Impacts of the intra-seasonal oscillations of West African Heat Low over the Sahel

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The West African Heat Low (WAHL) corresponds to continental depression associated with an increase of the potential temperature. It is a main component of the West African Monsoon likely to play a significant role in the rainfall variability over Sahel. Indeed, the low levels circulation generated by the depression tends to modulate the Monsoon flux and the Harmattan wind.

Based on the ECMWF analysis during ERA 40 experiment and the operational analysis for recent years, we distinguish several modes of intra-seasonal pulsations of the WAHL during the summer season (i.e. the rainy season in Sahel), using the Low Levels Atmospheric Thickness (LLAT), defined as the difference between two geopotential heights at 0600 UTC.

Dynamical environment of each period oscillations have been analysed and interactions with other synoptic component of the West African Monsoon (as African Easterly Waves, Inter Tropical Discontinuity, African Easterly Jet) have been studied. From this analyse we purpose the possible climatological life cycle scenario for the WAHL.

In term of impact, the WAHL location could explain a part of the north-south displacement of the inter-tropical discontinuity, whereas the evolution of the WAHL thickness seems to be very close to the intensity of the monsoon flux. The reasons of the intra-seasonal variability of the WAHL characteristics were found to be controlled by the horizontal advections (ventilation) of humidity and potential temperature, responsible

for the strengthening or the weakening of the depression. Mean convective activity, rainfall and dust events associated with each WAHL states will be discussed.