



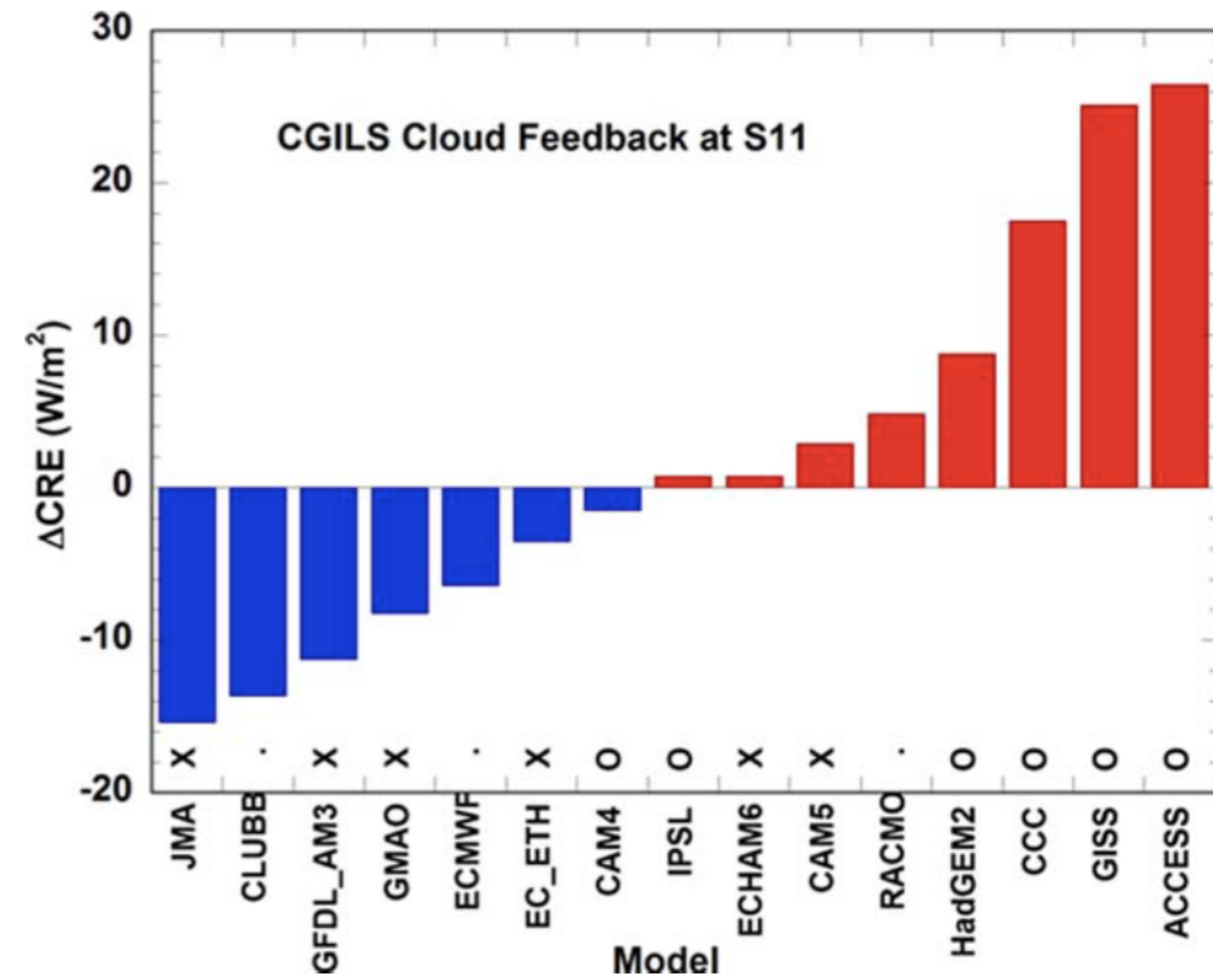
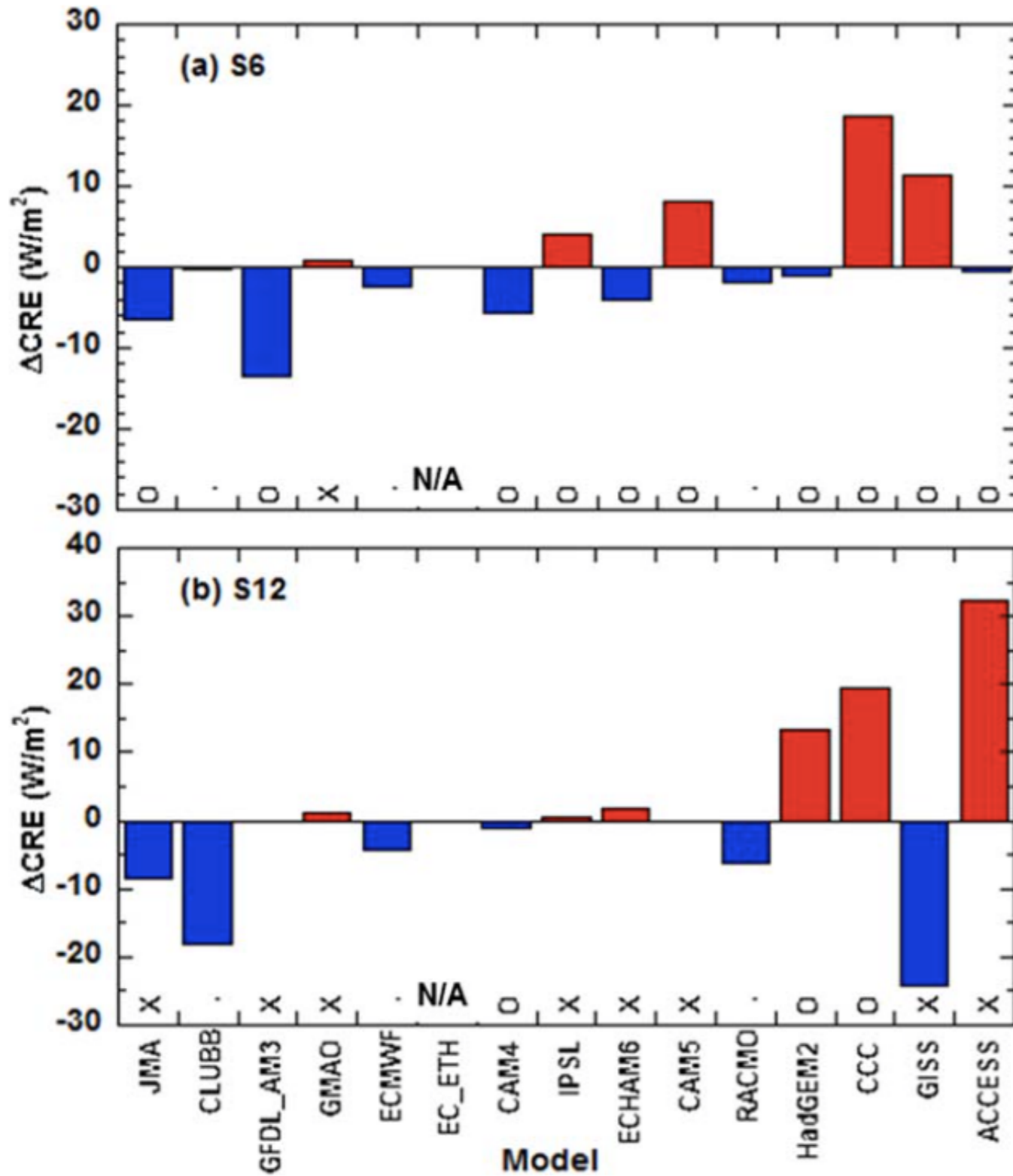
CGILS Phase 2 preliminary results:
Response to 4xCO₂ in single-column models

Brian Medeiros

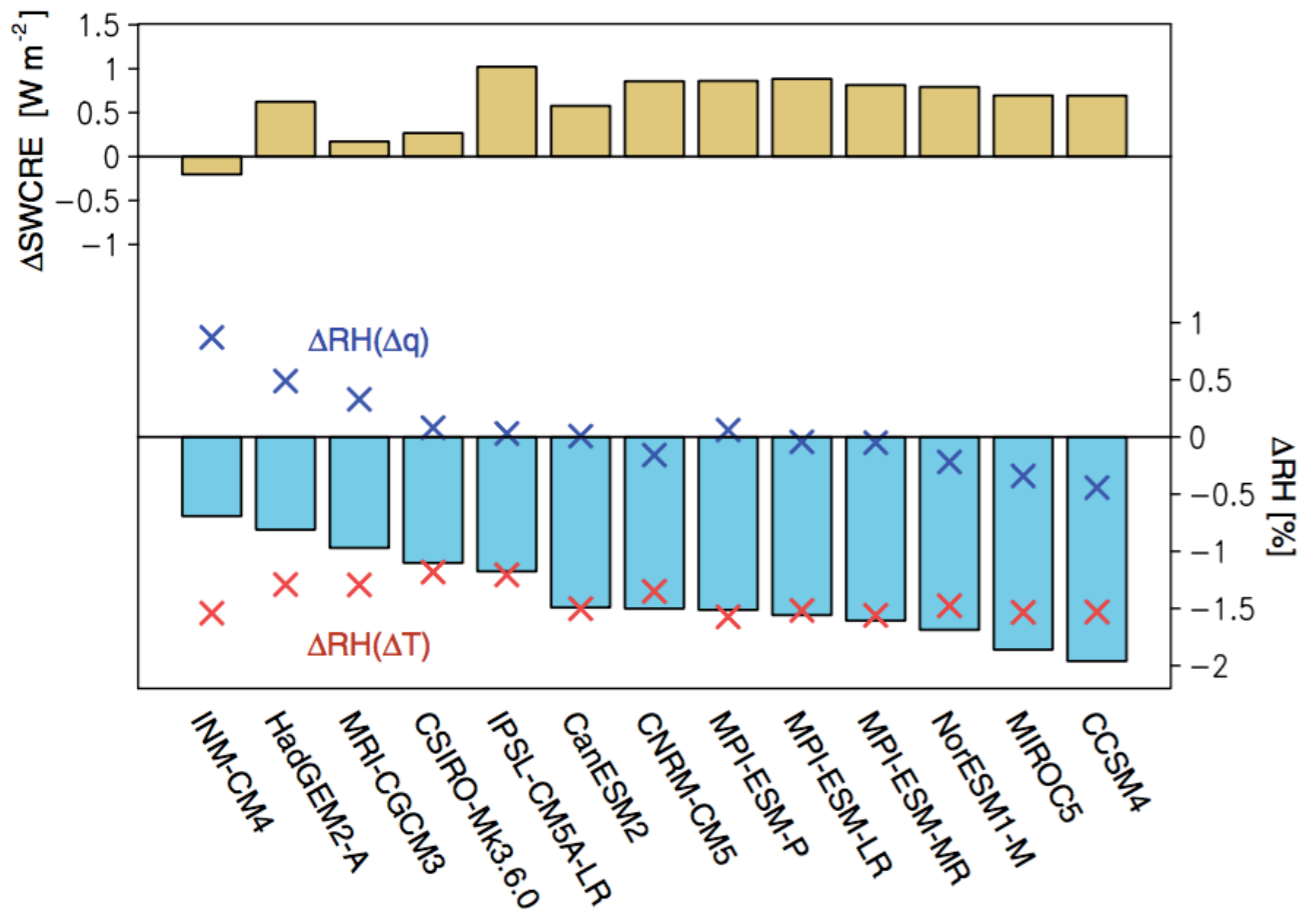
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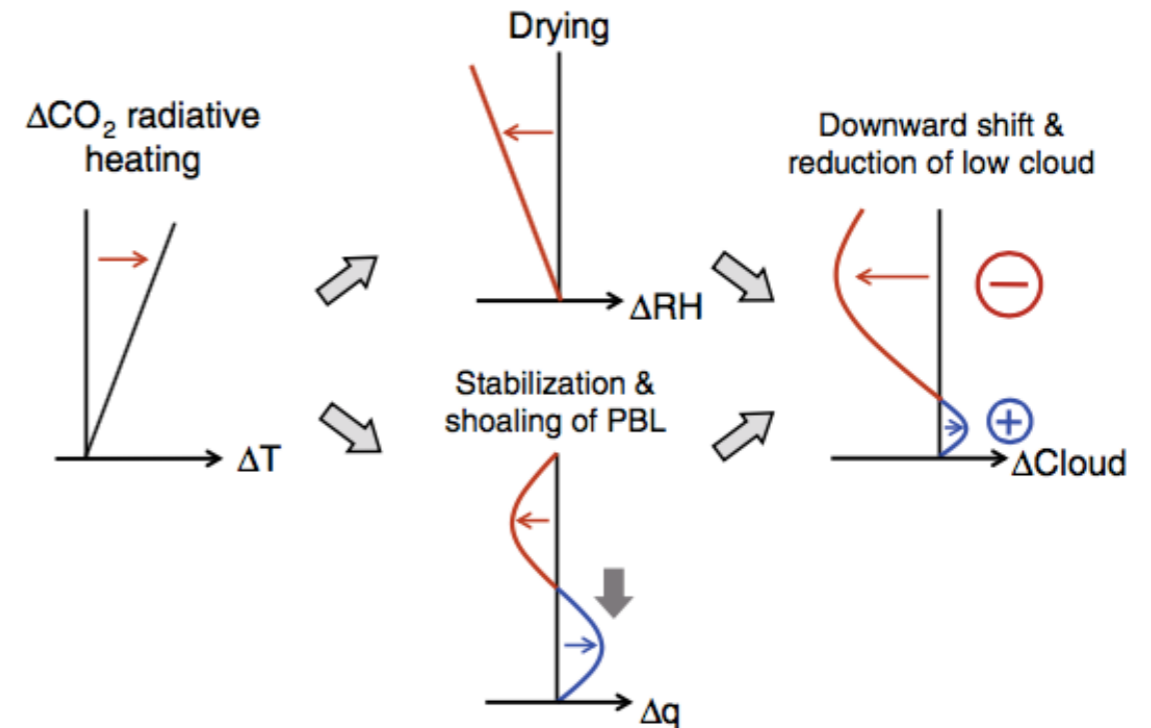
Results from SCM Phase 1



