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Nocturnal low-level jet and low-level cloud occurrence over Southern West Africa during DACCIWA campaign

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During the summer monsoon period in West Africa, a nocturnal low-level jet (NLLJ) is frequently observed and is associated with the formation of a low-level deck of stratus or stratocumulus clouds over the southern domain of this region. The understanding of the mechanisms controlling the diurnal cycle of the low-level cloud (LLC) is one of the goals of the DACCIWA (Dynamics-aerosol-chemistry-cloud interactions in West Africa) project. During the ground campaign, which took place in June-July 2016, numerous instruments devoted to document the atmospheric boundary-layer dynamics and thermodynamics, clouds, aerosols and precipitation were deployed at Kumasi (Ghana), Savè (Benin) and Ile-Ife (Nigeria) supersites.

Several parameters can influence the LLC formation: these are the large-scale conditions, but also local parameters such as stability, the interaction between Monsoon and Harmattan flows and turbulence. It has been pointed out in previous studies that the NLLJ plays a key role in LLC formation. Therefore, based on 49 nights of observations, our study focuses on the possible link between NLLJ and the formation, evolution and dissipation of the LLC over Savè. The characteristics of LLCs (onset, evolution and dissipation time, base height and thickness) are investigated using data from the ceilometer, infrared cloud camera, and frequent and normal radiosoundings. The UHF wind profiler data are used to estimate the occurrence of the NLLJ as well as the depth of the monsoon flow.