



Epistemic and aleatory uncertainty in the study of dynamic human-water systems

Giuliano Di Baldassarre, Luigia Brandimarte, and Keith Beven

Uppsala University, Department of Earth Sciences, Uppsala, Sweden (giuliano.dibaldassarre@geo.uu.se)

Here we discuss epistemic and aleatory uncertainty in the study of dynamic human-water systems (e.g. socio-hydrology), which is one of the main topics of Panta Rhei, the current scientific decade of the International Association of Hydrological Sciences (IAHS). In particular, we identify three types of lack of understanding: (i) known unknowns, which are things we know we don't know; (ii) unknown unknowns, which are things we don't know we don't know; and (iii) wrong assumptions, things we think we know, but we actually don't know. We posit that a better understanding of human-water interactions and feedbacks can help coping with wrong assumptions and known unknowns. Moreover, being aware of the existence of unknown unknowns, and their potential capability to generate surprises or black swans, suggest the need to rely more on bottom-up approaches, based on social vulnerabilities and possibilities of failures, and less on top-down approaches, based on optimization and quantitative predictions.