

EGU General Assembly 2022 – large scale hydrology

Improving impact model intercomparison by developing and applying quality control and quality assessment tools – the example of the ISIMIP global water sector



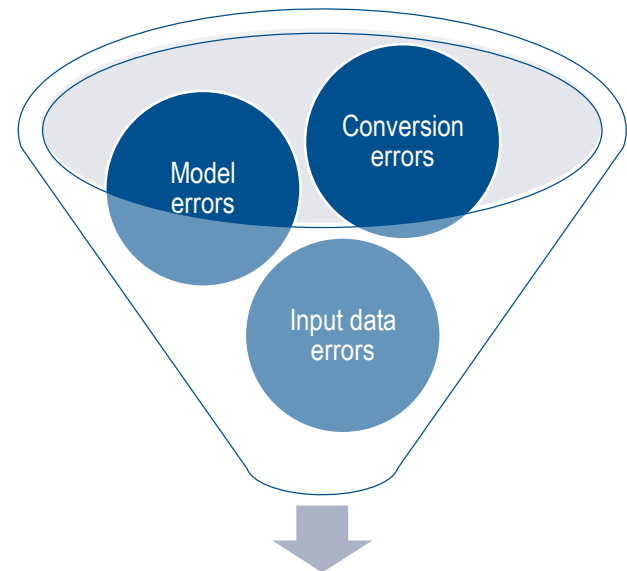
Hannes Müller Schmied^{1,2}, Matthias Büchner³, Jochen Klar³, Iliusi Vega del Valle³, **Aristeidis Koutroulis**⁴, Simon N. Gosling⁵, Laura Dobor⁶, Emmanuel Nyenah⁷ & Christopher Reyer³

¹Goethe-University Frankfurt, ²Senckenberg SBIK-F Frankfurt, ³PIK Potsdam, ⁴Technical University of Crete, Chania, ⁵University of Nottingham, ⁶Czech University of Life Sciences, Praha, ⁷VUB Brussels



Motivation & background

- Process-based impact models as valuable tools for simulating processes in a changing world (e.g., socio-economy, climate)
- Inter-Sectoral Model Intercomparison Project (www.isimip.org) act as umbrella for multiple sectors and ~ 100 modelling groups that follow a simulation protocol
- allows model intercomparison, evaluation and (cross-) sectoral (multi-) model impact assessments
- But: high quality model output is needed



Flawed model output?



Objective

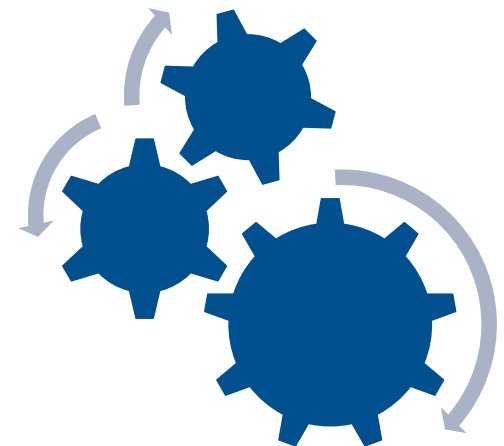
- **Establish a QC/QA workflow with tools to**
 - check plausibility of the model output and proper data format (Quality control, QC), and afterwards
 - assess key variables with benchmark data (Quality assessment, QA)

→ Serves model development (e.g. QC tool can be run at own institution)

→ Avoids publishing incorrect data at ISIMIP repository

→ supports model intercomparison

→ EU Cost-Action CA19139 PROCLIAS <https://proclias.eu>



Status of the QC tool

- QC-tool is existing (created by ISIMIP data management team) and in operational use with each data submission
 - It checks:
 - file name against the protocol schemas and patterns
 - variables, dimensions and global attributes
 - consistency of NetCDF time axis
 - if the data is within a valid value range (but values are available only for the water sector)
- **Tool is easy-to-use also at modeller's institution** (saves data transfer and time)
- NOW: Collecting valid value ranges for each variable

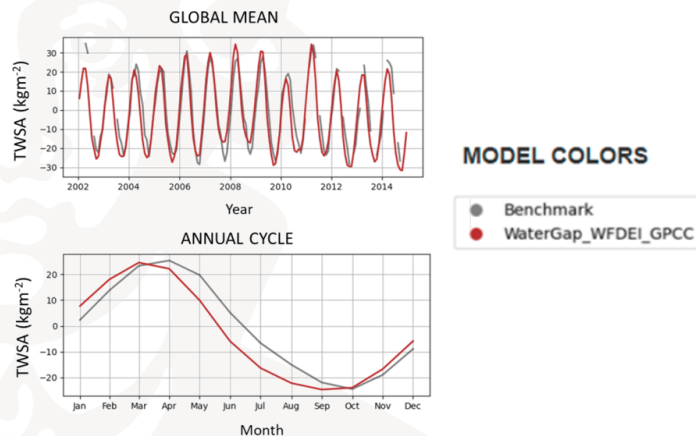


<https://github.com/ISI-MIP/isimip-qc>

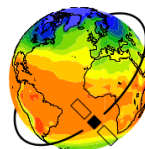
Status of the QA tool

- Specific ISIMIP QA-tool is not yet existing
 - First steps:
 - Review of existing QA tools (e.g. ILAMB, ESMValTool)
 - virtual mobility grant by EU COST-Action to use ISIMIP model output with ILAMB and ESMValTool (focus on global water sector)
 - Establishing a streamflow gauge dataset for consistent evaluation of global water models*
- Reports are available (* in preparation) via <https://proclias.eu>

→ We recently got a „home“: <https://github.com/ISI-MIP/isimip-qa>



ILAMB



ESMValTool
Earth System Model Evaluation Tool



Outlook

QC-tool

- Collecting valid value ranges for each variable

QA-tool

- Connect to initiatives with experiences with QA-tools
- Explore ESMValTool (make ISIMIP model output compliant)
- Adapt ILAMB (e.g. to digest basin outlines)
- Strategy towards QA-tool development for ISIMIP model output

Interest to join? Any Suggestions? Willing to exchange ideas?

→ ✉ hannes.mueller.schmied@em.uni-frankfurt.de

