FIGURES

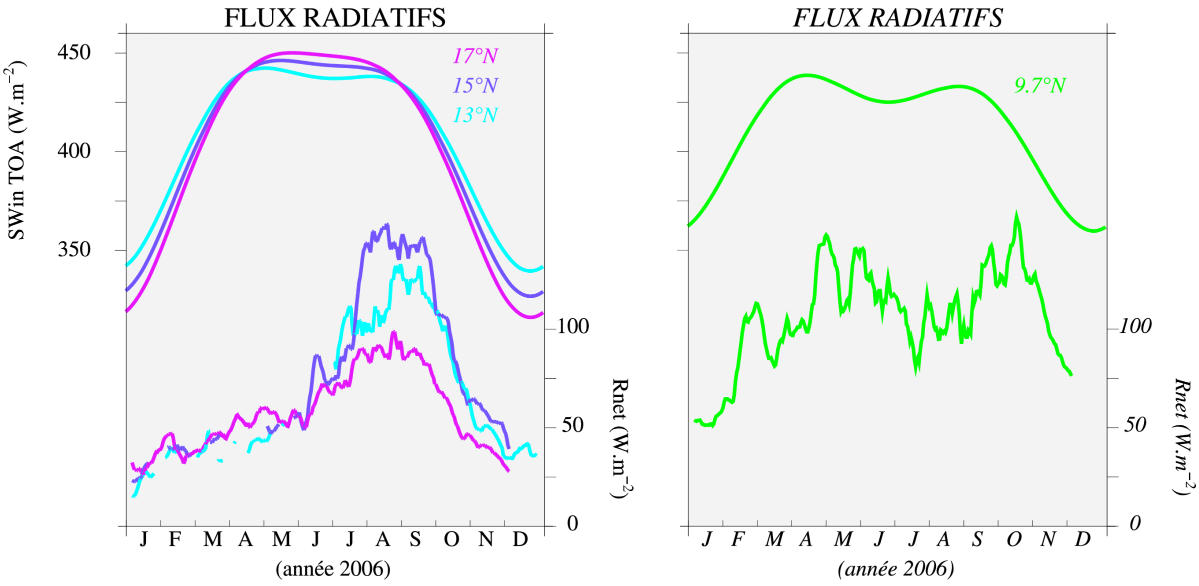

Figure 1: Top of atmosphere incoming solar flux (top curves) and surface net radiation (Rnet)(lower curves) (a) the colours are for three Sahelien sites, Wankama (3°E,13°N in Niger), Agoufou (1°O,15°N in Mali) and Bamba (1°O, 17°N in Mali). (b) same as (a) further South in Djougou (9.7°N) within the .

The left plot illustrate that the surface net radiation Rnet (Rnet ~ H+LE at time scales of 24h and larger) is not simply driven by the top of atmosphere incoming shortwave flux in the Sahel (left panel), and displays a maximum shifted late in the monsoon (Aug-Sep).
The right plot shows that the situation is different in the Soudanian zone where the clouds in particular are responsible for a much stronger damping of the surface incoming radiation.

In Guichard et al. (2009), I try to explain this very particular annual cycle of Rnet in Agoufou (15°N).

