



Climate response to anthropogenic aerosols and related SST variabilities including ENSO in the Asian monsoon region

Sho Kitabayashi and Hiroshi G. Takahashi

Department of Geography, Tokyo Metropolitan University, Hachioji, Tokyo, Japan

Over the past decades, the emission of anthropogenic aerosols in the Asian monsoon region is increasing. This change alters the climate condition, such as the Asian monsoon precipitation, through the aerosol–radiation and –cloud interactions (ACI). Previous studies pointed out that the slow response to aerosols, through the SST change induced by ACI, particularly around the Maritime Continent (MC), was the primary component of climate response to aerosols. Dynamical ocean feedbacks through ACI modify the Asian monsoon circulations and precipitation. Over and around the MC, the amount of aerosol was likely to be affected by the El Niño–Southern Oscillation (ENSO).

The aim of the study is to evaluate the climate response to anthropogenic aerosols in the Asian monsoon region. Also, we understand the relationship with SST change, including ENSO. To isolate the impact of anthropogenic aerosols, we analyzed the historical climate experiment (HIST) and the climate experiment with fixed aerosols at the preindustrial era (hist-piAer), which were provided in the CMIP6. As a result, the climatological mean surface air temperature in HIST was lower over most parts of the world than that in hist-piAer. However, a warm surface air temperature signal was found in the northern part of India, particularly in JJA during the rainy season. Also, there were dry signals in India and other Eurasia regions. We will also analyze fixed-SST historical simulation to identify physical process, including SST-related process.