



Developments in the Gung Ho dynamical core

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Gung Ho is the new dynamical core being developed for the next generation Met Office weather and climate model, suitable for meeting the exascale challenge on emerging computer architectures. It builds upon the earlier collaborative project between the Met Office, NERC and STFC Daresbury of the same name to investigate suitable numerical methods for dynamical cores.

A mixed-finite element approach is used, where different finite element spaces are used to represent various fields. This method provides a number of beneficial improvements over the current model, such a compatibility and inherent conservation on quasi-uniform unstructured meshes, whilst maintaining the accuracy and good dispersion properties of the staggered grid currently used.

Furthermore, the mixed finite element approach allows a large degree of flexibility in the type of mesh, order of approximation and discretisation, providing a simple way to test alternative options to obtain the best model possible.