

Bringing ESMValTool to JupyterLab

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Part 1: the concept of shared infrastructure



Back in the day: data to the user, user responsible for compute, software, etc.



Today: data providers also provide compute resources and software stacks



This is how DLR illustrates the shared infrastructure





Part 2: Jupyter increasingly popular as an interactive analysis



Jupyter Lab: a full-blown interactive data analysis environment

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Jupyter **Hub** enables multi-user access to shared resources via the browser

https://jupyter.org/hub

Jupyterhub

A multi-user version of the notebook designed for companies, classrooms and research labs







Technical documentation

Please consult the technical documentation to get started with Jupyterhub.

💭 Jupyter<mark>hub</mark>

Welcome to Jupyterhub @ DKRZ

Jupyterhub is a multi-user server to serve Jupyter Notebooks to a large number of users. It is integrated with our Mistral's batch scheduling system to allocate computing resources and launch Jupyter Notebooks directly on the HPC system. It therefore also supports the execution of parallel computation.

Sign in with your DKRZ account

Forgot your password? First time user?

Warning: JupyterHub seems to be served over an unsecured HTTP connection. We strongly recommend enabling HTTPS for JupyterHub.

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Server Options

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Part 3: bringing ESMValTool to the Jupyter Lab



https://meetingorganizer.copernicus.org/EGU21/EGU21-3476.html



ESMValTool

Earth System Model Evaluation Tool

Recent developments

User friendly

- **Regular releases**
- Documentation
- **Tutorials**
- **Community support**
- Install using conda, pip, containers
- **Stable interfaces**
- **Reduced memory use**
- **Over 100 scientific recipes**
- Jupyter integration
- And much more



Community

- **Team of technical contributors**
- User engagement team
- **Two principal investigators**
- **Collaborate in public on GitHub**
- **Extensive contributor** documentation
- **Open monthly meetings**
- Several workshops a year



A community diagnostic and performance metrics tool for routine evaluation of Earth system models in CMIP

Large team of scientific contributors

Join us!

Get started: esmvalgroup.github.io/ **ESMValTool_Tutorial**

Read all about it: docs.esmvaltool.org

Join our community: github.com/ESMValGroup





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On the DKRZ JupyterHub, you can add your own custom kernels. We added ESMValTool



https://jupyterhub.dkrz.de

Instructions for setting this up on your own account: https://github.com/ESMValGroup/ESMValTool-JupyterLab

ESMValTool knows where the data is stored, is (to some extent) optimized for the compute environment, and implements scientific workflows in a semi-standardized, yet flexible format.

ESMValTool + Jupyter / shared infra =

- Easy access to a lot of data
- Easy access to compute resources
- Easy access to scientific workflows
- A great way to share your work

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github.com/ESMValGroup/ESMValTool-JupyterLab/blob/main/example_notebooks/

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ESMValTool is a library of climate analysis workflows ("recipes"), as well as a tool to execute them. With the new Python API, this library is now also easily accessible in Jupyter environment. It allows you to easily run existing recipes as well as developing new ones. A very useful feature is that you can directly access all the output (data, images, etc) and further process them in the notebook.



Example 2: Running a scientific recipe



github.com/ESMValGroup/ESMValTool-JupyterLab/blob/main/example_notebooks/



Example 3: Creating a new recipe interactively



github.com/ESMValGroup/ESMValTool-JupyterLab/blob/main/example_notebooks/

Shared infrastructure is even more powerful with shared recipes :-)

netherlands Science center



- Documentation: https://docs.esmvaltool.org/projects/esmvalcore/en/latest/api/esmvalcore.api.html
- Examples and setup instructions: https://github.com/ESMValGroup/ESMValTool-JupyterLab
- By email: p.kalverla@esciencecenter.nl
- Github: https://github.com/ESMValGroup/ESMValTool
- Generic ESMValTool tutorial: https://esmvalgroup.github.io/ESMValTool_Tutorial/