



A new gridded surface solar radiation dataset over Europe from the Global Energy Balance Archive: update

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The need for a gridded downward surface shortwave radiation (DSW) dataset from surface observations is important for the study of long-term changes as well as for the assessment of modeled and satellite-derived data of this radiative parameter. This will be accomplished by applying geostatistical techniques, such as ordinary kriging and inverse distance weighting from distributed DSW station data over Europe from the Global Energy Balance Archive (GEBA) for the period 1965-2005, onto regular grids of different spatial resolutions. Though the dataset is comprised of stations that cover the globe, they are highly concentrated in Europe with a total of 437. However, only about 170 stations were available for our period of study. Quality control procedures have been applied to this dataset with a measurement random error of about 2% for the monthly mean. Such a low error allows this dataset to be highly useful for climate and validation studies. A number of studies have already been made on this subject in the past but would greatly benefit if a gridded database of DSW would exist, especially for a direct comparison to be made between modeled and satellite-derived data. After applying the ordinary kriging and inverse distance weighting methods, an assessment could be made on their performance using cross validation techniques and a direct comparison to DSW station measurements from the Baseline Surface Radiation Network (BSRN). Variogram modeling will also be performed including testing different model variograms to improve results. Overall it showed that ordinary kriging is the best method to estimate DSW with good precision and low biases and root mean square errors.