Impact of climate change on aquatic ecosystems along the Asse River network

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Abstract Intermittent rivers and their ecosystem will have to face climate change during the 21st century, with more frequent and more severe droughts possible, leading to changes in biodiversity. The Asse River (France) basin is one of the tributaries of the Durance River basin experiencing dry conditions. A framework was developed to simulate flows and biodiversity richness of intermittent rivers. The approach involves two rainfall–runoff models with distinct structures and a post-processing technique to simulate zero flow events. Perturbed meteorological forcings (downscaled GCM projections and biased resampled observed time series) are considered to study the biological response and intermittence. Results suggest that, by 2050: (1) zero flow events could be more frequent, (2) durations of zero-flows event are expected to increase, and (3) the consequence could be a loss of approximately two taxa. Sensitivity analysis also demonstrates that this basin is very sensitive to changes in total precipitation between June and November.

Key words intermittence; rivers; Durance River; climate change, hydro-ecology; hydrological modelling