Research software and beyond - a community and FAIR software:

ESMValTool for evaluations of Earth system models

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DCC Event: Sustainable Research Software: Challenges & Solutions

University of Groningen, May 2023

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- Why a community-driven and FAIR software

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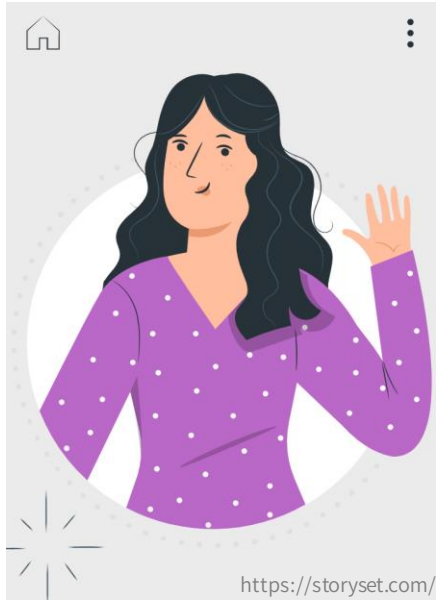
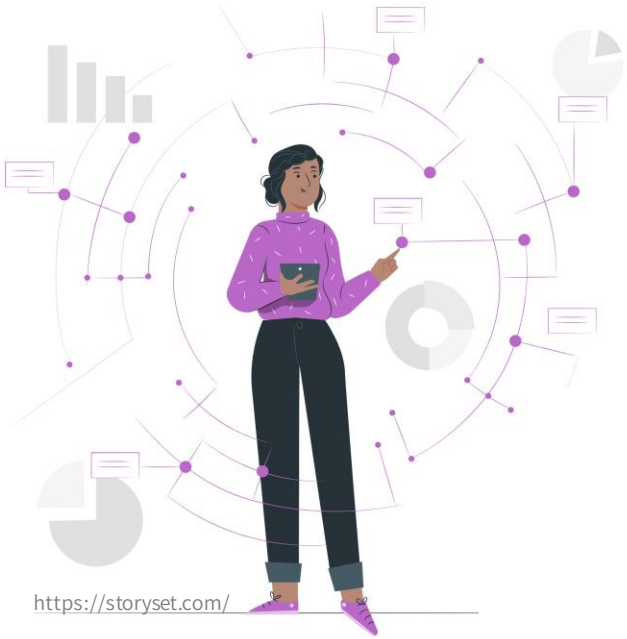
- Why a community-driven and FAIR software
- Example of a community-driven and FAIR software:
  - Earth System Model Evaluation Tool (ESMValTool)



Jane.

Researcher in climate science.



Task:

to analyze a time series of 50 years of air temperature in the past and in the future generated by 10 climate models.

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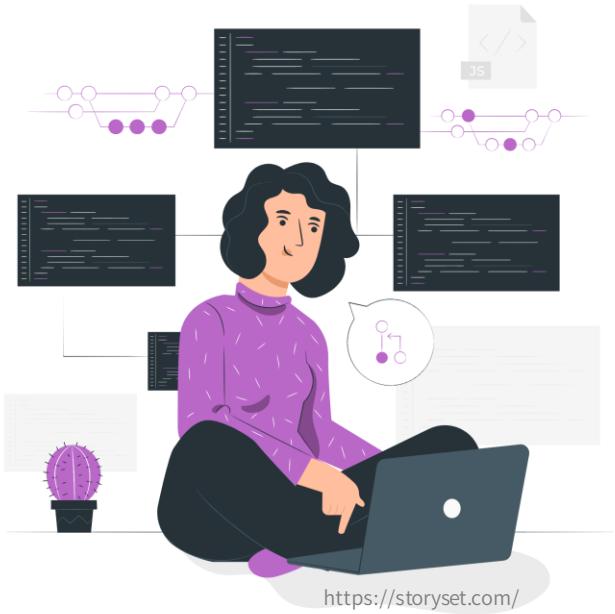
Implementation:

- finding and downloading data
- checking data for correctness
- processing data
- storing results
- creating plots
- making code FAIR



