Evaluating satellite-derived evapotranspiration products over the Amazon region

Jessica Baker (1), Luis Garcia-Carreras (2,1), John Marsham (1,3), Wolfgang Buermann (1), Manuel Gloor (4), and Dominick Spracklen (1)

(1) School of Earth and Environment, University of Leeds, Leeds, UK, (2) School of Environment, University of Manchester, UK, (3) National Centre for Atmospheric Science, Leeds, UK, (4) School of Geography, University of Leeds, Leeds, UK

Water recycled through transpiring forests drives precipitation in the Amazon, and may play a role in the initiation of the wet season. However, due to the challenges and costs associated with measuring evapotranspiration (ET) directly, patterns of variation and long-term trends in this key component of the Amazon hydrological cycle remain poorly understood. In recent years, gridded remote sensing ET products have become available, appearing to provide ET insights over hitherto unmonitored parts of Amazonia. Here, we used a process-based approach to evaluate the Moderate Resolution Imaging Spectroradiometer (MODIS) and Global Land Evaporation Amsterdam Model (GLEAM) ET products, which are both strongly constrained by satellite data. Correlation analyses between ET and other climate variables produced contrasting results when using the MODIS and GLEAM products, with substantial discrepancies between the datasets apparent over tropical forest regions. Site comparisons revealed differences between the satellite data products at seasonal and interannual timescales, and variable correspondence with ground-based ET measurements from Amazon flux towers. Overall, these results show ET estimates from space contain important inconsistencies, which until they can be resolved, will hamper attempts to better understand the factors controlling land-atmosphere moisture exchange over regions of tropical forest.