

EGU2020-20141

<https://doi.org/10.5194/egusphere-egu2020-20141>

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



Model Assessment Strategy in a Karst Hydrological Model Using a Process-based Diagnostic Tool

Kubra Ozdemir Calli¹, Lieke Melsen¹, and Andreas Hartmann²

¹Wageningen University and Research, Earth and Environment, Hydrology and Water Resources, Netherlands

²Albert-Ludwigs-University of Freiburg, Institute of Earth and Environmental Sciences, Germany

Model assessment is a crucial part of hydrological modelling studies. The traditional intuitive approach is to judge model performance to explore its effectiveness and informativeness about the system reality. However, this approach does not necessarily guarantee that one captures system hydrological functioning from the model output. Here, we proposed a novel model assessment strategy that provides a direction to constrain model output space with the concept of model functionality. In the study, we used StorAge Selection (SAS) function approach as a process diagnostic tool to explore the model output space which is simultaneously informative on the system hydrological behaviour and functioning. To do that, the SAS model was fed by a karst-dedicated hydrological model (VarKarst) simulations to model the karst aquifer $d^{18}O$ transport and young water fraction of system discharge, F_{yw} . Model functionality was assessed by a new model verification metric, named Exceedance Probability Ranked Score, EPRS. The eligible clusters from the model output were then served in order to examine the model parameter space. Our findings provide direction to indicate that using young water fraction, F_{yw} as a process-diagnostic metric leads to an improvement in model realism while carrying a physically realistic model parameter set throughout the model output space.