SHORT COMMUNICATION

CLIMATE HISTORY THROUGH THE HOLOCENE AT LOCHNAGAR, SCOTLAND

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This research forms part of the EU-funded project 'CHILL-10,000: Climate History as recorded by ecologically sensitive Arctic and Alpine Lakes in Europe during the last 10,000 years: A multi-proxy approach'. This is a multidisciplinary project (ENV4-CT97-0642) incorporating high-altitude European lakes in Finland, Norway, Sweden, Austria, Switzerland, Spain and Scotland. The lakes are being examined for responses to past climate changes recorded in their sediments. The Cairngorm mountain region in Scotland is the only natural alpine environment in the UK, and Lochnagar, a corrie loch 785m above sea level, is one of the few sites suitable for this study. The high quality of the monitoring data available for Lochnagar makes it an ideal site for this investigation.

The objective of the CHILL-10,000 project was to undertake detailed, quality controlled, high-resolution microfossil and geochemical analyses. To this end, lake sediment cores were retrieved and accelerator mass spectroscopy was used to date the bulk sediments. The lake sediment samples retrieved represent the last *c.* 9000 calendar years. Biological proxy data from Lochnagar, including pollen, diatoms and chironomids, were investigated, and sedimentological proxies, including organic matter, minerogenic matter, biomarkers, lipid analyses, mineral magnetism and particle size, were also analysed.

The relatively high rate of sediment accumulation at Lochnagar compared with other high-altitude lakes in the UK makes it ideal for high-resolution analysis investigations. Approximately 1.7m of sediment was laid down over the 9000 year period. The results show interesting cycles in the per cent loss-on-ignition and per cent dry weight profiles. The more organic phases may reflect warmer climate phases and increased productivity. Organic carbon and organic nitrogen measurements also follow this trend. Pollen analyses indicate that regional pollen deposition dominates the pollen record at Lochnagar. Major patterns include progressive loss of woodland cover and soil deterioration to podzols and peat. Statistically significant zones were identified in the pollen assemblages; anthropogenic impacts were probably the main influential factor. These zones can also be seen in the *Chironomidae* profiles. A chironomid response to a change from warm to cool temperatures is indicated in the early part of the core, while the upper samples may reflect a response to natural catchment acidification. Diatom analyses reveal high diversity and high diatom accumulation rates; the highest diatom-inferred pH occurred *c.* 5000 calendar years BP, and declines in pH are apparent in the last 1000 calendar years BP. Variation in diatom species composition may correspond to cold/warm phases. Major increases in acidophilous taxa are evident in the more recent sediments, supporting the results of other studies.

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