

H05: Insights into Environmental/Hydrological Models Using Sensitivity and Uncertainty Analysis and Information Theory

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Session Description

Proper characterization of uncertainty and information remains a major challenge, and is inherent to many aspects of modelling such as structural development, hypothesis testing and parameter estimation, and the adequate characterization of forcing data and initial and boundary conditions. To address this challenge, methods for a) uncertainty analysis (UA) that seek to quantify uncertainty (and how it propagates through a system/model), and b) the closely-related methods for sensitivity analysis (SA) that evaluate the role and significance of uncertain factors (in the functioning of systems/models), have proved to be very helpful.

This session invites contributions on both theory and/or application of SA/UA methods applicable to all Earth and Environmental models (e.g. climatological or hydrological models). Contributions addressing any or all aspects of sensitivity/uncertainty, including those related to structural development, hypothesis testing, parameter estimation and model calibration, forcing data, and initial and boundary conditions are invited. Particular topics of interest include (but are not limited to):

- 1) Novel methods for effective characterization of sensitivity and uncertainty
- 2) Implications of SA/UA for model calibration and validation
- 3) Impact of input data uncertainty on model learning and performance
- 4) Single- versus Multi-criteria SA/UA
- 5) Metric specification for model evaluation
- 6) Improving the computational efficiency of SA/UA (efficient sampling, surrogate modelling, parallel computing, model pre-emption, etc.)

- 7) Information-theoretical analysis of uncertainty in (the interface between) models and data

Note: The proposed session is mainly intended for Hydrology and Glaciology, but due to its general scope it can be open to submission for both CGU and CSAFM members.