

## Medium-term predictions of cumulative runoff in a Mediterranean mountain river.

Zacarías Gulliver (1), Javier Herrero (2), and María José Polo (1)

(1) Andalusian Institute for Earth System Research, University of Cordoba, Campus de Rabanales, edif. Leonardo da Vinci, 14071-Cordoba, Spain, (2) Andalusian Institute for Earth System Research, University of Granada, Edificio CEAMA, Avda. del Mediterráneo s/n, 18006-Granada, Spain.

It is important to find patterns and hidden connections between data to assess the development of decision-making tools for water management. The climate variability of the Mediterranean environments makes it necessary the establishment of methodological/hydrological frameworks that allow us to limit the uncertainty on the decision for further periods within the year, and thus achieve better resource utilization. For that, a study of different machine learning methods has been applied in a Mediterranean mountainous basin in South Spain, by means of an ensemble classification and regression approach to predict the river flow volumes for further periods on a quarterly scale. The predictions are made within the same hydrological year and under two different time schemes, after three (A-scheme) and six months (B-scheme), testing the further periods. The study was carried out with the longest streamflow time series registered in the basin (43 years), collected at a high mountain gauge station (Narila, 975 metres above sea level) in the Guadalfeo River. This station is located in the upstream part of the river (with an associated 67 km<sup>2</sup> contributing area), where there are not significant human alterations of the natural hydrological cycle (withdrawals or discharges) and with a strong influence of the snow regime. The set of selected predictors for the river water volumes includes cumulated runoff, cumulated rainfall and the average of different Climate indexes. The results show that the nature of future periods can be classified accurately in our study case by the methods proposed, classifying correctly more than 90 % of the values during the testing period.