

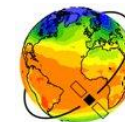
# ESMValTool

Earth System Model Evaluation Tool

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

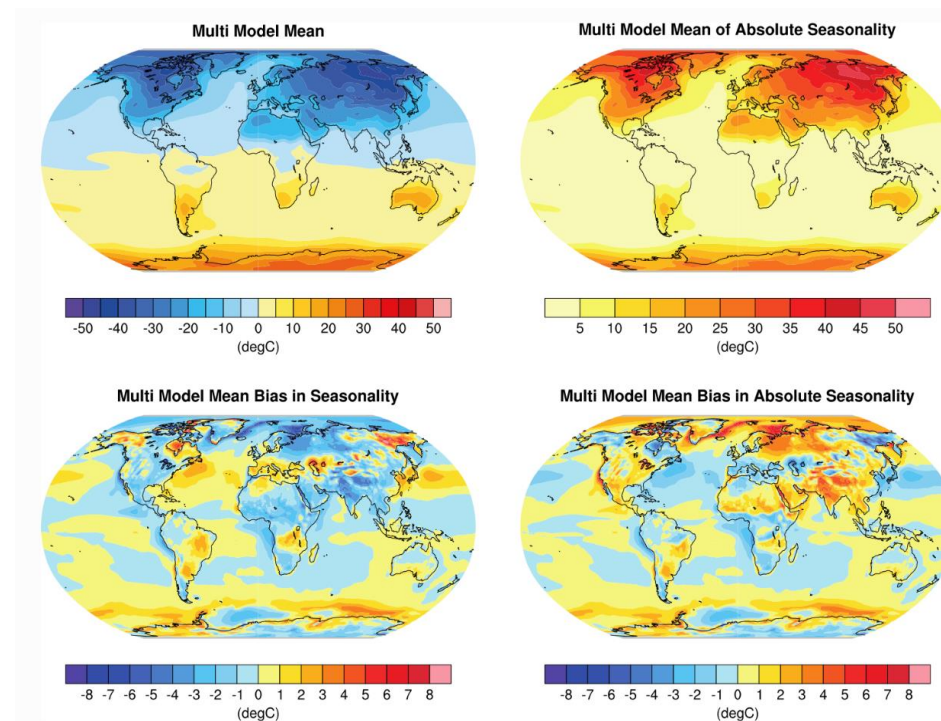
Earth System Model Evaluation with  
ESMValTool in a Jupyter notebook

25 May, EGU 2022



# What is ESMValTool?









It facilitates the analysis of Earth system model's data.



[IPCC AR5 Chapter 9](#)

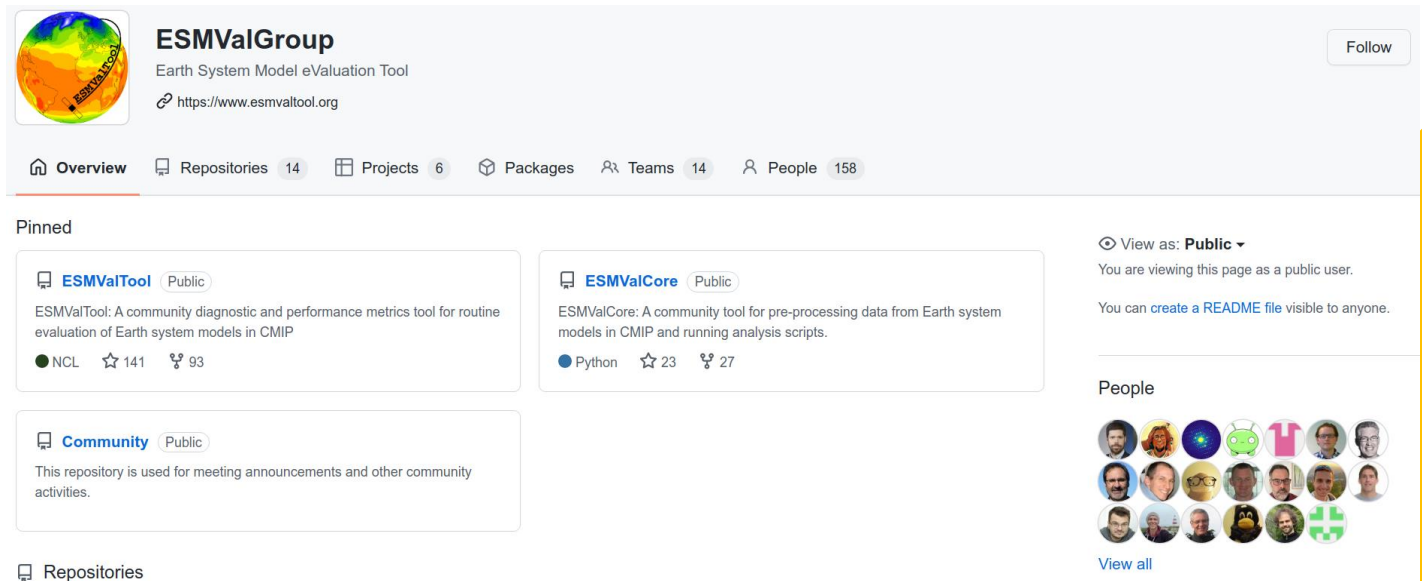
# What is ESMValTool?

