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# TRIPLE OXYGEN ( $^{16}\text{O}$ , $^{17}\text{O}$ , $^{18}\text{O}$ ) AND HYDROGEN ( $^1\text{H}$ , $^2\text{H}$ ) ISOTOPE ANALYSES OF RAINFALL EVENTS IN CENTRAL-SOUTH PYRENEES

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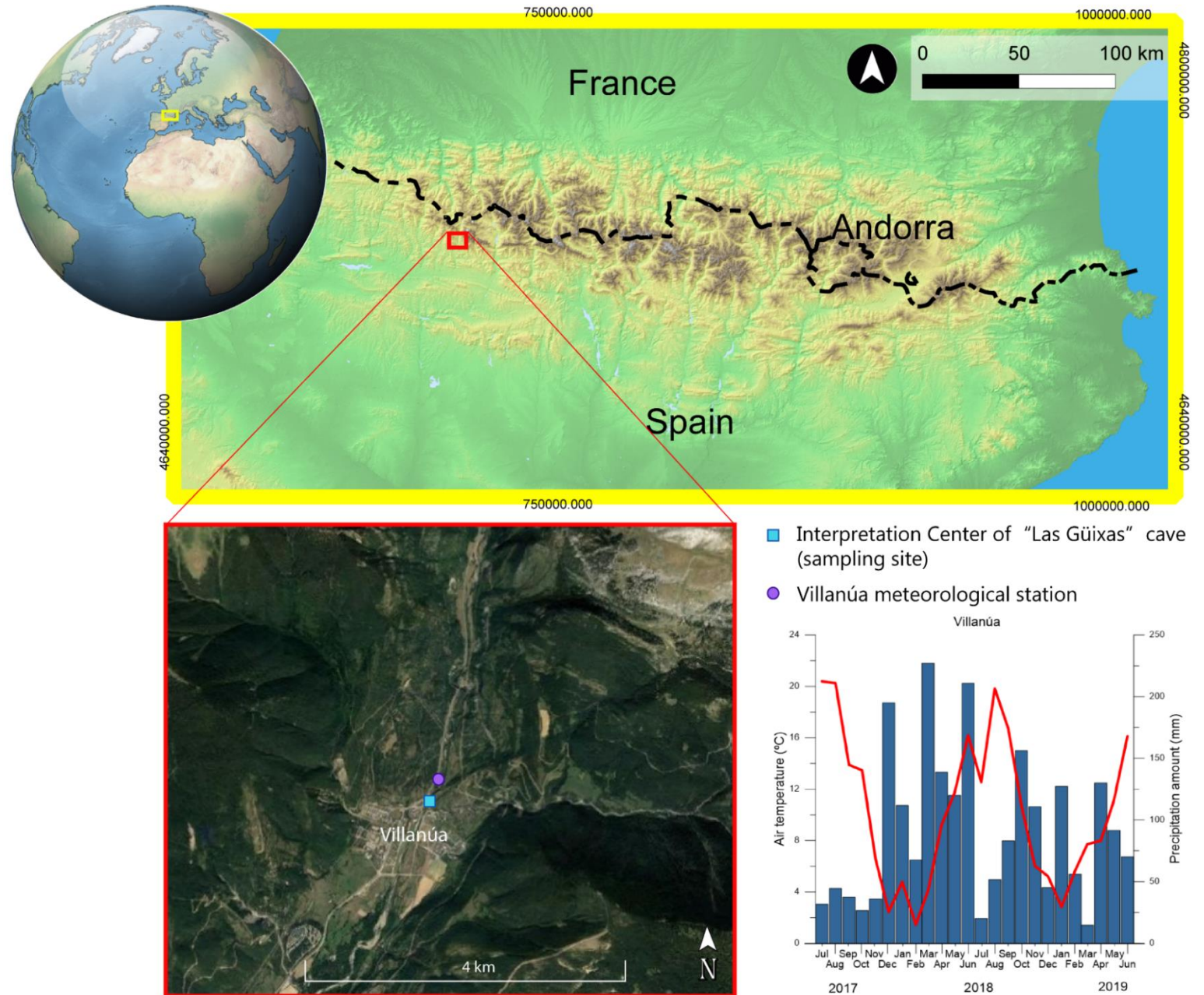
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# STUDY SITE AND CLIMATE SETTING

The study site is Villanúa (Huesca- Spain), a village located in central south Pyrenees. This mountain area is characterized by a transitional Mediterranean – Oceanic climate with a contrasted seasonality, mean annual temperature of 10°C and mean annual precipitation of 1100 mm.

