

Boundary-layer moisture regimes during wet and dry season above Rondonia Forest

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Abstract: Two distinct boundary-layer moisture regimes are observed over Rondônia Amazonian forest during diurnal periods of a few days in wet and dry seasons. To identify these two regimes, the scale dependence of skewness of moisture and temperature was investigated. Turbulent signals of temperature and specific humidity measured with an eddy covariance system installed at 62 m height, over a 30-35 m tall forest, were scale projected using Daubechies-8 orthogonal wavelet, and the skewness factor at each scale was calculated for these signals. The data were measured in March-April (late wet-season) and in August-September, year of 1999, as a part of the Brazil/European Union LBA Tower Consortium. Measurements are made at micrometeorological tower located in the Biological Reserve of Jaru (10° 04' S, 61° 56' W), Ji-Paraná, Rondonia state. The fast response temperature and specific humidity measurements, sampled at 10.42 Hz rate, were made using a three-dimensional sonic anemometer (Solent A1012R, Gill Instruments) and a closed-path infrared gas analyzer (LI 6262, LI-COR). During dry season, the boundary-layer is characterized by relatively weak surface evaporation (comparatively to the wet season) and the entrainment of dry air from the top of boundary-layer occasionally reaches the surface, leading to negative moisture skewness in spite of positive temperature skewness associated with warm moist updrafts. This is observed specially during late morning, when the boundary layer rapidly grows into the residual layer from the previous day. In contrast, during wet season, associated with greater surface evaporation and a 'disturbed' state caused by frequent strong convection activities, the boundary-layer is characterized by positive moisture skewness and negative temperature skewness.