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 Print**CONTROL ID:** 1183629**TITLE:** Mapping Oxygen-18 in Meteoric Precipitation over Peninsular Spain using Geostatistical Tools**PRESENTATION TYPE:** Assigned by Committee (Oral or Poster)**CURRENT SECTION/FOCUS GROUP:** Hydrology (H)**CURRENT SESSION:** H131. Threats on Water: Chemical and Isotope Monitoring & Integrated Modeling of Water Quality across Scale in Eco-hydrological Systems**AUTHORS (FIRST NAME, LAST NAME):** Jose E Capilla<sup>1</sup>, Javier Rodriguez Arevalo<sup>2</sup>, Silvino Castaño Castaño<sup>3</sup>, Maria Fe Diaz Teijeiro<sup>2</sup>, Javier Heredia Diaz<sup>3</sup>, Rut Sanchez del Moral<sup>3</sup>**INSTITUTIONS (ALL):** 1. Research Institute of Water and Env Eng, Universidad Politecnica de Val, Valencia, Spain.

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**ABSTRACT BODY:** Rainfall isotopic composition is a valuable source of information to understand and model the complexity of natural hydrological systems. The identification of water recharge origins, water flow trajectories, residence times and pollutants movement in the hydrologic cycle can greatly benefit from this information. It is also very useful in other environmental issues associated to water movement in the biosphere. Although the potential of stable isotopes data in hydrology and climatic studies is promising, so far, it has been strongly limited by the availability of data. A major challenge is to extend sparse measurements of stable isotopes data to surrounding geographic areas taking into account other secondary variables as latitude, altitude and climate related parameters. Current state-of-the-art provides different approaches mainly based in deterministic interpolation techniques.

In Spain a network called REVIP, made up by 16 nodes, is maintained by CEDEX (Centro de Estudios y Experimentación de Obras públicas). At REVIP nodes, stable isotopes in meteoric precipitation (Oxygen-18 and Deuterium) have been continuously recorded since the year 2000. This network provides a rare opportunity to study the patterns of spatial distribution over the whole country. In fact, some accurate regression models have already been proposed that map stable isotopes against latitude and altitude. Yet, these regressions maintain small residuals at the network nodes that are possibly caused by the local average features of climatic events. There is an ongoing effort to improve these maps that includes the identification of relevant climatic parameters and the application of geostatistical techniques.

This paper describes the application of a regression kriging methodology to map oxygen-18 over peninsular Spain using REVIP data. The methodology includes a prior process to obtain normalized stable isotope concentrations that are independent of latitude and altitude, a structural analysis of this normalized variable, and a posterior ordinary kriging mapping of Oxygen-18, in a grid of 5000 x 5000 m. Results confirm the basic dependency of Oxygen-18 with latitude and altitude, show a good fitting of a variogram exponential model to isotopic composition data, and provide an exact reproduction of isotopic contents at REVIP nodes that slightly changes previous regression maps over large areas of the peninsula. These differences extend mainly to the NW and SW areas of Spain, and might be showing the influence of climatic events of different origin that have not been explained by climatological studies yet.

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**INDEX TERMS:** [1854] HYDROLOGY / Precipitation, [1800] HYDROLOGY, [0300] ATMOSPHERIC COMPOSITION AND STRUCTURE, [3300] ATMOSPHERIC PROCESSES.