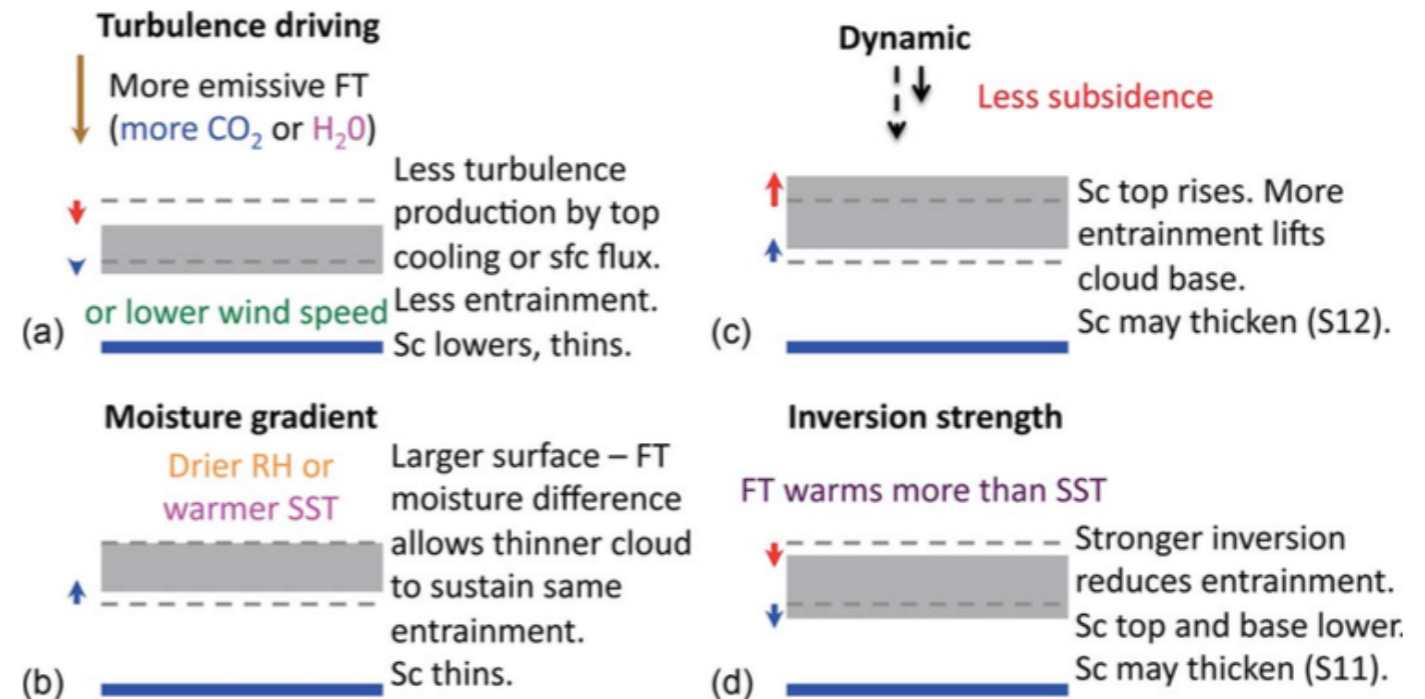
Cloud Adjustment



Mechanism of cloud adjustment

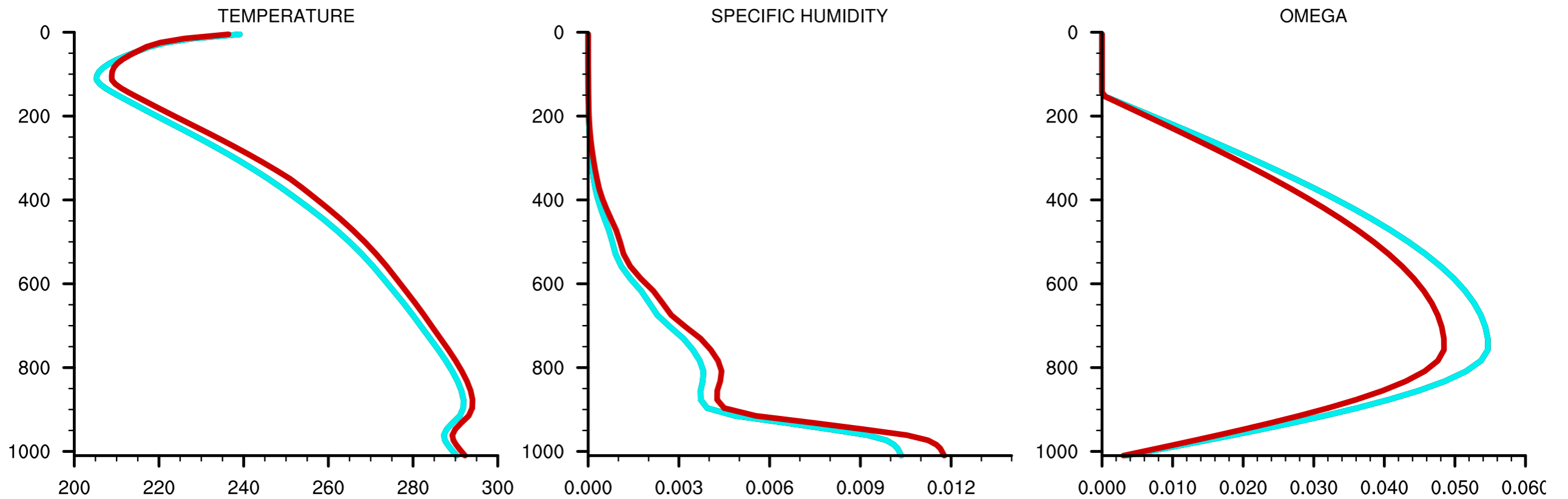


Kamae et al. Curr Clim Change Rep (2015)
DOI 10.1007/s40641-015-0007-5



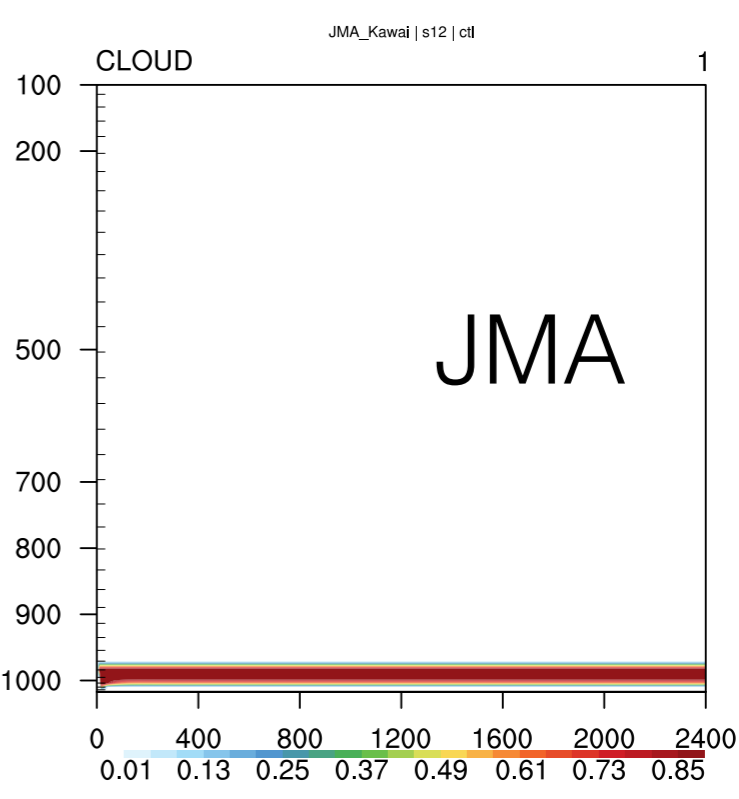
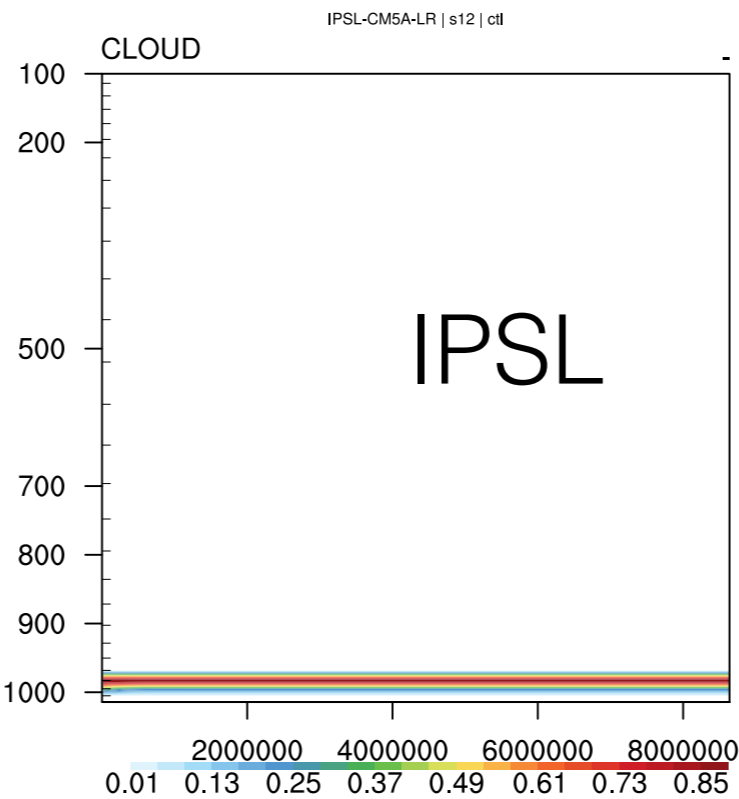
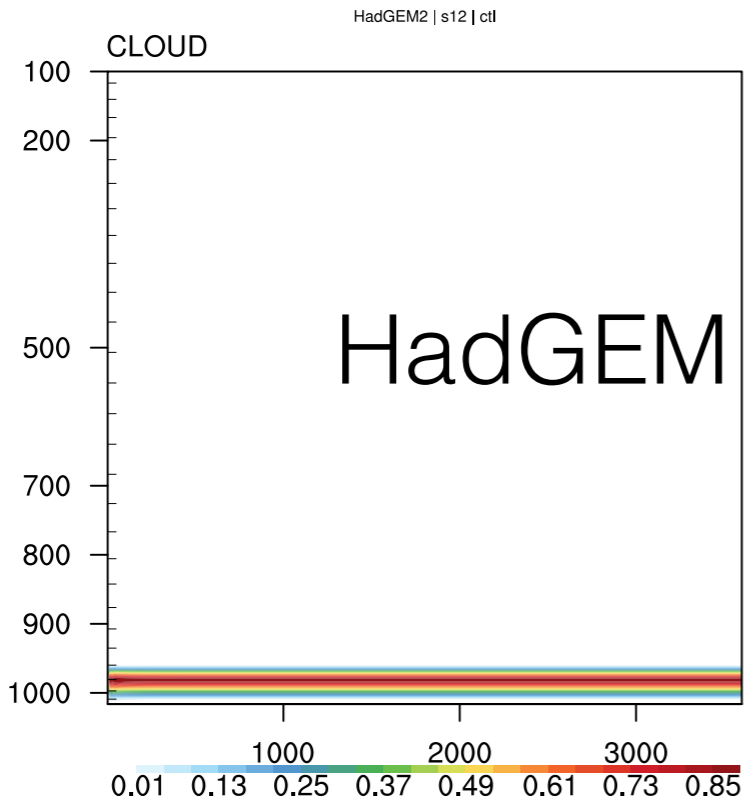
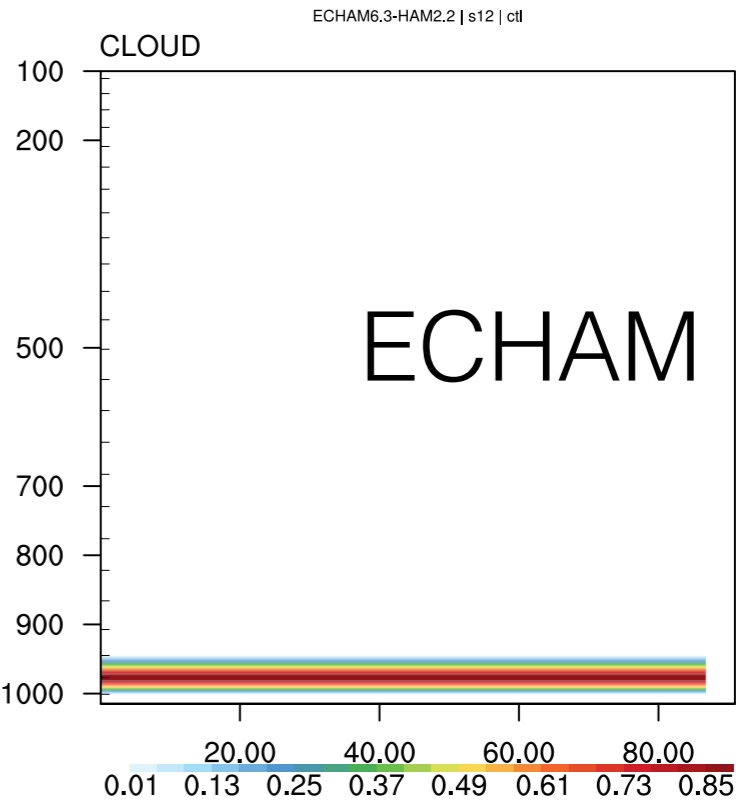
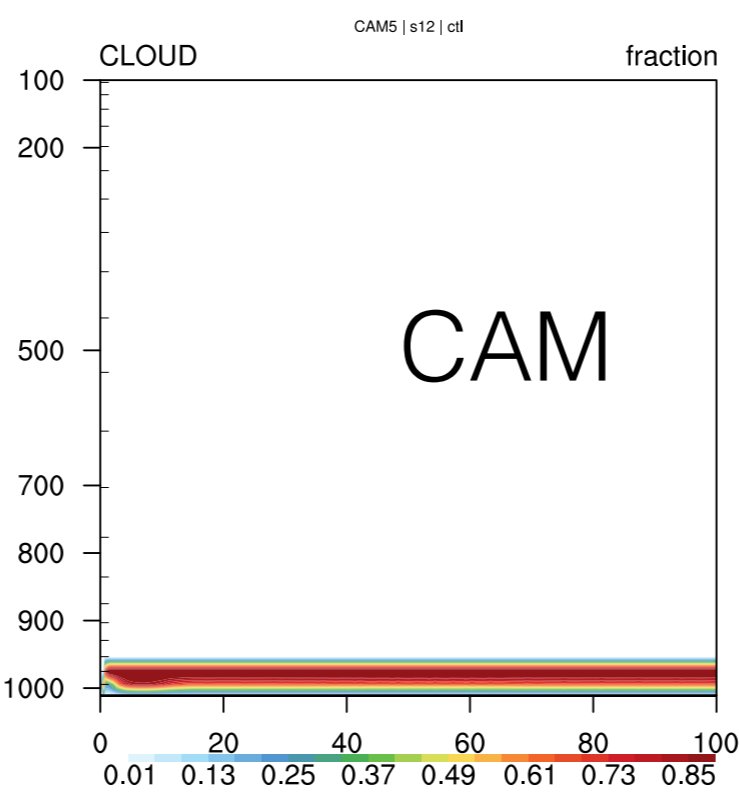
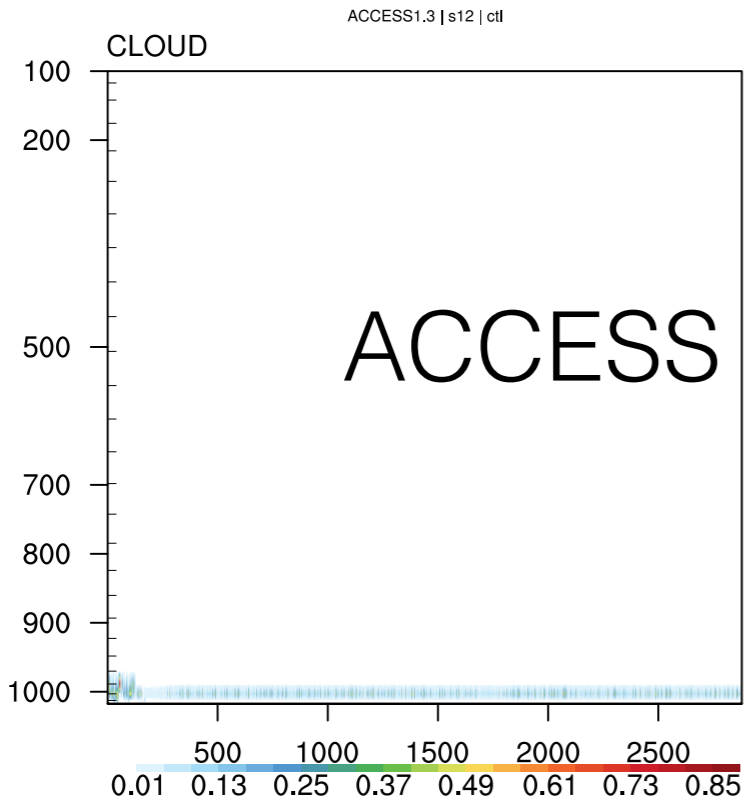
Bretherton et al. JAMES (2013)
DOI 10.1002/jame.20019

