



Sicily monthly high resolution solar radiation climatologies and comparison with future projections

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We developed a methodology to estimate solar radiation climatologies starting from a network of global radiation and/or sunshine duration records and a digital elevation model and applied it to a data set of 41 Sicilian global radiation records covering the 2002-2011.

All records were subjected to quality and homogeneity control. Moreover, the monthly record were subjected to a procedure aiming at estimate missing data.

The first step of the methodology consists in calculating global radiation monthly normals for all station sites or estimating them from sunshine duration normals, when global radiation data are not available.

The second step consists in estimating, the bias due to shading and adjusting the normal values in order to make them representative of un-shaded sites.

The third step consists in interpolating shading-bias-adjusted global radiation normals onto a 30 arc-resolution regular grid. This global radiation normals are then decomposed into the direct and diffuse components. Atmospheric turbidity is then evaluated over the same grid by means of the direct component obtained from shading-bias-adjusted global radiation.

The last steps consists in calculating direct, diffuse and reflected components of global radiation for any grid-cell, taking into account its slope and aspect and considering shading from the cell itself and from the neighboring cells. Knowing the direct, diffuse and reflected components, the global radiation can easily calculated by their sum.

This procedure will be presented and the resulting climatologies will be compared with those obtained from future projections (ENSEMBLES RCMs) with the objective to compare modelled and observed radiation climatologies.