Challenges:

- It takes some time and effort to develop the code.

https://storyset.com/

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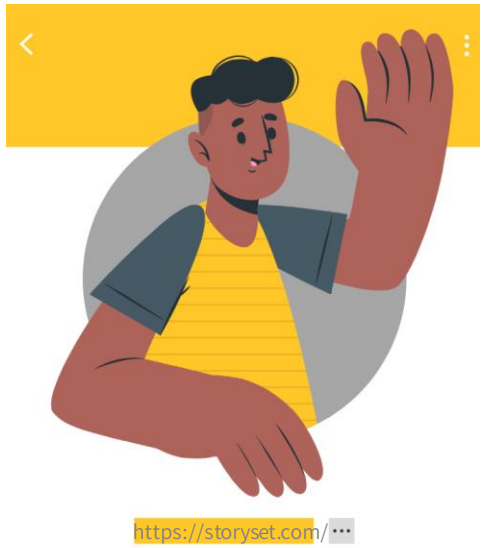
Challenges:

- It takes some time and effort to develop the code.
- Applying FAIR principles is not straightforward.

https://storyset.com/



Ben.

Researcher in climate science.

Task:

to analyze air temperature and precipitation simulated by 5 other different models.

Challenges:

- all the skills needed to write well-structured code.

What is ESMValTool?

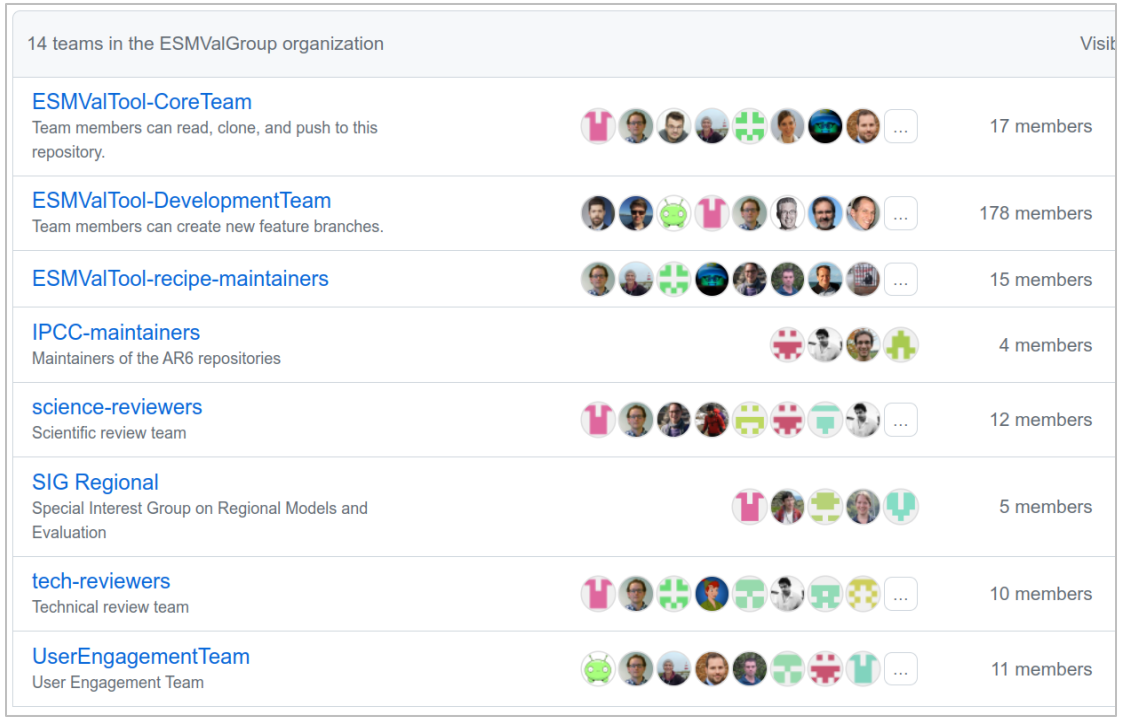
- It facilitates the analysis of climate data.

