

Large Seasonal Swings in Leaf Area of Amazon Rainforests

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Abstract:

Despite early speculation to the contrary, all tropical forests studied to date display seasonal variations in the presence of new leaves, flowers and fruits. These past studies were focused on the timing of phenological events and their cues, but not on the accompanying changes in leaf area which regulate vegetation-atmosphere exchanges of energy, momentum and mass. Here we report, from analysis of five years of recent satellite data, seasonal swings in green leaf area of about 25% in a majority of the Amazon rainforests. This seasonal cycle is timed to the seasonality of solar radiation in a manner that is suggestive of anticipatory and opportunistic patterns of net leaf flushing during the light rich dry season and net leaf abscission during the cloudy wet season. These heretofore unknown seasonal swings in leaf area are critical to initiation of the transition from dry to wet season, seasonal carbon balance between photosynthetic gains and respiratory losses, and litterfall nutrient cycling in moist tropical forests.