions>

- Website:

- <https://www.esmvaltool.org/>

- Tutorial (basic and advanced topics):

- https://esmvalgroup.github.io/ESMValTool_Tutorial/

- User mailing-list:

- esmvaltool@listserv.dfn.de

- User Engagement Team mailing-list:

- esmvaltool_user_engagement_team@listserv.dfn.de

- Personal support and email contact with developers

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

- **Task 3: Services for European infrastructure tools**

- ESMValTool Active User Support (AUS):

- Common KPIs for models and tools:

- (Released versions, active contributors, issuers, messages exchanged)

- Jul.-Dec. 2020: 3 released versions, 24 contributors, 98/135 issues opened/closed, ca. 4000 messages
 - Jan.-Jun. 2021: 5 released versions, 28 contributors, 110/126 issues opened/closed, ca. 4000 messages

Next steps with focus on key issues to be addressed

Next steps and issues to be addressed by the end of RP2 (December 2021)

- Periodical reports
- Service review
- Maintenance of services for AUS

Next steps and issues to be addressed during RP3 (January 2022 - December 2022)

- Periodical reports
- Service review
- Maintenance of services for AUS

WP7-VA2

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

- **Task 2: Compute Services (VA) – "Comp1", access to derived data products and data processing web services**
 - Developments to enable the generation online reports to ESMValTool
 - Website created with an overview of ESMValTool recipe runs: <https://esmvaltool.cloud.dkrz.de/shared/esmvaltool/v2.3.0-test/>
 - Creation of an ESMValTool recipe and a website showing the results of the run that is linked from the Climate4Impact portal. Users of that portal can use this to compare the performance of all available CMIP5 and CMIP6 models: <https://esmvaltool.cloud.dkrz.de/shared/esmvaltool/climate4impact/>

status	recipe output	run date	estimated run duration	estimated max memory (GB)	average cpu
success	recipe_albedolandcover	2021-07-01 16:12:51	0:00:42	3.9	216.6
failed (debug)	recipe_anav13jclim	2021-06-25 15:10:27	0:00:28	0.2	77.1
failed (debug)	recipe_anav13jclim	2021-07-02 14:16:54	1:53:22		
success	recipe_arctic_ocean	2021-07-01 16:12:51	0:48:52	26.8	102.5
success	recipe_autoassess_landsurface_permafrost	2021-07-01 16:12:51	0:00:50	2.0	131.0
failed (debug)	recipe_autoassess_landsurface_soilmoisture	2021-06-25 15:10:27	0:00:12	0.9	229.8
success	recipe_autoassess_landsurface_surfrad	2021-06-25 15:10:27	0:00:28	1.8	160.8
success	recipe_autoassess_radiation_rms_Amon_all	2021-06-25 15:10:27	0:01:42	6.6	347.2
success	recipe_autoassess_stratosphere	2021-06-25 15:10:27	0:02:01	3.1	253.3
failed (debug)	recipe_bock20jgr	2021-06-25 15:10:27	0:09:20	0.4	41.9
success	recipe_capacity_factor	2021-06-25 15:10:29	0:02:03	1.3	54.4
success	recipe_carvalhais14nat	2021-07-01 16:12:51	0:06:44	29.4	209.5
failed (debug)	recipe_check_obs	2021-06-25 15:07:07	0:06:47	0.2	26.1

Next steps with focus on key issues to be addressed

Next steps and issues to be addressed by the end of RP2 (December 2021)

- Updates to the webpage showing all recipe runs to make it more targeted at a scientific audience
- Updates to the visualization of the Climate4Impact recipe and webpage

Next steps and issues to be addressed during RP3 (January 2022 - December 2022)

- Activation of WPS service as production service which can be used as part of VA activity (break-out group discussion)

WP3-5-6-7

Deliverables and Milestones on
Model Evaluation

Work progress - Main achievements

Deliverables and Milestones (Delayed ones, and the next ones to complete before RP2)

Done:

- D3.1 – Initial requirements on model evaluation (delayed to June 21)
- D7.1 – First KPI and TNA report for ENES CDI services (July 20)

Delayed:

- D5.2 – Technical standards for diagnostic tools (Feb. 22)
- M7.3 – Improved version of evaluation portal (Nov. 21)

