

## **Monitoring the oxygen and hydrogen isotope composition of precipitation at Concordia Station, East Antarctica**

GIULIANO DREOSSI, MAURO MASIOL, DANIELE ZANNONI, MATTEO SALVINI, ENRICO BISCARO, CLAUDIO STEFANINI AND **BARBARA STENNI**

Ca Foscari University of Venice, Italy

Oxygen and hydrogen stable isotope records in ice cores are widely used for reconstructing past temperature variations. However, the relationship between  $\delta^{18}\text{O}$  ( $\delta^2\text{H}$ ) of precipitation and air temperature is yet to be fully comprehended and fine-tuning the sensitivity of the paleothermometer is crucial to obtain accurate temperature reconstructions from ice cores.

Since 2008, daily precipitation is collected on raised surfaces in the clean area of Concordia Station on the East Antarctic plateau, as part of the WHETSTONE and AIR-FLOC PNRA projects. Each sample is analyzed for  $\delta^{18}\text{O}$  and  $\delta^2\text{H}$ , and deuterium excess is calculated.

Here we present the  $\delta^{18}\text{O}$  (and  $\delta^2\text{H}$ ) record from 2008 to 2023: a 15-year continuous dataset that stands as the longest series of stable isotopes in daily precipitation ever recorded for Antarctica.

An extraordinary event captured within this dataset is the March 2022 heatwave, which brought unprecedented high temperatures to East Antarctica: this event left a distinct imprint on the isotopic composition of precipitation, leading to the highest  $\delta^{18}\text{O}$  ( $\delta^2\text{H}$ ) values ever recorded in our dataset since 2008.

For selected samples from 2022 and 2023,  $\delta^{17}\text{O}$  was also analyzed, allowing us to calculate the  $^{17}\text{O}$  excess: this parameter provides additional information on the hydrological cycle processes and is particularly sensitive to kinetic fractionation during evaporation and condensation.