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Comparison of the annual cycle of atmospheric parameters at Djougou and Niamey in relation to the surface energy balance

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One of the main goals of the AMMA project was to enhance the knowledge on the West African monsoon and the related atmospheric processes. Therefore, two locations were equipped with a variety of in-situ and remote sensing instruments in 2006: Djougou (Benin, 9.7°N, 1.7°E) and Niamey (Niger, 13.5°N, 2.1° E). These two stations represent the strong meridional humidity gradient within West Africa's monsoon climate: At the northern station of Niamey the annual precipitation is less than half of Djougou and the monsoon onset takes place more than one month later.

In this presentation, a statistical analysis of boundary layer parameters, such as temperature and humidity conditions at the ground, integrated water vapour as well as cloud base heights and cloudy times will be made with a special focus on their relation to the surface radiation and energy balance. For example, it was found that over the whole year the diurnal mean surface longwave radiation balance at Niamey is strongly related to the diurnal temperature range as well as the integrated water vapour. At Djougou, where cloud cover is much more frequent, the surface energy balance shows a quite different behaviour in the course of the year compared to the drier climate at Niamey.

The one-year deployment of many instruments in the areas of Djougou and Niamey provides a very good overview of the annual cycle of various atmospheric parameters and their differences between the moister and drier climates. The availability of data with high temporal resolution from the above mentioned locations makes it possible to present the similarities as well as some sharp differences both in diurnal and annual variability of energy balance and boundary layer parameters over West Africa.