By an international community of scientists and software engineers

14 teams in the ESMValGroup organization		Visibility ▾	Members ▾
<b>ESMValTool-CoreTeam</b> Team members can read, clone, and push to this repository.		17 members	2 teams ▾
<b>ESMValTool-DevelopmentTeam</b> Team members can create new feature branches.		148 members	0 teams
<b>IPCC developer</b> <span>Secret</span> ESMValTool AR6 contributions		39 members	0 teams
<b>ESMValTool-recipe-maintainers</b>		14 members	0 teams
<b>UserEngagementTeam</b> User Engagement Team		11 members	0 teams
<b>tech-reviewers</b> Technical review team		12 members	0 teams
<b>science-reviewers</b> Scientific review team		11 members	4 teams ▾
<b>IPCC-maintainers</b> Maintainers of the AR6 repositories		3 members	0 teams

# What is ESMValTool?

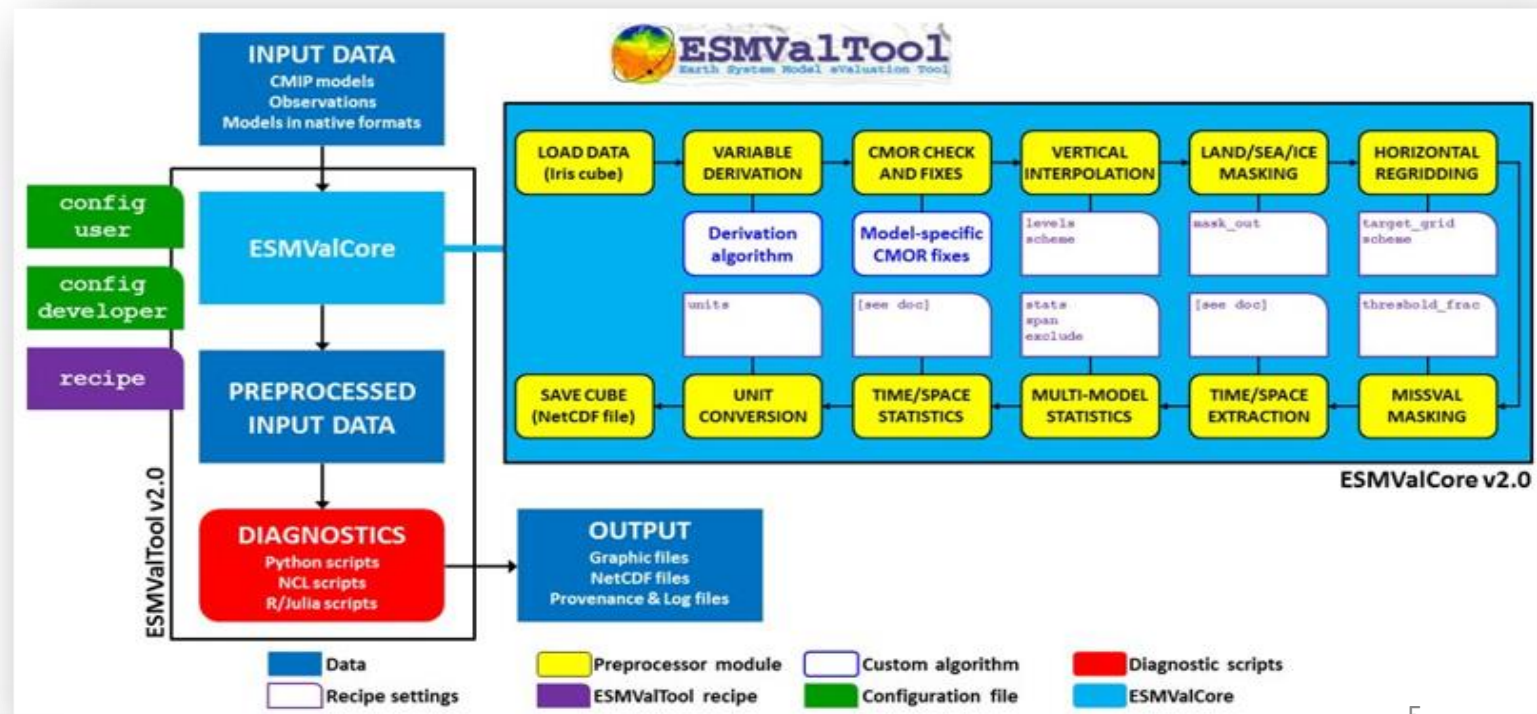
Developments, maintenance, discussions, and collaborations in **public** <https://github.com/esmvalgroup>



