



The quality of the BSRN measurements and its influence on the computation of monthly means

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The quality of the BSRN radiation measurements was determined by investigating data gap frequency and data quality. The second part focuses on the differences in the monthly estimates computed from minute values using different algorithms.

We found that a substantial fraction of the radiation fluxes observed at BSRN sites is either missing or flagged. Most flagged data in the shortwave (SW) are, however, due to negative SW fluxes during nighttime ("nighttime offset"). Ignoring the flagging of negative SW fluxes, the percentage of flagged data is generally low at all BSRN stations. A significant number of BSRN sites provide radiation data with more than 5% missing data. Averaged over all BSRN sites, 4.4%, 13.0%, 6.5% of the data are missing for global radiation, direct shortwave radiation, and downwelling longwave radiation, respectively.

The second part of the paper clearly reveals that the computation of monthly means from 1-minute observations is strongly dependent on the selected method. The difference between the computed monthly means from differing methods typically decreases with a decreasing amount of missing data. The quality of the data also has an impact on the method-depending monthly mean but the effect is less pronounced. The inter-method differences show that we should aim at a distinct reduction of the gap frequency at some of the BSRN sites.