



Can aerosol loading explain the solar dimming over the Tibetan Plateau?

Kun Yang (1), Baohong Ding (1), Jun Qin (1), Wenjun Tang (1), Ning Lv (2), and Changgui Lin (1)

(1) Inst of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing, China (yangk@itpcas.ac.cn, 8610 6284 9886),

(2) Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing, China.

Solar radiation over the Tibetan Plateau has declined over recent three decades, whereas total cloud cover has a decreasing trend. A likely explanation to this paradox is the increase in aerosols over this clean region. However, this study shows that the radiation extinction due to aerosol loading is of one order lower in magnitude than the observed dimming, and the solar dimming is also seen in a satellite product that was produced without considering temporal variations of aerosols. Instead, the inter-annual variability and decadal change in solar radiation is contrasting to that in water vapor amount and deep cloud cover (but not total cloud cover). Therefore, we suggest that the solar dimming over the Plateau is mainly due to the increase in water vapor amount and deep cloud cover, which in turn are related to the rapid warming and the increase in convective available potential energy.

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