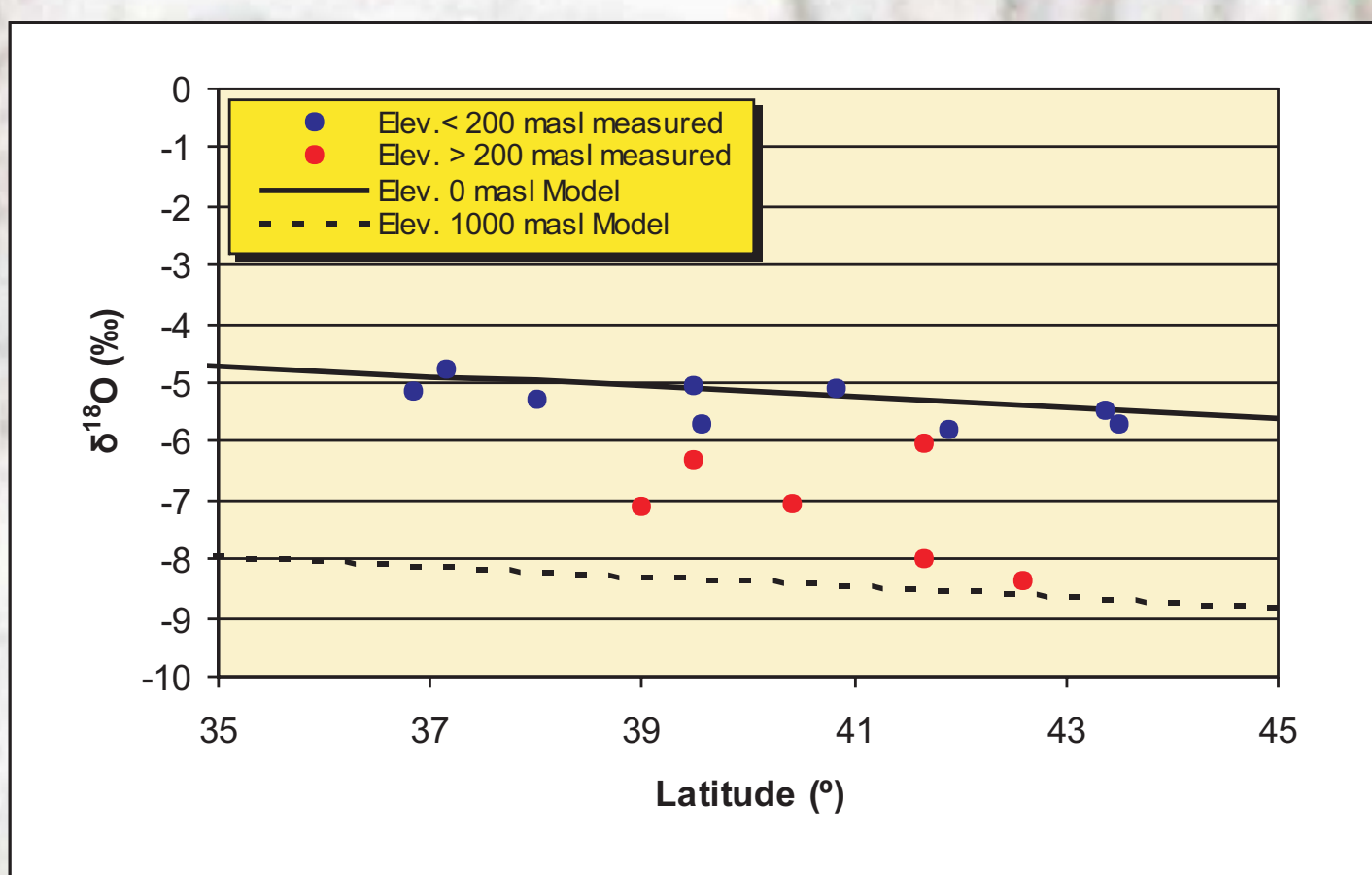# Modelling and mapping oxigen-18 isotope composition of precipitation in Spain for hydrologic and climatic applications

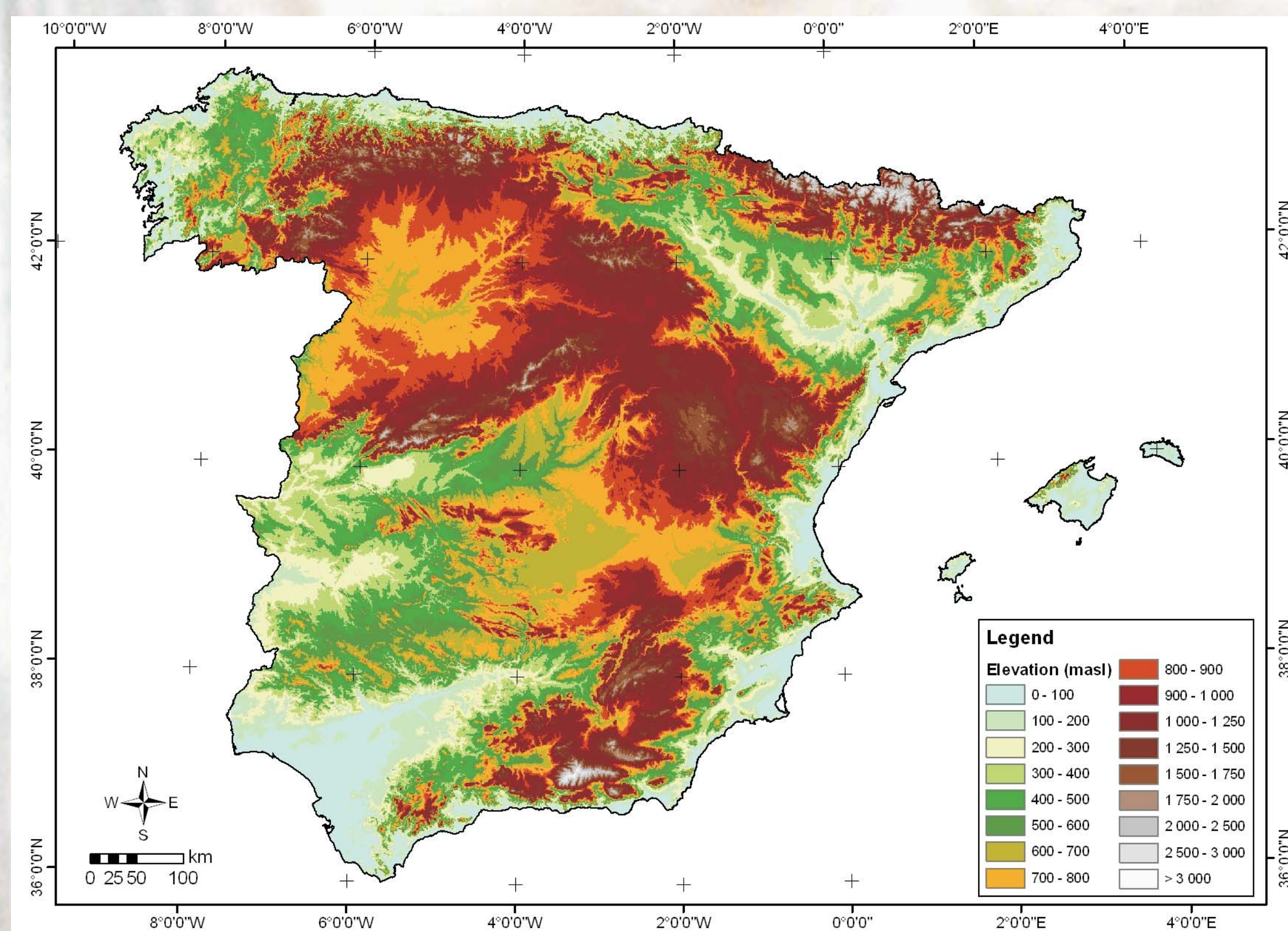## J. Rodríguez-Arévalo[a], M.F.Díaz-Teijeiro[a], S.Castaño[b]

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POLYNOMIAL MODEL:
$\delta^{18}O = f(LATITUDE, ELEVATION)$

ELEVATION DIGITAL MODEL

A simple multiple regression model based on two geographic factors (latitude and elevation) has been developed that reproduces reasonably well the spatial distribution of the current mean oxygen-18 isotope composition in precipitation over Spain. In a preliminary analysis, additional geographic and climatic factors do not improve the performance of the model. A continuous digital map of oxygen-18 isotope composition in precipitation has been produced by combining the polynomial model with a Digital Elevation Model using GIS tools.