Experimental Protocol

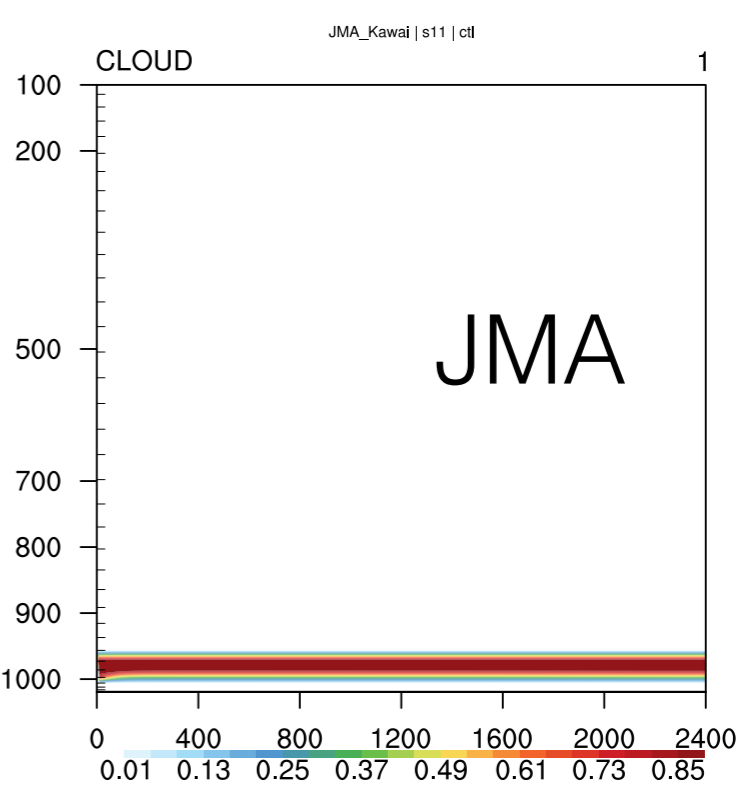
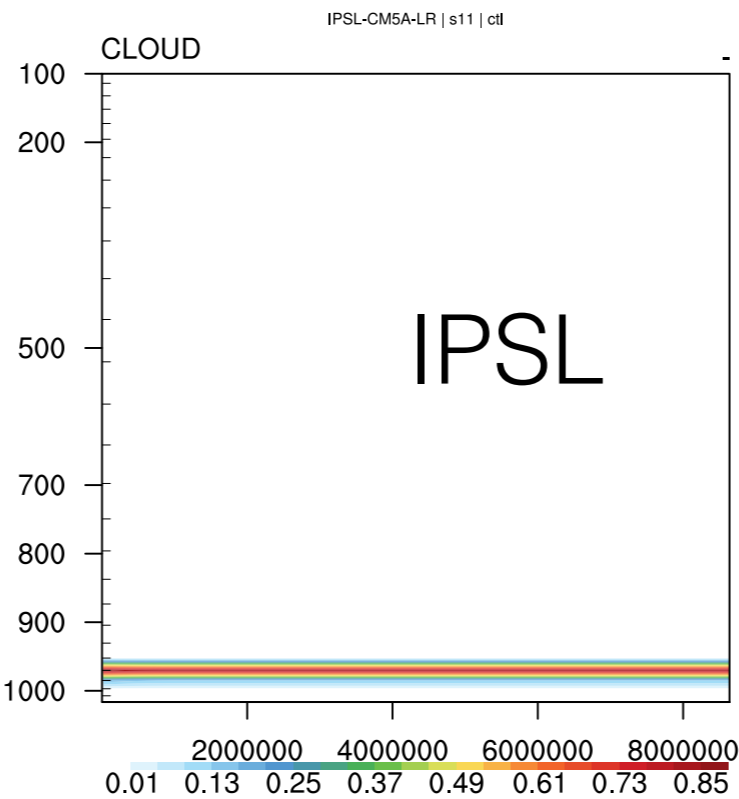
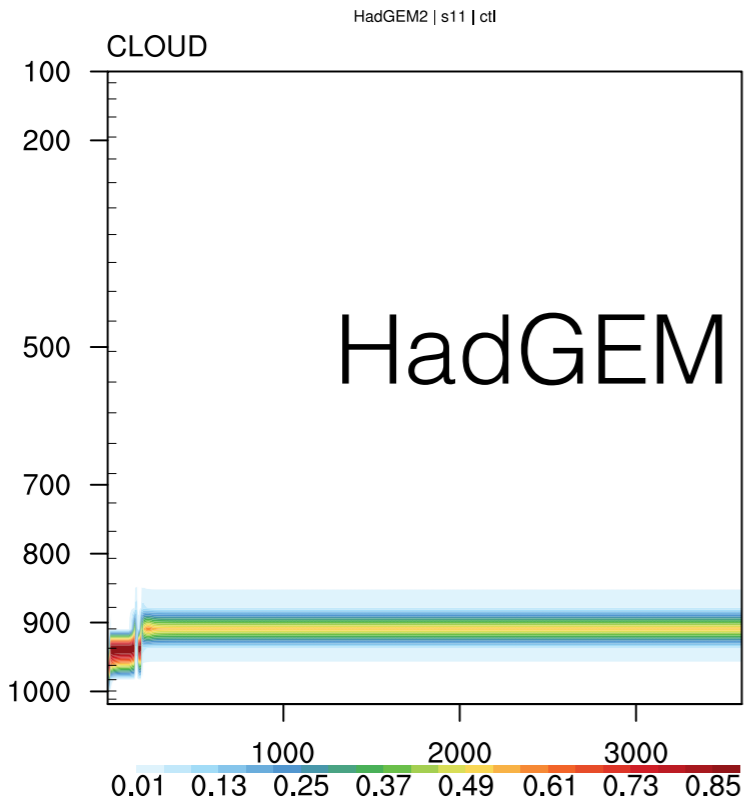
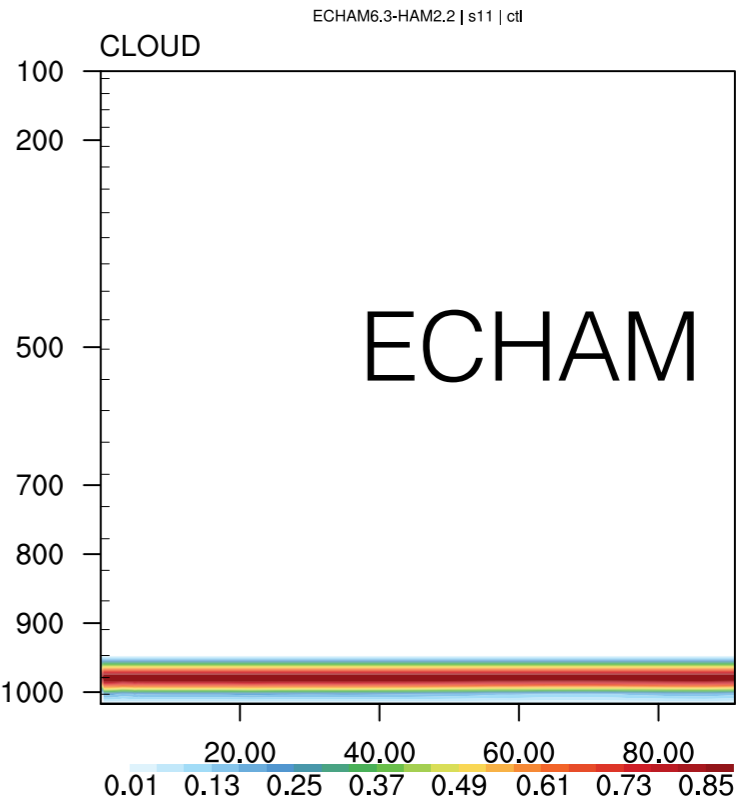
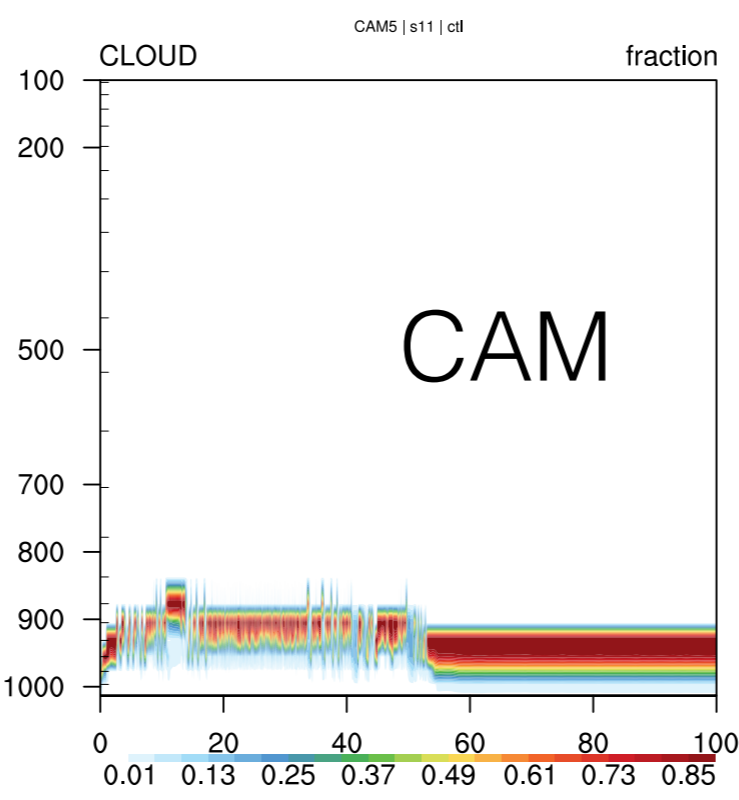
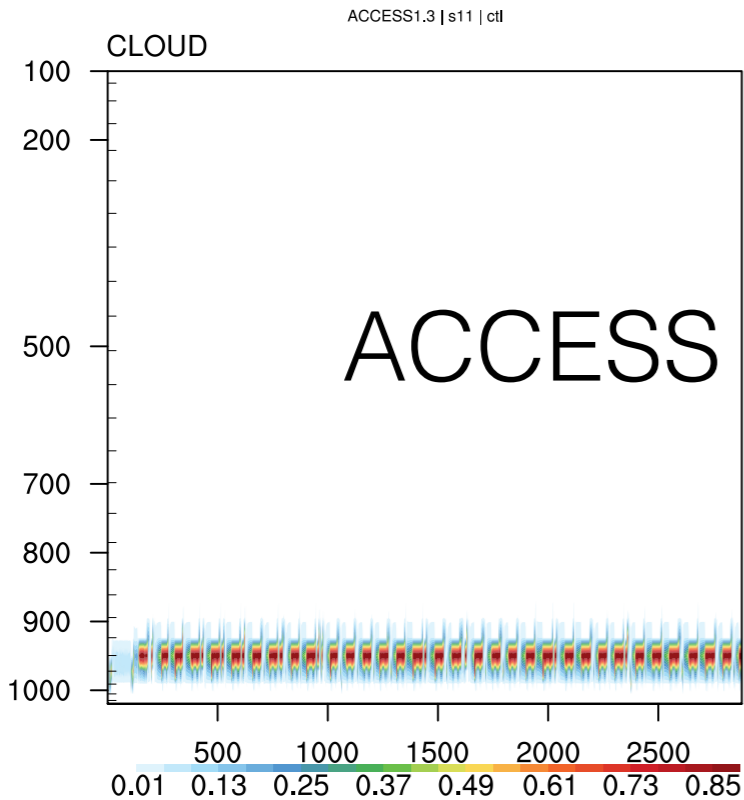


- ▶ Steady forcing.
- ▶ Sites: S12, S11, S6
- ▶ Runs: CTL, P2S, 4xCO₂ (plus MLI cases for S12, S11)
- ▶ ~100 days, hourly output
- ▶ Relax upper troposphere to T, q

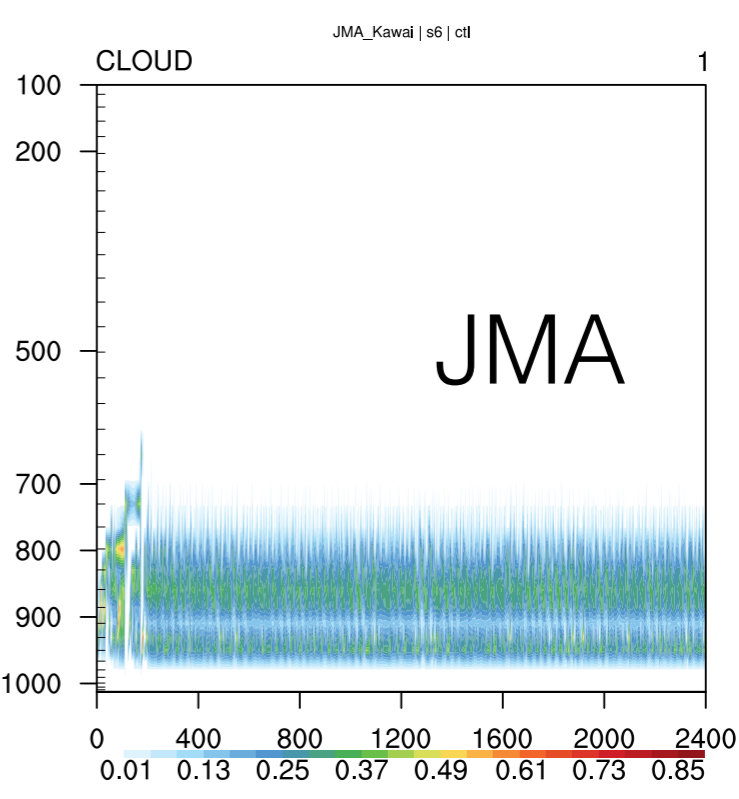
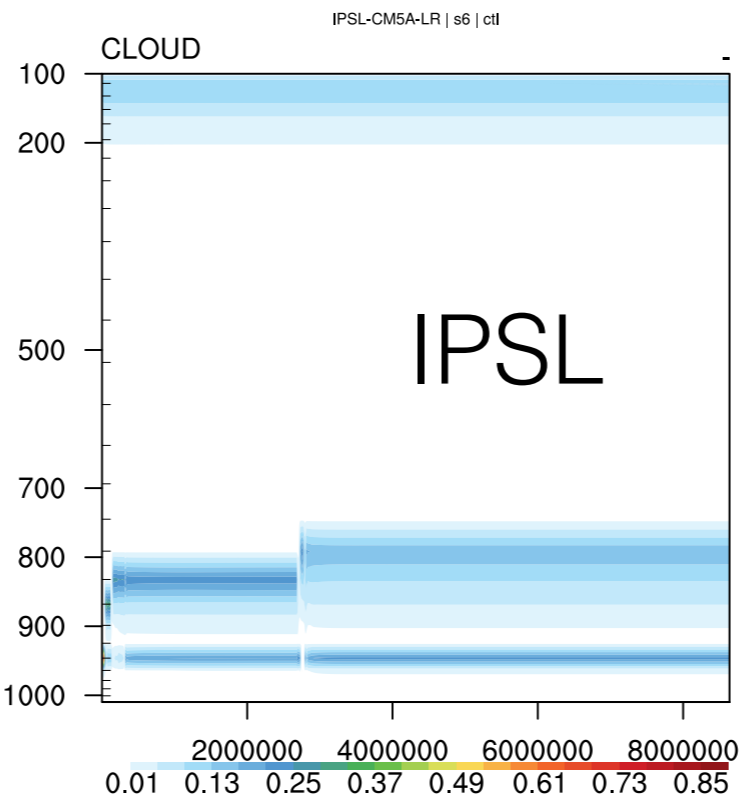
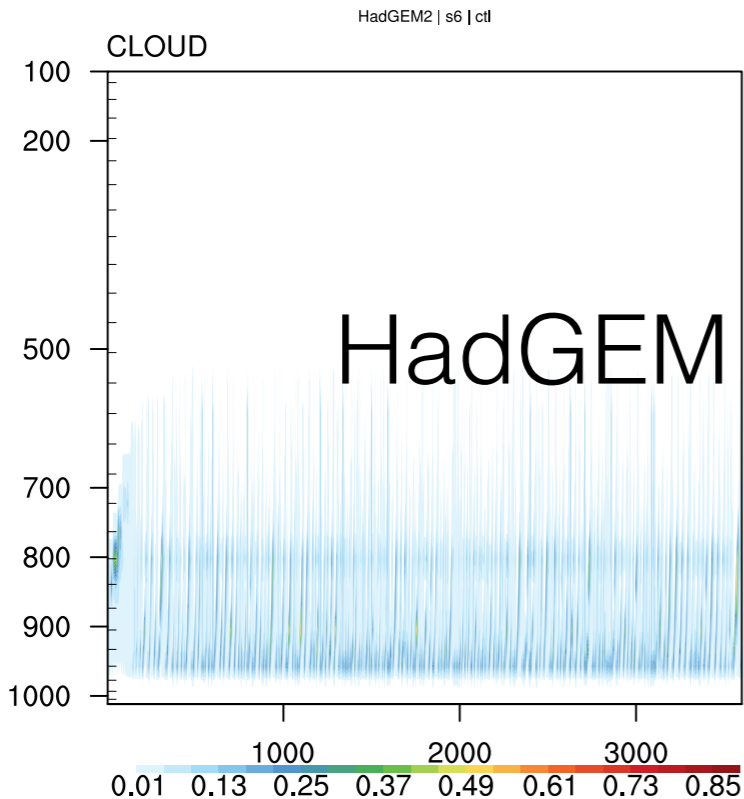
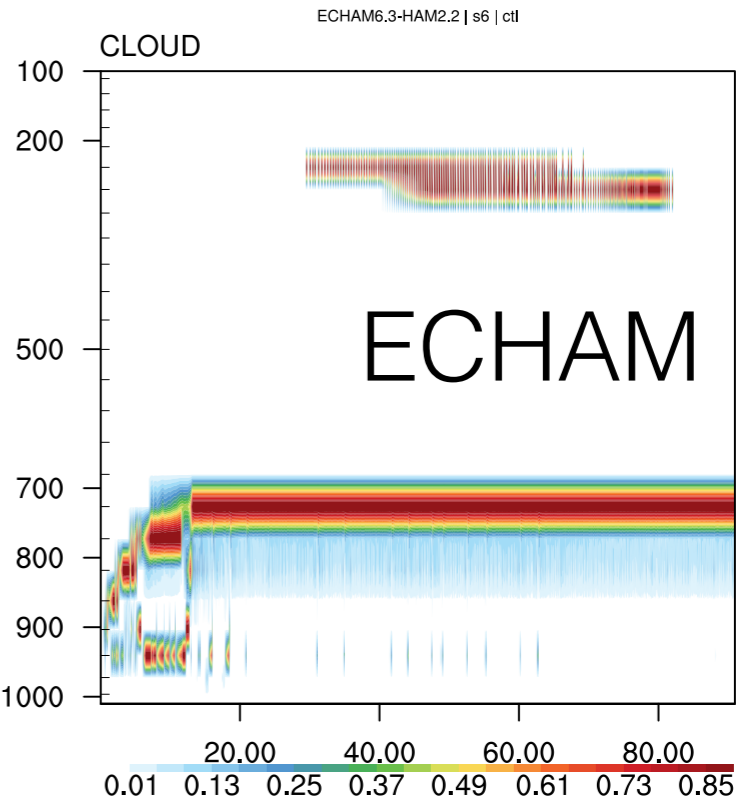
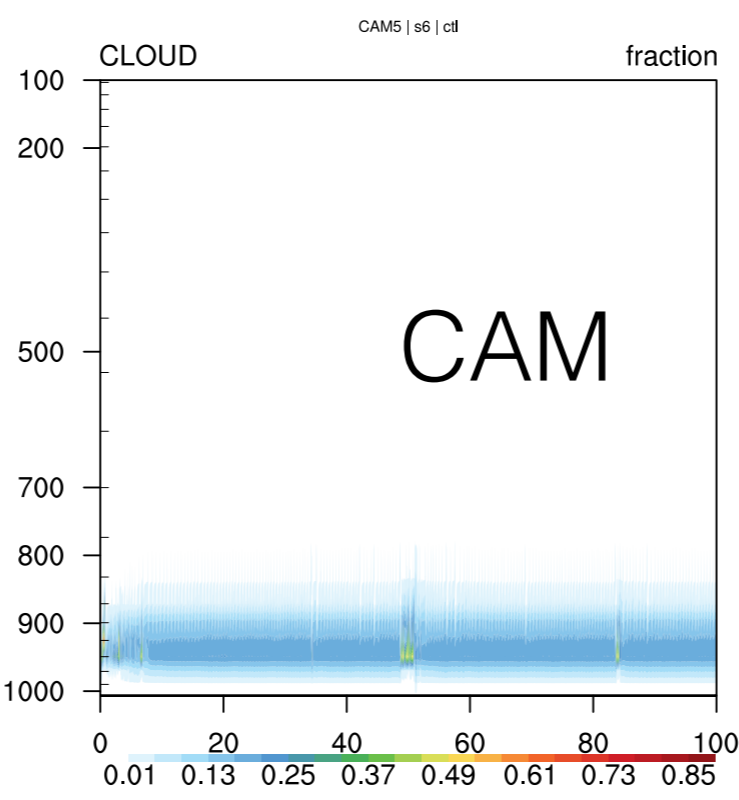
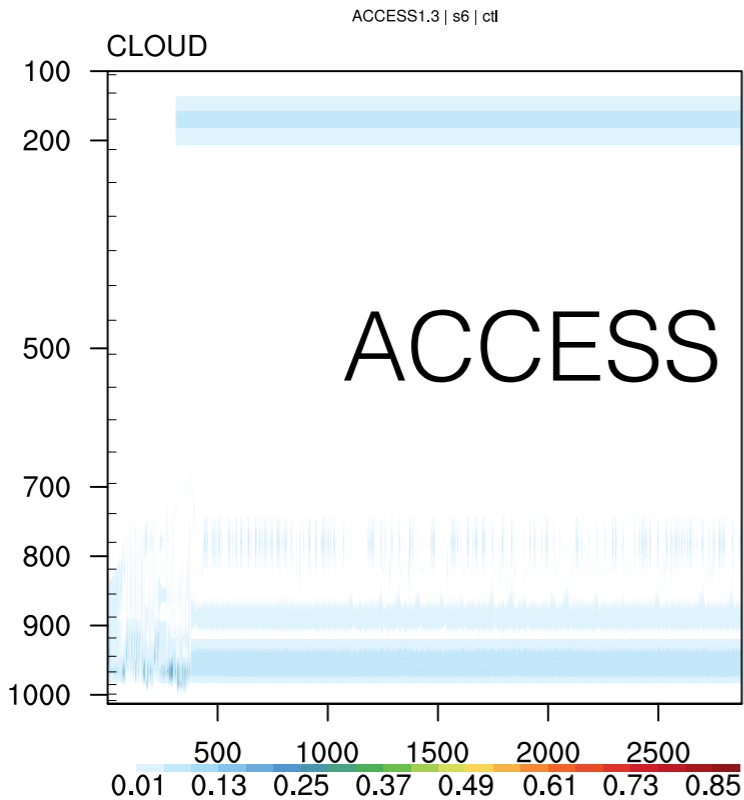
Cloud Fraction - Stratus - Control