Climograph on the right show monthly precipitation amount and air temperature in Villanúa during the two-years monitoring period.



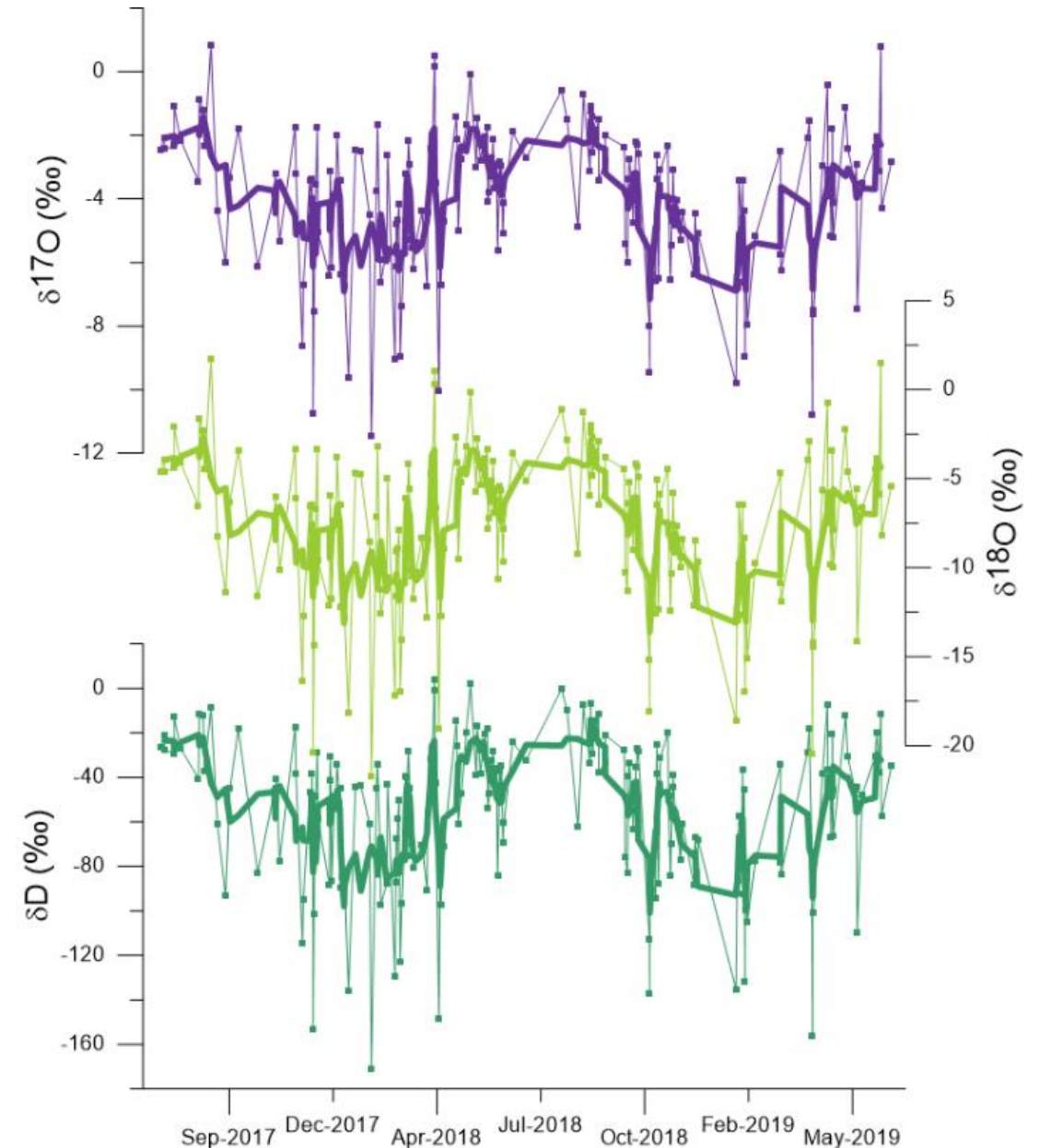


# METHODOLOGY AND ISOTOPE RESULTS

The samples were collected on a rainfall-event basis with amount of