



[Volume XL-8](#)

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-8, 307-313, 2014
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-8/307/2014/
doi: 10.5194/isprsarchives-XL-8-307-2014

Estimation of Net Radiation using satellite based data inputs

S. V. S. Sai Krishna, P. Manavalan, and P. V. N. Rao
Atmosphere and Climate Sciences Group (ACSG), Earth and Climate Science Area (ECSA), NRSC, Hyderabad, India

Keywords: Net Surface Radiation, Insolation, Shortwave Albedo, Air Temperature, Emissivity, Satellite based Data Inputs

Abstract. Daily net surface radiation fluxes are estimated for Indian land mass at spatial grid intervals of 0.1 degree. Two approaches are employed to obtain daily net radiation for four sample days viz., November 19, 2013, December 16, 2013, January 8, 2014 and March 20, 2014. Both the approaches compute net shortwave and net longwave fluxes, separately and sum them up to obtain net radiation. The first approach computes net shortwave radiation using daily insolation product of Kalpana VHRR and 15 days time composited broadband albedo product of Oceansat OCM2. The net outgoing longwave radiation is computed using Stefan Boltzmann equation corrected for humidity and cloudiness. In the second approach, instantaneous clear-sky net-shortwave radiation is estimated using computed clear-sky incoming shortwave radiation and the gridded MODIS 16-day time composited albedo product. The net longwave radiation is obtained by estimating outgoing and incoming longwave radiation fluxes, independently. In this, MODIS derived surface emissivity and skin temperature parameters are used for estimating outgoing longwave radiation component. In both the approaches, surface air temperature data required for estimation of net longwave radiation fluxes are extracted from India Meteorological Department's (IMD) Automatic Weather Station (AWS) records. Estimates by the two different approaches are evaluated by comparing daily net radiation fluxes with CERES based estimates corresponding to the sample days, through statistical measures. The estimated all sky daily net radiation using the first approach compared well with CERES SYN1deg daily average net radiation with r^2 values of the order of 0.7 and RMS errors of the order of $8-16 \text{ w/m}^2$.

[Conference Paper](#) (PDF, 1040 KB)

Citation: Sai Krishna, S. V. S., Manavalan, P., and Rao, P. V. N.: Estimation of Net Radiation using satellite based data inputs, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-8, 307-313, doi:10.5194/isprsarchives-XL-8-307-2014, 2014.

