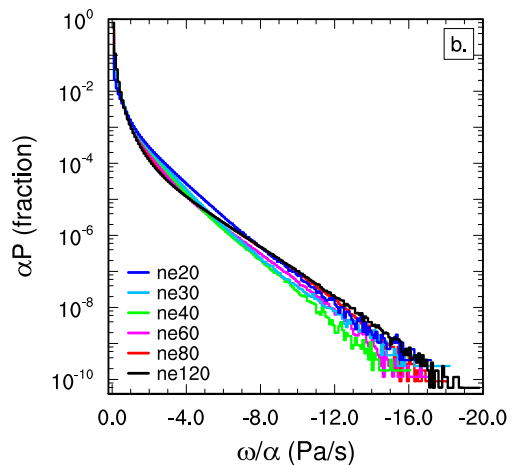
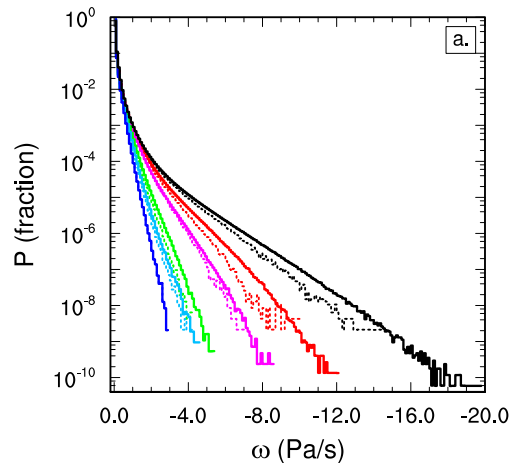


On resolution sensitivity in the Community Atmosphere Model



Scientific Achievement

The impact of changing the vertical velocity field with native grid resolution cannot be ignored in any effort to recover convergent solutions in AGCMs (these results reproduce resolution sensitivity in other AGCMs).

Significance and Impact

- Vertical velocities follow Δx^{-1} scaling across typical GCM resolutions
- Larger vertical velocities generate greater condensational/stratiform heating, while also causing greater subsidence drying
- Both processes increase atmospheric stability with resolution, reducing the activity of parametrized convection.

Research Details

- CAM6 aqua-planets experiment simulations
- Convergence experiment in Δx (grid spacing) from 2° to $1/4^\circ$
- Uncertainty on how to handle physics time-steps across resolutions; opted to scale in proportion to grid spacing

Herrington, A. R., and Reed, K. A., On resolution sensitivity in the Community Atmosphere Model, QJRM, 146, (2020). [DOI: 10.1002/qj.3873]