



Surface Downwelling Longwave Radiation: Evaluating the use of ERA-Interim for Climate Monitoring

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The surface radiation budget has been identified by GCOS as an essential climate variable (ECV). Surface measurements by well-maintained radiation sensors provide the backbone for climate monitoring of surface quantities. However, surface measurements at selected sites can only provide a limited view of the Earth climate. For global climate monitoring larger-scale data sets need to be employed. There are two options to globally monitor ECVs: satellite observations or reanalysis data. Note that through data assimilation systems satellite data are also substantially incorporated into reanalysis data records.

Here, we focus on the evaluation of the applicability of the monthly mean surface downwelling longwave radiation from the latest reanalysis of the European Center for Medium-Range Forecast (ECMWF), ERA-Interim, for climate monitoring. Surface measurements from the Baseline Surface Radiation Network (BSRN) are used to evaluate the performance of the ERA-Interim data with respect to the requirements requested for climate monitoring. Including 38 surface stations and considering a total of 3585 monthly mean values, we find a negative bias between the ERA-Interim and the surface measurements of about -4 W m^{-2} . Less than 15 % of the monthly mean values exhibit a bias of more than 15 W m^{-2} as determined by comparison with the BSRN measurements. Based on this evaluation, the ERA-Interim data set for monthly mean surface downwelling longwave radiation seems to be a promising candidate for global climate monitoring.