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HIGH PHYTOPLANKTON BIOMASS AND PRODUCTION ALONG THE PATAGONIAN SHELF-BREAK (AUSTRAL SPRING 2004)

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Ocean phytoplankton is estimated to produce half of the organic carbon through photosynthesis in the planet. Recent studies based on remote sensing suggest that phytoplankton production has increased significantly over the past two decades in the Southwestern Atlantic sector of the Southern Ocean, particularly in the Patagonian region. The shelf-break front along the Patagonia shows a conspicuous band of high phytoplankton biomass throughout spring and summer, detected by ocean colour sensors. That area is the feeding and spawning ground of several species of commercial fish and squid and is thought to play an important role in CO_2 sequestration by the ocean. Those blooms have been mainly attributed to coccolithophores a group of calcite producing phytoplankton. Here we present the first observations along the high chlorophyll band in the Patagonian shelf-break (40 - 48 S) from an experiment conducted as part of the XXIII Brazilian Antarctic expedition. We found a remarkable bloom of diatoms and dinoflagellates (approx. 1200 Km extension) in spring, which precede the summer coccolithophore blooms in the frontal region. Nineteen oceanographic stations were sampled during 3-6 November, 2004. Sampling was conducted during daytime, in groups of 4 or 5 stations, with the ship sailing southwards at night. Three transects were sampled along the shelf-break front and one transect was sampled across the front, at latitude 44 S. Primary particulate production rates (^{14}C technique) was performed at four stations along the Patagonian shelf-break. At Station 6 production was particularly high, partly due to the elevated phytoplankton biomass, which consumed most nitrate and phosphate in surface waters. These high primary production rates (1.9 to 7.8 gC m^{-2} d^{-1}) are comparable with maxima seasonal productivity at Eastern Boundary Current. The large bloom extent in the Patagonian shelf-break (approximately 55,000 Km^2 of >2 mg m^{-3} chlorophyll patch in November 2004) and the associated primary production rates are expectedly a significant regional source of ocean carbon sink.