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Systemic approach to hydrological modelling: a historical perspective in the case of the GR models

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Modelling the hydrological response of a catchment to climate variables has been the subject of much research over the past decades, and the issue of environmental change adds much difficulty to this task. In spite of various advances, there is not a single approach today which would appear as best in all cases. Instead, many intercomparisons show that different modelling approaches can have various advantages and drawbacks in different contexts.
The empirical/conceptual approach is one of these modelling approaches, which seems a good compromise between data requirements, modelling efficiency and ease of use, for various applications ranging from flow estimation, test of scenarios to flow forecasting.
The objective of this presentation is to discuss the applicability of such models in various contexts by a review of 300 papers published on the GR models. The evolution in the range of applications of these models will be analysed, as well as their limits, and the perspective for their use in changing environments will be discussed.