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THE REPRESENTATION OF HIGH ARCTIC PLANT COMMUNITIES IN SURFACE POLLEN ASSEMBLAGES

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ABSTRACT. To fully understand past patterns of vegetation change, a detailed knowledge of the relationship between modern pollen deposition and vegetation is essential (Caseldine & Pardoe 1994, Pardoe 1996). The present study examines the relationship between arctic vegetation and surface pollen assemblages in Kongsfjord, north west Spitsbergen. Five contrasting plant communities are studied: *Dryas octopetala* heath; *Salix polaris-Dryas octopetala* heath; herb-rich, bird-cliff vegetation; *Cassiope tetragona* heath; and sparse, pioneer-type vegetation. The modern pollen assemblages are compared with pollen data from Brřggerhalvřya dating back to 4400 BP (van der Knaap 1988a, 1990).

INTRODUCTION

Moss polsters were collected from a total of 54 sampling sites and, at each site, the vegetation within a 4 m^2 quadrat was surveyed. The vegetation and pollen data were ordinated independently using detrended correspondence analysis (DCA) and subsequently the two datasets were ordinated simultaneously, using canonical correspondence analysis (CCA) to differentiate the plant communities. The Holocene and modern samples were compared by ordinating both datasets simultaneously using DCA.

RESULTS

Preliminary results indicate a predominantly local source area; frequently, more than 80% of the pollen has a potential source within the 4 m^2 quadrat sampled. Regional deposition is limited, with taxa such as *Pinus* and *Abies* comprising less than 5% of the total land pollen sum. The five plant communities produce distinctive pollen spectra. The results of detrended correspondence analysis of both the vegetation and pollen data indicate that the five communities can be differentiated on the first two ordination axes. Direct ordination of the data, using canonical correspondence analysis, indicates that the samples from the birdcliff community form a discrete cluster. Comparison of the modern samples with Holocene sub-fossil pollen data from Brřggerhalvřya indicates that generally there is a limited correspondence between the two data sets, although one Holocene sample is similar to samples from the *Salix polaris-Dryas octopetala* heath.

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