



## **Evaluation of surface solar radiation trends from WRF simulations over Europe with satellite and ground-based observations**

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In this study, we evaluate the ability of WRF (Weather Research and Forecasting model) to capture the surface solar radiation (SSR) trends over Europe during the "brightening" period 1990-2008. For the needs of this work, two WRF hindcasts were implemented for the EURO-CORDEX (European Coordinated Regional Climate Downscaling Experiment) domain at a spatial resolution of  $0.44^\circ$ . Both simulations are driven by the ERA-interim reanalysis. Different model parameterizations are used to investigate the sensitivity of model physics on the radiation components. The simulations are evaluated against high-resolution satellite measurements from the CM SAF (Satellite Application Facilities for Climate Monitoring) and ground-based observations from the GEBA (Global Energy Balance Archive). The ability of the model to reproduce the SSR annual and seasonal patterns is discussed taking into account cloudiness, which is the main driver of the SSR patterns. Then, the SSR trends from WRF are compared against trends from the CM SAF and GEBA datasets. Our results highlight the importance of such studies in order to understand the current limitations of WRF climate simulations in predicting future trends in SSR.