Geophysical Research Abstracts
Vol. 19, EGU2017-13484, 2017
EGU General Assembly 2017


# The evolution of nocturnal boundary-layer clouds in southern West Africa – a case study from DACCIWA

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During the monsoon season, the atmospheric boundary layer in southern West Africa is characterised by various kinds of low-level clouds which experience a distinct diurnal cycle. During the night, extensive low-level stratiform clouds frequently form with a cloud base often less than few hundred metres above ground. After sunrise the cloud base slowly starts rising and eventually a transition to convective clouds occurs. While the existence of the clouds is documented in satellite images and synoptic observations, little is known about the mechanisms controlling their evolution. To provide observational evidence, a field campaign was conducted in southern West Africa in June and July 2016 within the framework of the Dynamics-aerosol-chemistry-cloud interactions in West Africa (DACCIWA) project. Comprehensive ground-based in situ and remote sensing measurements were performed at three different supersites in Ghana, Benin and Nigeria.

In this contribution, we present the diurnal cycle of boundary-layer clouds for a typical day using data from a supersite at Savè in Benin. Due to the synergy of various instruments, we are able to obtain detailed information on the evolution of the clouds as well as on the boundary-layer structure with high temporal and vertical resolution. By combining ceilometer, cloud radar and microwave radiometer data we determined the cloud base, -depth and -density. The clouds form in the same layer as a nocturnal low-level jet (NLLJ), which we probe by sodar and UHF profiler. There is evidence for a strong link between the height and strength of the NLLJ and the density of the nocturnal clouds.