Geophysical Research Abstracts, Vol. 7, 00026, 2005 SRef-ID: 1607-7962/gra/EGU05-A-00026 © European Geosciences Union 2005



Biogeochemical setting and coastal eutrophication in Southern Chile

Mulsow, S^{1,*}., Y. Krieger² and B. Kennedy³

¹Instituto de Geociencias, Universidad Austral de Chile, Casilla 567, Valdivia-Chile

²GeoBenthos, Inc. 2150 P.A. Cerda, Valdivia-Chile

³National University of Ireland, Institute of Zoology, Galway-Ireland

* e-mail of corresponding author: sandormulsow@uach.cl

Two state-of-the-art techniques were used to assess the impact of organic loading from fish farming in two fjords of Southern Chile, Pillan and Reñihue Fjords. A Sediment profile imaging (SPI) camera was deployed and sediment micro-profiles (oxygen, H₂S, redox and pH) were measured in undisturbed sediment cores collected using a HAPS corer. Four out of seven stations in Pillan Fiord were found to be severely disturbed: SPI images showed azoic conditions (no apparent Redox Potential Discontinuity layer, no evidence of aerobic life form, presence of an uneaten fish food layer, negative OSI scores). These findings were corroborated by very high oxygen consumption rates (700 - 1200 mmol $m^{-2} d^{-1}$), H₂S concentrations increasing quickly within the sediment column and redox potential decreasing towards negative values within a few mm down core. Results for Reñihue Fjord were not so straight forward. SPI images indicated that most of the stations (R3 to R7) presented well-mixed conditions (high apparent RPD layers, presence of infauna, burrows, etc.), but oxygen profiles yielded consumption rates of 230 to 490 mmol $m^{-2} d^{-1}$ and organic carbon mineralization of 2.16 to 4.53 g C m⁻² d⁻¹. These latter values are close to the limit of aerobic degradation of organic matter although no visible changes have yet been recorded within the sediment column. In view of our findings the importance of integrating multidisciplinary methodologies in impact assessment studies are discussed.