The authors would like to thank the anonymous referee for providing comments on this manuscript. Our responses are in blue, just below the referee comments.

This is an exceptionally well-written manuscript which introduces a new version of the CFMIP Observational Simulator Package (COSP). The manuscript clearly described the design of COSPv2 and its software improvements compared to the COSPv1. The reorganization of the COSP architecture allows for increased efficiency, helps to make the diagnostics consistent with radiation calculations of the host model more easily, and makes it easier to add new simulators and diagnostics. Given the wide use of the COSP in the global climate modeling community, this article should be able to provide helpful guidance to users.

*Comment 1: It will be better if the author can quantitatively estimate the improved efficiency of the new COSP version compared with the old one in section 3.* 

In the text, we refer to "modest" increases in performance as a result of removing memory copies and redundant calculations in COSP2. Unfortunately, it's not feasible to compare COSP1 and COSP2 timing results on such a granular level, since the codes are organized very differently. With that being said, we're confident to say that computing a field once instead of three times is computationally more efficient.

From our experiences running COSP2 inline with a GCM (CAM), we observe roughly a ~65% speedup in COSP2 runtime when compared to COSP1. However, since we only tested this implementation in one model, we are reluctant to say that this performance increase is robust across a range of architectures and testing COSP2 across a range of models is beyond the scope of this work.

Comment 2a: Since COSPv1.4.1 is the production version for CFMIP3 and CMIP6, will the new COSPv2 diagnostics be different?

The diagnostics from COSPv1.4.1 are scientifically equivalent to the diagnostics produced by COSPv2.

Comment 2b: It was also mentioned in the summary that there is an optional layer in COSPv2 to provide compatibility with COSPv1.4.1. Is this option recommended for recent efforts of model evaluation?

Provided with COSP2 is an interface designed to be a "drop-in" replacement for COSP1.4.1. This is intended for modeling centers to implement COSP2 in their models without having to make code modifications. However, if you are new to using COSP for model validation/evaluation, we suggest starting directly with COSP2, as the 1.4.1 interface is more or less intended for legacy COSP1 users to use as a "bridge" between COSP1 and COSP2.

Comment 3: Page 3, Line 10, "ISSCP" should be "ISCCP". Changed in manuscript.