



Cloudless sky downwelling longwave radiation estimations and comparison with measurements at Girona, Spain

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The work presented here is carried out in the frame of the Spanish project NUCLIER (Clouds and climate change: climatic analysis of cloudiness in the Iberian Peninsula; and measurement and modelling of cloud radiative effects at the surface). One goal of this project is the adequate description of shortwave and longwave irradiances at ground level and for all sky conditions; this goal will be addressed by assuring correct measurements, application of radiation parameterizations, and use of radiative transfer modelling. In this communication, downwelling longwave irradiance is estimated by using simple empirical or semi-empirical approaches, and only for cloudless sky conditions. Such conditions are selected from the 1-year record of radiation measurements taken at Girona, Spain, by visually inspecting the time evolution of SW and LW irradiances and also by applying an objective algorithm for day-time clear sky detection based on SW radiation. The measurement site enjoys a typical Mediterranean climate, with quite cold winters (with minimum temperatures often below 0°C) and hot summers (with maximum temperatures above 35°C). Humidity is also highly variable, producing a broad range of conditions to be simulated and their results to be checked against measurements. A number of parameterizations for estimating IR are used; most of them use both screen level temperature and humidity as input data. A statistical analysis of the differences between estimations and measurements is presented as well as a discussion about possible causes of these differences. Special attention is focused on distinguishing between results for day and night, and between cold dry days and hot wet days.