Geoscientific
Model Development
Discussions

*Interactive comment on* "Bitwise identical compiling setup: prospective for reproducibility and reliability of earth system modeling" *by* R. Li et al.

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We thank Referee #2 for the comments. We will improve the manuscript according to these comments when revising the manuscript. Here we'd like to reply these comments one by one.

1. First, vectorization and SIMD are important options for most modern CPU architectures and they affect performance significantly for most ESMs, especially for OpenMP/MPI hybrid computation models. Therefore, the claim on P9832 L18 "such a compiler flag does not significantly decrease the computation performance" may be valid for some climate models only. But, it does not affect the validity of using the com-

piler flags from the biggest bitwise identical compiling setup set for code testing and code validating. In practice, it is always the best to select a compiling setup with the best computation performance while the scientific correctness of a model simulation is guaranteed.

Response: Thanks a lot for this comment. We agree with the importance of vectorization and SIMD. It is true that any selection of a compiler flag for a model simulation will not affect the code testing based on bitwise identical compiling setup sets. We will improve the expression of the suggestion in the manuscript.

2. P9856 and P9857: the "Advantage of compiler flag B compared to compiler flag A" in both Figure 4 and Figure 5 are not well-defined. The axis labels on the right-hand sides of those figures are not mentioned anywhere.

Response: The advantage of compiler flag B compared to compiler flag A is defined as the performance improvement when change compiler flag from A to B. We will complement it in the revised manuscript.

3. P9843, P9844, P9845 and P9849: there is no explanation about why Intel compiler suite version 11 is significantly different with later versions in Tables 8, 9, 10 and 14.

Response: This is because the version 11 and the subsequent versions use different default instructions to generate the binary code (https://software.intel.com/en-us/forums/intel-visual-fortran-compiler-for-windows/topic/281713), which produces different bitwise results (https://software.intel.com/en-us/forums/intel-visual-fortran-compiler-for-windows/topic/279705).

Interactive comment on Geosci. Model Dev. Discuss., 8, 9817, 2015.