precipitation from July 2017 to June 2019 (n=216).

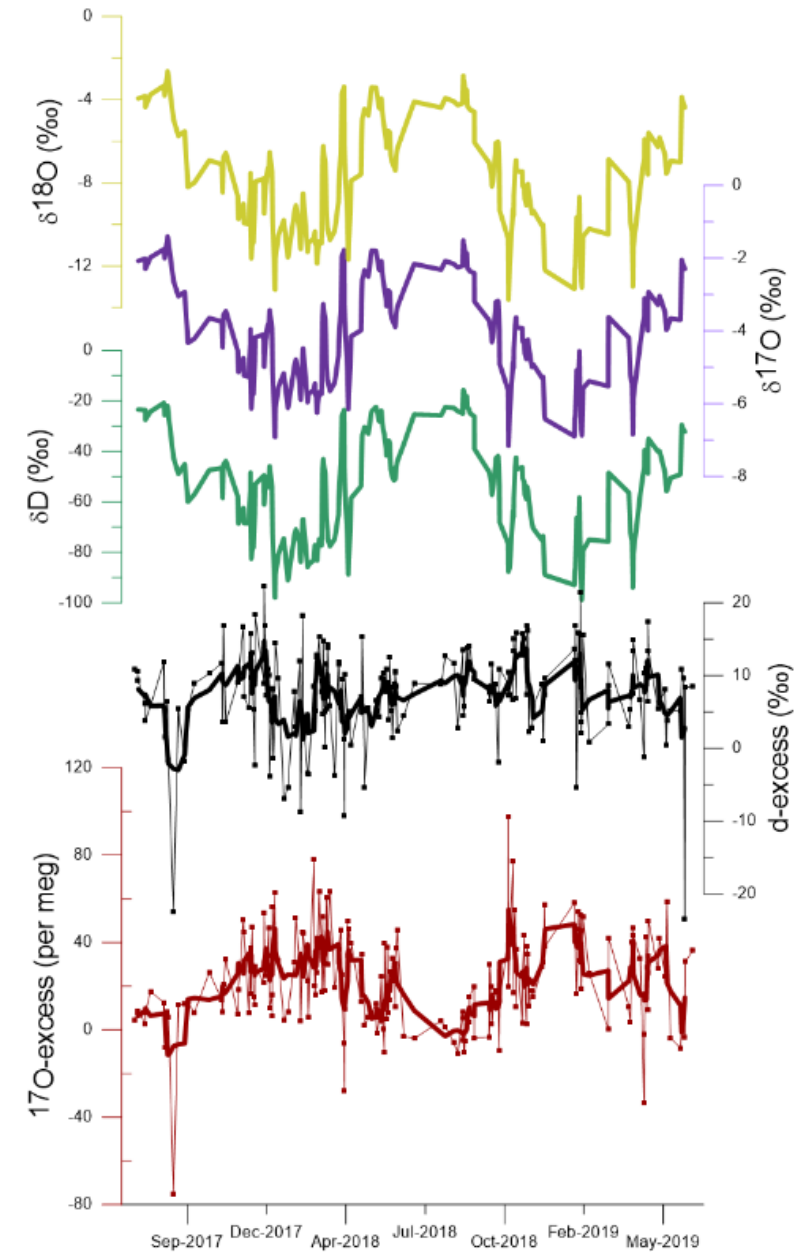
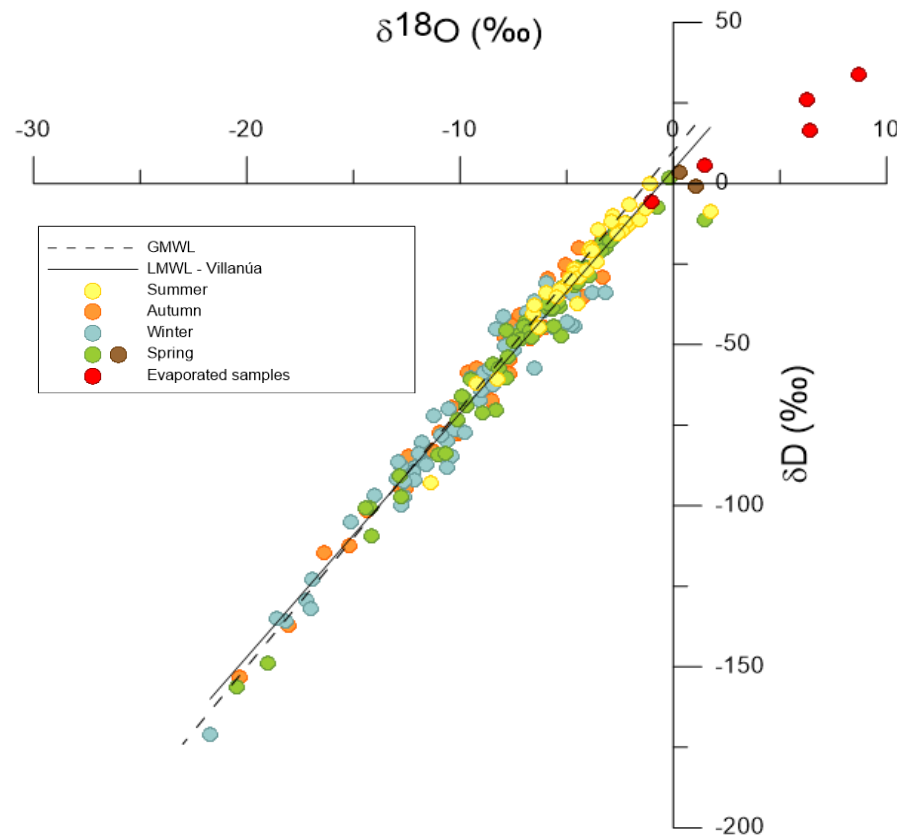
Event average temperature and relative humidity for each event was calculated from data monitored every 10 minutes by Villanúa meteorological station.

