WP9/JRA2:
Earth System Model Evaluation developments

Veronika Eyring (DLR) and Kim Serradell (BSC)

12 Partners
DLR (26), BSC (25), Met Office (13), NLeSC (11), UREAD-NCAS (9), SMHI (8),Met.no (7), CMCC (5), CNRS-IPSL (4), DKRZ (3), NORCE (2), KNMI (2)

WP Objectives

WP9/JRA2 aims at further developing the Earth System Model Evaluation Tool (ESMValTool)

https://github.com/ESMValGroup/ESMValTool

- <u>Improving ESMValTool technically</u>: IS-ENES3 will devote a significant effort to further develop the tool so that it can efficiently handle the large amount of data expected in CMIP6 and in future phases of CMIP together with the observational data required for model evaluation while ensuring efficiency, provenance, automated testing, and proper documentation.
- <u>Extending ESMValTool features to attract users</u>: IS-ENES3 will also further advance the tool in terms of its applicability towards a seamless evaluation tool that can be consistently applied to output from global and regional climate models (RCMs) and across timescales.
- <u>Coupling of ESMValTool to other infrastructures</u>: This task will ensure that the ESMValTool can be run efficiently alongside the ESGF infrastructure at selected nodes in order to ensure a stable service in WP7/VA2 Data.

IS-ENES3 Objectives

- <u>Objective 1</u>: IS-ENES3 will pursue the **integration** of the Earth's climate system modelling **community** and will prepare the **sustainability** of its infrastructure.

- <u>Objective 2</u>: IS-ENES3 will foster the **common development of models and tools**, and the efficient use of HPC.

- <u>Objective 3</u>: IS-ENES3 will support the **exploitation of model data** by the Earth system science community, the climate change impact community and the climate service community.

WP tasks

- T1: Coding Workshops and Coordination of ESMValTool activities

- T2: Technical Improvements of the ESMValTool
  - Enhance and improve automated testing (CI)
  - Improving the performance of the ESMValTool backend
  - Improve the modularization of the code
  - Containerization
  - Implementation of standard interfaces, provenance and coding guidelines

- T3: Data preprocessing and reformatting
  - Pilot support for ocean data on original grids
  - Providing observations to the user
  - Version documentation of utilized observations

WP tasks

- T4: Seamless Evaluation with the ESMValTool
  - Application to Regional Climate Models
  - Flexible use across different types of experiments and timescales

- T5: Enhancing the use of the ESMValTool for model development
  - Quicklook system for online diagnostics
  - Incorporation of ESMValTool into modelling or stand-alone workflow

- T6: Coupling of externally developed diagnostics and metrics to the ESMValTool

- T7: Coupling of ESMValTool to the ESGF

- T8: Distributed ESMValTool computing and calculations on user demand

Overview of model evaluation workflow
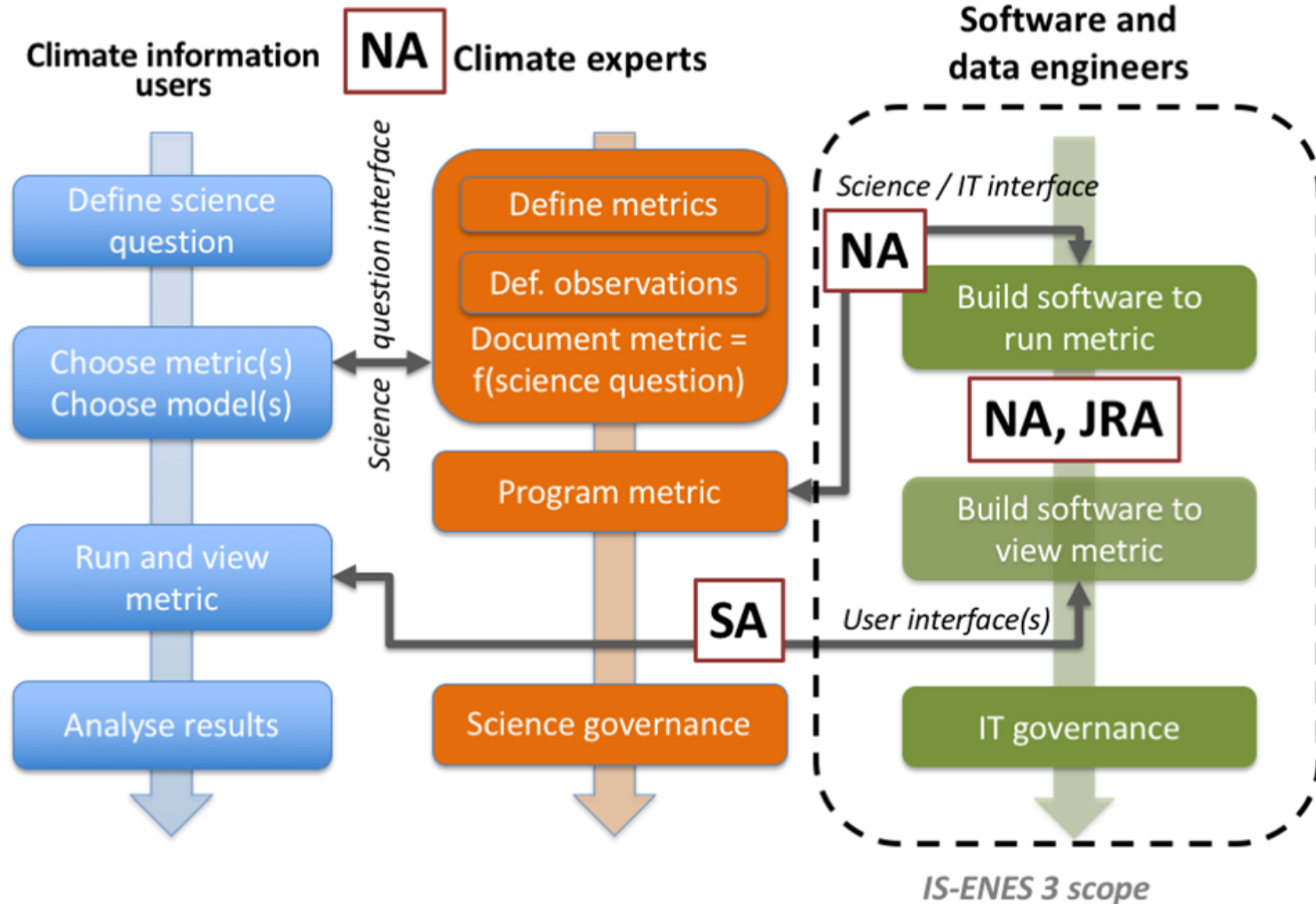
Links with other WPs

- User survey and requirements coming from WP3/NA2

- User requirements and standards will be defined in WP3/NA2

- ESMValTool service will be provided in WP7/VA2 activities will include those parts of the service on model

- WP6/VA1 will include the user support to the ESMValTool

- The coupling to the ESGF and distributed computing have links with the corresponding data WPs

Issues to be addressed

- *BoG #3 "Model Evaluation" on Friday 10th (1h30)*

  - Cross-WPs NA2, NA4, VA2, JRA2

  - First topics we should discuss:
    - Survey (NA2)
    - Standard interface for provenance (NA2)
    - ESMValTool developments (JRA2, SA2)

  - Other topics:
    - Sustainability of development of infrastructure (ESMValTool)
    - Climate4impacts portal