

Geochemical and microclimatic characterization of the water resources in the Copparo area (Ferrara, Italy)

Di Roma A., Vaccaro C., Pepi S., Fazzini M., Bianchini G.,
Department of Physics and Earth Sciences, University of Ferrara.

Abstract

The Ferrara province is located in the Po valley, a low plain surrounded by Alps and Apennine. This research was focused on Copparo area, which is characterized by closeness from the sea and by its continental climate [1]. In this work, we have studied the isotopic heavy element composition ($\delta^2\text{H}$ e $\delta^{18}\text{O}$) of the meteoric waters picked up in six chosen stations, in order to verify the compositional variability on an extensive province area. The selected stations for this study include several province sectors and they allowed to determine the isotopic range, which characterizes the local meteoric waters. A framing climate, associated with the isotopic study, was conducted to better define the character of the climate and the type of precipitations which affects the area.

The measurement methodology is based on the spectroscopy of laser absorption to high solution [2, 3]. The registered isotopic values show a range of -6,95 and -5,19 for the $\delta^{18}\text{O}$ and a mean value between -46,21 and -31,82 for the δD . Considering the concentration of heavy isotopes ($\delta^{18}\text{O}$ and δD values), it was possible to identify the origin of precipitations. The comparison between data obtained by the sample analysis and the Northern Italy meteoric straight line [2, 4] has allowed to define a first characterization of the isotope distribution in meteoric waters concerning this area.

In conclusion, the application of the isotopic techniques, as highlighted by the collection of these data, can be considered very useful to create a dataset for rainfall of the Ferrara province and to improve a bigger knowledge of the geochemical zone features.

[1]Ponzetto E., relatori: Billi P.,Fazzini M..Analisi delle condizioni climatiche favorevoli al turismo nel territorio del parco regionale del delta del Po. Thesis degree in Geography. academic year 2004-2005.

[2] Gobbi A. Caratterizzazione della risposta idrologica di un piccolo bacino alpino mediante dati idrometrici, isotopici e di conducibilità elettrica. PhD Thesis University of Padua. year 2012

[3] Dongarra', G., Varrica, D. (2004) Geochimica e ambiente. Napoli:EdiSES

[4] Longinelli A., SelmoE. "Isotopic composition of precipitation: a fist overall map" Journal of Hydrology (2003) p .270