The screenshot shows the GitHub profile for ESMValGroup. The profile header includes the ESMValTool logo, the name "ESMValGroup", the description "Earth System Model eValuation Tool", and the website "https://www.esmvaltool.org". A "Follow" button is in the top right. Below the header is a navigation bar with tabs: Overview (selected), Repositories (14), Projects (6), Packages, Teams (14), and People (158). The "Pinned" section displays three repositories: "ESMValTool" (Public, NCL, 141 stars, 93 forks), "ESMValCore" (Public, Python, 23 stars, 27 forks), and "Community" (Public, description: "This repository is used for meeting announcements and other community activities."). On the right, there is a "View as: Public" dropdown, a note about viewing as a public user, a link to create a README file, and a "People" section showing a grid of 15 user avatars with a "View all" link below.

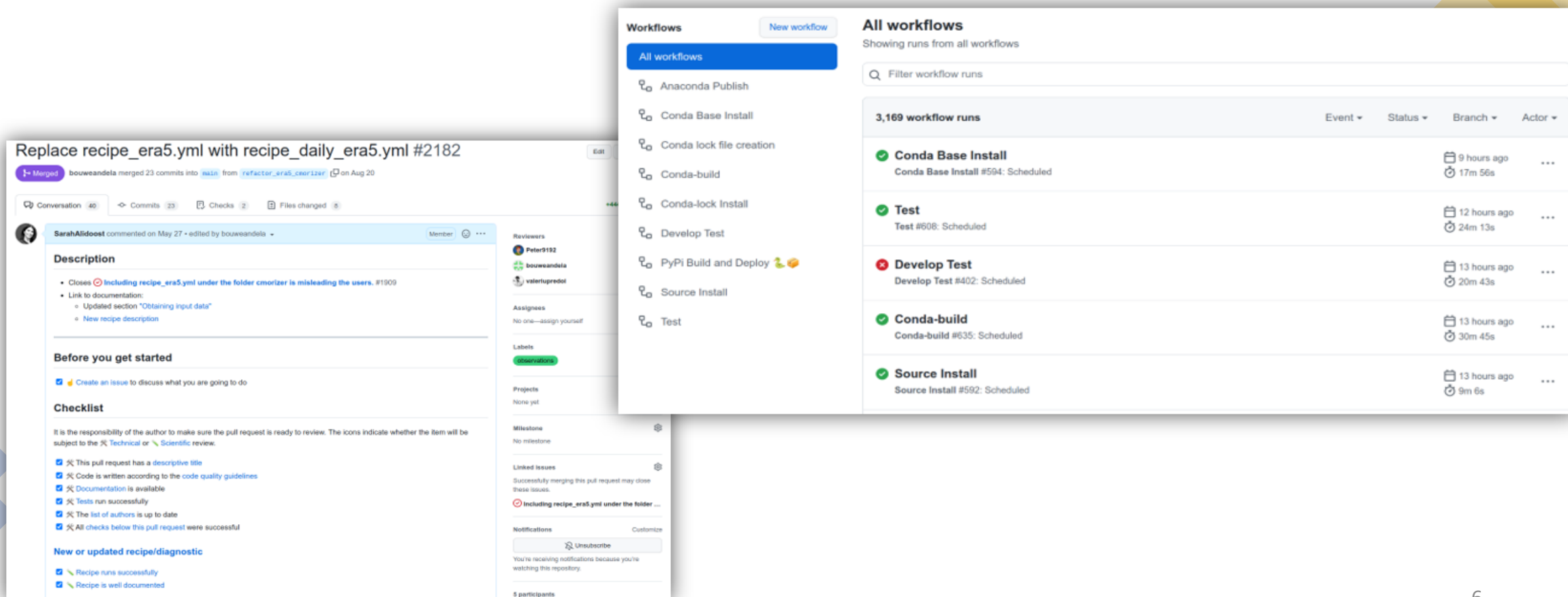
# What can ESMValTool do for you?

