



Tree cover gradients in Europe based on pollen and AVHRR data

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Advanced Very High Resolution Radiometer (AVHRR) satellite data has provided several global scale vegetation datasets, which, to date, have been little exploited in palaeoecology. These are, however, highly complementary with pollen data. AVHRR data, as the name implies, has a high spatial resolution, but only exist for approximately 20 years, whereas palynological information may be obtained over longer time periods (typically 10^3 to 10^5 years), but has a lower and more complex spatial resolution. Following the pioneering work of Williams et al. (2003), we present here a calibration of satellite data using modern pollen samples from the European continent. Samples were calibrated against percentage values of Total Tree Cover, Needleleaf Tree Cover, Broadleaf Tree Cover, Deciduous Tree Cover and Evergreen Tree Cover, for use in a modern analogue matching technique. Cross validation gives a RMSE of between 3.72 to 7.77 and a R^2 between 0.74% and 0.78%. A spatial comparison between pollen-derived maps of tree cover percentages and AVHRR-derived maps show that gradients of change are well-reconstructed for the present. The samples were used to reconstruct tree cover changes downcore and spatially at 6ka BP. These results confirm the interest of calibrating pollen spectra in terms of AVHRR variables. The global nature of these data should facilitate comparisons between reconstructions from different regions, and similar work is being undertaken in the Former Soviet Union and Asia, which will lead to the construction of hemispheric scale reconstructions. Further, the continuous of the data will help understand past changes in the gradients between different vegetation types. The results may also be used as input to vegetation and general circulation models, as well as providing a a dataset for testing models run in

past periods.

Williams, J.W. and Jackson, S.T. (2003) Palynological and AVHRR observations of modern vegetational gradients in eastern North America. *The Holocene*, 13:4, 485-497.