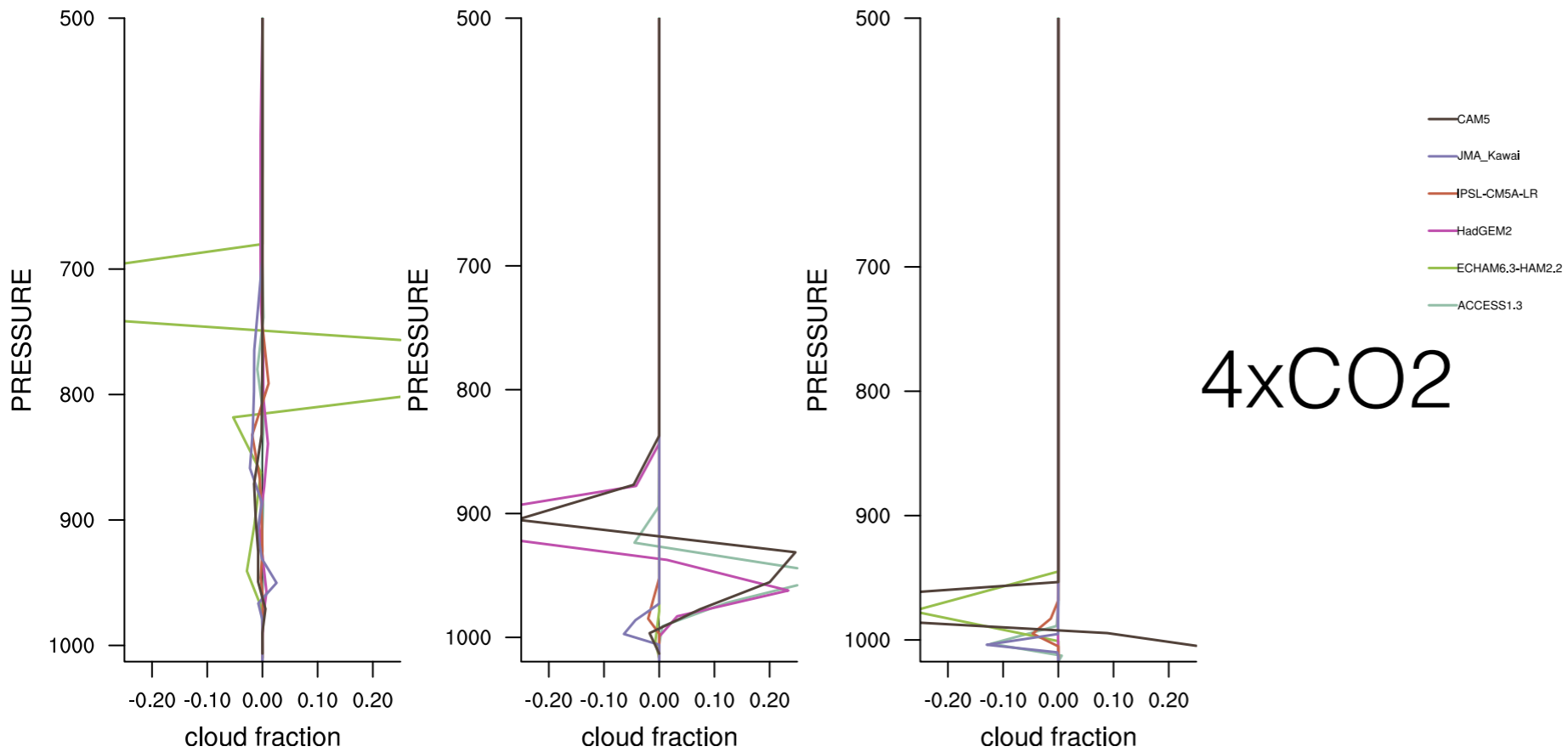
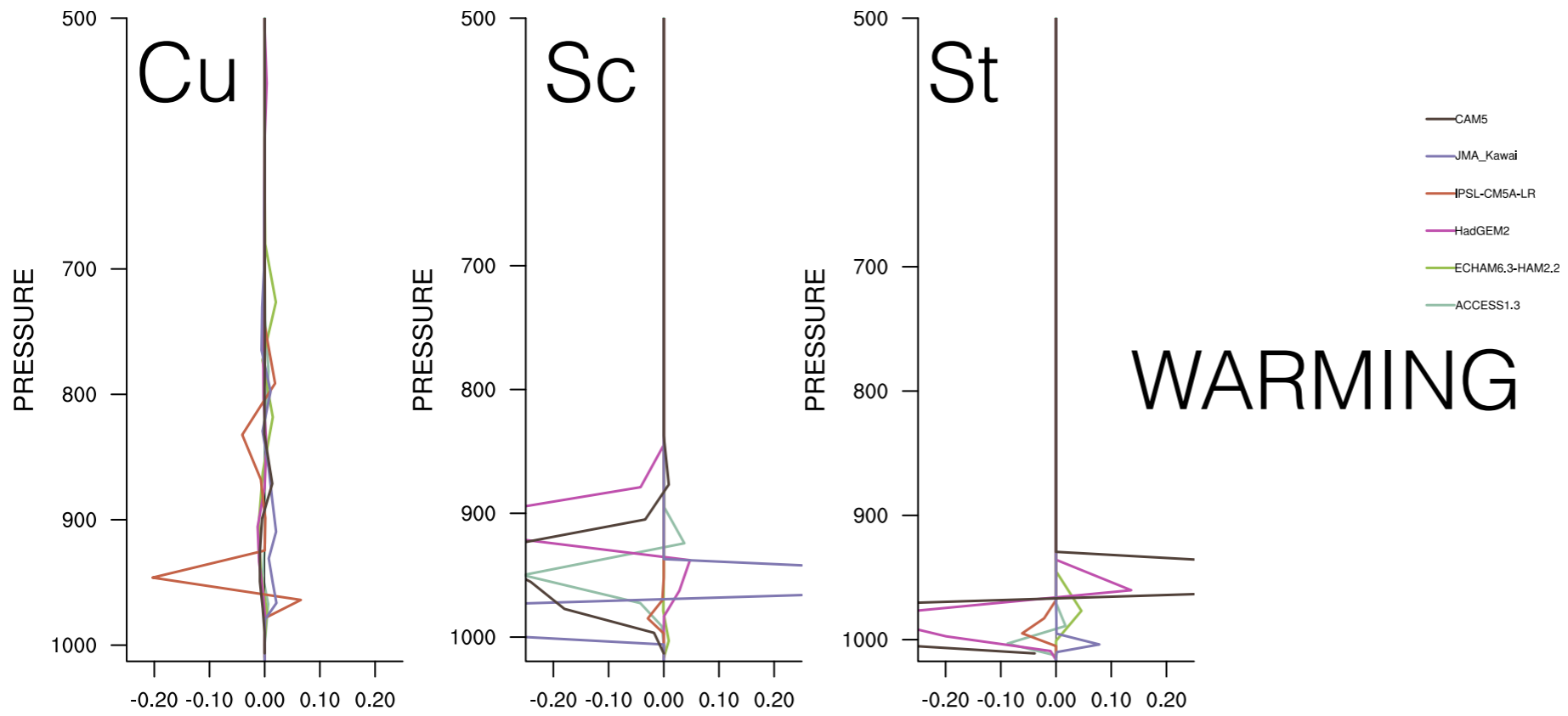
Cloud Fraction - Decoupled Stratocumulus - Control



