Decadal change in East Asian monsoon climate system: Natural variability vs anthropogenic forcing

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The East Asian monsoon (EAM) has been experiencing a considerable decadal weakening since around 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. However, the reason for the decadal change in EAM remains unclear. This talk will present our current understandings on this issue. Two fundamental questions will be raised. First, what is the role of the natural variability? In this regard, the Pacific Decadal Oscillation (a striking phenomenon with decadal warming in the tropical Indo-Pacific basin and cooling in the midlatitude North Pacific) and its effect on the EAM change will be described. Second, whether the decadal weakening of EAM can be attributed to the increased anthropogenic aerosols over East Asia? In this regard, the effect of increased aerosols on EAM simulated by a state-of-the-art atmospheric general circulation model (GCM) with aerosol-cloud-radiation-precipitation interaction, in comparison with the increased CO2 effect, will be discussed.

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