What is ESMValTool?

- It facilitates the analysis of climate data.
- It provides a standard format for scientific analysis workflow a.k.a. "recipes".

Who are ESMValGroup?

By an international community of scientists and software engineers

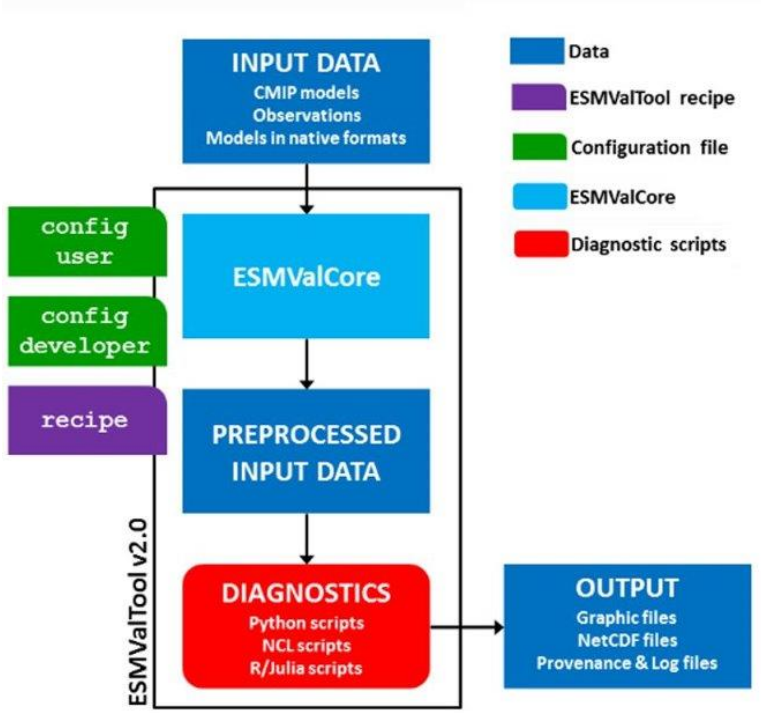


https://github.com/esmvalgroup

• 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

What can ESMValTool do for you?

- Helps to analyze climate data
- Provides a collection of recipes
- Provides provenance and citation information
- Helps efficient data processing

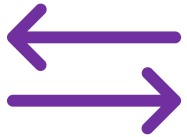


https://www.esmvaltool.org

What can ESMValTool do for you?

