

Paper and Referee

Paper: C502

Manuscript Title: Parallel Iterative Solvers for Unstructured Grids using Directive/MPI Hybrid Programming Model for GeoFEM Platform on SMP Cluster Architectures

Authors: K. Nakajima and H. Okuda

Referee: D. Place

Referee Address: QUAKES, Department of Earth sciences, The University of Queensland, St Lucia, Brisbane QLD 4072, Australia. e-mail: place@quakes.uq.edu.au

Referee recommendations: Accepted provided the suggested changes are made

Referee Comments (For Editor Only)

The manuscript describes an efficient parallel iterative method for GeoFEM using MPI and loop directives. A complete analysis of the performance obtained is provided which shows the high performance of the method used. I think the paper will make a great contribution to the journal, the approach is very well described and the performance analysis is well done. Therefore, I recommend the manuscript for publication.

Referee Comments (For Author(s) and Editor)

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- It is stated that to increase performance with a node or PE, loops should be sufficiently long so that data or instructions can be efficiently pipelined through each PE. I agree with this statement but I think a comment should be added on the effect of the length or complexity of the body of the loops. The length or the complexity of the code within a loop can be an important factor. If the body of a loop is too large the PEs may run out of registers and/or may not be able to pipeline the instructions efficiently.
- An additional comment for Figure 9 is required, where apparently the speed-up is starting to roll over when using more than 8 SMP-nodes, which I think is due to the small work load per node when using small problem sizes.
- In Figure 11 showing the effect of the coefficient matrix storage method and re-ordering, a decrease in performance is observed using the PDJDS/CM-RCM method when the number of DOF exceed 10^6 . A comment on that should be added.