

A DIATOM AND SEDIMENTOLOGICAL BASED RECONSTRUCTION OF MID AND LATE HOLOCENE PALAEOCLIMATE CHANGES IN SOUTH GEORGIA

Wim Van Nieuwenhuyze¹, Stephen J. Roberts², Elie Verleyen¹, Dominic A. Hodgson², Nathalie Van der Putten³, Mieke Sterken¹, Koen Sabbe¹ & Wim Vyverman¹

¹Laboratory of Protistology and Aquatic Ecology, Department of Biology, Ghent University

²British Antarctic Survey Natural Environment Research Council

³Lund University, Department of Geology, Quaternary Sciences

South Georgia's location within the Polar Frontal Zone and the Southern Westerlies wind belt between Antarctica and the mid-latitudes makes it a key location for studying the main drivers of past and present-day climate variability in the South Atlantic. We undertook multi-proxy analyses, including fossil diatom and pigment analysis, of a 5.83 m long, ca. 7800 cal. yr. B.P. old, sediment core from Fan Lake, Annenkov Island, South Georgia (54°29'0"S, 37°5'0"W) to determine whether proxies for Holocene palaeoclimatic variability could be separated from those which reflected local catchment stability and glacier activity. Deglaciation of the Fan Lake site occurred ca. 7800 cal. yr. B.P. A low nutrient/low productivity environment until ca. 3600 cal. yr. B.P., indicating slow development of the lake ecosystem after deglaciation, was followed by a short period of elevated biological productivity 3600-3380 cal. yr. B.P, inferred from the changing carbon content. Anomalous radiocarbon ages of terrestrial mosses between 3380 to 2735 cal. yr. B.P. most likely reflect enhanced inputs of older terrestrial moss from the inflow streams that pass over moss banks in the catchment. The most recent phase of lake development, 2735-0 cal. yr. B.P., was characterized by high and variable biological production. The diatom communities during this entire period were dominated by *Cyclotella stelligera*, but some significant fluctuations in other diatom species occurred in the upper part of the core. For example, a peak of the diatom *Fragilaria capucina* peak can be tentatively linked to increased catchment disturbance ca. 1100 cal. yr. B.P., and was possibly associated with a deglaciation event following a cold spell ca. 1770-1335 cal. yr. B.P. Other brief cold spells possibly took place at 2364 and between 720-495 cal. yr. B.P. Data from Fan Lake complement previous and ongoing reconstructions of past environmental change from peat bogs and lake sediments on South Georgia.