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Dynamics of Inorganic Components in Terra Nova Bay Lake Ecosystems (Antarctica)

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A large suite of inorganic analytes was determined in water collected from six shallow Antarctic lakes of Terra Nova Bay (Northern Victoria Land, Antarctica), as well as in algae, mosses and suspended particulate material (SPM). The sampling campaigns took place between 2007 and 2012 (and one in 2002) within the framework of the Italian National Program of Research in Antarctica (PNRA). The purpose of this work was to gain insight into the natural processes regulating species distribution, define natural background values and detect possible present or future local and/or global anthropogenic contamination.

The results were processed with multivariate chemometric techniques. Lake water composition was found to be mainly influenced by marine spray and meltwater input, i.e. natural phenomena. The obtained results were compared with older literature data from the same lakes. A considerable variability was observed in metal concentrations, but no clear trend was identified; no evidence of an increase of metal concentrations over time was found for water or vegetation samples. Seasonal variability was also evaluated for each analyte, and explained considering the natural transport processes involving each species. Higher element concentrations were found in SPM than in water, suggesting that weathering plays an important role on the chemistry of these lakes. The exam of the SPM samples with a SEM showed the presence of many diatoms belonging to different species.