**Reading guidelines for Lecture 10: The West African Monsoon**

**Part 1: synoptic climatology (read sections 1, 2, and 5)**

1. As with all monsoon systems (discussed in previous lectures), the evolving ocean and land conditions are crucial for determining the nature of WAM and its variability.
2. The problems of model simulations have in predicting the WAM variability arise through a misrepresentation of the basic mean annual cycle. What is the implication here?
3. Discuss the asymmetrical annual cycle of sea surface temperature in the Gulf of Guinea. What cause it?
4. Why is the cooling of sea waters in the Gulf of Guinea (begins in April) important for the observed annual cycle of rainfall in WAM?
5. Why is the seasonal change of insolation important for the observed annual cycle of rainfall in WAM?
6. What is the role of Saharan heat low (SHL) to the WAM ITCZ jump? Here, notions should be given to discuss the concept of inertial instability of monsoon system.
7. What is responsible for the formation of mid-level (around 600 hPa) African Easterly Jet (AEJ)?
8. The African easterly waves (AEW) are the major synoptic weather systems in the WAM. A conceptual AEW life cycle is shown in Fig. 6.
9. The AEW can trigger tropical cyclogenesis events which in some cases further develop into the hurricanes.
10. The Kelvin waves are recently detected over the West-to-Central equatorial Africa.
11. What is the extra-tropical dry intrusion event?

**Part 2: variability (read section3 only)**

1. Attentions should be given to the long term trend of rainfall anomalies over the WAM region (see Fig. 2).
2. The inter-annual variability of WAM seasonal rainfall exhibits 2 kinds of spatial patterns. Discuss 3 possible causes and their related processes.
3. Also, discuss 3 possible causes responsible for the multi-decadal rainfall variability experienced in the Sahel.
4. What are the sources of uncertainties while studying the climate change impact on the WAM?
5. Some studies propose that the increase of aerosols could lead to Sahel drought in 1970s and 1980s. Please try to reason this connection.