Aerosol Indirect Effect During Successive Contrasting Monsoon Seasons Over Indian Subcontinent Using MODIS Data

A. S. Panicker[1*], G. Pandithurai[1], S. Dipu[1] and Dong-In Lee[2]

[1] Indian Institute of Tropical meteorology, Pune, India

[2] Pukyong National University, Busan, South Korea

Aerosol indirect effect (AIE) was estimated over six Indian regions, which have been identified as main source regions of absorbing aerosol emissions, for four successive contrasting monsoon years, 2001 (normal monsoon rainfall year), 2002 (drought year), 2003 (excess monsoon rainfall year) and 2004 (below normal rainfall year). The AIE has been estimated both for fixed cloud liquid water path (CLWP) and for fixed cloud ice path (CIP) bins, ranging from 1 to 350 gm^{-2} at 25 gm^{-2} intervals obtained from Moderate resolution imaging spectroradiometer (MODIS). In 2002 and 2004, majority of the fixed CLWP and CIP bins were found to be showing positive indirect effect (Twomey effect), while in 2001 and 2003 majority of the bins were found to be showing negative indirect effect (Anti-Twomey effect). Changes in circulation patterns during contrasting monsoon seasons, bringing up air mass containing aerosols of different source origins may be the main reason for this positive and negative AIE. The study suggests that AIE could be one of the key factors in modulating the Indian summer monsoon and hence AIE should be parameterized in climate models for better prediction of monsoon.