



Inter-Comparison of satellite retrieved Aerosol Optical Depth (AOD) from geostationary and polar-orbiting platforms with ground-based measurements over a Semi-continental site of north-eastern India

Parminder Kaur⁽¹⁾, Prasanth S. ⁽¹⁾, Pranab Dhar⁽¹⁾, Barin Kumar De⁽¹⁾, S. Suresh Babu⁽²⁾, M.M. Gogoi⁽²⁾, Anirban Guha^{(1)*}

(1)Department of Physics, Tripura University, Agartala, 799022, Tripura, India

(2)Space Physics Laboratory, Vikram Sarabhai Space Centre, Thiruvananthapuram, 695002 India

In the area of global climatic implications of atmospheric aerosols in the recent decades, accurate estimation of aerosol properties on long-time basis over distinct geographic regions and seasons are very essential. In this regard, satellite remote sensing is an effective tool to monitor Aerosol Optical Depth (AOD), a parameter most important for assessing the radiative impact of aerosols, at the regional as well as global level. This study aims at comparing the satellite retrieved AOD from geostationary and polar-orbiting platforms with the ground-based measurements over the semi-continental site of north-eastern India. For this, we have utilized AOD products derived from the imager of Indian National Satellite (INSAT)-3DR and the Moderate Resolution Imaging Spectro Radiometer (MODIS) on-board Terra and Aqua satellites. A handheld Sun Photometer (Microtops-II) provided the ground based estimates of AOD. The main goal is to validate and demonstrate the most accurate and suitable satellite retrieval of aerosols over the northeastern semi-continental site of India. In the present study, we used INSAT-3DR AOD observations at 650 nm over the region of interest and the level-3 daily AOD estimates from MODIS (both Aqua and Terra) at the same wavelength for the year of 2015. The inter-comparison of satellite retrieved AOD with ground based AOD is examined and statistical parameters, such as root mean square error (RMSE), coefficient of determination (R^2) are determined for each set of data in different time blocks. Overall, MODIS on-board the polar orbiting platforms (aqua and terra) showed better correlation with the ground based sun-Photometer measurements. On the other hand, even though the bias in AOD retrieval from geostationary platform is higher than that of the polar orbiting ones, the diurnal features of aerosol were clearly visible in the INSAT-3DR data. This is important in order to understand the distinct influence local and synoptic source processes. Details will be presented.