

Atmospheric deposition of trace metals and other contaminants over the Pyrenees

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The Pyrenees constitute an orographic barrier oriented East-West influenced by the Atlantic and Mediterranean climates. We are monitoring trace element deposition in Central Pyrenees (Haut Vicdessos valley) at different time and spatial scales using rain and snow collectors. Since 2013, bulk deposition is monitored as well as the origin of air masses thanks to oxygen-deuterium isotopes and back trajectories analyses. In addition, local variability over a radius of about 10 km was studied using altitudinal transects in 2013-2014. Finally, since 2018, our results are compared with the results obtained in Andorra on the southern slope of the Pyrenees. Results for Haut-Vicdessos show that most intense deposition of dissolved trace elements occurred during summer season, with the intensity of deposition correlated with the amount of water (for Pb, Cu, Sb, As, Cr and Ni). Red dust from North Africa contributed to the majority of deposited dissolved major cations (Ca, Ba, Sr), a great part of As, Sb and V and a large part of particulate deposition. This monitoring of atmospheric deposition can then be compared with the long-term deposition studied using sphagnum bogs, the oligotrophic water composition of high-altitude lakes, or even with metal fluxes at the scale of the critical zone in this watershed with a long mining history.