

Validation of sunshine duration of the Surface Solar Radiation Data Set – Heliosat (SARAH-2.1) for Croatia

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Solar radiation components and sunshine duration are used in the assessment and monitoring of climate conditions, in the estimation of the potential for using renewable solar energy and in the calculation of parameters for energy consumption for heating and cooling of buildings. Here, validation of the satellite-based climate data record Surface Solar Radiation Data Set – Heliosat (SARAH-2.1) derived from satellite-observations onboard the geostationary Meteosat satellites is made. The validation is performed using ground sunshine duration observations from 27 meteorological stations in Croatia with less than 10 % of missing data in the period 1983–2017. Meteorological stations used for validation are covering different climate regions: five stations are located in a continental part of Croatia, four in the mountain region, while the rest are on the coast of the northern, middle and southern Adriatic. Average monthly bias is ~7 h, with the largest mean bias in January and March (~13 h) and the lowest in May (-0.1 h). At the highest station Zavižan (height~1600 m) satellite data underestimate measurements in all months, especially in summer which may be the effect of convective clouds in the surrounding area as well as high albedo. Significant positive bias is found in winter at continental stations, as well as at the valley stations, probably due to fog occurrence in those areas. Overall good agreement of satellite data compared to in-situ measurements is found, however due to larger differences at specific locations additional correction would be needed.

Key words: sunshine duration, satellite data