



Solar UV radiation measurements across the Tibetan Plateau

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From ground-based measurements with NILU-UV multichannel, moderate-bandwidth filter instruments deployed at altitudes from 3,000 m to 4,500 m on the Tibetan Plateau (TP) values for the UV index (UVI), the total ozone column amount (TOCA), and the cloud modification factor (CMF, defined to be 100% for a clear-sky atmosphere) were derived for the measurement period from June 2008 to September 2010. The values of these three geophysical parameters were compared at four different study sites on the TP: Linzhi (29.66N, 94.37E, 2,995 m), Lhasa (29.65N, 91.18E, 3,683 m), Tingri (28.66N, 87.13E, 4,335 m), and Naqchu (31.47N, 92.06E, 4,510 m). For 2009, the annual mean UVI values at the four study sites were found to be 6.8 for Linzhi, 8.8 for Lhasa, 10.5 for Tingri, and 6.7 for Naqchu; the annual mean TOCA value was found to be in the range of 261-264 Dobson units (DU) in Lhasa, Linzhi, and Naqchu, but only 247 DU in Tingri; and the annual mean CMF values were found to be 70% for Linzhi, 83% for Lhasa, 92% for Tingri, and 70% for Naqchu. The low UV radiation level found in Linzhi was due to its low altitude among the four study sites and a quite cloudy sky. The highest UVI of 19.2 was measured in Tingri, where the high UV radiation level mainly was due to the high CMF value of 92% and a relatively high albedo associated with a gray ground surface and surrounding snow-covered mountains. By use of radiative transfer calculations the UVI differences between the four study sites due to different TOCA values, latitudes, and altitudes were estimated. The TOCA values derived from the ground measurements in Lhasa were found to be in good agreement with those derived from OMI measurements.