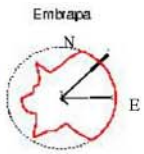

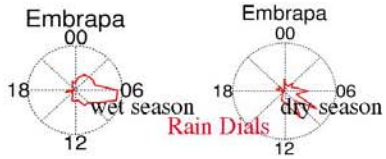

Mesoclimate near the Tapajós-Amazon confluence

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Wind rose/transmission factor

The Embrapa station along the Amazon River at Cacoal Grande proves to provide critical information. The *transmission factor* (TF, average wind speed by sector normalized by the maximum average speed anywhere in the network) shows that there is excellent exposure from the east, the predominant direction. Note the TF and wind rose for data from the top of the 63 m Tapajós tower at km83 (upper left of poster) shows that wind speeds at Cacoal Grande are comparable to those at the tower, 10-20 m above the vegetation. Rain dials at Cacoal Grande show the nocturnal peak in both seasons, but there is no evidence of an afternoon convective peak.

A. Diurnal average wind speeds.
B. Diurnal average temperature.
C. 10-day window maximum instantaneous temperature
D. 10-day window minimum instantaneous temperature
E. Diurnal average of incident global solar radiation S_{dn}.
F. Diurnal average ratio of the maximum instantaneous S_{dn} tominimum instantaneous S_{dn}.
G. Dry season. diurnal average of the maximum instantaneous S_{dn} (blue) the hourly average S_{dn} (black) and the minimum instantaneous S_{dn} (red).
H. Same as G, but for the dry season.

Comments on figures.

A. Stations along the Amazon River (s = Cacoal Grande; f = Vila Franca) stay windy at night because the river is convective day and night.

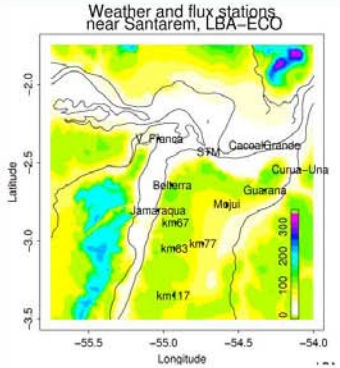
B. Similarly, the minimum temperatures near the river remain elevated owing to the proximity of the warm river. Inland radiative cooling (esp. during the dry season) often leads to fog. Fog and low cloud cover also occurs in the river, as water vapor is trapped in a shallow (< 200 m thick) convective boundary layer. Such is evident in reports of low cloud base at STM airport, a base that corresponds well to the LCL of river surface air.

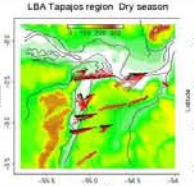
C, D. We looked for trends in extremes. Did seasons age markedly? Has there been any measurable trend owing to land-use change? The daily maximum and minimum temperatures (grab samples taken at 3 second intervals, not half-hour averages) were recorded. Extremes of this over 10 days presented in these figures for T_{max} and T_{min} and for incident global solar radiation S_{dn} (not shown) do not indicate gross trends that might indicate sensor failure (except for S_{dn} at one station).

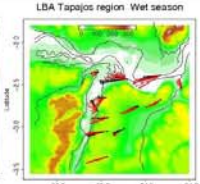
That T_{min} values look similar at most stations reflects the convective homogenization during the daytime, especially inland. Note however, that T_{min} at the Cacoal Grande station is higher (as the diurnal averages showed) but also the seasonal pattern of T_{min} does *not* follow the dry/wet season form of other stations. It appears to reflect the phases of the river stage, with higher maximum temperature at low water.

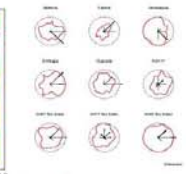
E, F. Diurnal average incoming global solar radiative flux for all stations. As expected, the stations very near the river show the highest average values. Not that T_{max}/T_{min} shows that the near-river stations are cloudy in the morning (if at all) and clear in the afternoon, with the opposite occurring inland.

G, H. Especially at Cacoal Grande, the mean incident solar radiation is skewed to the afternoon. The average *maximum* instantaneous value is symmetrical, with its highest value falling at local solar noon. With convective cloudiness appearing in late morning most days, the opposite is seen at the inland stations.







