Preliminary Results of a study of Surface Pollen Deposition in Western Spitsbergen

Fyribilsúrslit frá eini rannsókn av botnseting av yvirflatuflogsáð í Vestursvalbarð

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Úrtak

Fyribilsúrslit verða løgd fram frá eini rannsókn av botnseting av yvirflatuflogsáð í fimm ólíkum plantusamfeløgum í Vestursvalbarð. Fjølfráviksarbeiðshættir sýna, at plantusamfeløgini kunnu vera ólík av bæði floruni og flogsáðsamansetingini.

Extended Abstract

A detailed knowledge of the relationship between modern pollen deposition and vegetation is essential to fully understand past patterns of vegetation change. There have been few systematic studies of surface pollen deposition in arctic areas (van der Knaap 1990) although such environments are potentially a good source of modern analogues for Late-Glacial and early Holocene pollen assemblages. Preliminary results are presented of a study of the relationship between arctic vegetation and surface pollen assemblages in Kongsfjorden, north west Spitsbergen. Five contrasting plant communities were studied: *Dryas-octopetala* heath; *Salix polaris-Dryas octopetala* heath; herb-rich, bird-cliff vegetation; *Cassiope tetragona* heath; and sparse, pioneer-type vegetation.

The presence and percentage cover of vascular plant species within a 4 m^2 quadrat was estimated, at a total of 54 sampling sites. A moss polster consisting of twenty pinches of moss was collected from each quadrat. The pollen was extracted and counted using standard techniques. The vegetation and pollen data were ordinated independently by detrended correspondence analysis (DCA) and subsequently the two datasets were ordinated simultaneously, using canonical correspondence analysis (CCA) to differentiate the plant communities.

The five plant communities produce quite distinctive pollen spectra, although pollen diversity is generally low. The results indicate a predominantly local source area; dominant taxa in the vegetation, such as *Salix, Oxyria* and *Saxifraga oppositifolia,* are often well represented in the pollen spectra. Frequently, more than 80% of the pollen has a potential source within the 4 m^2 quadrat sampled. *Dryas, Cassiope* and Caryophyllaceae tend to be under-represented. The frequency of individual taxa

can be highly variable within a small area, possibly reflecting the local sparseness of vegetation or the proximity of individual plants or clumps of plants, that may represent an important source of local pollen on the micro-scale. Regional deposition is limited, with arboreal taxa such as *Pinus* and *Abies* generally comprising less than 5% of the total land pollen sum.

The results of detrended correspondence analysis of the vegetation data indicate that the five communities can be differentiated on the first two ordination axes. Ordination of the pollen data produces a less clear-cut separation of the sites but, nevertheless, clearly interpretable trends emerge. Direct ordination of the data, using canonical correspondence analysis, indicates that the samples from the birdcliff community form a discrete cluster. There is greater dispersion of sites from the other plant communities on the second ordination axis.

The modern pollen assemblages are compared with pollen data from Brøggerhalvøya dating back to 4400 bp (van der Knaap 1988a, 1990). Generally there is a limited correspondence, although one Holocene sample is similar to *Salix polaris-Dryas octopetala* heath samples.