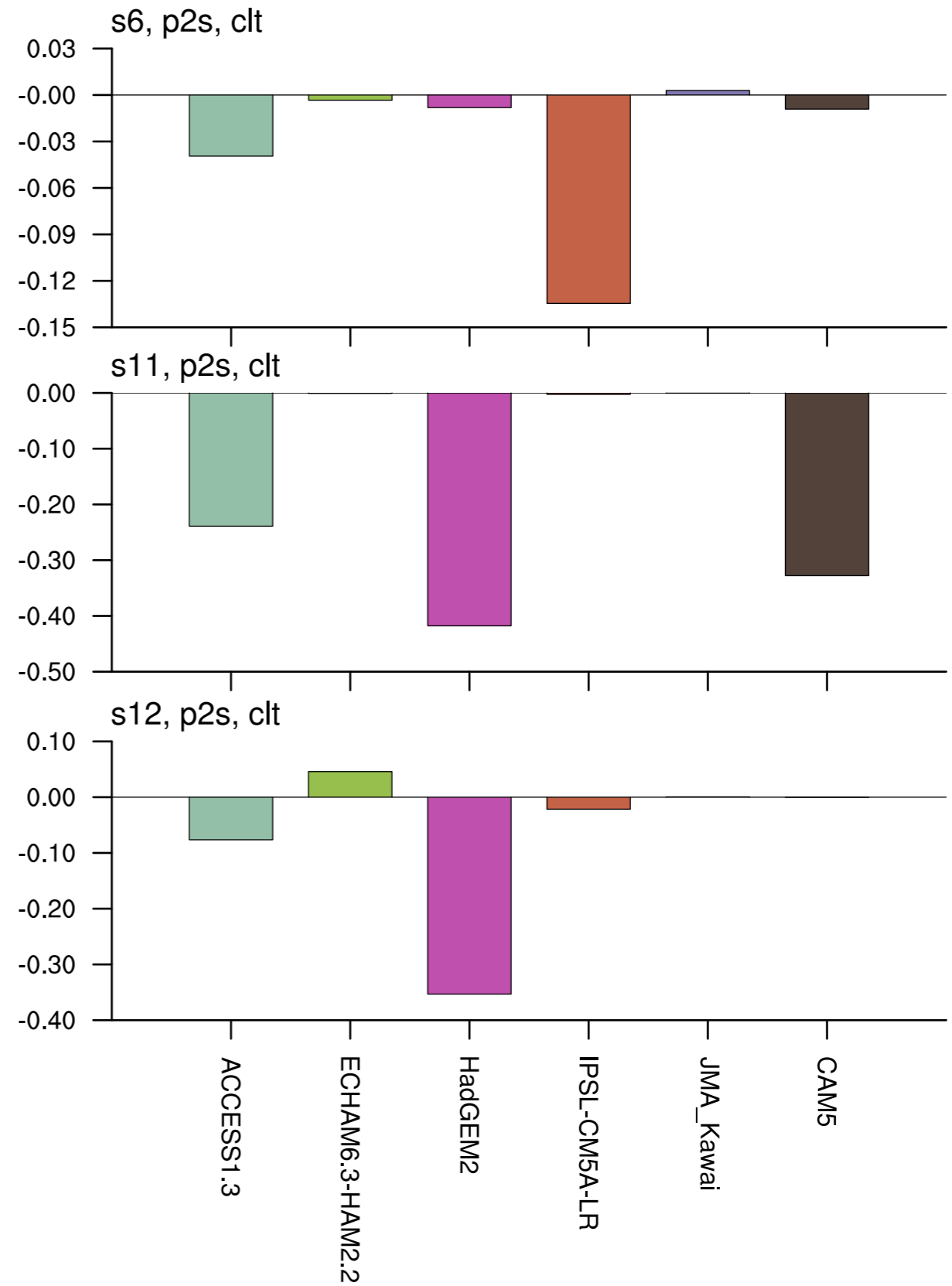
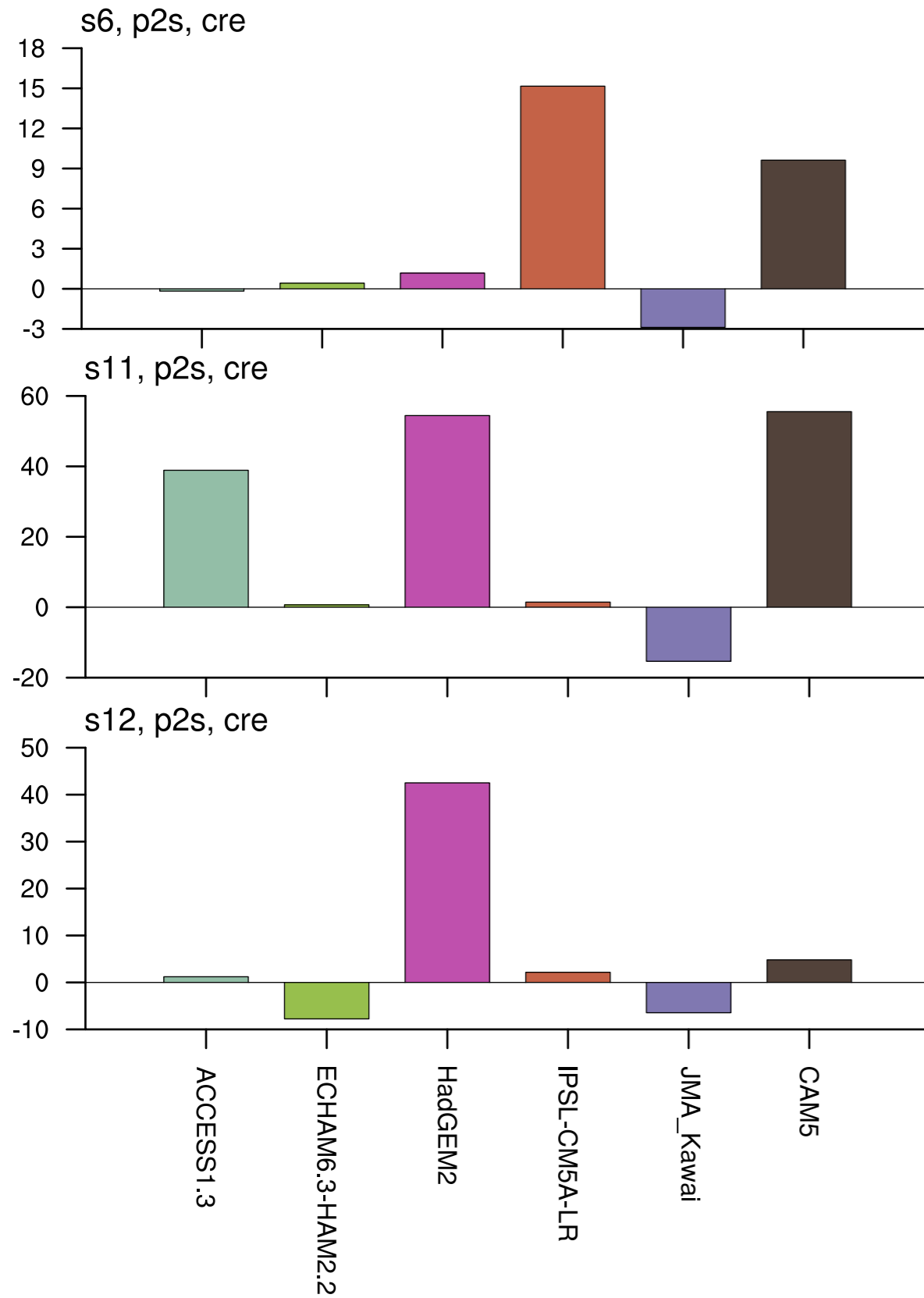
Cloud Fraction - Shallow Cumulus - Control



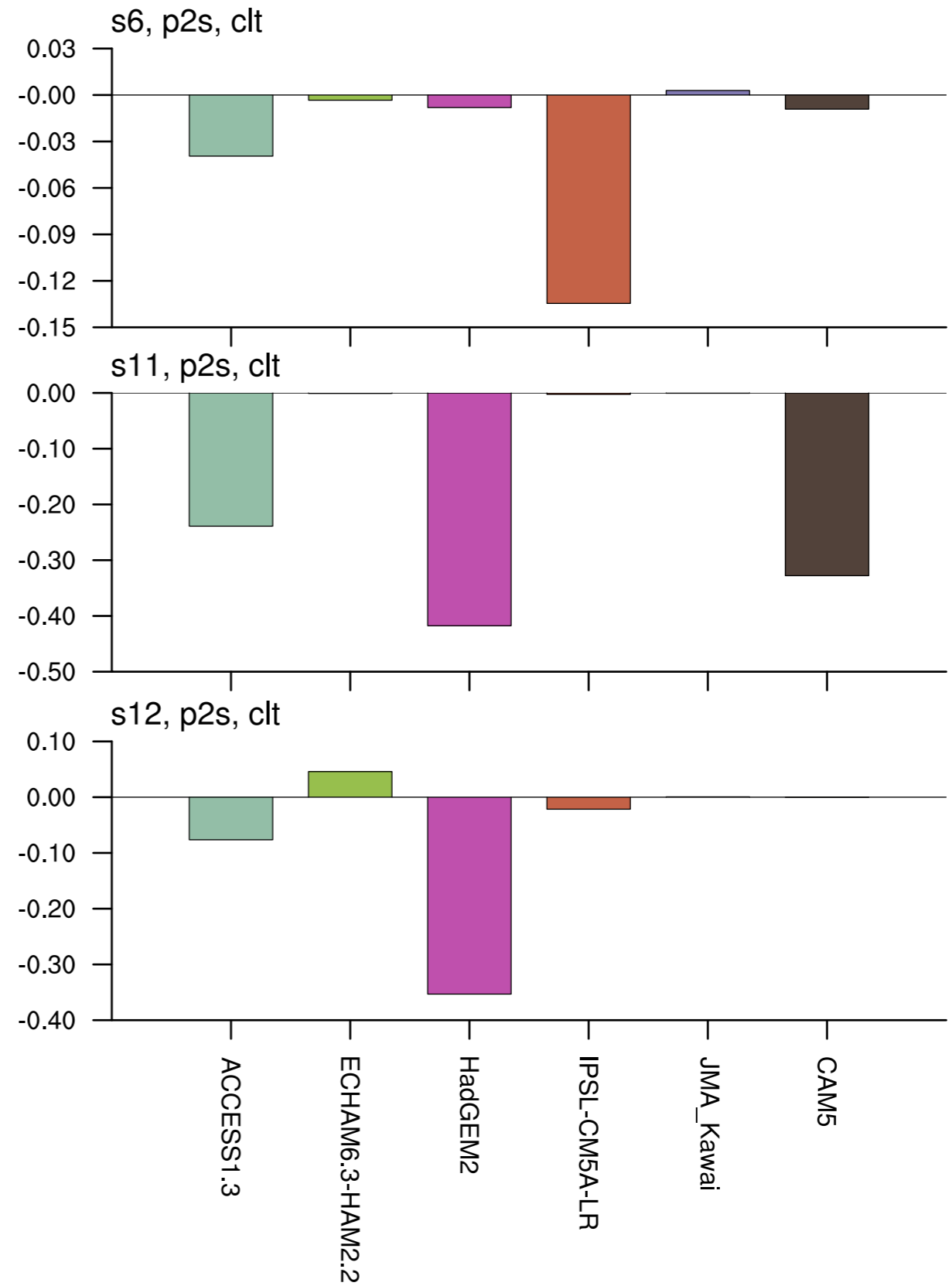
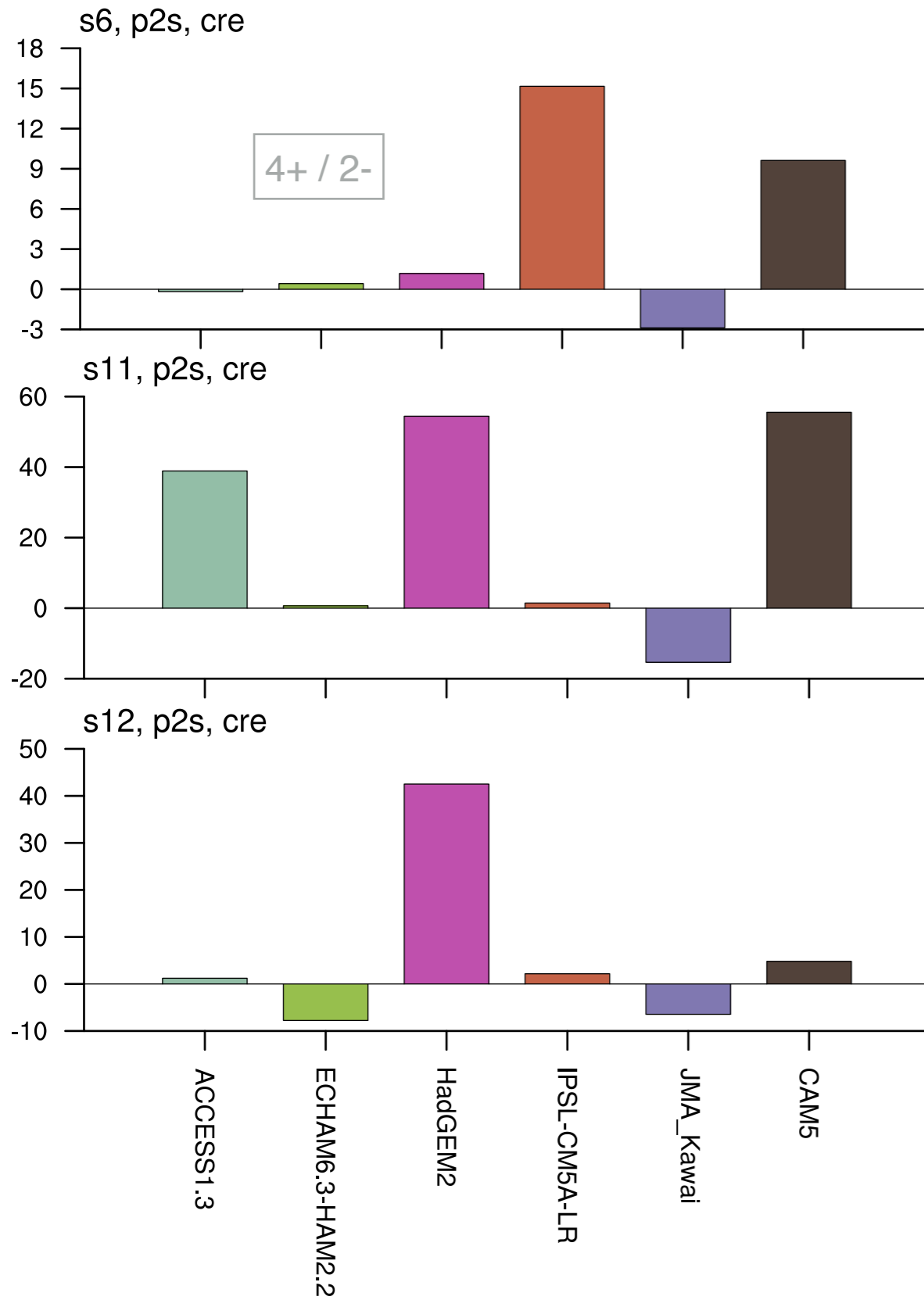
Cloud Fraction Response



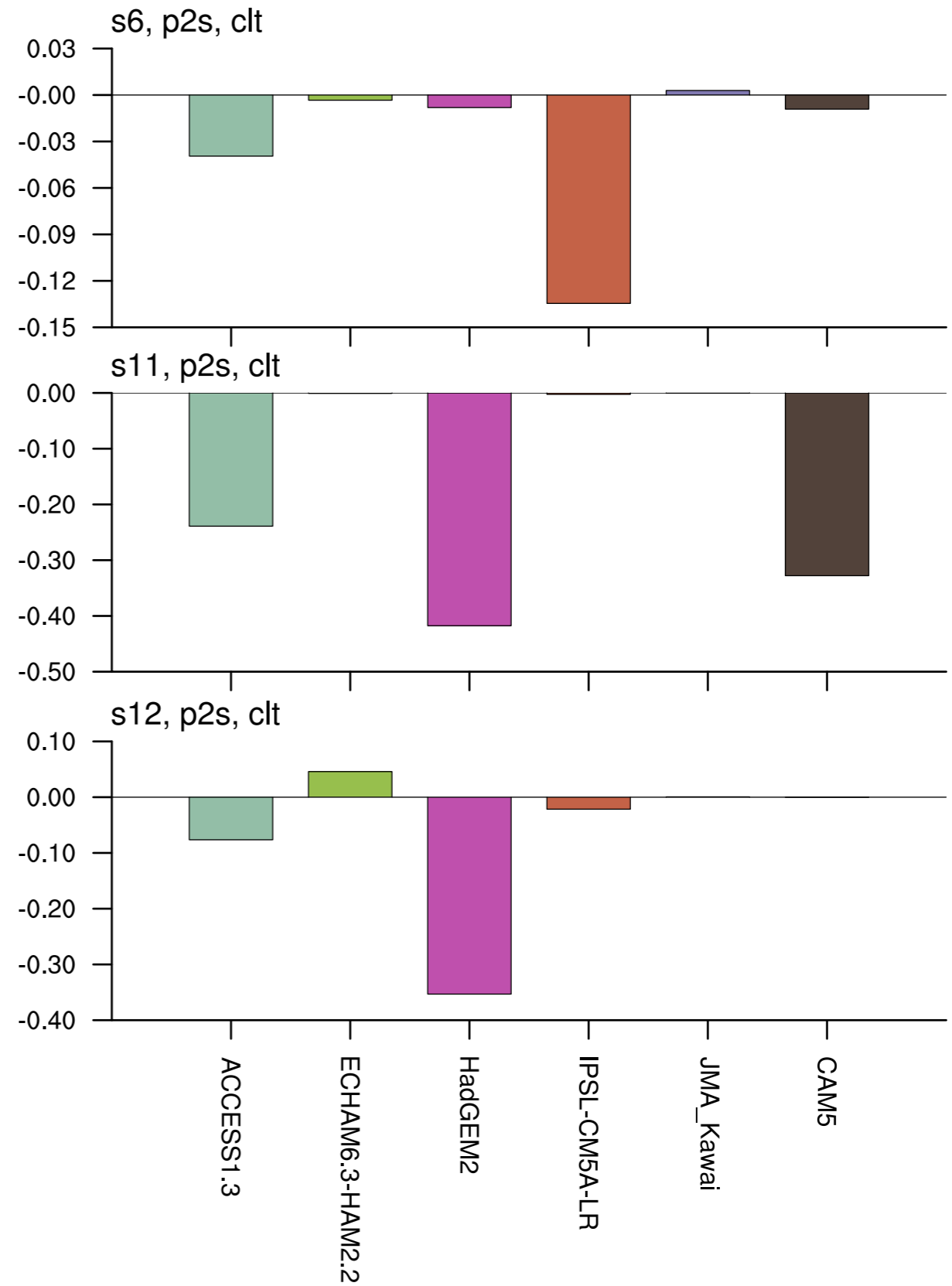
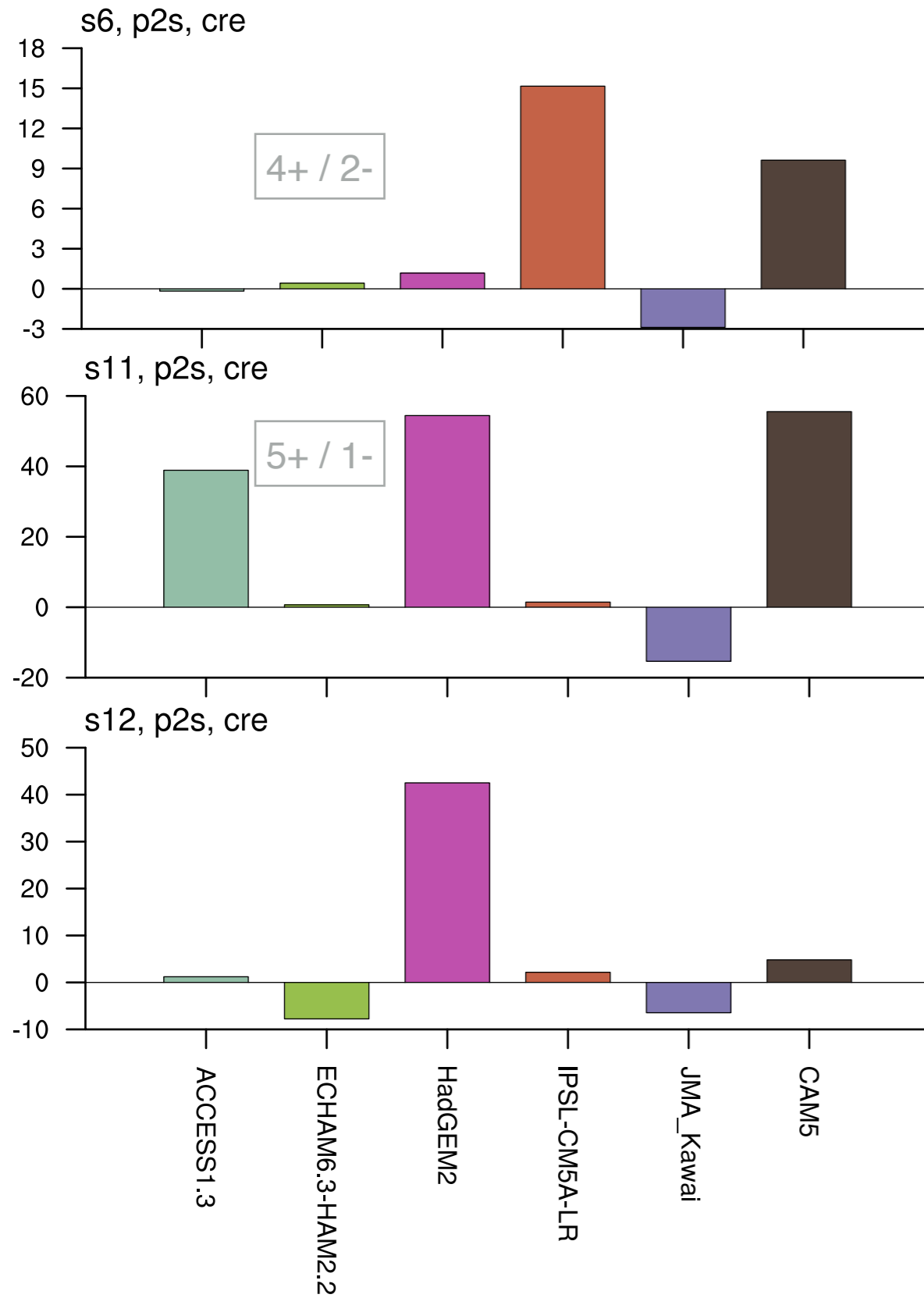
response to warming



