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Dynamic identification of moisture sources in the Orinoco Basin in Equatorial South America

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This study examines the main areas of net moisture uptake in air masses over the Orinoco River Basin, in part of equatorial South America north of the Amazon basin. Although the Orinoco River has the third largest average annual discharge in the world (with 5.4 x 10^{11} m^3 per year draining into the Atlantic Ocean), the sources of moisture that feed it have not previously been studied in any detail. We present results from analyses of backtracking of all the air masses over the Orinoco basin over a period of five years (2000-2004) using the diagnostic Lagrangian tool FLEXPART (Stohl et al., 1998). The input data for the model was obtained from the European Centre for Medium-Range Weather Forecasts (ECMWF). Air transported into the Orinoco basin experiences a large uptake of water over the tropical North Atlantic within the three days prior to its arrival over the basin. The Tropical South Atlantic and the eastern coast of the Pacific become significant moisture sources for about five to 10 days before arriving over the Orinoco basin. Contrary to what might be expected, large areas of the Amazon basin, along with the Gulf of Mexico, do not provide significant moisture to the study area. Interestingly, over these zones the air experiences net moisture loss. Preliminary analysis of the processes that occur leads to the conclusion that most of the water observed over the Orinoco basin derives from advective fluxes into the area, while recycling of moisture is negligible.

Reference: Stohl, A., Hittenberger, M. & Wotawa, G. (1998) Validation of the Lagrangian particle dispersion model FLEXPART against large scale tracer experiment

data. Atmos. Environ. 32, 4245-4264.