- Helps to analyze climate data
- Provides provenance and citation information.
- Supports several programming languages and operating systems.
- Helps efficient data processing.



# What can ESMValTool do for you?

- Provides automated testing and review processes.



The image displays three screenshots illustrating the ESMValTool workflow and its integration with GitHub.

**Left Screenshot: GitHub Pull Request**

**Replace recipe\_era5.yml with recipe\_daily\_era5.yml #2182**

Conversation (40) Commits (23) Checks (2) Files changed (5)

SarahAlidoost commented on May 27 • edited by bouweandela

**Description**

- Closes [including recipe\\_era5.yml under the folder cmorizer is misleading the users](#). #1909
- Link to documentation:
  - Updated section "Obtaining input data"
  - New recipe description

**Before you get started**

- ☒ Create an issue to discuss what you are going to do

**Checklist**

It is the responsibility of the author to make sure the pull request is ready to review. The icons indicate whether the item will be subject to the [Technical](#) or [Scientific](#) review.

- ☒ This pull request has a descriptive title
- ☒ Code is written according to the [code quality guidelines](#)
- ☒ Documentation is available
- ☒ Tests run successfully
- ☒ The list of authors is up to date
- ☒ All checks below this pull request were successful

**New or updated recipe/diagnostic**

- ☒ Recipe runs successfully
- ☒ Recipe is well documented

**Right Screenshot: GitHub Workflows**

**Workflows** [New workflow](#)

**All workflows** Showing runs from all workflows

Filter workflow runs

**3,169 workflow runs**

Event	Status	Branch	Actor
Conda Base Install	Conda Base Install #594: Scheduled	9 hours ago	17m 56s
Test	Test #608: Scheduled	12 hours ago	24m 13s
Develop Test	Develop Test #402: Scheduled	13 hours ago	20m 43s
Conda-build	Conda-build #635: Scheduled	13 hours ago	30m 45s
Source Install	Source Install #592: Scheduled	13 hours ago	9m 6s