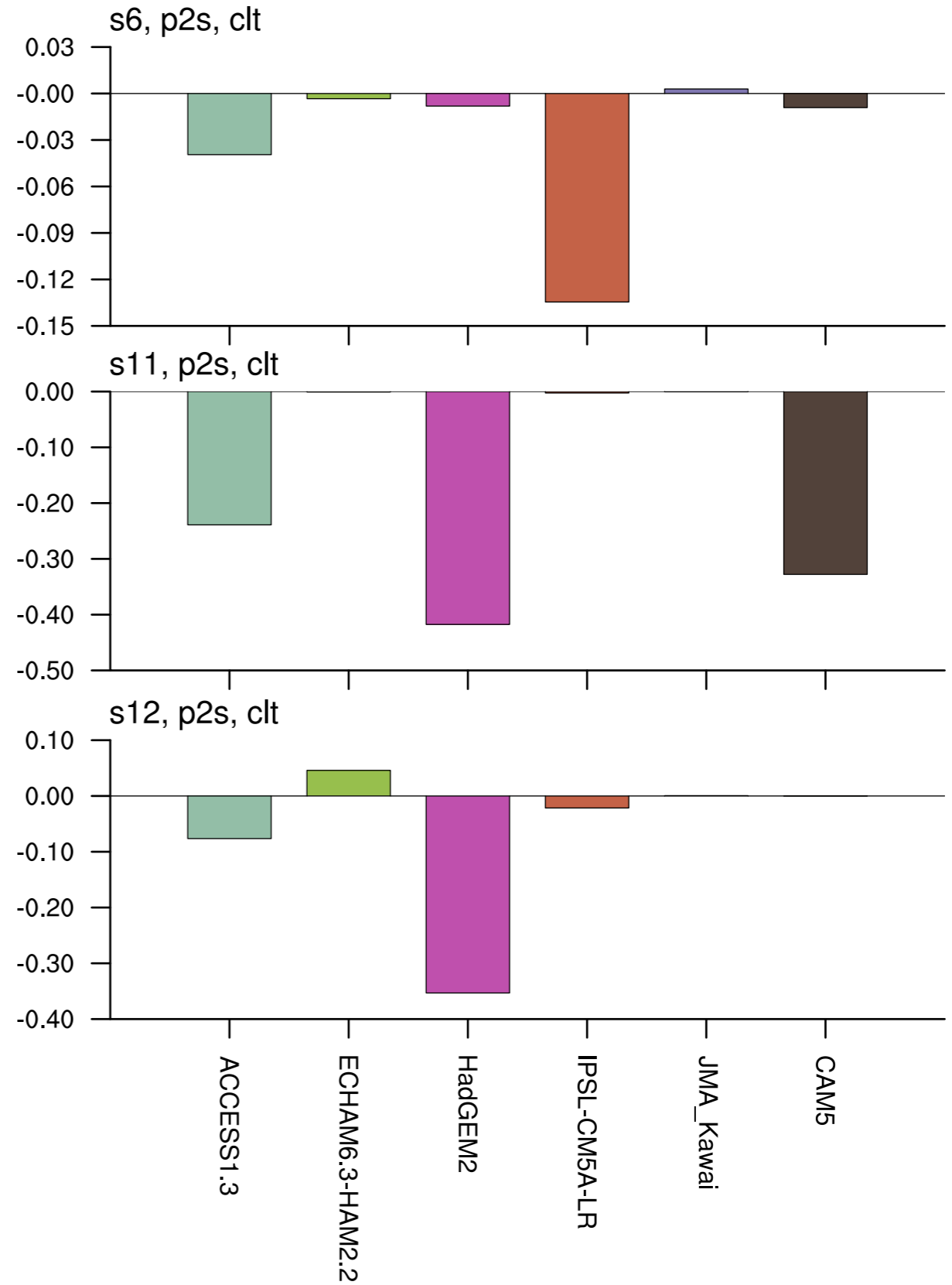
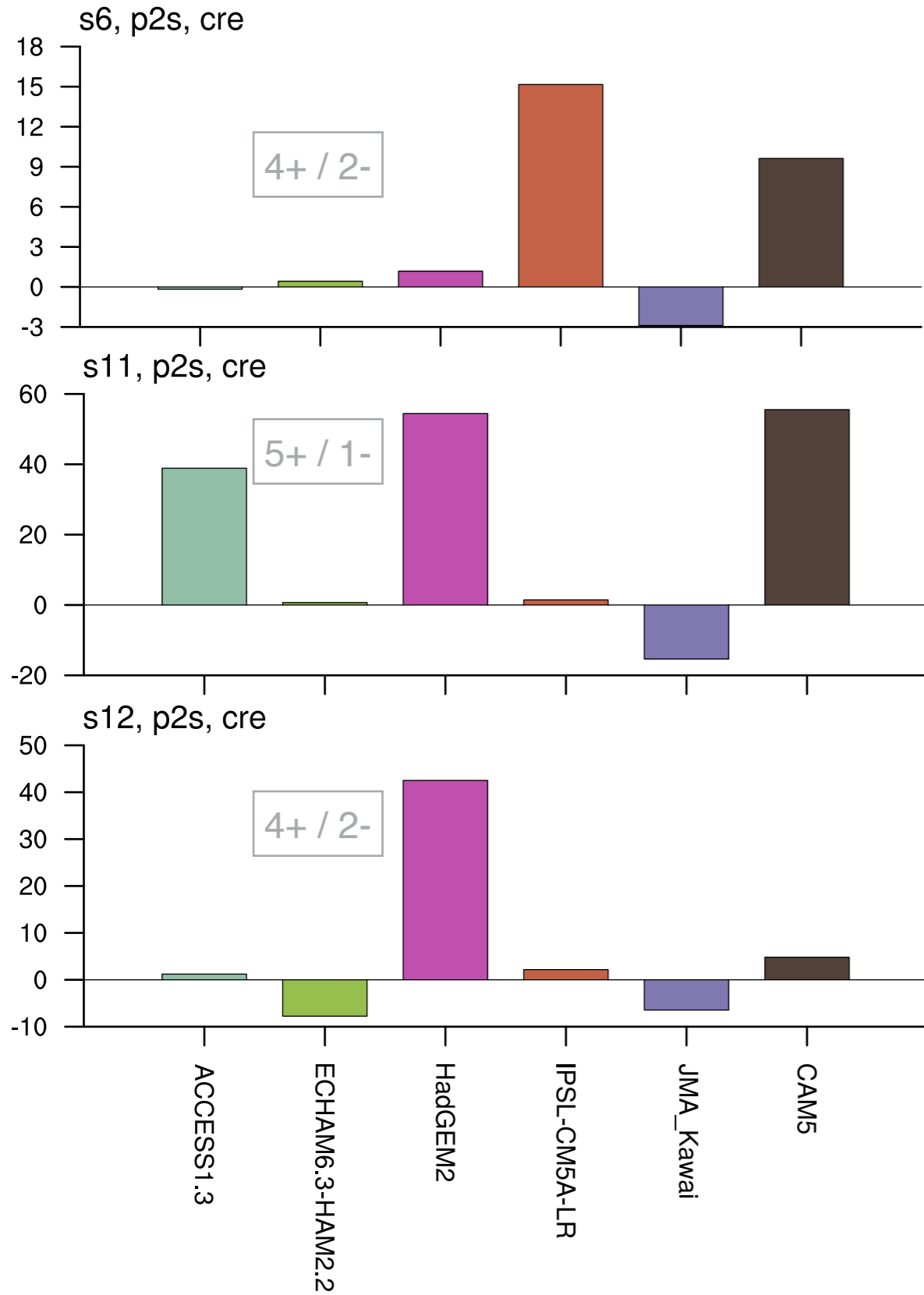
response to warming



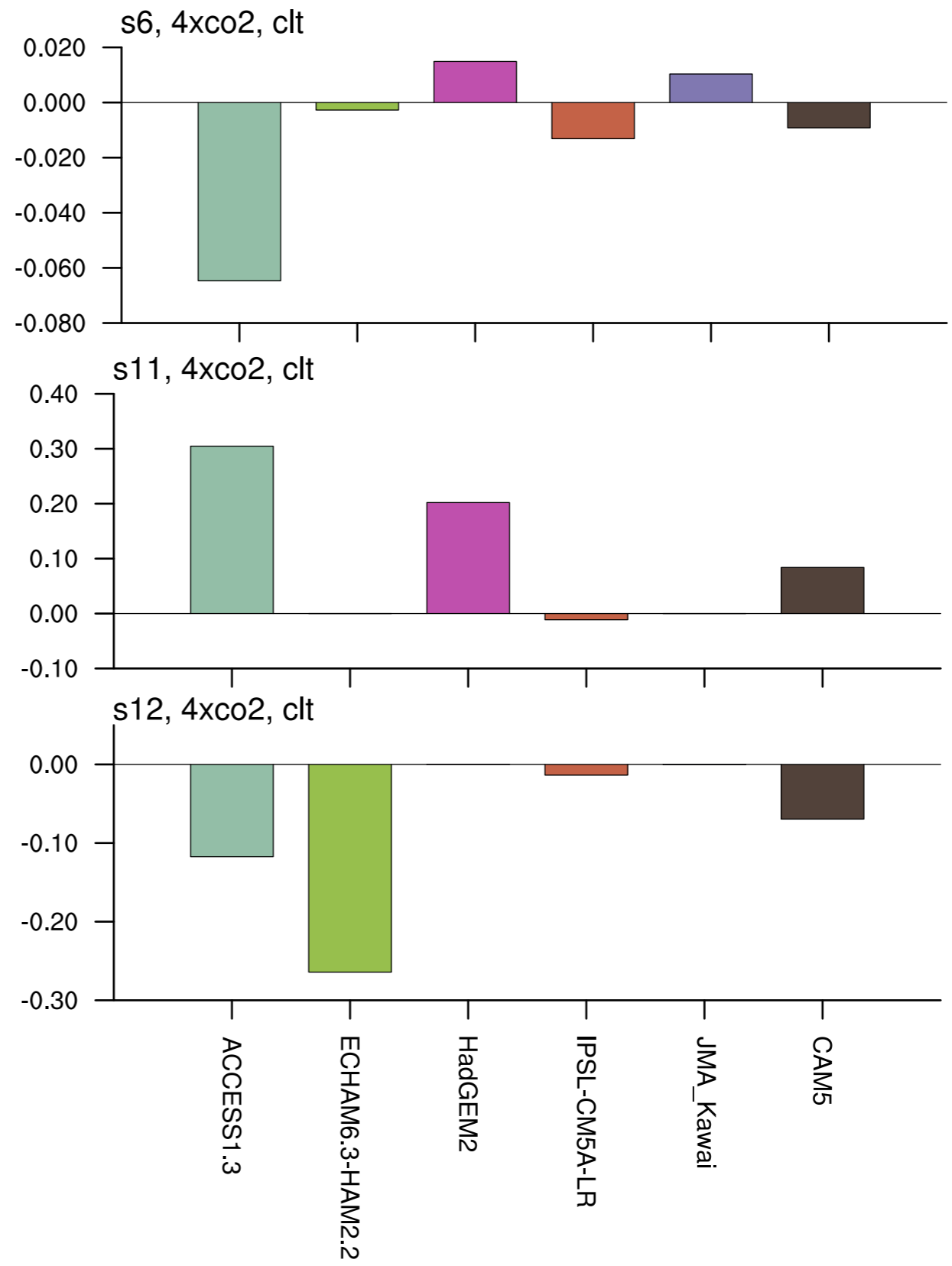
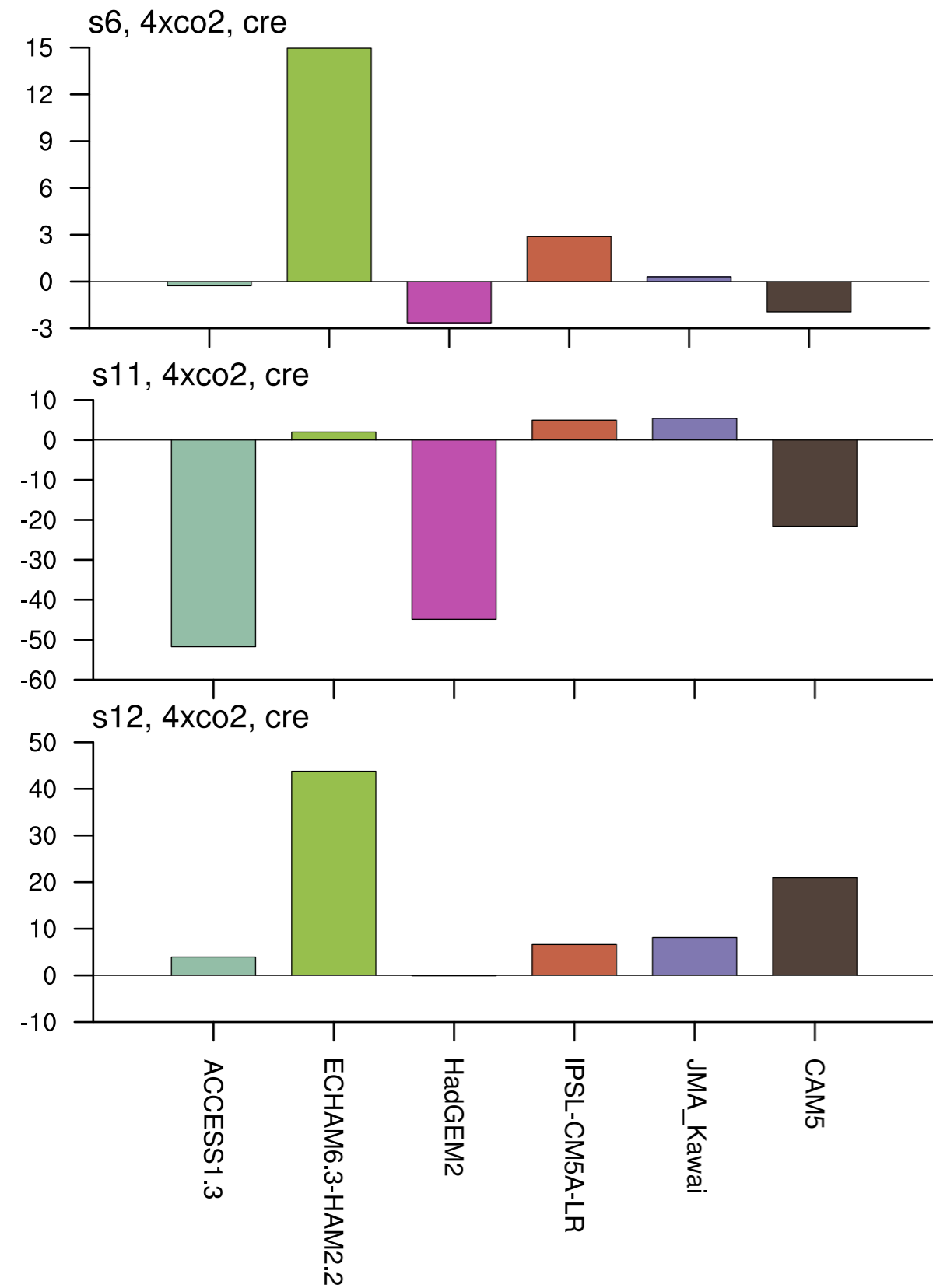
response to warming



