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## Evaporation from Scots pine (*Pinus sylvestris*) following natural re-colonisation of the Cairngorm mountains, Scotland

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**Abstract.** Recently, changing land-use practices in the uplands of Scotland have resulted in increased re-colonisation of wet heath moorland by natural Scots pine (*Pinus sylvestris*) woodland. The simple semi-empirical water use model, HYLUC, was used to determine the change in water balance with increasing natural pine colonisation. The model worked well for 1996. However, values of soil moisture deficit simulated by HYLUC diverged significantly from measurements in 1997 when rainfall quantity and intensities were less. Measured interception by the forest canopy (interception by the undergrowth was not measured) was very different from HYLUC simulated values. By changing interception parameters to those optimised against measured canopy interception, HYLUC simulated changing soil moisture deficits better and gave more confidence in the resulting transpiration values.

The results showed that natural pine woodland interception may be similar to plantation stands although the physical structure of the natural and plantation forests are different. Though having fewer storage sites for interception in the canopy, the natural pine woodland had greater ventilation and so evaporation of intercepted rainfall was enhanced, especially during low intensity rainfall. To understand the hydrological changes that would result with changing land-use (an expansion of natural forests into the wet heath land), the modelled outputs of the wet heath and mature forest sites were compared. Evaporation, a combination of transpiration and interception, was 41% greater for the forest site than for the wet heath moorland. This may have significant consequences for the rainfall-runoff relationship and consequently for the hydrological response of the catchment as the natural woodland cover increases

**Keywords:** Evaporation; interception; transpiration; water balance; Scots pine; forest

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