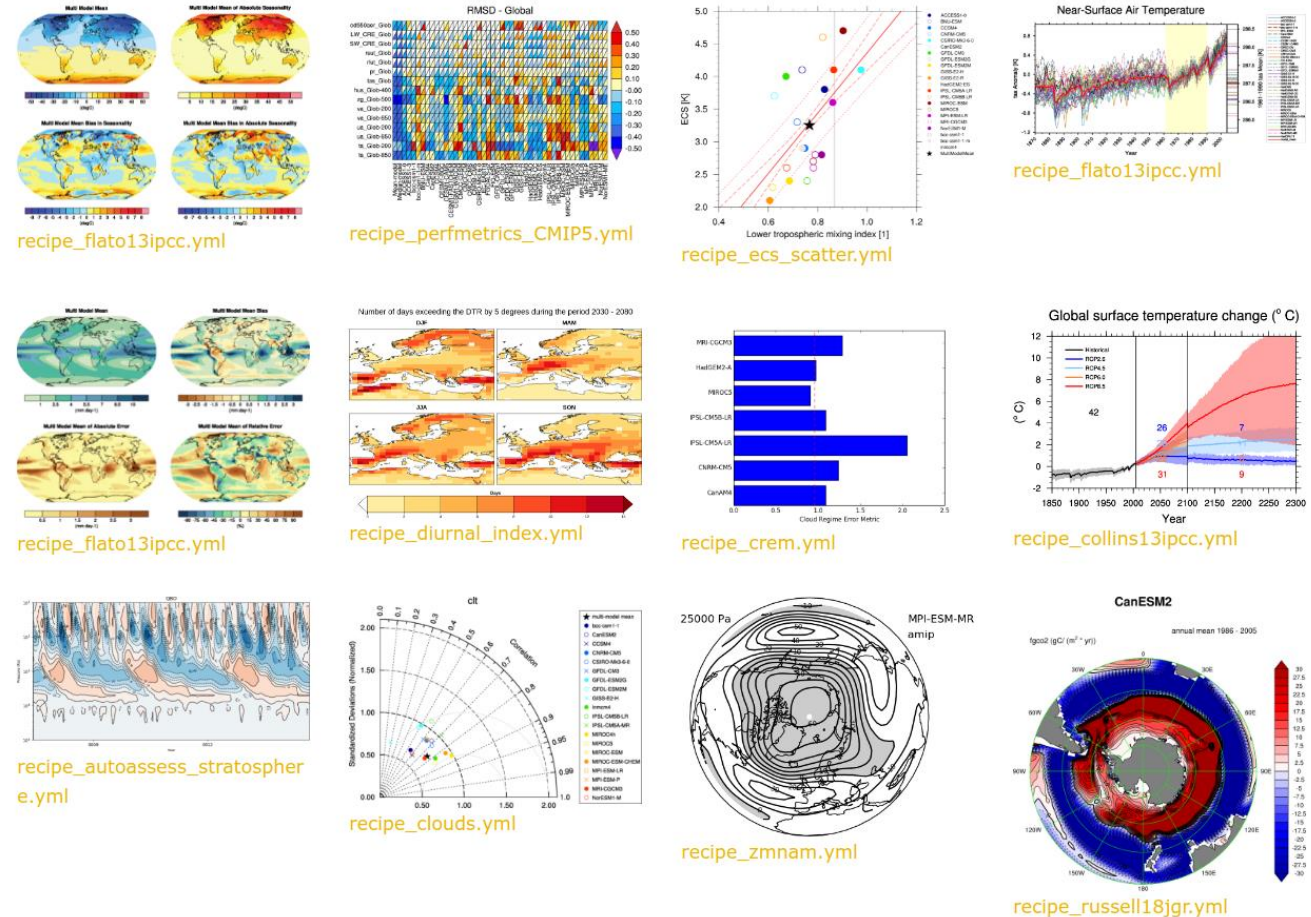
# What can ESMValTool do for you?

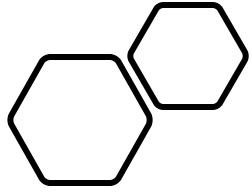
- A collection of scripts with extensive documentation.

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

- An online tutorial

[https://esmvalgroup.github.io/ESMValTool\\_Tutorial/](https://esmvalgroup.github.io/ESMValTool_Tutorial/)

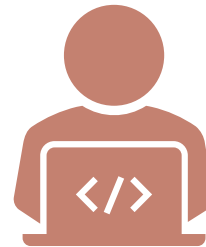




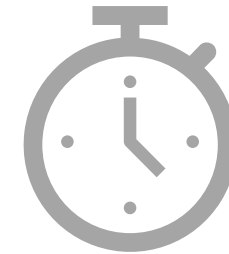
# using ESMValTool:



