



Development and application of high resolution petrography on resin-impregnated Holocene peat columns to detect and analyse tephras, cryptotephras, and weathered materials

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We describe the potential for high-resolution detection, observation and chemical analysis of tephras and cryptotephras in freeze-dried and resin-impregnated peat sections. Special attention is drawn to tephra grain alteration products, sensitive to standard lab treatment, but preserved using an impregnation technique developed here. Resulting blocks and thin sections provide a continuous archive of tephras that can be investigated through a wide range of non destructive techniques encompassing polarizing and fluorescence microscopy, scanning electron microscopy with/without elemental analysis, and XRF-based core scanning. We present several examples which illustrate the potential applications and limitations of impregnated peat which contain tephra from Iceland, Germany, and Belgium.

The impregnation of tephra-containing peat sections and their subsequent study in thin section using various techniques allows a broad range of observations useful not only for the field of tephrostratigraphy but also for studies of tephra alteration mechanisms and by-products, for discriminating between reworked or *in situ* tephra and

for detecting of cryptotephra. It has potential for a wide range of chemical investigations leading to a better understanding of the chemical signature of tephra and their alteration products.