FAMOUS-CI
a fast Earth System GCM

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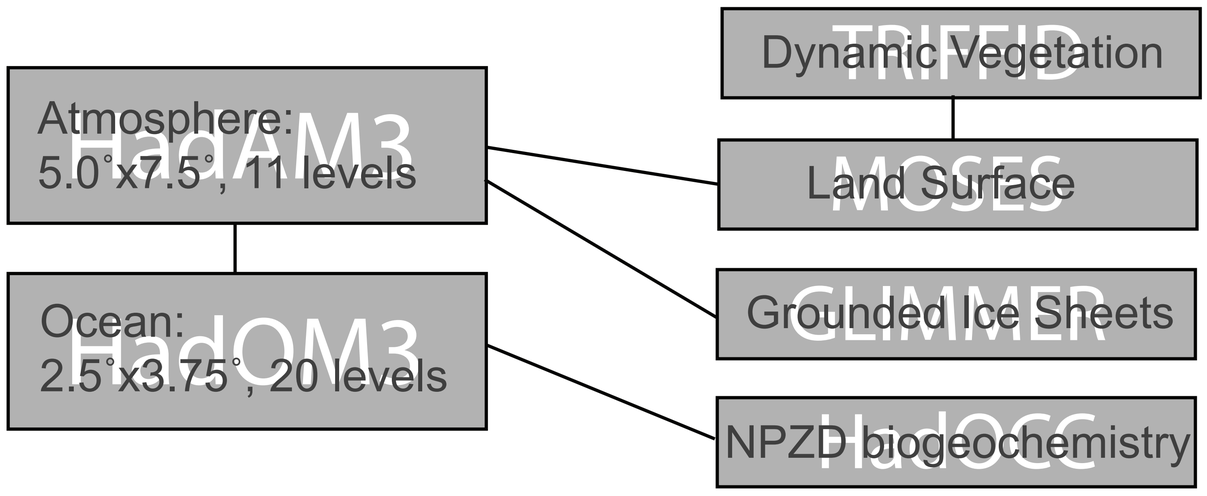
- FAMOUS-CI is an Earth System Model based on the HadCM3 atmosphere-ocean general circulation model

- It has optional representations of the marine and land carbon cycles, along with two-way coupling to an ice-sheet model

- FAMOUS can integrate ~100 model years per day on high performance computing resources, and has also been installed on desktop machines

Model configuration

FAMOUS-CI is an Earth System model, based on HadCM3, that has been developed in the UK jointly by NCAS, the Hadley Centre, Bristol University and the QUEST and RAPID programmes. It has roughly half the spatial resolution of HadCM3, but retains all the complex processes that are represented in an AOGCM. FAMOUS-CI includes some processes not modelled in HadCM3; the fully coupled carbon cycle and ice-sheet models allow it to be applied to a wide variety of climate problems.



The relatively low spatial resolution of FAMOUS means that it has lower computational requirements that most climate GCMs. FAMOUS can simulate around 100 model years per day using 8 processors of a high performance cluster, making millennial-scale transients and ensemble runs feasible. Like HadCM3, FAMOUS-CI does not require flux adjustments to produce a stable, reasonable simulation of modern climate. The global climate sensitivity to CO2 forcing is also very similar to that of HadCM3.