Next:

- D3.3 – Standards synthesis (Dec. 21)
- D3.4 – CMIP documentation requirements (Dec. 21)
- D5.5 – Style guide on coding standards (Dec. 21)
- D6.3 – Second periodical report on service statistics for models and tools (Dec. 21)
- D7.3 – Second KPI and TNA report for ENES CDI services (Dec. 21)



WP9-JRA2

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

- **Task 1: Coding Workshops and Coordination of ESMValTool activities**

- Virtual 3-days coding workshops organised: Nov. 2020, May 2021, Nov. 2021
- Regular topical workshops



- **Task 2: Technical Improvements of the ESMValTool**

- Release of ESMValTool v2.0 in Aug. 2020 with 4 published papers to described ESMValTool v2.0
- Followed by regular releases (3/year).
- Continuous development of the ESMValTool via public collaboration on GitHub
- Enhancement and improvement of automated testing
- Task parallelism
- Modularization of the code
- Containerization to improve the user friendliness for the installation on different machines and platforms

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

Task 3: Data processing and reformatting

- Pilot support for ocean data on original grids
- Providing observations to the users (download and reformatting scripts)

Task 4: Seamless evaluation with the ESMValTool

- Application to Regional Climate Models (model evaluation, regridding, diagnostics)
- Support for different timescales and experiments (e.g. decadal)

Dataset name	Tier	Auto-download	Last access
APHRO-MA	3	Yes	2020-03-06
AURA-TES	3	Yes	2018-12-08
BerkeleyEarth	2	Yes	2020-02-25
CALIPSO-GOCCP	2	Yes	2020-01-27
CDS-SATELLITE-ALBEDO	3	Yes	2019-04-01
CDS-SATELLITE-LAI-FAPAR	3	Yes	2019-07-03
CDS-SATELLITE-SOIL-MOISTURE	3	Yes	2019-03-14
CDS-UERRA	3	Yes	2019-11-04
CDS-XCH4	3	Yes	2019-03-11
CDS-XCO2	3	No	2019-03-19
CERES-EBAF	2	No	2019-11-26
CERES-SYN1deg	3	No	2019-02-07
CowtanWay	2	Yes	2020-02-26
CRU	2	Yes	2019-05-16
CT2019	2	Yes	2020-03-23
Duveiller2018	2	Yes	2019-04-30
E-OBS	2	Yes	2020-02-25
Eppley-VGPM-MODIS	2	Yes	2019-05-15
ERA-Interim-Land	3	No	2019-11-04
ERA-Interim	3	No	2019-09-05
ESACCI-AEROSOL	2	Yes	2019-01-24
ESACCI-CLOUD	2	Yes	2019-02-01
ESACCI-FIRE	2	Yes	2019-01-24
ESACCI-LANDCOVER	2	No	2019-01-10
ESACCI-OC	2	Yes	2019-02-27
ESACCI-OZONE	2	Yes	2019-02-01

examples of supported observational datasets

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

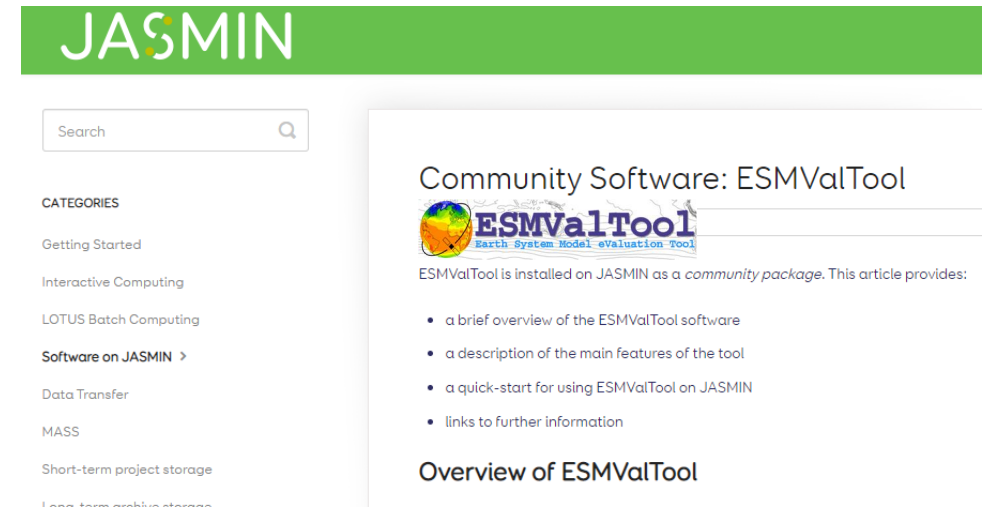
- **Task 5: Enhancing the use of the ESMValTool for model development**
 - Loading native model data formats
 - Incorporation of ESMValTool into model development workflows: AutoAssess (MetOffice), EC-Earth (BSC), IPSL-CM, NorESM (Met.no), SMHI
 - Quicklook system to allow monitoring simulations

