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# Characteristics in highly time resolved solar irradiance data at a higher latitude location

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When measuring solar irradiance with high time resolution using fast response sensors, e.g. photovoltaic cells, data show properties in both gradients and maximum amplitude well beyond the ranges known from (slow) thermopile sensors. Respective analyses are e.g. reported by [1].
Of special interest are situations with atmospheric conditions governed by broken clouds which, on one hand can cause fast changes in irradiance with considerable amplitudes which may reach some hundredth of (W/m2)/s (see e.g. [2]). Moreover the irradiance sets measured with a time resolution of 1s and beyond can show maxima exceeding the expected clear sky irradiance and even the extraterrestrial irradiance level ("overirradiances") [3].
In this paper, respective data sets of global irradiance on an inclined plane (39°) at a higher latitude location (Grimstad, coast of Norway 58° North, ) are analyzed. Focus is on hand on the statistics of fast changes in irradiance ("ramp events") concerning their magnitude and temporal structure of their occurrence. On the other hand the magnitude and duration of overirradiance events is analyzed. The probability of occurrence of ramps and overirradiances is studied for Norwegian summer months and discussed in view of their impact of photovoltaic systems.

[1] Zehner, M., et al., "Systematic analysis of meteorological irradiation effects", Proc. 25th EUPVSEC, Valencia, Spain, 2010, pp. 4545–4548.
[2] Beyer, H.G. et al., Analysis and synthesis of cloud pattern for radiation field studies. Solar Energy, 52, 379-390 (1994).
[3] Yordanov, G.H., et al., "Overirradiance (cloud enhancement) events at high latitudes", IEEE Journal of Photovoltaics, vol. 3, pp. 271–277, 2013.