



Modelling the hydrological impacts of catchment afforestation on a headwater peatland in central France

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The Massif Central is one of the areas with the highest density of mires in Metropolitan France, Many of these wetlands are Special Areas of Conservation designated under the EU Habitats Directive. In many parts of the Massif Central there has been a large increase in forest cover on mineral soils within the catchment of these mires over the last 50 years. This is due to both active plantation and spontaneous afforestation of land abandoned by farming. The impacts of these changes in catchment landuse on the hydrology and conservation of wetlands have never been assessed in France and only a handful of studies of these issues are available worldwide. We coupled HYLUC and MIKE SHE to simulate the likely impacts of such changes in a 231ha catchment representative of groundwater-dependent acidic valley mires at the bottom of granitic etch-basins commonly found in the Massif Central. The HYLUC model was parameterised using long-term interception ratios recorded in similar environments, while the MIKE SHE model was calibrated and validated against observed stream discharge and groundwater table depth. The model was forced with a number of landuse scenarios. Results suggest that the replacement of open habitats with forests, and of deciduous woodlands with coniferous plantations, would lead to a substantial decrease in surface and groundwater inputs to the wetland. This would lower the water table within the mire, particularly during dry summers and around its margins, with implications for the ecological integrity of the site.