- **Task 6: Coupling of externally developed diagnostics and metrics to the ESMValTool**
 - Integration of several diagnostics including NCAR CVDP, ENSO, AutoAssess documented, following coding standards and provenance tracking

Work progress - Main achievements

Significant results and activities in RP2 (including deviations from Description of Activities) – From July 2020 to Sept. 2021

- **Task 7: Coupling of ESMValTool to the ESGF**
 - Option to download missing data from ESGF nodes using esgf-pyclient
 - Maintenance and availability of pools of observational datasets at the ESGF sites DKRZ and CEDA
 - Central installations of ESMValTool (module load esmvaltool) at DKRZ-Mistral and CEDA-Jasmin
 - Deployment of a Jupyter Kernel to work with DKRZ Jupyterhub on Mistral



The screenshot shows the JASMIN website interface. At the top is a green header with the word 'JASMIN' in white. Below the header is a search bar. A sidebar on the left lists various categories: 'CATEGORIES', 'Getting Started', 'Interactive Computing', 'LOTUS Batch Computing', 'Software on JASMIN >', 'Data Transfer', 'MASS', 'Short-term project storage', and 'Long-term archive storage'. The main content area displays the title 'Community Software: ESMValTool' with a small globe icon and the text 'ESMValTool is installed on JASMIN as a community package. This article provides:'. Below this are four bullet points: 'a brief overview of the ESMValTool software', 'a description of the main features of the tool', 'a quick-start for using ESMValTool on JASMIN', and 'links to further information'. At the bottom of the article preview is the title 'Overview of ESMValTool'.

<https://help.jasmin.ac.uk/article/4955-community-software-esmvaltool>

- **Task 8: Distributed ESMValTool computing and calculations on user demand**
 - Implementation of an automatic search and download of data required to run an ESMValTool recipe

Work progress - Main achievements

Deliverables and Milestones (Delayed ones, and the next ones to complete before RP2)

Done:

- D9.1 – ESMValTool version supporting irregular and unstructured grids (Nov. 20)
- D9.2 – ESMValTool version enabling model development usage (July 21)

Delayed:

- D9.3 – ESMValTool version with ESGF coupling and distributed computation features (Dec. 21)

Next:

- D9.4 – ESMValTool version supporting regional climate models and different timescales (Dec. 21)
- M9.1 – Release of enhanced ESMValTool documentation for WP6/VA1 activity (Dec. 21)
- M9.2 – Release of enhanced ESMValTool version for WP7/VA2 activity (Dec. 21)



Next steps with focus on key issues to be addressed

Next steps and issues to be addressed by the end of RP2 (December 2021)

- Release of ESMValTool and ESMValCore v2.4 (end of Oct. 21)
- Virtual coding workshop (Nov. 21)
- Finish a pilot implementation to enable ESMValTool recipe splitting based on data availability at ESGF sites and combination of the results (task 8)
- Completing the upcoming deliverables (D9.3, D9.4) and milestones (M9.1, M9.2)

Next steps and issues to be addressed during RP3 (January 2022 - December 2022)

- Further releases of the ESMValTool and ESMValCore (3/year)
- Coding workshops and regular ESMValTool meetings
- Completion of D9.5 (tasks 2 and 6) – Final IS-ENES3 ESMValTool version:
 - Continuous development and maintenance
 - Improvement of ESMValTool testing strategy
 - Merging diagnostics used for IPCC WGI AR6 into the public ESMValTool

