

## ***Interactive comment on “PatCC1: an Efficient Parallel Triangulation Algorithm for Spherical and Planar Grids with Commonality and Parallel Consistency” by Haoyu Yang et al.***

### **Anonymous Referee #2**

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#### **1 General Comments**

This paper presents a parallel triangulation approach that can be used on spherical and planar grids. The authors establish three main criteria as requirements for a triangulation algorithm: commonality, parallel efficiency, and parallel consistency. The proposed algorithm uses MPI and OpenMP for parallelism of the different steps and their experiments show that it can achieve better scalability, parallel efficiency, and parallel consistency than previous triangulation approaches. The parallel consistency results presented are an improvement over the related algorithms discussed.

C1

#### **2 Specific Comments**

- The authors provide a clear overview of the goals they have set for their algorithm.
- They describe 3 other parallel algorithms used for Delaunay triangulations and address how PatCC1 differs clearly, which provides the reader an understanding of the intended improvements.
- The paper is comparing PatCC1 (MPI+OpenMP algorithm) with Jacobsen's (MPI only) in Table 3. Please clarify how many OpenMP threads per MPI process were used by PatCC1.
- Obtaining a complete triangulation can be challenging, which is one of the difficulties encountered in the previous algorithms (e.g. stitching, invalid or repeated triangles). The paper would be strengthened by addressing the step or providing a potential parallel approach.
- Given that the algorithm utilizes MPI+OpenMP it would be interesting to scale it to a larger number of nodes to truly observe the impact of internode communication.
- A more detailed description of the implementation of the computing resource manager would be welcomed. The current description favors optimal parallel performance at the cost of leaving resources idle. Perhaps publishing the source code will help clarify this mechanism.

#### **3 Technical Corrections and Minor revisions**

- The paper states that the source code will be available in June 2019. It would be good for the link to be included in the final version.

C2

- Recommend showing the scaling results using a figure rather than a table.
- Line 36: "new horizontal grid appear" -> "new horizontal grids appear"
- Line 38: "types of horizontal grid" -> "types of horizontal grids"
- Line 40: "types of horizontal grid" -> "types of horizontal grids"
- Line 42: "horizontal grid," -> "horizontal grids,"
- Line 105: "unable to handle well some types..." -> "unable to handle some types of model grids well such as..."
- Line 136: "complicated implementation" -> "complicated implementations"
- Line 146: "the checking" -> "the check"
- Line 165: "Fig. 1" -> "Fig. 2"
- Line 436: "Tables 8, S7, S8" -> what does "S7 and S8" refer to?

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2018-284>, 2019.