



Building a distributed hydrological model from scratch

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Hydrological models often rely on many assumptions on the conceptualization of hydrological processes. Often, these assumptions are not based on the data available at the location where the model is applied, but are heritage of settled knowledge, derived from case studies or perceptions, whose origin is sometimes difficult to track. Because of the high variability of hydrological processes depending on place, spatial and temporal scales, model assumptions may have been extrapolated out of the context where they were originally developed, and be unjustified, unrealistic, or wrong in the context where the model is applied. Therefore, it may be useful to undertake an exercise where we pretend to erase what we know, or we think we know, about processes conceptualization, and try to relearn it. We would probably discover something that was already discovered, but it would also be an opportunity to challenge the “hydromythologies” that are perceived to populate hydrological models, as the theme of the current session suggests. In the spirit of starting from scratch, we built a hydrological model for the Mosel catchment. The model objective was to reproduce streamflow at 20 locations within the catchment. Model decisions were assisted by prior data analysis, aimed at understanding the causal relationships between climate, landscape and streamflow. This analysis helped to formulate model hypotheses, which were then refined in a subsequent stage of adjusting the model to the data. Results helped to understand the relative importance of rainfall distribution, evaporation, geology and topography in controlling streamflow spatial variability. Although modelling from scratch carries the limitation that findings are limited to the study area under investigation, it may help rethinking some of the assumptions that are routinely made, which may not have general validity.