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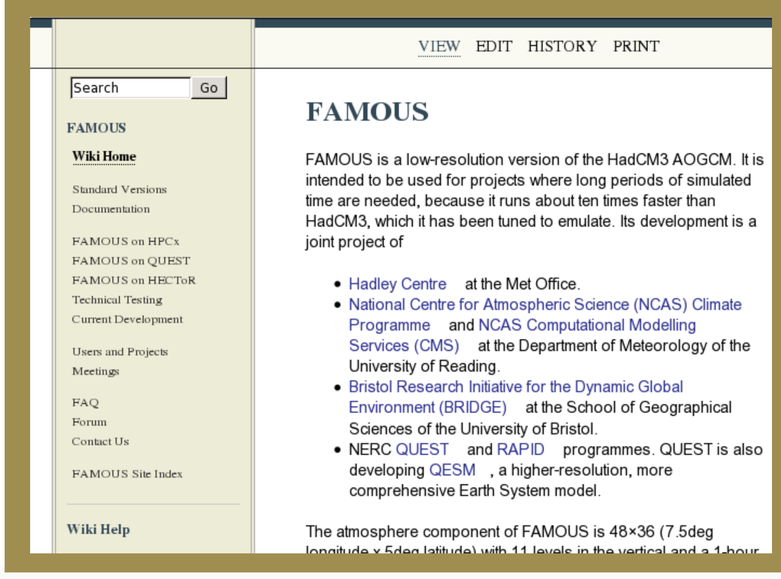
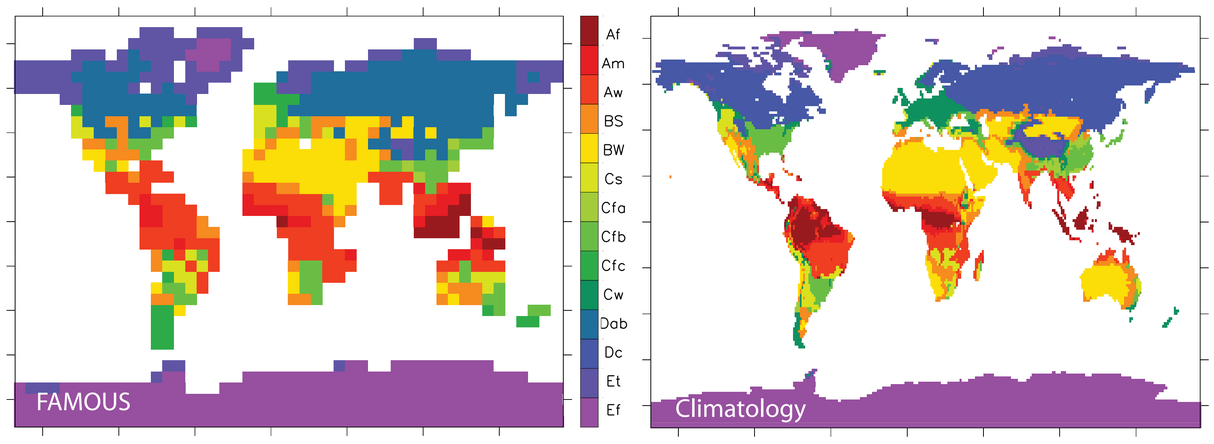


For more information on FAMOUS, please visit our website. Here you'll find information about getting and running FAMOUS, as well as access to our mailing list, links to the different projects in the FAMOUS community and announcments of new developments.

