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Chemical properties of a microbially-derived fulvic acid from a hypereutrophic coastal pond in Antarctica

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The fluorescence of natural waters can be studied to gain an understanding of the dominant chemical and biological processes. We have been studying the chemistry of fulvic acids from Pony Lake, a hypereutrophic coastal pond in the McMurdo Sound region of Antarctica, beginning in 1992 and continuing until 2006. Although the dominant algal species have not changed, the physical conditions, such as the extent of ice-cover and timing of surface melt, have changed dramatically. The concentrations of DOM have ranged from over 100 mgC/L to as low as 10 mgC/L. Nonetheless, the chemical characteristics of the fulvic acid fractions isolated over these range of conditions show remarkable consistency. These stable characteristics include elemental content, ^{13}C-NMR, absorbance, and fluorescence spectra, and carbon isotopic composition. During the summer of 2005-2006, a reference sample of Pony Lake was collected and will be made available to serve as a microbial end-member for distribution through the International Humic Substances Society.