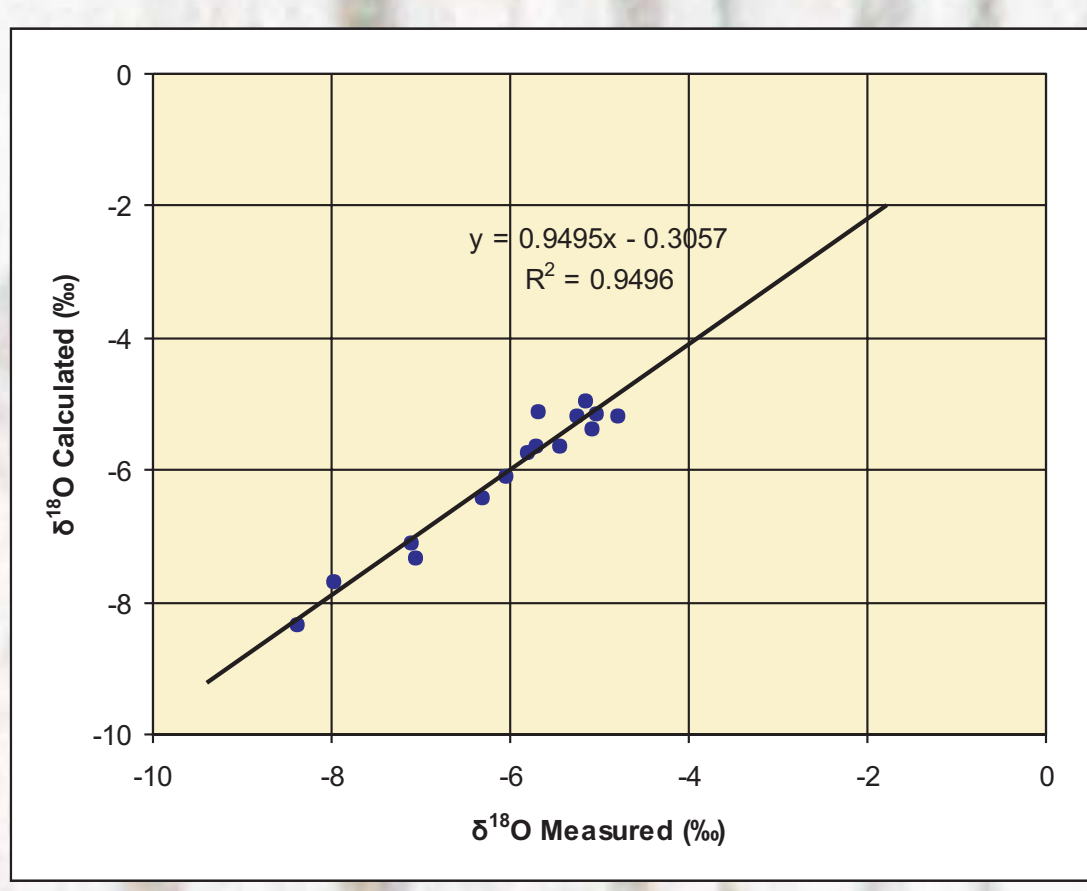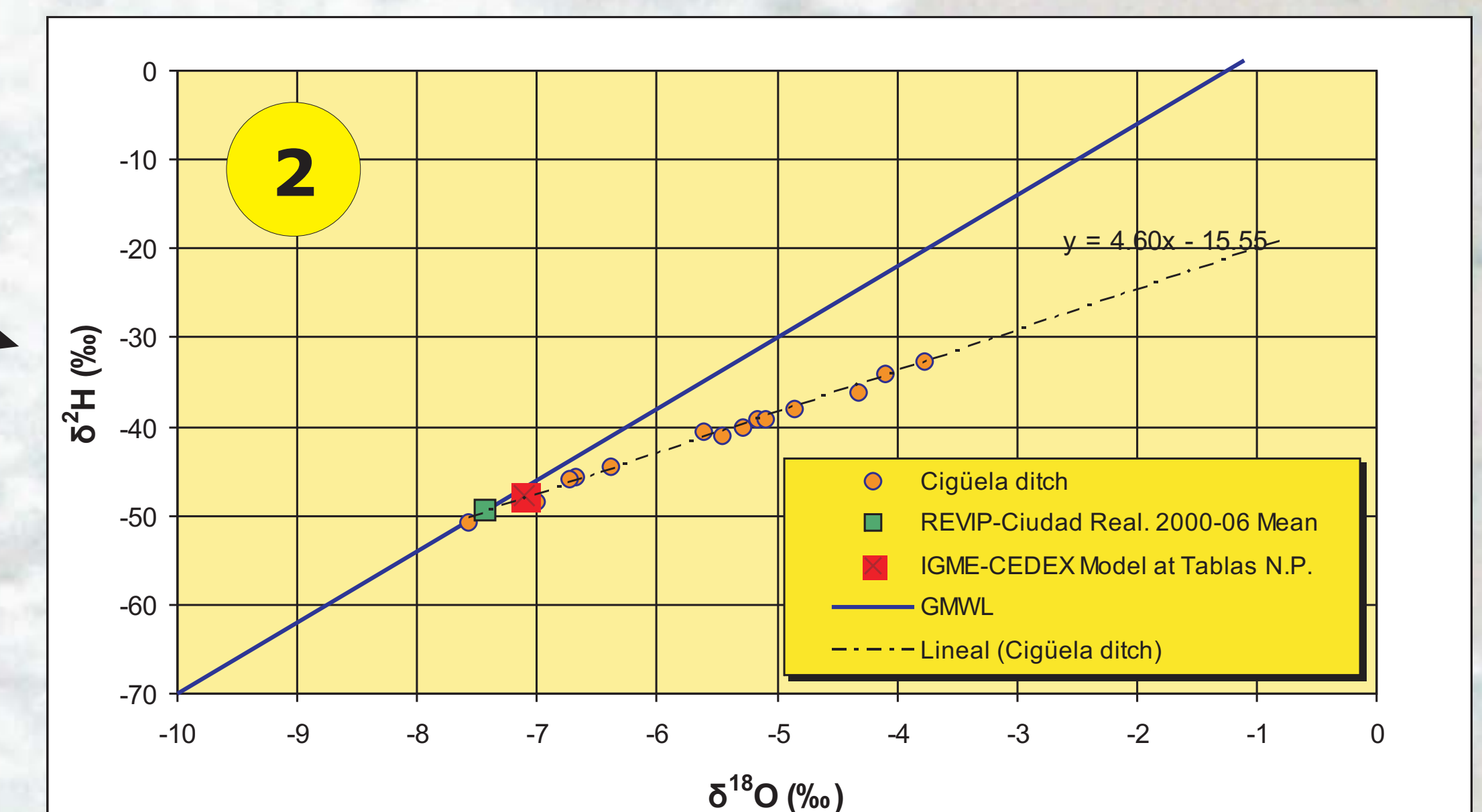
CONTINUOUS DIGITAL MAP OF $\delta^{18}O$ IN PRECIPITATION IN SPAIN
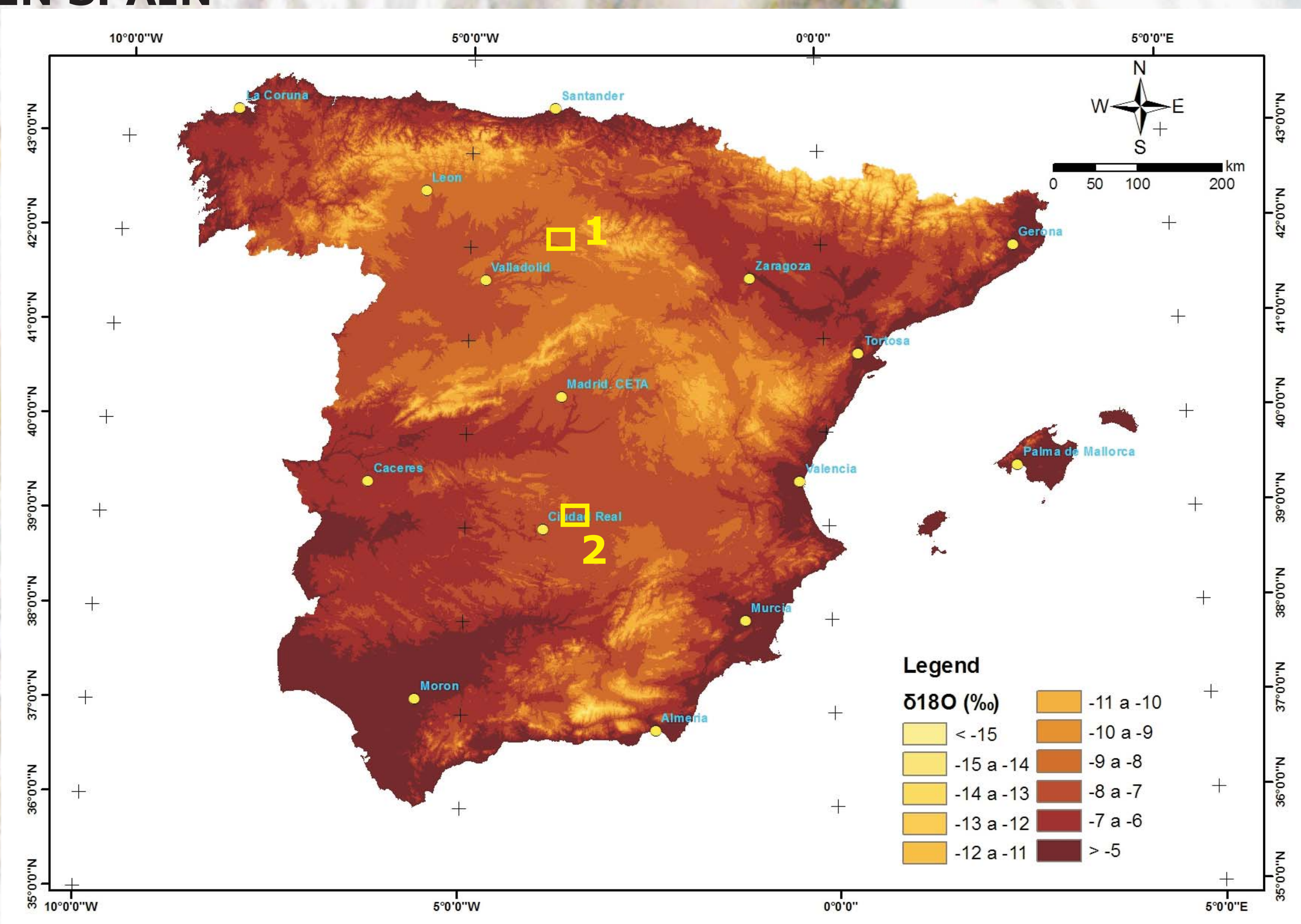
MEASURED VERSUS MODELLED VALUES OF ISOTOPES IN PRECIPITATION
