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Dynamics of the West African Monsoon Demise

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The West African monsoon plays an important role in regional climate and water resources of the Sahel. From late September to October, rainfall over the Sahel decreases gradually, in contrast to the abrupt monsoon onset process. Both of the onset and demise dates are critical in agricultural planning. A better understanding of the physical processes related to the monsoon onset and/or demise will help improve the operational weather and climate forecasts. Whereas the West African monsoon onset process, especially the abrupt feature of the monsoon jump, has been explored in several studies, not so much attention has been paid to the demise process. In this study we propose to investigate the basic dynamics of the West African monsoon demise. The Global Precipitation Climatology Project (GPCP) and Tropical Rainfall Measuring Mission (TRMM) precipitation datasets are used to characterize the climatology and interannual variations of the monsoon demise. The demise date is found to be correlated with the total rainfall amount during the monsoon season over the Sahel. The ERA-Interim reanalysis data are used to investigate the dynamics. A composite analysis suggests that the early (late) demise of the West African monsoon is associated with the strengthening (weakening) of the subtropical high during the demise period of Oct 03-18. In addition, an atmospheric moisture budget analysis is conducted to explore how the subtropical high is associated with the precipitation anomalies.

Keywords: West African monsoon, Sahel rainfall, demise, subtropical high.