



Spatio-temporal variability in the late-Holocene fire regime of Scandinavia

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Climate variability has been proposed as the chief driving force for changes in fire regime, though changes in vegetation composition and structure are also known to be regulatory determinates. Understanding the relative importance of these factors is important in forecasting the likely future fire risk associated with climate change. To assess the relative roles of these factors, a spatially extensive network of 75 forest soil profiles were collected throughout Norway and Sweden. The soil samples were analysed for their concentration of large charcoal fragments and scanned for spruce pollen. Large charcoal fragments were targeted for analysis because they are representative of local burning. Average charcoal concentrations were determined per millennia and these values were spatially interpolated in a geographic information system to generate a spatio-temporal map of changing charcoal concentration in Scandinavia. The late-Holocene pattern of charcoal deposition reveals both climatic and biotic controls on the fire regime throughout Scandinavia. Consistently low charcoal values in the coastal region reflect unsuitable conditions for burning in this typically moist area, revealing a regulatory role of climate. In contrast, a reduction in the incidence of fire from high to low is clearly evident in the interior of Scandinavia. This change is concomitant with the invasion of a new forest dominant, *Picea abies*, in the late-Holocene and is indicative of a biotic control. Finally, in southern Scandinavia human activity maintained a consistently high incidence of fire. Thus it can be concluded that while climate is important in regulating a fire regime, other factors such as biotic change and human activity are likewise important regulators.