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Identifying sequential characteristics of irradiance data sets applicable for the validation of sets for the assessment of the performance of renewable energy systems containing storage

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For the analysis of the expected performance of renewable energy systems of all sizes, nowadays various data bases offer the required time series of irradiances and wind speed. The validation of these sets is mainly based on various comparison schemes of averages or distribution functions on a yearly or monthly scale, forming a comprehensive toolbox for the respective quality assessment. This allows for a high confidence in predictions of system performance data, as-long-as system operation can be considered as “memory-less”. This is most prominently not the case for systems containing storage devices whose performance depend on the temporal characteristics of the time series - which had been less in focus for the validation of irradiance sets.

This contribution aims to discuss which sequential characteristics of the data series govern the storage sizing. This should result in the identification of parameters that are applicable for the validation of irradiance series for this task. As example, photovoltaic + battery systems are analyzed, that are driven by data extracted from different sources made available by the PVGIS (<https://ec.europa.eu/jrc/en/pvgis>) service.