

Developing High Resolution WACCM: identifying users, needs and pathways towards

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In brief: Let's set up a fully tuned version of CESM with a high top and high horizontal resolution ($\sim 0.25^\circ$)! What would be the computational and workforce requirements to produce it? Who would this be for, and what would the community need?

In detail: Developing a CESM version with a high top (say, WACCM) at higher horizontal resolution could have many scientific benefits for many different communities. It could help improve understanding of stratospheric turbulence for aviation; it could help improve simulations of volcanic/SAI plumes, enabling better validation of ESMs against available observations; it could help elucidate the role of stratospheric-tropospheric coupling. It could also improve circulation in the mesosphere and above and thus help inform research about interhemispheric coupling and coupling between QBO (Quasi-Biennial Oscillation) and SAO (Semi-Annual Oscillation). It could inform development of parameterizations for coarser resolutions. It could inform model development for WACCMX to reduce complexity in the troposphere and make running WACCMX more computationally affordable. However, all these scientific questions, taken alone, might lead to the development of slightly different model versions, with different computational and tuning costs. Questions we would like to address: Is there a need for ocean coupling, or chemistry/aerosol coupling? What is the length of required simulations: full historical/observational period with spin-up from lower resolution version; short simulations starting in present days? What output is needed, at which frequency? Are there viable ways to use ML to enhance/speed up the process (for instance, tropospheric BCs, or emulation of longer periods/variability).

The aim of this preliminary workshop is to identify the space of relevant stakeholders that can provide their own perspective for answering these questions.

Format: 3 hours online workshop in the Fall; potential in-person meeting in the Spring (at NCAR) to identify stakeholder, discuss, map out and define details. Also important to identify potential funders for the effort. Access the form to sign up for the meeting [here](#).

Outcome: 1 white paper outlining needs and potential outcomes of the research; 1 or more proposals to appropriate agencies.