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Supplement of

Fifty-six years of surface solar radiation and sunshine duration over São Paulo, Brazil: 1961–2016

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Verification of the long-term calibration shift of the Actinograph

To evaluate the stability of the Actinograph used to measure surface solar irradiation (SSR) analysed in the manuscript, we compare a one-year of simultaneous measurements, conducted in 2014, with a brand new Robitzsch-Fuess Actinograph, type 58dc. Monthly scatterplots comparing irradiation data from daily measurements are available at http://www.estacao.iag.usp.br/Relatorios/Relat_tecnico_3.pdf (in Portuguese – last access on 10 February, 2021). Figure S.1 presents the scatterplot of all daily measurements performed in 2014, comparing both instruments data, where SSR_operational refers to irradiation measured by the instrument whose data is analysed in the manuscript and SSR_new refers to irradiation measured by the new actinograph. Bars (vertical and horizontal) indicate the 5% instrumental uncertainty. Applying a least square fitting to the data, the resulting slope was 0.919 ± 0.006. We assume that the operational actinograph suffered a linear degradation throughout the years, from 1961 to 2014, and that, in the first year, the slope should be equal 1. Using such hypotheses, the difference in slope results in a long-term trend of about -1.5 % per decade, ranging from (-1.6 to -1.4) % per decade. Identical results were obtained by Plana-Fattori and Ceballos (1988), confirming the long-term stability of the instrument.
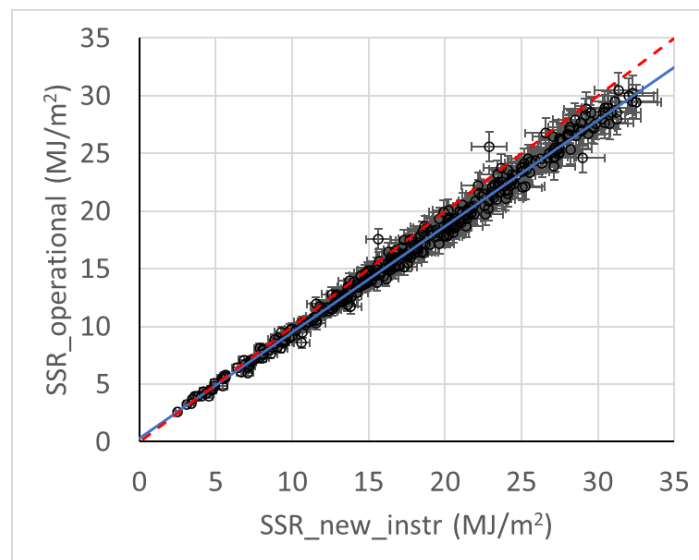

Figure S.1 – Comparison of one year of irradiation measurements performed with two Actinographs, the operational, whose data is discussed in the manuscript, and a brand

new one. The blue line represents the least square fit with coefficients: linear = 0.30 ± 0,07 and slope = 0.919 ± 0.006. The red line is the 1:1.