

# Summary

- ◆ The East Asian summer monsoon (EASM) has been experiencing a considerable decadal weakening since the end of 1970s with a significant southward shift of increased precipitation in East Asia.
- ◆ Such a decadal change has caused serious consequences by increasing drought and/or flooding and altering water resource distribution, which can affect the sustainable development in East Asian region.
- ◆ The EASM weakening is closely related to the tropical ocean warming. Its role exhibits considerably basin-dependent. The tropical eastern Pacific warming tends to weaken EASM, while the tropical Indian ocean warming plays an opposite role.

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- ◆ Most of the IPCC AR4 models show that the increased CO<sub>2</sub> tends to enhance the EASM, which can not be used to explain the observed EASM weakening.
- ◆ The state-of-the-art model with aerosol direct and indirect effects shows that increased anthropogenic aerosols tend to weaken East Asian summer monsoon with precipitation shifted to southern China and adjacent oceanic regions by reducing land-sea thermal contrast, which is mostly caused by the aerosol's radiative effect.
- ◆ The model also shows that the increased anthropogenic aerosols tend to reduce the precipitation over most of the land areas, especially over Southeast Asian sub-continent, which is mostly related to aerosol's cloud-microphysical (indirect) effect (i.e., the decreased droplet effective radius).