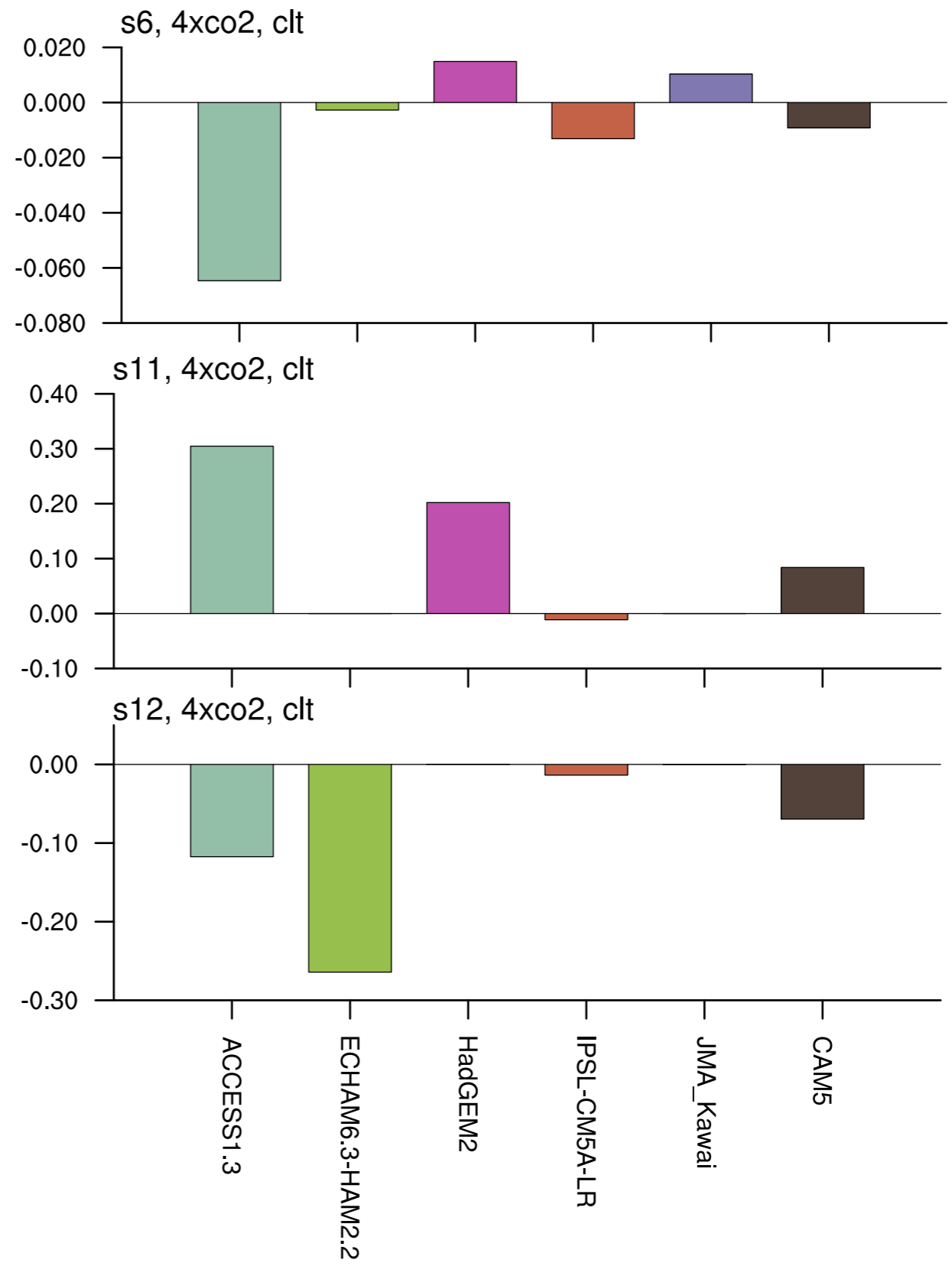
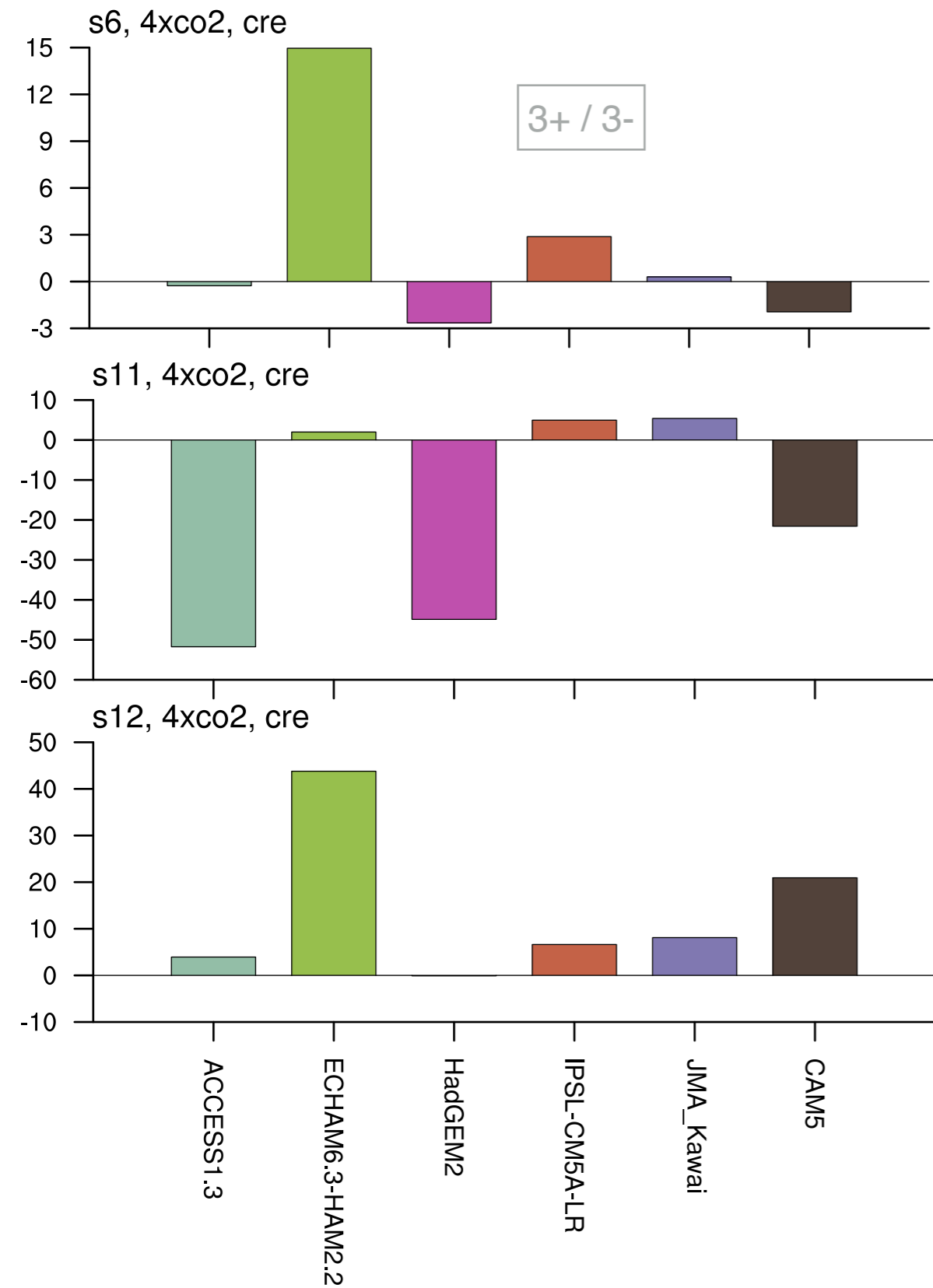
response to warming



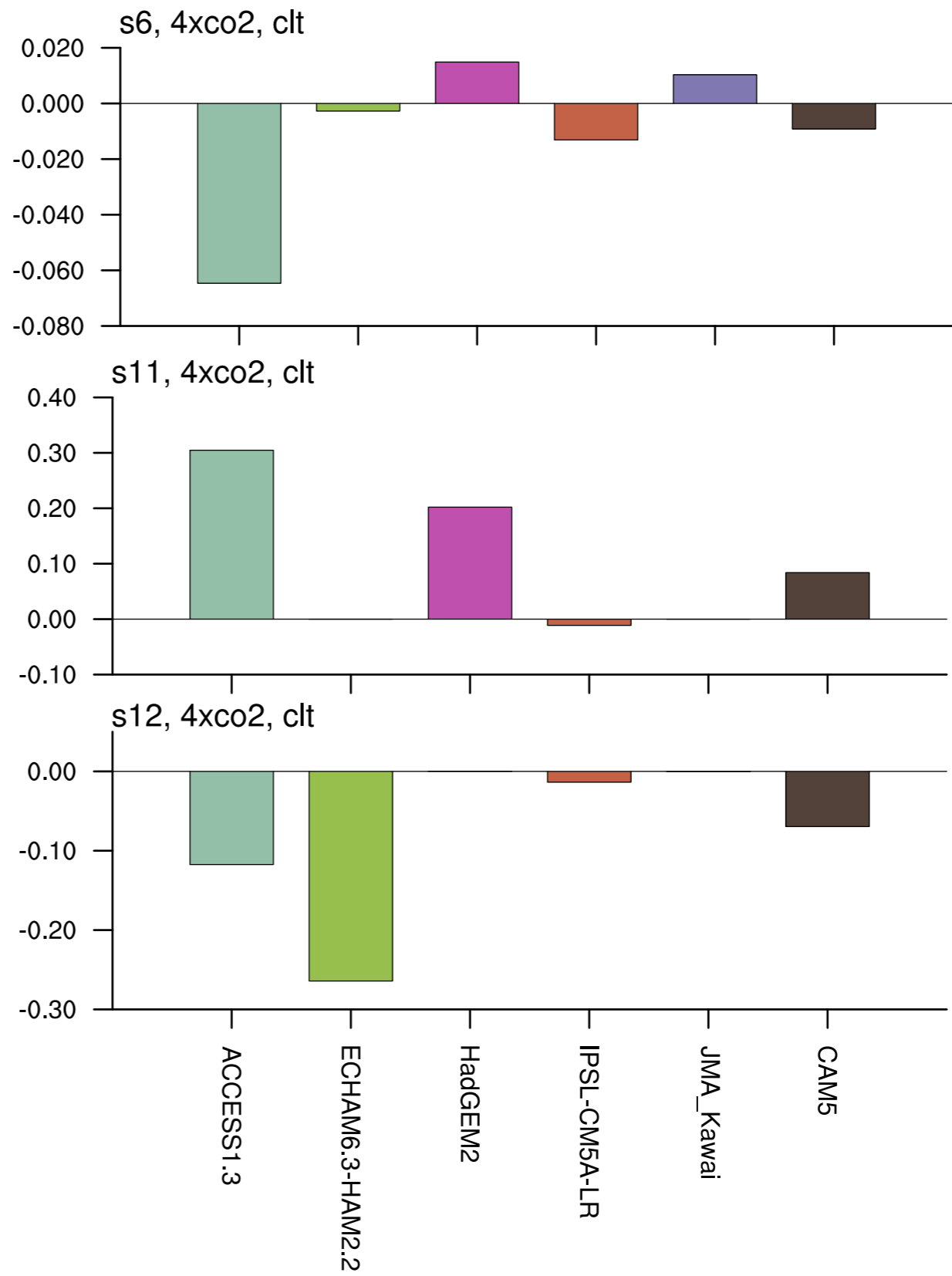
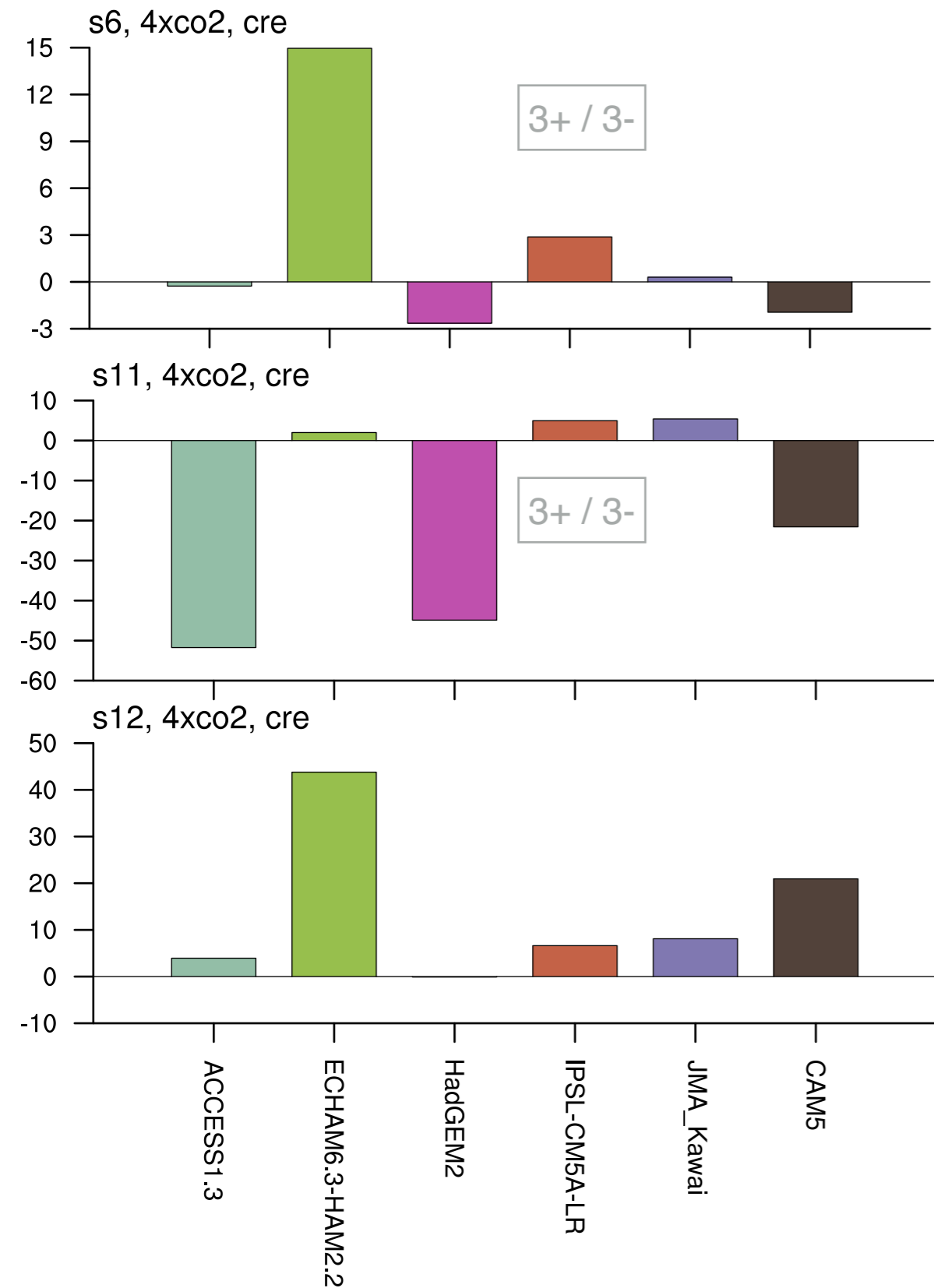
response to 4xCO₂



