

FLEXPART forward and backward trajectories during IOP1 and IOP2 based on 625m resolution winds from WRF simulations

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Abstract:

The main goal of the GoAmazon 2014/15 experiment is to measure and understand the factors affecting aerosol particles over a tropical rain forest, especially the effects of anthropogenic pollution plume from Manaus as a perturbation to natural state of the pristine forest surrounding the city. For helping the interpretation of data measured with the G1 aircraft and at the ground sites, we have performed WRF simulations for intensive operating periods 1 and 2. We employed high spatial resolution ($\Delta x = 0.625$ km) to resolve the shallow cumulus and river-breeze scales. The simulations correspond to a dynamical downscaling of CFS analysis with 40 vertical levels, 30 minutes outputs, and three nested grids (10 km, 2.5 km, 0.625 km). Improved vegetation (USGS + PROVEG), albedo and green fraction (computed from MODIS-NDVI + LEAF-2 land surface parameterization), as well as pseudo analysis of soil moisture were used as input, resulting in more realistic precipitation fields when compared to observations in sensitivity tests. Convective parameterization was switched off for the 2.5/0.625 km grids, where cloud formation is resolved by the microphysics module (WSM6 scheme, which provided better results). The WRF simulations were then used as the forcing meteorological fields to compute forward and backward trajectories using FLEXPART model. An index for “in-plume” and “off-plume” events was built from the analysis of the simulated concentrations at ground level, and the actual plume position relative to each site. Results will be discussed.