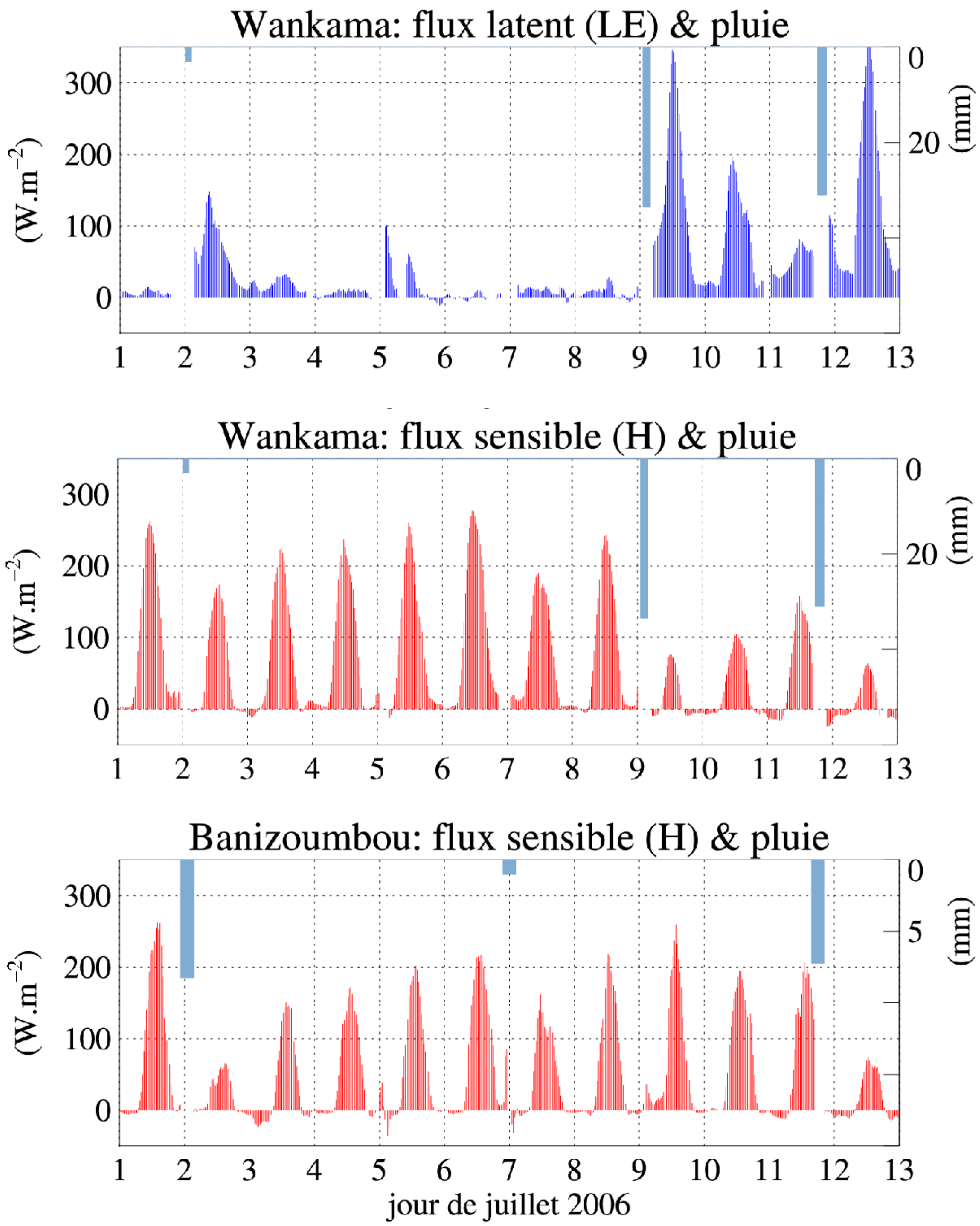

Figure 2: This figure illustrates the spatio-temporal variability of surface heat fluxes (early monsoon in the vicinity of Niamey). The top two plots show time series of surface latent and sensible heat fluxes in Wankama, with precipitation events indicated with thick blue bars. The bottom plot shows the sensible heat fluxes in Banizoumbou, a few tens of kilometres away.

In Wankama, the evaporative fraction is very weak during the first days of July (weak latent heat fluxes, high sensible heat fluxes), but increases substantially after rain (9 July). There is a partial recovery until the next rain event (11 July in the evening).

In Banizoumbou, similar fluctuations of the sensible heat flux are observed during this period, but the sequence is different, largely because the rain events are not the same.

