Human-impacted rivers: new perspectives from global high-resolution monitoring

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The spatial distribution of river runoff at the global scale controls human development and social security. Runoff availability and river networks play indeed a key role in the spatial and temporal dynamics of human settlements. On the other hand, the enhancing human impact on rivers, linked to the increase of population density close to river networks, is posing challenging questions. How much are water-related risks (i.e. floods and droughts) increasing? Is the development of human societies close to rivers sustainable? An increasing need to better understand the dynamics of coupled human-water systems and to provide quantitative indicators to estimate the human influence is claimed by the scientific community and policy makers. In this talk I would like to promote an innovative vision for assessing the status of river water resources and water-related risk by fostering a global analysis of local scale problems. This vision aims at bridging the scale gap between the point occurrence of single environmental emergencies and the large spatial scale (up to the global one) typically characterizing environmental assessment and planning. One of the keys to bridge this scale gap is provided by global high-resolution datasets that allow unprecedented possibilities for the analysis and identification of human-water interactions, as well as their progress in time. I will provide several examples showing the opportunities provided by nightlight data, a variable not traditionally used in hydrology, to better decipher the interaction between human and water systems.