



The role of seasonal water scarcity on water quality: a global analysis with case study in the Magdalena, Colombia

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Water scarcity is not just a problem of its own right (hydrological drought) but cascades the hydro-economic system to create problems for crop growth and livestock (agricultural drought) and thus for wellbeing and economic productivity (economic drought). One of these cascades is the impact of reduced water quantity on water quality as a result of non-point source pollutant concentration in water bodies such as rivers, lakes and wetlands. This paper investigates the impact of seasonal water shortages on the quality of supplied water to urban centres with a view to better understanding how land use management can reduce dry-season pollutant spikes.

We apply a widely used spatial hydrological model (WaterWorld) and its water quality index (the human footprint on water quality, HFWQ) to examine to what extent HFWQ of water flowing into urban water intakes is affected by flow seasonality and by typical "dry year" events. A global analysis shows trends across climatic and land use gradients and is followed by a regional analysis of the Magdalena basin in Colombia: a large basin with 79% of the country's population and a mixture of intensively farmed and protected lands along a seasonality gradient from South to North. The Magdalena is a case study basin of the Earth₂Observe project.