

## ***Interactive comment on “Solar Forcing for CMIP6 (v3.1)” by Katja Matthes et al.***

**M. Snow (Referee)**

snow@lasp.colorado.edu

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This manuscript gives a very understandable overview of how the recommended solar forcing is determined. The topic is very technical, but the authors have done a great job in making the content accessible to a wide range of scientists. My comments are primarily on the radiative sections, and all of them are minor.

P3 L29: The text mentions uncertainties in the irradiance measurements, and there is no question that these uncertainties can be sometimes larger than solar variability at some wavelengths. There is a brief discussion that uncertainties in models are sometimes difficult to assess. Measurements only go back a few solar cycles, and both irradiance models are based on interpretation of those measurements. Extrapolating these proxy models to the past and future requires several assumptions about proxy relationships remaining invariant. For example, the numerical relationship between sunspot number (or area) and the sunspot blocking function in NRLSSI2 could

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change if the sunspot contrast evolves over time. So it is not automatically true that we understand proxy relationships well enough over long timescales. Model development will continue to improve as we continue to make better measurements. State of the art model reconstructions as described in this manuscript are the best we currently have, but their uncertainties are also still significant.

P9 L14: Averaging two quantities that disagree produces a result that is also not likely to be correct. Calling this "the most reasonable approach" is perhaps controversial. Maybe calling it "a reasonable approach" would be more appropriate.

P9 L30: The comment that F10.7 was a good proxy for EUV at one time, but "this may not be true anymore" reinforces my discussion about page 3 above. It is an assumption that proxy relationships do not change over time, and this assumption must factor into the estimation of model uncertainties.

Overall, I think this manuscript does an excellent job in describing the recommended solar forcing for the climate community.

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