Reciprocity

Open development



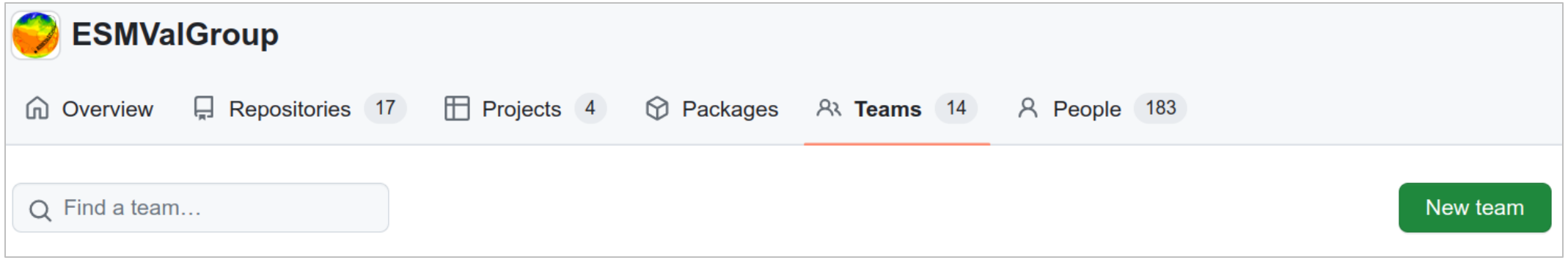
Facilitating exchange

Ripple effect

Thriving Community

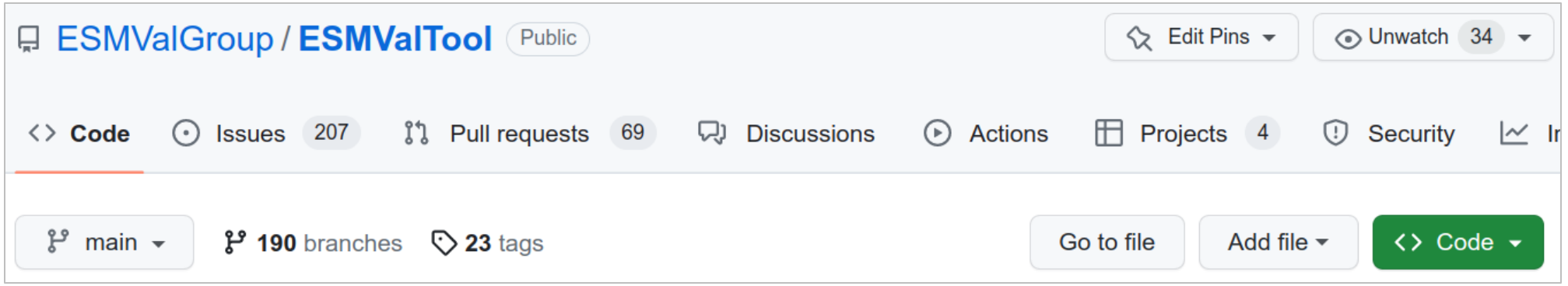
Reciprocity

- Make your work available
- Build upon others' work
- Give and receive feedback on code



