



Estimation of catchment averaged sensible heat fluxes using a Large Aperture Scintillometer

Bruno Samain (1), Bram Ferket (1), Willem Defloor (2), and Valentijn Pauwels (1)

(1) Ghent University, Laboratory of Hydrology and Water Management, Ghent, Belgium (bruno.samain@ugent.be), (2) Flemish Environmental Agency - Operational Water Management

Evapotranspiration rates at the catchment scale are very difficult to quantify. One possible manner to continuously observe this variable could be the estimation of sensible heat fluxes (H) across large distances (in the order of kilometers) using a Large Aperture Scintillometer (LAS), and inverting these observations into evapotranspiration rates, under the assumption that the LAS observations are representative for the entire catchment.

The objective of this study is to assess whether measured sensible heat fluxes from a LAS over a long distance (9.5 km) can be assumed to be valid for a 102.3 km² heterogeneous catchment. Therefore, a fully process-based water and energy balance model with a spatial resolution of 50 m has been thoroughly calibrated and validated for the Bellebeek catchment in Belgium. A footprint analysis has been performed.

In general, the sensible heat fluxes from the LAS compared well with the modeled sensible heat fluxes within the footprint. Moreover, as the modeled H within the footprint has been found to be almost equal to the modeled catchment averaged H, it can be concluded that the scintillometer measurements over a distance of 9.5 km and an effective height of 68 m are representative for the entire catchment.