

Response to Reviewer 2's comments:

This article describes a rather novel technique to model polarized solar radiation using CLARREO, an instrument insensitive to polarization. I believe this article demonstrates what can be achieved with ingenious data processing. The paper is well-organized and the methods are described in great detail. I feel that the authors could better describe what is unique about this approach in the abstract and/or introduction. There are a number of very minor typos that can be corrected with another reading – these are obvious, like the missing "f" in "of" (17609;27). I only have some minor comments. 17586;6: suggests MODIS is polarization sensitive. 17587;3,4: also. 17590; 11: It's not clear what "true intensity" is. Do you mean "intensity"? 17590;18: same with "true radiance"

The authors thank this reviewer for the helpful comments. We have revised the manuscript following the comments:

- 1. Abstract is modified to better show the uniqueness of this work as “This report presents the first accurate approach for making the spectral PDMs over broad solar spectra, which cannot be achieved by empirical PDMs based on the data from polarimetric sensors.”**
- 2. Typo errors are corrected. “true intensity” and “true radiance” are changed to “actual intensity” and “actual radiance” to mean the real value, not the measured ones.**
- 3. MODIS does have some sensitivity to polarization of light. However, saying it is a polarization-sensitive instrument overstates its problem. “polarization sensitive” is removed from before “MODIS”.**