Study of water reservoirs at different hydrological and climatic systems in Spain based on a map of isotopic distribution in precipitacion

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In the past decades, significant advances have been accomplished that explain the spatial and temporal variations of isotopic composition in precipitation, and identify the geographic and climatic factors that govern them. Recently, isotopic maps have been developed as a result of interpolating models and processing these factors at different scales, by the use of GIS tools. Data collected from the Spanish Network for Isotopes in Precipitation (REVIP), during the time period that runs between 2000-2006, has allowed for a continuous digital map of the $\delta^{18}O$ distribution in precipitation over the Spanish peninsula to be performed. This map is based on a multiple regression model depending on two geographic factors: latitude and elevation. Nowadays, the *Centro de Experimentación y Obras Públicas* (CEDEX) investigates on the possibilities that offer both model and map to provide $\delta^{18}O$ reference values that could be used on studies of surface hydrology and, in particular, on reservoirs.

This paper presents a methodology that puts into practice the model of the spatial distribution of $\delta^{18}O$ in precipitation over Spain, to determine the isotopic characterization of water reservoirs and their river basins. This is meant to: 1) help identify factors that regulate the isotopic composition in water reservoirs from different hydrological and climatic systems within the country; 2) improve on the understanding of the water budget, specially the evaporation rates, of these water reservoirs and; 3) correlate their water isotope composition with other lake and water reservoir's records on climatic change.

The isotopic characteristics of different water reservoirs have been compared with the mean value of $\delta^{18}O$ in precipitation over the watershed, calculated using the model and map. The water reservoirs selected were chosen in order to have a wide representation of the geographic-climatic and physical variability present in Spain. Results show that applying the model to the different river basins of water reservoirs is valid for the objectives and scope of this research. The methodology used allows characterizing the isotopic content of oxygen-18 in the precipitation that gives start to the water contribution into

the dam. It also makes it easier to study and quantify the effects produced afterwards, particularly those related to evaporation, a key factor in calculating water budgets. Evaporation is clearly more significant at those water reservoirs whose river basins are mainly under the influence of warm and dry summer's climate, specifically at those where the residence time of water is longer, in the order of several years.

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