**Reading guidelines for Lecture 04: Recent change of global monsoon precipitation**

1. A central theme is: how the global monsoon precipitation (GMP) has responded to the last decades of rapid global warming?
2. The annual variation of solar radiation is a fundamental driver for the existence of monsoon. Therefore, monsoon must be a global phenomenon.
3. Although the land-sea thermal contrast is critical for the location and strength of the monsoon, it is neither a necessary nor a sufficient condition.
4. **Primary questions**:
5. **Can the internal feedback processes (e.g., ENSO) drive GMP variability? To what extent?**
6. **Are there any trends in GMP in recent decades? If any, what are the causes?**
7. **Are there any differences between northern and southern hemisphere summer monsoon variability? If any, what are the causes?**
8. **What roles does GM change play in global precipitation change?**
9. The use of *global monsoon year* (May 1 to April 30) instead of *calendar year* (January 1 to December 31) is more adequate for studying the inter-annual variation of GMP variability.
10. How to measure the monsoon intensity? => Notions are given in the definitions of NHMPI, SHMPI and GMPI.
11. What is the Maximum Covariability Analysis (MCA; also mistaken called Singular Value Decomposition; SVD)?
12. Concept of atmospheric teleconnection (also atmospheric bridge) can be used to illustrate the remote impacts of ENSO induced variability over regional monsoons.
13. What is the implication as the EP cooling-WP warming pattern resembles the IPO pattern?
14. What is the implication as the EP cooling-WP warming pattern resembles the 2 m air temperature trend pattern?
15. What are the warm land-cold ocean and warm NH-cold SH mechanisms? Why they can be used to explain why the NHMPI (and thus GMPI) has a stronger upward trend than the SHMPI?
16. The monsoon-desert coupled system is intensified in recent decades leading to a “rich-gets-richer and poor-gets-poorer” trend pattern. This is particularly evident in the northern hemisphere.
17. The drying trend in the arid regions results from the increased descent produced by the monsoon heating-induced Rossby waves that interact with subtropical westerly flows.