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Large scale hydrological studies for the benefit of water resources management – looking up or down?

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Hydrological information at the macro scale has become increasingly available through the establishment of global archives of hydrological observations (e.g. the Global Runoff Data Centre) and the development of hydrological models for the purpose of water resource assessments and climate change impact studies at the global and continental scale. As such, it has contributed to improved knowledge of the present state of global water resources and variability across large spatial domains, the role of terrestrial hydrology in earth system models and the influence of climate variability and change on continental hydrology, including extremes. Recent advances include among other, improved representation of subsurface hydrology and land-surface atmosphere feedback processes. Models are further adapted to multiple sources of input data, including remote sensing products, which in turn has facilitated the development of global and continental scale flood and drought monitoring and forecasting systems (e.g. the European Flood Awareness System and the Global Integrated Drought Monitoring and Prediction System). Nevertheless, there are several challenges related to large-scale modelling due to limited data for ground truth (e.g. soil moisture, groundwater, streamflow), large differences in data availability and quality across regions, sub grid variability, downscaled and bias-corrected climate data as driving force, etc. Limitations that have questioned the usefulness of large-scale model simulations for water resource management and policy making at various scales. Still, one can argue that such models represent a useful source of information, particular for continental-scale hydrological assessments and evidence-based policy making at the EU level, as up-to-date, consistent hydrological data are not easily available across national borders. Transfer of knowledge across scales is essential to improve hydrologic predictions at different spatial scales in an ever-changing world. Targeted studies at the spatial and temporal scale identified by the decision makers are not always available, in which case large-scale data can prove a useful source of information along with local studies. This talk addresses the value of macro scale hydrological information for the benefit of policy framing and water resources management at different scales and challenges the common perception that such information is irrelevant at the local river basin scale. Focus is on Europe and on experience gained in several EU funded projects addressing water and global change, and drought in particular.