Application of quantitative vegetation reconstruction techniques to Late Holocene records at Inshriach Forest

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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University

Signed……

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Abstract:

This thesis considers some of the main issues surrounding the quantitative models that have been developed to reconstruct vegetation from pollen assemblages. Conducted within a pine dominated woodland, a palynologically difficult landscape, to determine vegetation changes over the late Holocene the results highlight the complexities of undertaking such studies in these contexts.

Pollen productivity estimates were calculated from moss samples over the woodland using complete sets and derived subsets to detect influences of sampling design on resultant model output. Differences in the PPE sets were compared using reconstructions from simulation models in comparison to observed vegetation patterns. The results indicate that both parameter calculation and model reconstructions were influenced by the landscape form and composition. Sensitivity of the models to such small variations in parameter values heightens the need for robust data generation and increased investigation to controlling factors on pollen productivity.

Performance of the reconstruction models experienced variation with respect to deposition basin size and site specific characteristics. Overall, the regional reconstructions proved to generate more confident estimates of vegetation cover whilst local scale reconstructions were subject to greater variability. Comparison of the quantitative modelling to standard interpretation and the modern analogue approach shows contrasts between the results obtained with respect to limitations associated with each method and the time frames, recent (*ca.* 100 years) and longer (*ca.* 3000 years), over which they were applied. Consequently, no one quantitative approach could be identified as being superior as site specific variations were recognised in relation to the most suitable approach. In response, a hierarchical technique is proposed to utilise the benefits of each technique and to obtain detailed information to strengthen interpretations. However, it is stressed study specific constrains that determine the available resources will influence the ability to fully apply this composite approach.

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