Climate Simulations

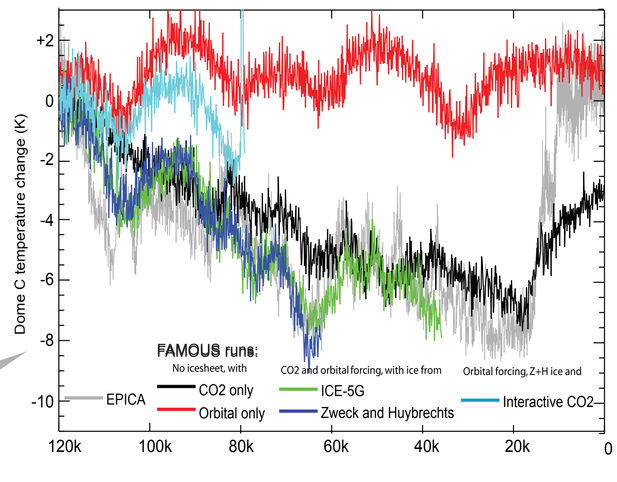


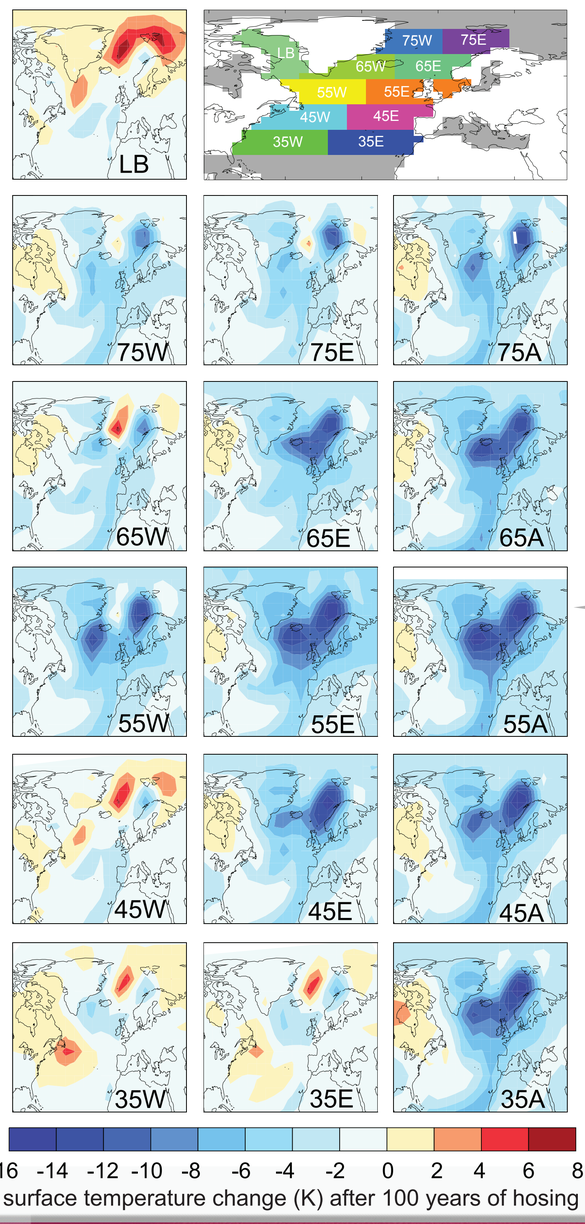
Main climate - A: equatorial; B: arid; C: warm temperate; D: snow; E: polar
Precipitation - W: desert; S: Steppe; f: fully humid; s: summer dry; w: winter dry; m: monsoonal.
Temperature - h: hot arid; k: cold arid; a: hot summer; b: warm summer; c: cool summer; d: extremely continental; F: polar frost; T: polar tundra

Classifying the preindustrial climate simulated by FAMOUS into the Köppen-Geiger climate zones shows that FAMOUS does a good job of simulating both the mean climate and seasonal variability of a modern climate.

Accelerated transient runs through the last glacial cycle are being used to investigate the influences of different forcing factors on the climate and atmospheric CO2 further demonstrate that the climate sensitivity in FAMOUS is realistic.

FAMOUS has also been coupled to the Glimmer ice-sheet model, and has been used to investigate icesheet-climate feedbacks during glacial inception.





Developing the common "Atlantic hosing" experiment further, an ensemble run of FAMOUS has been used to investigate the sensitivity of the Atlantic meridional overturning circulation (AMOC) to the location of an applied freshwater flux. 0.5Sv of freshwater were applied to either the east (E) or west (W) side of the basin at a given latitude, with a second group of experiments where both east and west were hosed simultaneously (A). The AMOC weakens differently dependent on the location of the hosing, with corresponding differences in surface temperature change. These results closely mirror the model-dependent response of the AMOC in intercomparisons, suggesting that the geography of the deepwater formation in the models is an important difference. Some local warming was also observed to result from the AMOC decline. In some experiments central Greenland temperatures were found to warm whilst the wider North Atlantic cools.