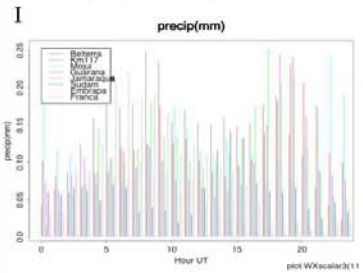


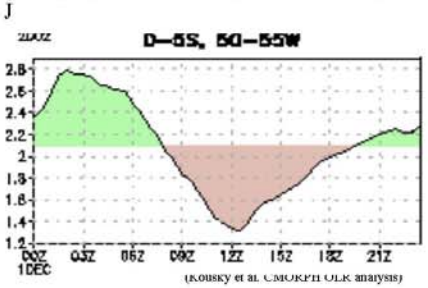
Average May low cloudiness

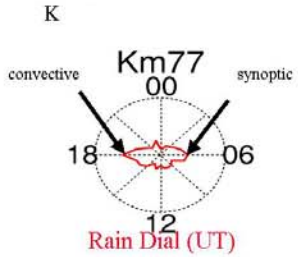
Landsat image indicates that cloud streets line up on surface wind direction; Amazon river breeze seen in long-term aves; Transmission factors (red) show local obstacle effects

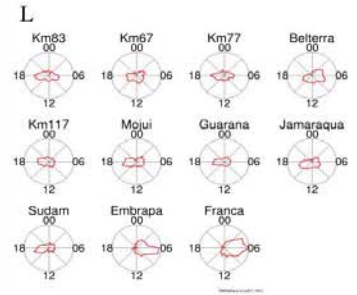
l wind circulations in the Amazon are dominated river and sea breezes, responsible for the routine situation in which the rivers are clear w
nsequences of the breeze circulation are evident in the solar radiation observation (see lower right panel on this poster) and especially in the form of diurnal patterns in
tation (below). Observed precipitation shows an early morning precipitation peak (I) consistent with previous studies of propagating squall line circulations from the Atlantic
Cohen et al., 1995, *Mon. Weather Rev.* 123, p. 3163; *J. Climate* 13, p.1331). Cutrim et al. referenced works indicating that at Santarém, most rainfall is at night. Recent studies
ig rainfall from outgoing longwave radiation (OLR) has confirmed these suggestions (Kousky et al., 2005; Garreaud, 1997,
to.atmos.washington.edu/pacs/rene/IHOP.mk.html).
findings at Santarém show that there is a solitary nocturnal rainfall maximum, ***but only for stations very near the Amazon River***. Further inland, there is also an appreciable
on convective peak (Look at the 'rain dials'!). Since many climate stations are indeed near communities along the river, precipitation records from such stations are biased.
Its suggest that interpolation (e.g., Wilmott and Johnson, 2005; *Int. J. of Climatology*, in press) in this region must be done only are careful consideration of how mesoscale
:t regional precipitation—stations as close together as 10 km can be in very different mean rainfall regimes.

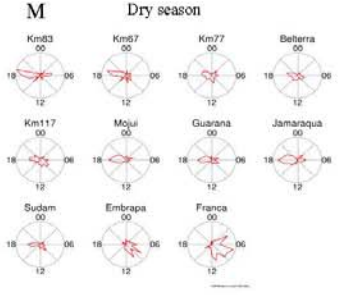
Diurnal precipitation averages: Inland stations exhibit two diurnal peaks, but stations close to river (like most climate stations) do not. OLR-inferred precipitation does not either.











I: Hourly averaged precipitation during field operations of the weather station network in LBA-ECO. Stations are identified in the map above.

J. Detail from presentation by Kousky et al., 2005. (*www.cpc.ncep.noaa.gov/products/outreach/proceedings/cdw29_proceedings/Kousky2.pdf*). Diurnal pattern of rainfall inferred from satellite OLR records.

K. Definition sketch of the Rain Dial. Time is plotted clockwise (UT). Average precipitation by hour is shown.

L. Wet season rain dials for all stations. These are scaled to the maximum anywhere in the network at any time of day.

M. Dry season rain dials for all stations. These are scaled to the maximum anywhere in the network at any time of day.