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M. Malandrino[1], A. Giacomino[2], S. Buoso[1], C. La Gioia[1], F. Burgay[1], E. Conca[1], O. Abollino[1]
[1]Dipartimento di Chimica, Università degli Studi di Torino, Via Pietro Giuria, 5 – 10125Torino
[2]Dipartimento di Scienze e Tecnologia del Farmaco, Università degli Studi di Torino, Via Pietro Giuria, 9 – 10125 Torino

Marine sediments are sinks and repositories of matter recirculated in the environment by a number of different processes. They behave as environmental archives, providing a key to the understanding of the processes occurring in a given region in the course of time.
During the XX Italian Antarctic Survey, several sea sediment cores were sampled in the Ross Sea, Antarctica. In this study, we characterized the inorganic composition of four sediment cores collected in different localities of Terra Nova Bay (TNB) in the Ross Sea, an area of major environmental interest as it hosts a number of crucial processes connecting atmospheric transport with the Southern Ocean system [1]. The total concentrations of major, minor, and trace elements were determined. The results were treated with chemometric techniques. The elemental composition of the cores was found to bemainly dominated by terrigenous elements, but it is also influenced by biological factors, such as, for example, thepresence of corals in one of the core (coded as H2) [2].
Since the knowledge of the total concentration of elements is not sufficient to understand their reactivity and, in general, their behavior in the environment, we applied the modified Bureau of Community Reference (BCR) three-step sequential extraction procedure. With this procedure, we evaluated the concentration, the distribution and the bioavailability of eight metals (Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn).
Finally, we investigated the geological and biological components of the sediment through a XRD and SEM analyses respectively.
The knowledge of the metal distribution across these Antarctic sediment cores allowed us to assess long-term climatic changes and possible natural background values in this specific environment. Furthermore, the results showed a separation between higher and lower sections of the core thatsuggests a stronger fingerprint from biogenic and geological processes,respectively.

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