

From hydrological regimes to water use regimes: influence of the type of habitat on drinking water demand dynamics in alpine tourist resorts.

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In the last decades, integrated water resources management studies produced integrated models that focus mainly on the assessment of water resources and water stress in the future. In some cases, socioeconomic development results to cause more impacts on the evolution of water systems than climate (Reynard et al., 2014). There is thus a need to develop demand-side approaches in the observation and modeling of human-influenced hydrological systems (Grouillet et al., 2015).

We define the notion of water use cycle to differentiate water volumes that are withdrawn from the hydrological system and that circulate through anthropic hydro-systems along various steps: withdrawals, distribution, demands, consumption, restitution (Calianno et al., submitted). To address the spatial distribution and the temporal dynamics of the water use cycle, we define the concepts of water use basins and water use regimes (Calianno et al., submitted). The assessment of the temporal variability of water demands is important at thin time steps in touristic areas, where water resource regimes and water demands are highly variable. This is the case for are alpine ski resorts, where the high touristic season (winter) takes place during the low flow period in nival and glacio-nival basins.

In this work, a monitoring of drinking water demands was undergone, at high temporal resolution, on different types of buildings in the ski resort of Megève (France). A dataset was created, from which a typology of water demand regimes was extracted. The analysis of these temporal signatures highlighted the factors influencing the volumes and the dynamics of drinking water demand. The main factors are the type of habitat (single family, collective, house, apartment blocks), the presence of a garden or an infrastructure linked to high standing chalets (pool, spa), the proportion of permanent and temporary habitat, the presence of snow in the ski resort. Also, temporalities linked to weekends and weekly tourism are observed.

This typology of water demand regimes is at tool that can be developed to reproduce the temporal dynamics of water demands, when knowing the characteristics of habitat in a given region.

References:

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