$\delta^{17}\text{O}$ ,  $\delta^{18}\text{O}$ ,  $\delta\text{D}$  and derived parameters  $^{17}\text{O}$ -excess and  $\text{d}$ -excess in rainwaters were analyzed using a Picarro L2140-i analyzer at the University of Almería (Spain), with mean precisions (1-standard error) of 5 per meg for  $^{17}\text{O}$ -excess and 0.1‰ for  $\text{d}$ -excess.



# $^{17}\text{O}$ -EXCESS AND D-EXCESS RESULTS

The local meteoric water line is defined by:  
 $\delta\text{D} = 7.56 \cdot \delta^{18}\text{O} + 4.33$  ( $R^2=0.97$ );  $n=210$



# CORRELATION WITH METEOROLOGICAL PARAMETERS

The  $\delta^{17}\text{O}$ ,  $\delta^{18}\text{O}$  and  $\text{dD}$  values were higher during summer and lower during winter, in contrast with the  $^{17}\text{O}$ -excess and  $\text{d}$ -excess values.

Isotopic parameters are weakly correlated with rainfall amount during each event, but they strongly depend on seasonal changes in air temperature and relative humidity.

Further processing of this database will consider other influencing factors in the isotopic composition of rainfall event to further understand the complexity of atmospheric processes through the information stored in the triple oxygen isotopes of rainfall, with application to future  $^{17}\text{O}$ -excess studies in speleothems.

