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Global estimates of rainfall interception loss from satellite observations: recent advances in GLEAM

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The evaporation of rainfall intercepted by canopies back into the atmosphere – often referred to as rainfall interception loss – is a significant component of terrestrial evaporation in many ecosystems. The physical process of rainfall interception loss can usually be broken down into three phases: (1) wetting up of the canopy, (2) saturated canopy conditions, and (3) drying out after rainfall has ceased. During each of these phases, the process is affected by many factors, including rainfall characteristics, such as gross rainfall, rainfall intensity and rainfall duration, vegetation characteristics such as canopy height, leaf area and the orientation of branches and leaves, and meteorological conditions such as temperature, wind speed and relative humidity. The Global Land Evaporation Amsterdam Model (GLEAM; Miralles et al. 2011) estimates terrestrial evaporation, including forest rainfall interception loss, at the global scale mostly from satellite data. However, the model estimation of interception loss has not been updated since its release almost 10 years ago (Miralles et al. 2010).

In this regard, improving the estimation of interception loss in the model remains a priority. In GLEAM, rainfall interception is estimated using the revised Gash analytical model by Valente et al. (1997), in which the canopy storage and mean wet canopy evaporation rate are both considered constants in both space and time. In addition, only tall-canopy interception is considered. Here we explore the potential of the modified Gash's model by Van Dijk and Bruijnzeel (2001), which uses time variant canopy storage and evaporation functions dependent on leaf area index, for its application at global scales. In addition, due to its dependency on leaf area index, the model is applied to the estimation of rainfall interception loss of low vegetation types such as shrubs and grasses. An extensive meta-analysis of previous interception loss field campaigns provides an extensive archive of data to parameterize and/or validate model estimates over multiple ecosystem types. This presentation provides a general overview of the challenges in rainfall interception loss modelling at global scales and the first results of the global benchmarking of the Valente et al. (1997) and the Van Dijk and Bruijnzeel (2001) formulations against *in situ* data.

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