others can understand our  
analyses

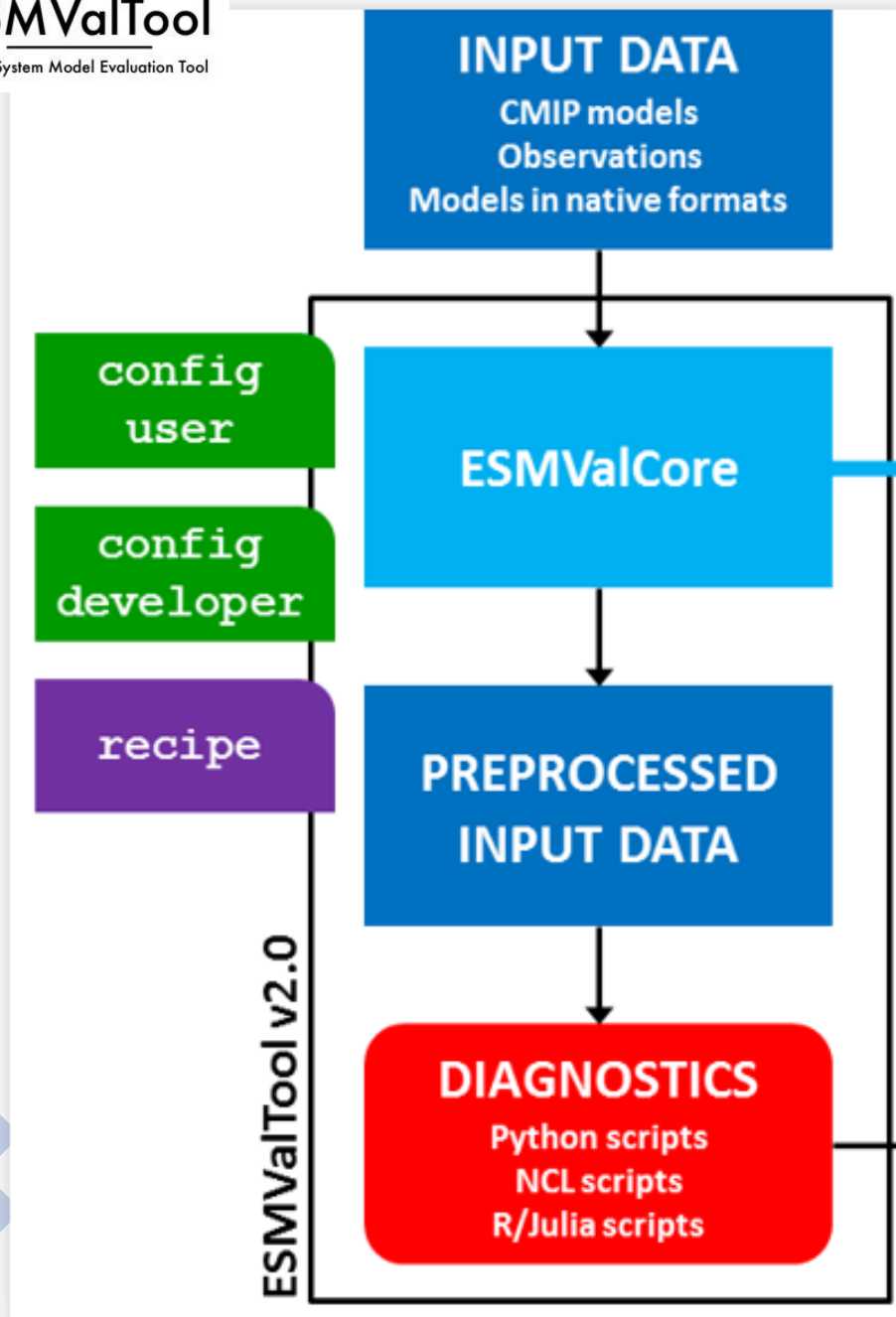


we can re-use code  
instead of re-implementing it

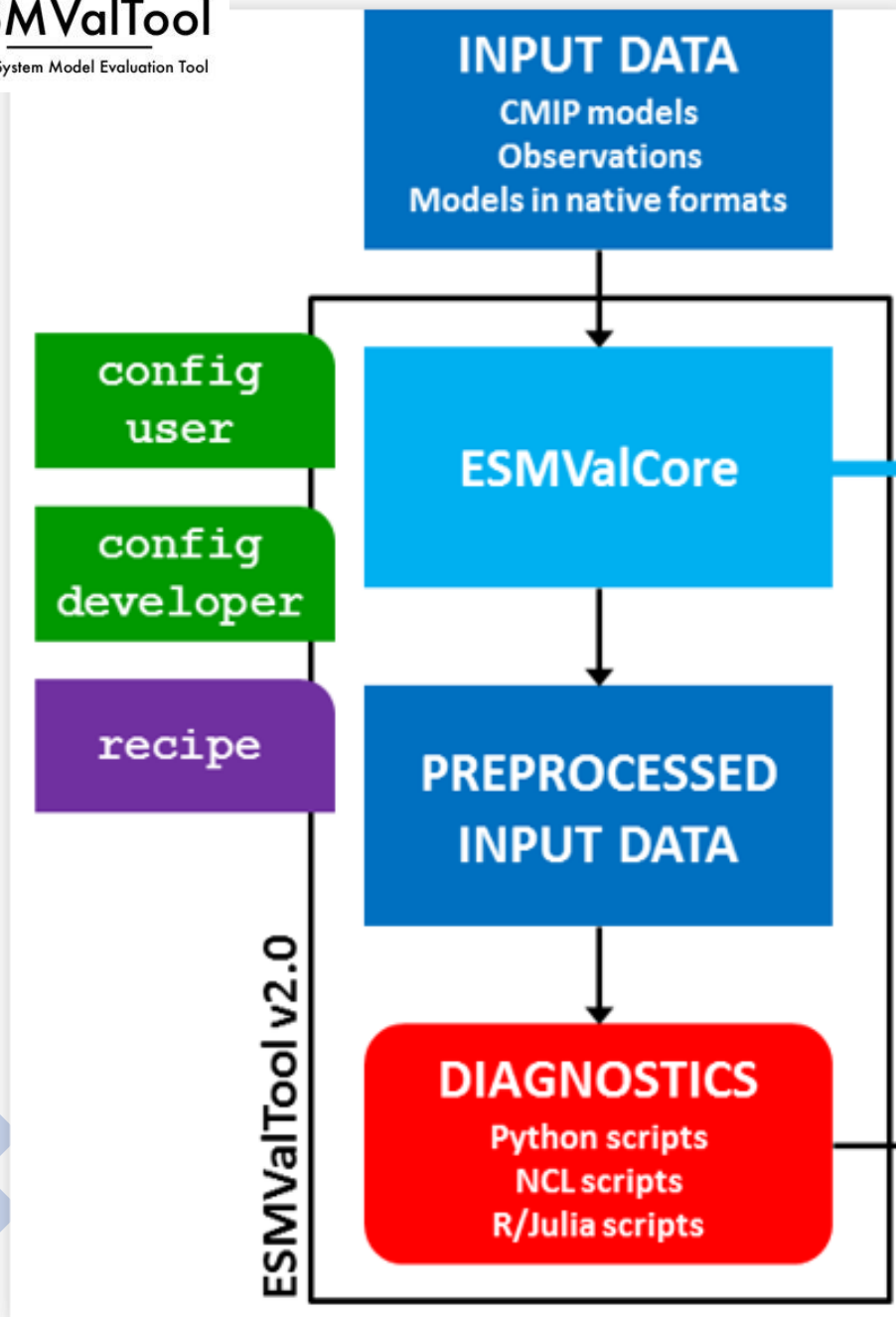


we spend less time on  
developing code





## Earth System Model Evaluation with ESMValTool



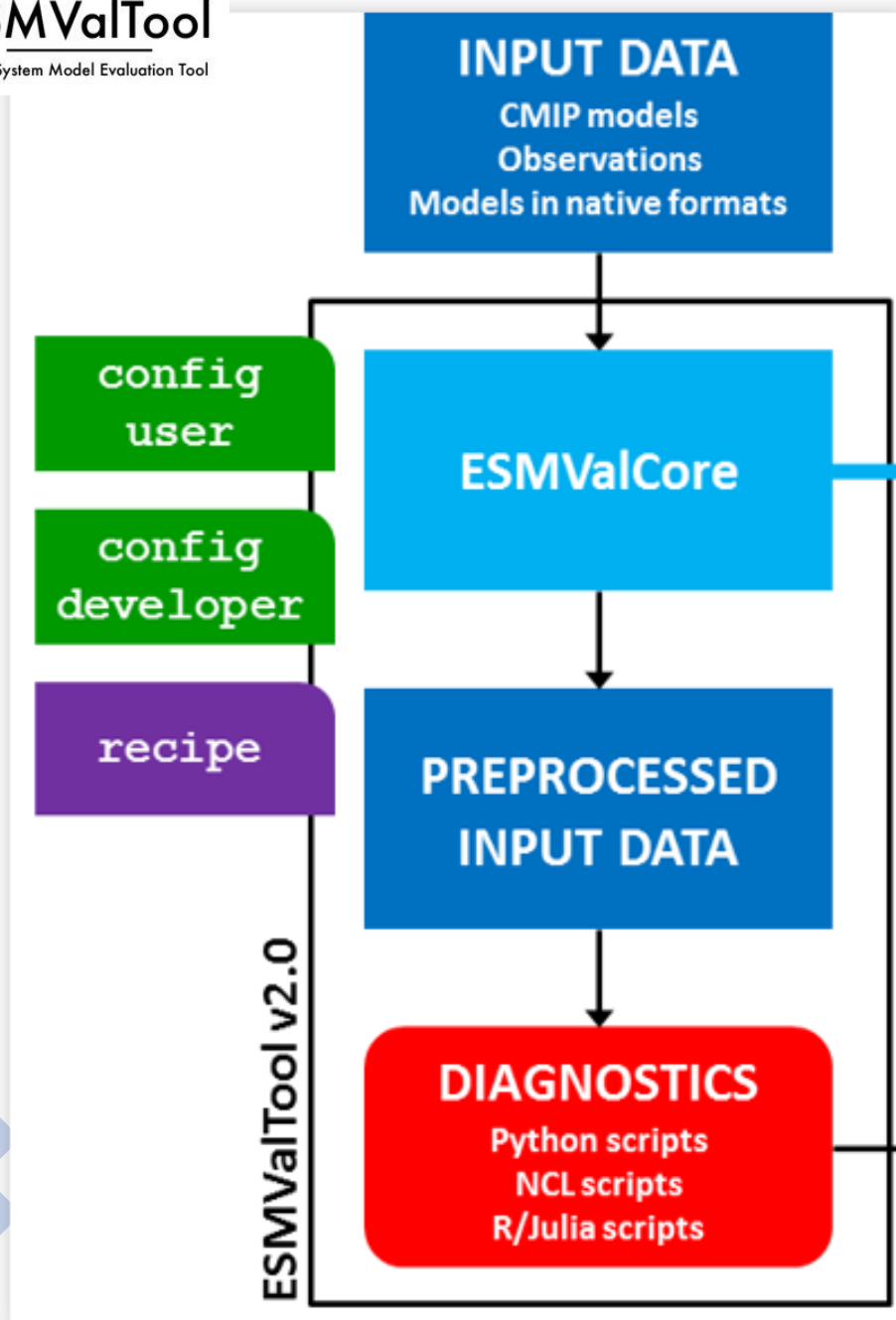
## How to run ESMValTool:

- Run ESMValTool as a command-line tool:

```
esmvaltool run examples/recipe_python.yml
```

- Run ESMValTool using its Python API:

We learn it during the course.



# Earth System Model Evaluation with ESMValTool

Instructions are given to esmvaltool using a YAML script called a recipe.

Instructions like:

- the **datasets** which need to be analyzed,
- the **preprocessors** that need to be applied,
- the specific analysis called **diagnostic** script.

Available recipes:

<https://docs.esmvaltool.org/en/latest/recipes/index.html>

## Access to CMIP and observational data and a suitable compute cluster

Use a computing cluster with an Earth System Grid Federation (ESGF) node:

- German Climate Computing Center (DKRZ), Germany
- Center for Environmental Data Analysis (CEDA), UK
- Institut Pierre-Simon Laplace (IPSL), France
- Swiss Federal Institute of Technology Zurich (ETHZ), Switzerland
- National Supercomputer Centre (NSC), Sweden
- Barcelona Supercomputing Center (BSC), Spain

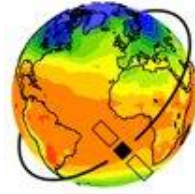




## Related projects:

- IS-ENES3 has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824084
- EUCP has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776613





**ESMValTool**

Earth System Model Evaluation Tool

# Earth System Model Evaluation with ESMValTool in a Jupyter notebook

