

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

### **Anonymous Referee #2**

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This article presents a great idea of technical testing for earth system modeling. The technical testing method can help to identify code-development bugs and also to get around compiler bugs. Thus, it will improve reliability and reproducibility of the Earth System Models (ESMs). The authors also provide a practical way/utility for finding the compilation-sensitive code segments in a ESM. I recommend for publication in GMD after the following technical issues are corrected or clarified.

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

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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 compiler 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.

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.

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.

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