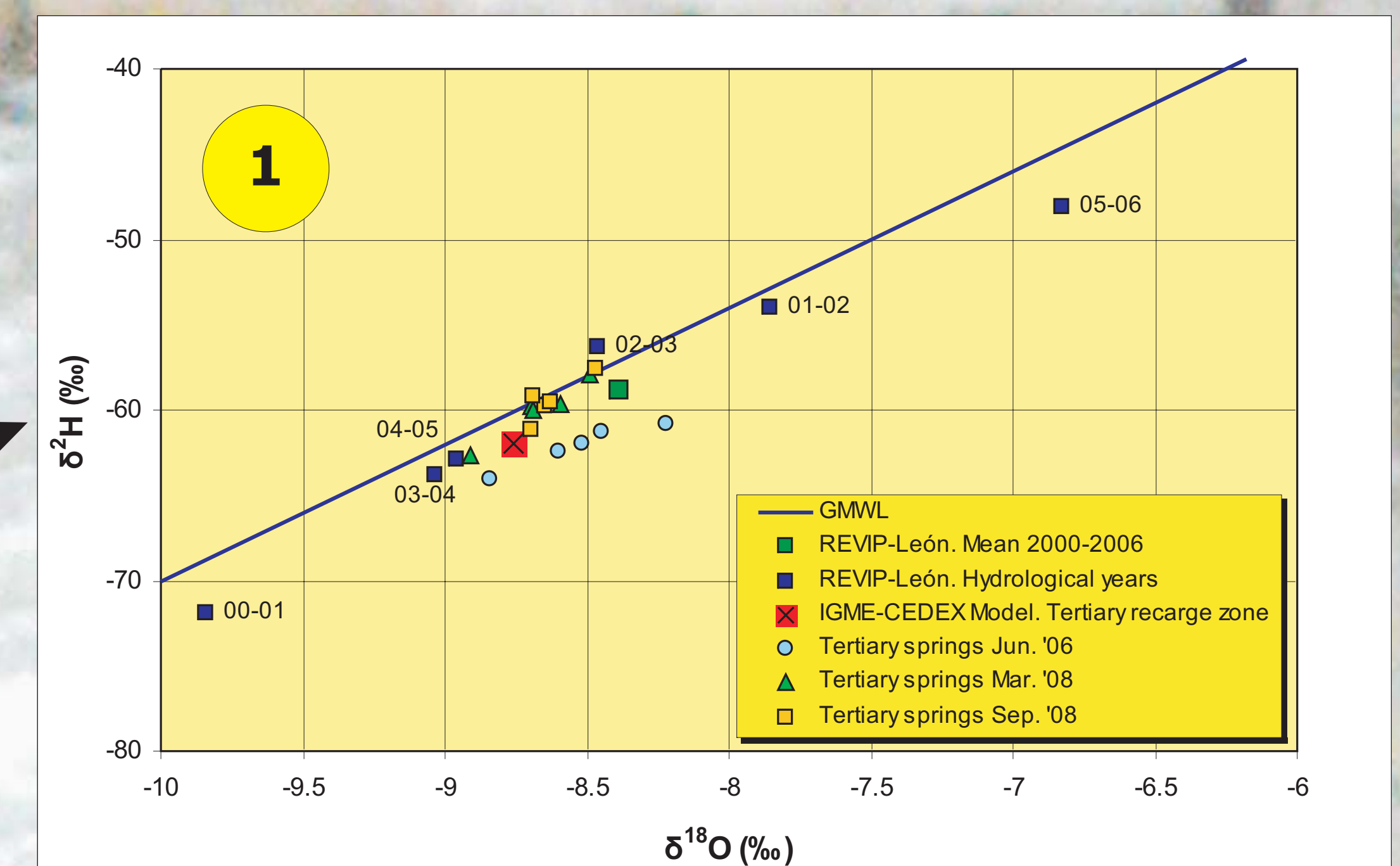
Ground waters in Burgos

Surface waters in Daimiel National Park

Application of the resulting map to several case studies in Spain has shown it to be useful as a reference of the isotope input function to groundwater recharge and surface runoff. The results obtained so far show a good fit between modelled stable isotope values and those measured in surface and ground waters from different aquifers and recharge areas. The GIS tools applied to a continuous digital layer of spatial isotope are able to provide accurate information at detailed scales that are not affordable by other means.

Further validation of the model, and further testing of its usefulness in surface hydrology and climatic studies, is going on.