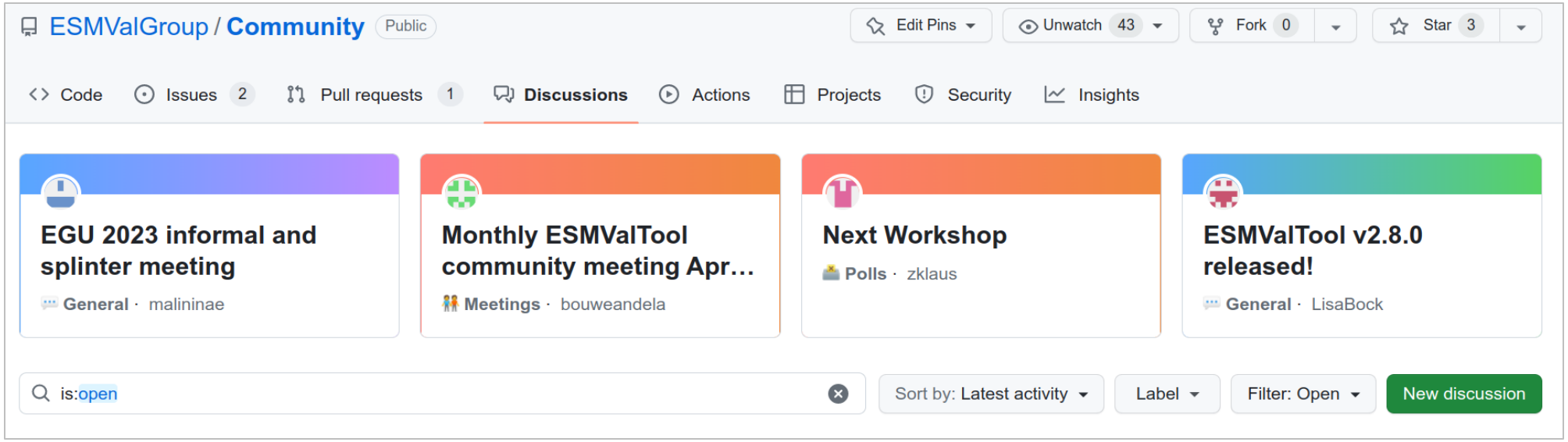
Open development

- Transparency
- Automated testing
- Review processes



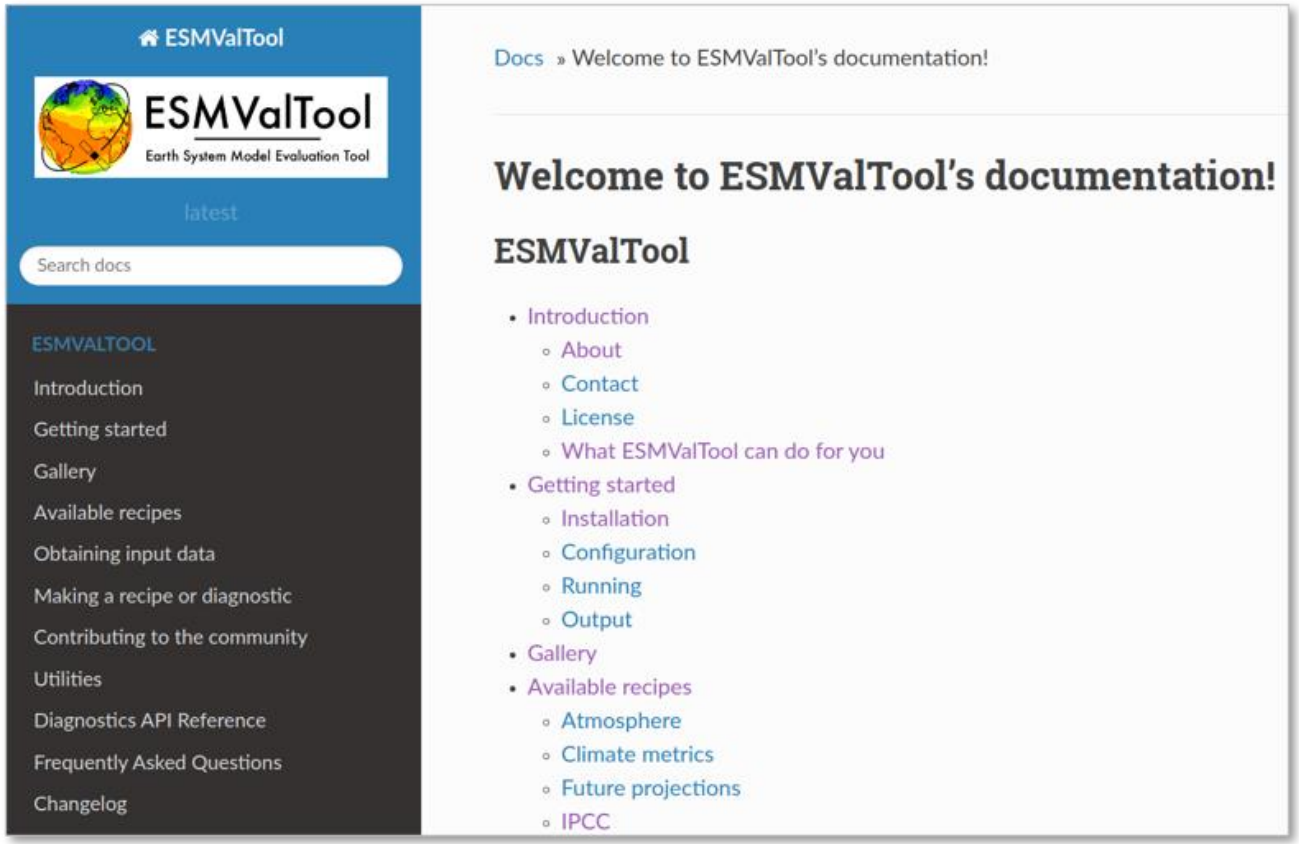
Facilitating exchange

- Public Repository
- Maintain a collection of recipes
- Open protocols and guidelines



Ripple effect

- Dissemination of best practices
- Promotion of standards
- Voice in development of dependencies



Thriving community

- Collaborate on GitHub and beyond
- Welcoming
- Fun!

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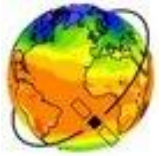

ESMValTool

Earth System Model Evaluation Tool

https://www.esmvaltool.org

https://github.com/ESMValGroup/Community/discussions