Dynamics of inorganic components in lake waters from Terra Nova Bay, Antarctica

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Water and Suspended Particulate Material (SPM) samples analysed in this work were collected in the austral summer 2011/12 from six shallow Antarctic lakes (Carezza, Edmonson Point 14 and 15a, Gondwana, Inexpressible Island 10b and Tarn Flat 20) of Terra Nova Bay (Northern Victoria Land, Antarctica). The total concentrations of a large suite of inorganic analytes were determined, in order 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. Lake water composition was found to be influenced by marine spray, lake geographical position and meltwater input. Seasonal variability was also evaluated for each analyte, and explained considering the natural transport processes involving each species. Multivariate chemometric techniques were used in order to identify groups of samples with similar characteristics and find out similarities and correlations among variables. The variability observed within the water samples is closely connected to the sea spray input; hence, it is primarily a consequence of geographical and meteorological factors, such as distance from the ocean and period of year. Higher element concentrations have been found in SPM than in water, suggesting that adsorption processes take place. SPM samples were also examined with a Scanning Electron Microscope (SEM), and many diatoms belonging to different species were detected. No evidence of a relevant metal contamination was found in the investigated area.