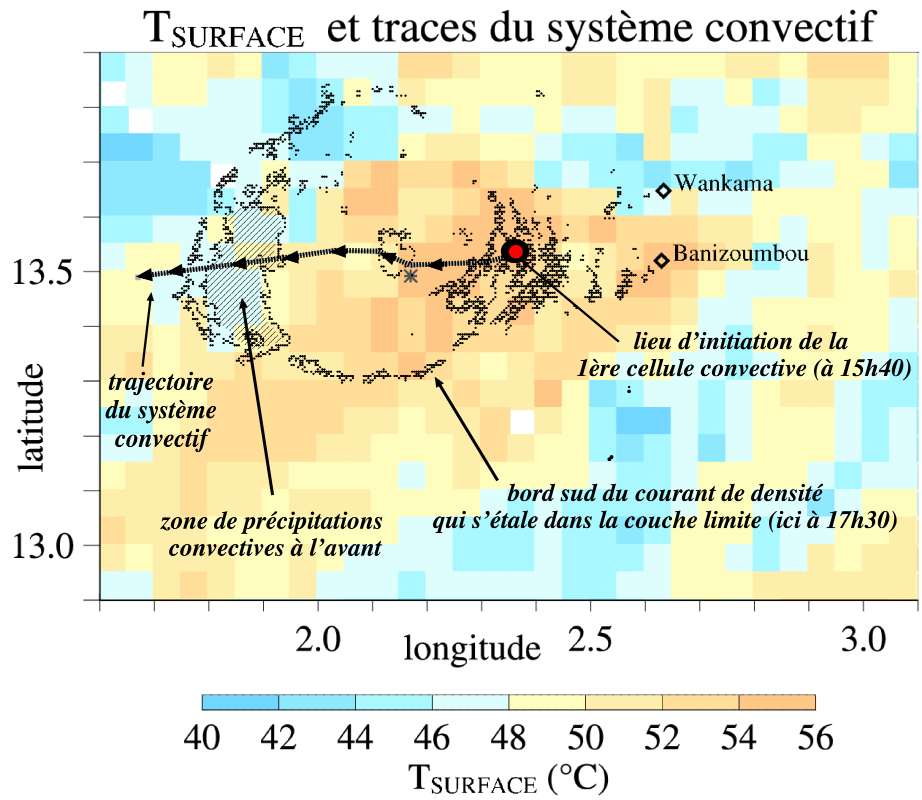

Figure 3: a map to locate Wankama and Banizoumbou (here shadings are for land surface temperatures, SEVIRI data, the 10 July 2006, 12h)

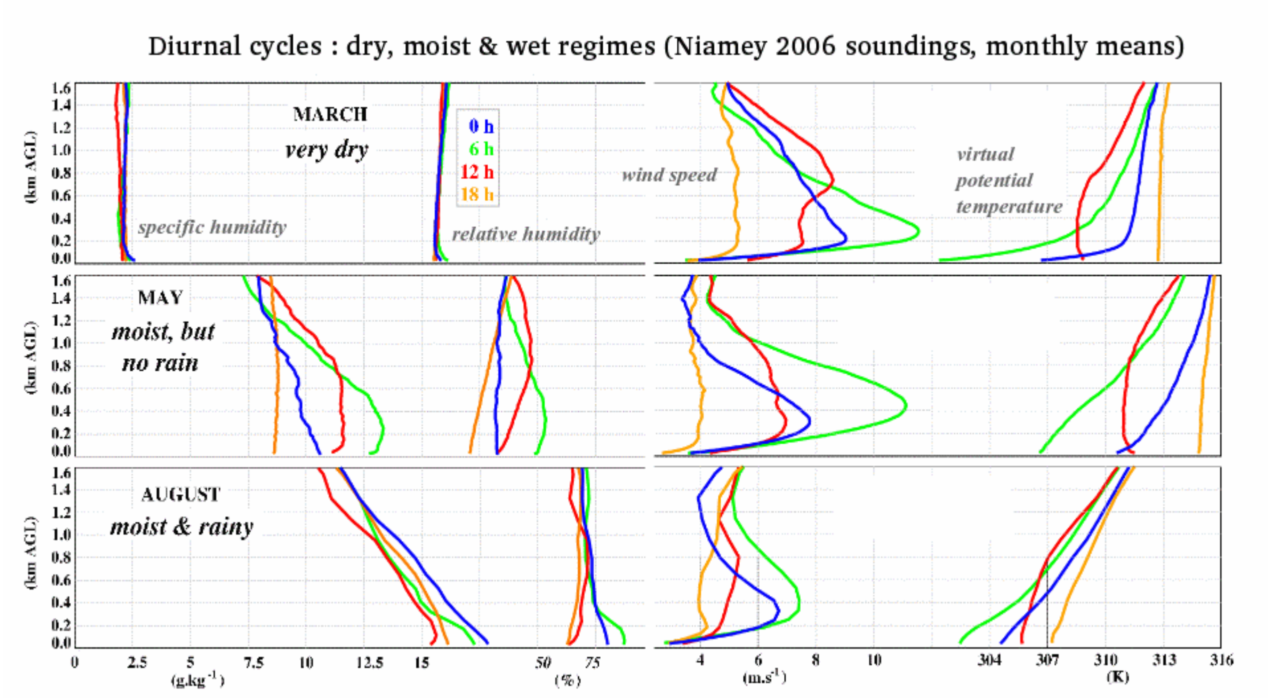

Figure 4: This illustrates typical mean changes in the low levels when the atmosphere turns from dry (in Match) to moist (in May) to wet (in August).

The changes in maximum daytime boundary-layer height (after 12h) are not well seen because the graph is cut too low.
But one can see among other things:
- the daytime weakening of wind speed, the significance of the low level jet,
- changes in the magnitude of the diurnal fluctuations of temperature, larger nighttime cooling but over a thinner layer in March, much weaker fluctuations in August,
-the strong daytime drying (for qv) in May,and diurnal fluctuations of low-level specific humidity that are much less in August,
-the thickening of the night-time boundary layer in May when the atmosphere becomes moist,
- the weakening of the low level jet in August compared to May.