



## **Measuring forest evaporation and transpiration rates with fibre optic temperature sensing**

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Evaporation is one of the most important fluxes of the water balance as it accounts for 55-80% of the precipitation. However, measuring evaporation remains difficult and requires sophisticated and expensive equipment. In this paper we propose a new measuring technique based on the existing Bowen ratio method. With a fibre optic cable a temperature and a vapour pressure profile can be measured by the principle of a psychrometer and combined with the net radiation (and ground heat flux) the latent heat can be calculated. Compared to the conventional Bowen ratio method the advantages of this method is that the profiles are measured with a single sensor (resulting in a smaller error), and contain more measuring points in the vertical and therefore give more insight into the developed profiles. The method also allows to measure through a forest canopy. Applying the Bowen ratio above and below the canopy an estimation of the transpiration flux can be obtained. As a first test, we compared in a pine forest in The Netherlands (Loobos) the transpiration estimates of the fibre optic cable with sapflow measurements, and eddy covariance measurements above and below the canopy. The experiment was carried out on three days in September 2013 and the preliminary results show reasonable correlation with the eddy covariance estimates, but not with the sapflow observations. To explain the differences further investigation is needed and a longer measuring period is required.