Ultraviolet (UV) Index Climatology of Nepal Himalaya Using Ozone Monitoring Instrument (OMI) Data

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This paper presents the UV index climatology of six stations of Nepal Himalaya using AURA/OMI satellite data. The OMI UV index is first validated with ground data using NILU UV multi-band filter radiometer (MBFR). Ground data from the year 2008 to 2010 covering altitude ranges from 70 m to 2850 m were used to validate the OMI data. The station overpass data of OMI and coincidently measured one-minute resolution ground data were used for the validation. The OMI UV index data are first separated for clear-sky and cloudy-sky condition using Lambert Equivalent Reflectivity (LER) as a proxy. It was found that the relative difference (bias) on OMI UV index varied from 34.5% to 47.9% for cloud free condition and from 106.4% to 286.4% for cloudy condition. More deviation was found on those high altitude stations due to satellite's poor performance on resolving cloud factor. High altitude stations have very high UV index values above 15 during the summer months. The satellite data was then empirically corrected to study the UV index climatology of Nepal Himalaya. A UV index more than 3 in the winter months (e.g. December) and more than 9 during the summer months (e.g. June) are common at most of the stations. High altitude stations have more extreme values (>11) during the summer months.

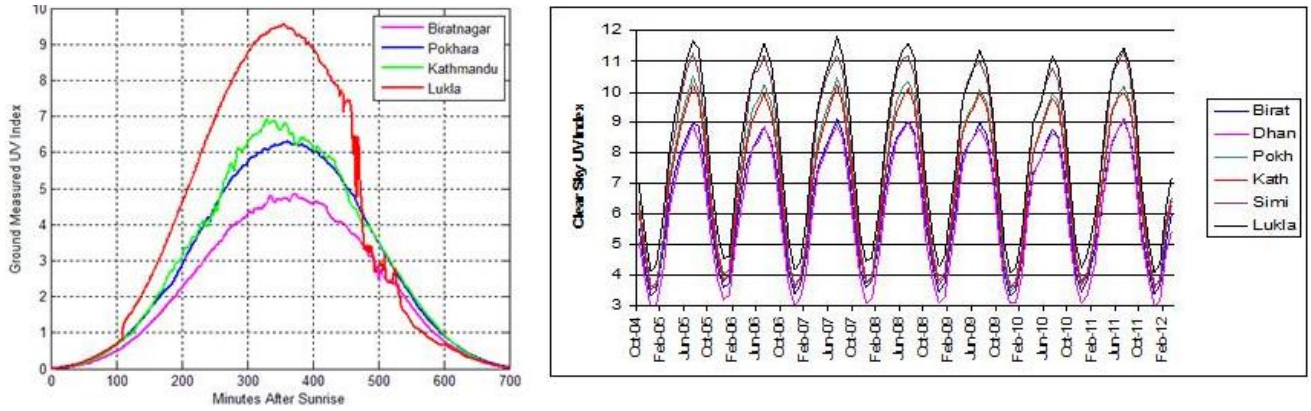

Figure 1. A typical diurnal pattern of ground measured UV index for week 3rd of March 2010 for four stations; Biratnagar (72 m, magenta), Pokhara (850 m, blue), Kathmandu (1350 m, green), and Lukla (2850 m, red) as shown in the left and OMI UV index climatology for six stations at Nepal Himalaya from October 2004 to March 2012.