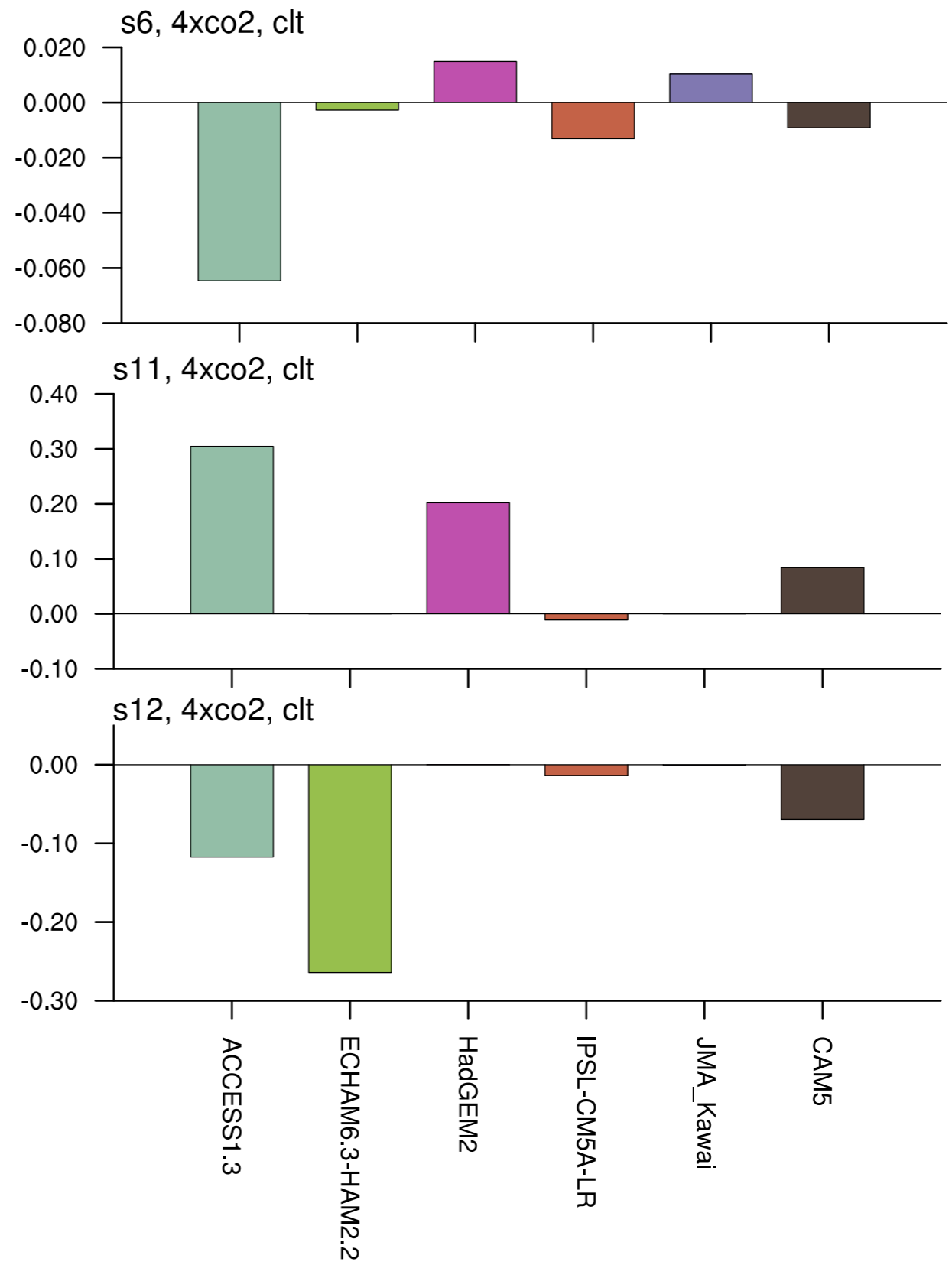
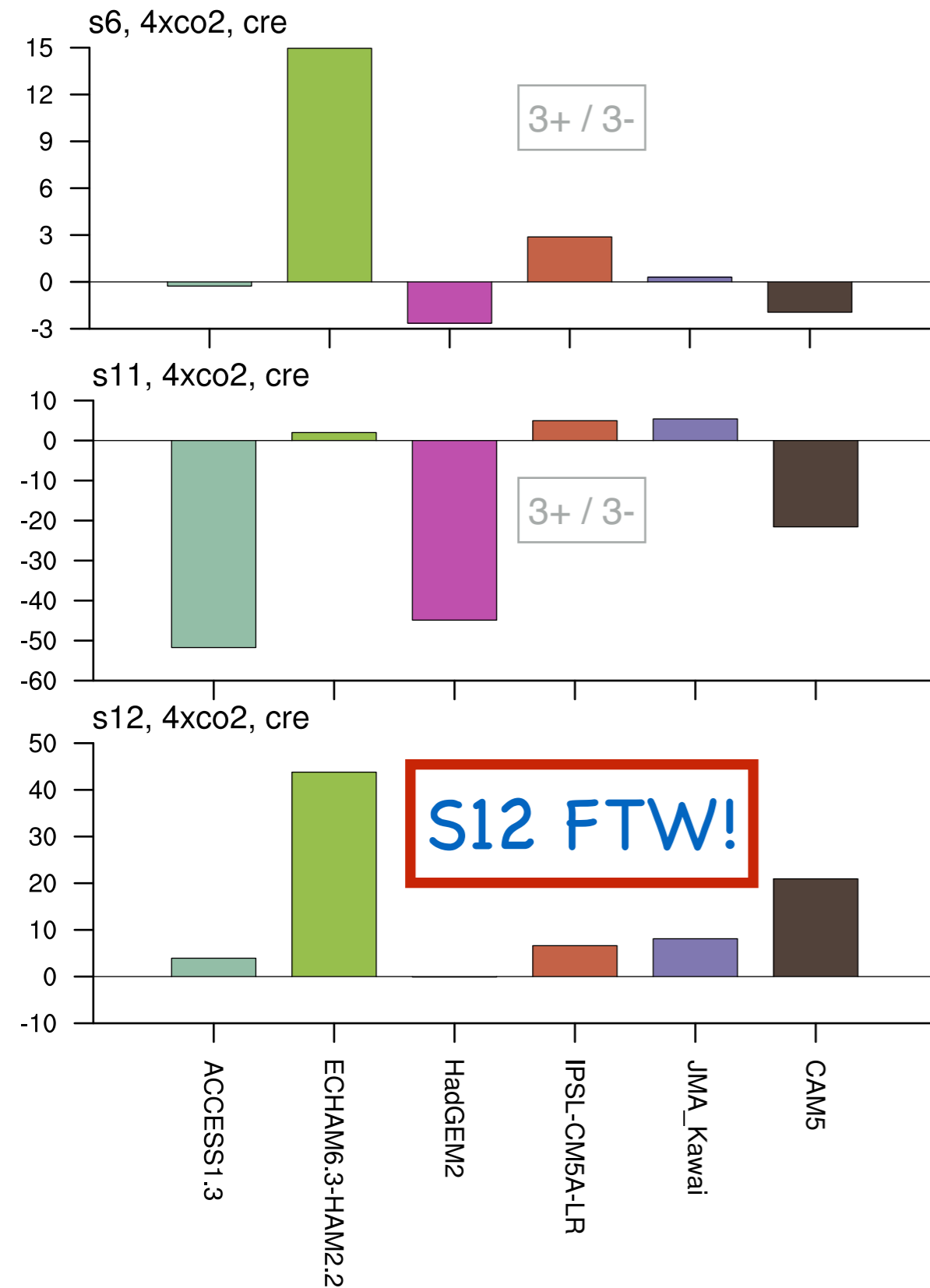
response to 4xCO₂

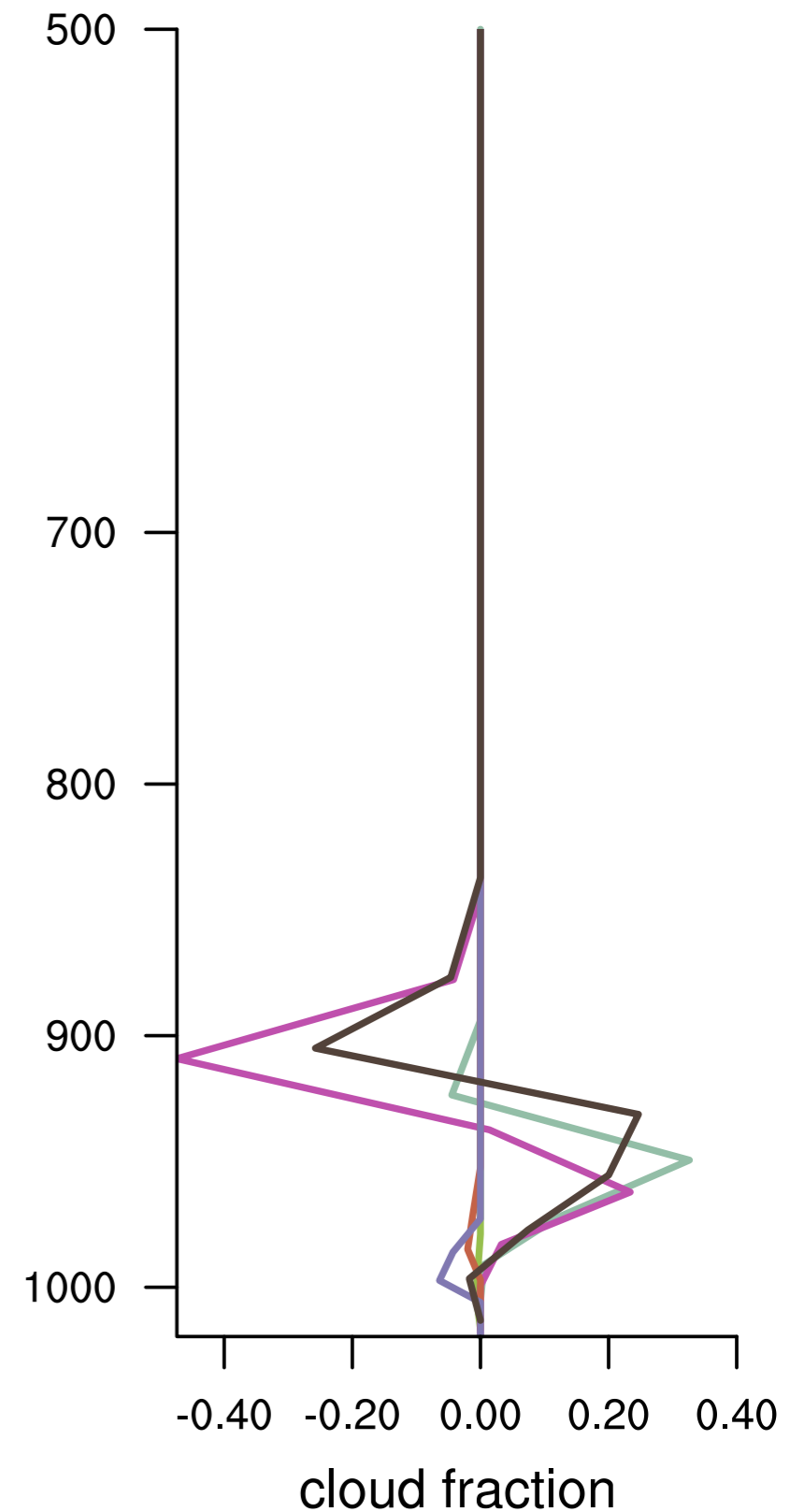
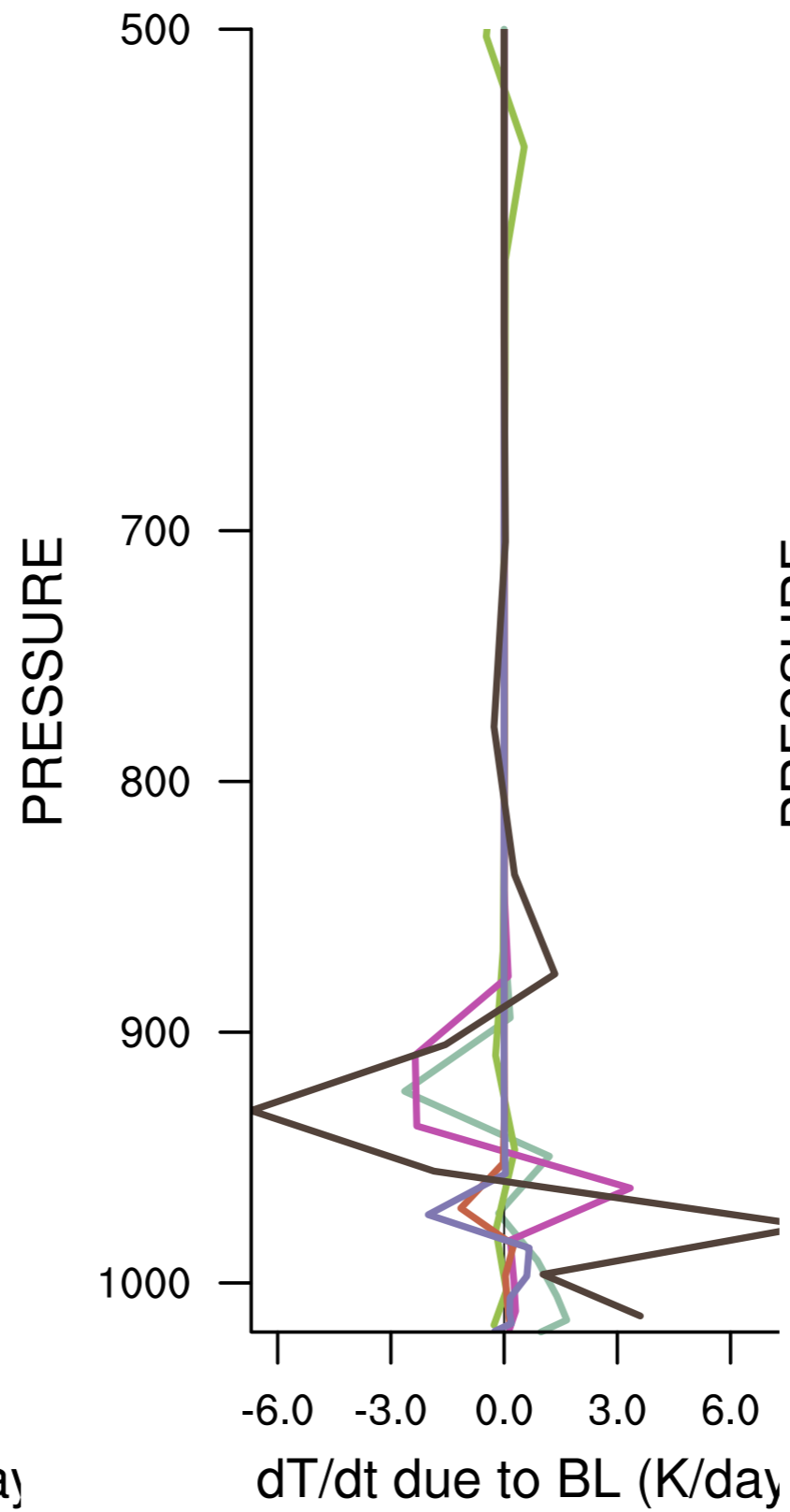
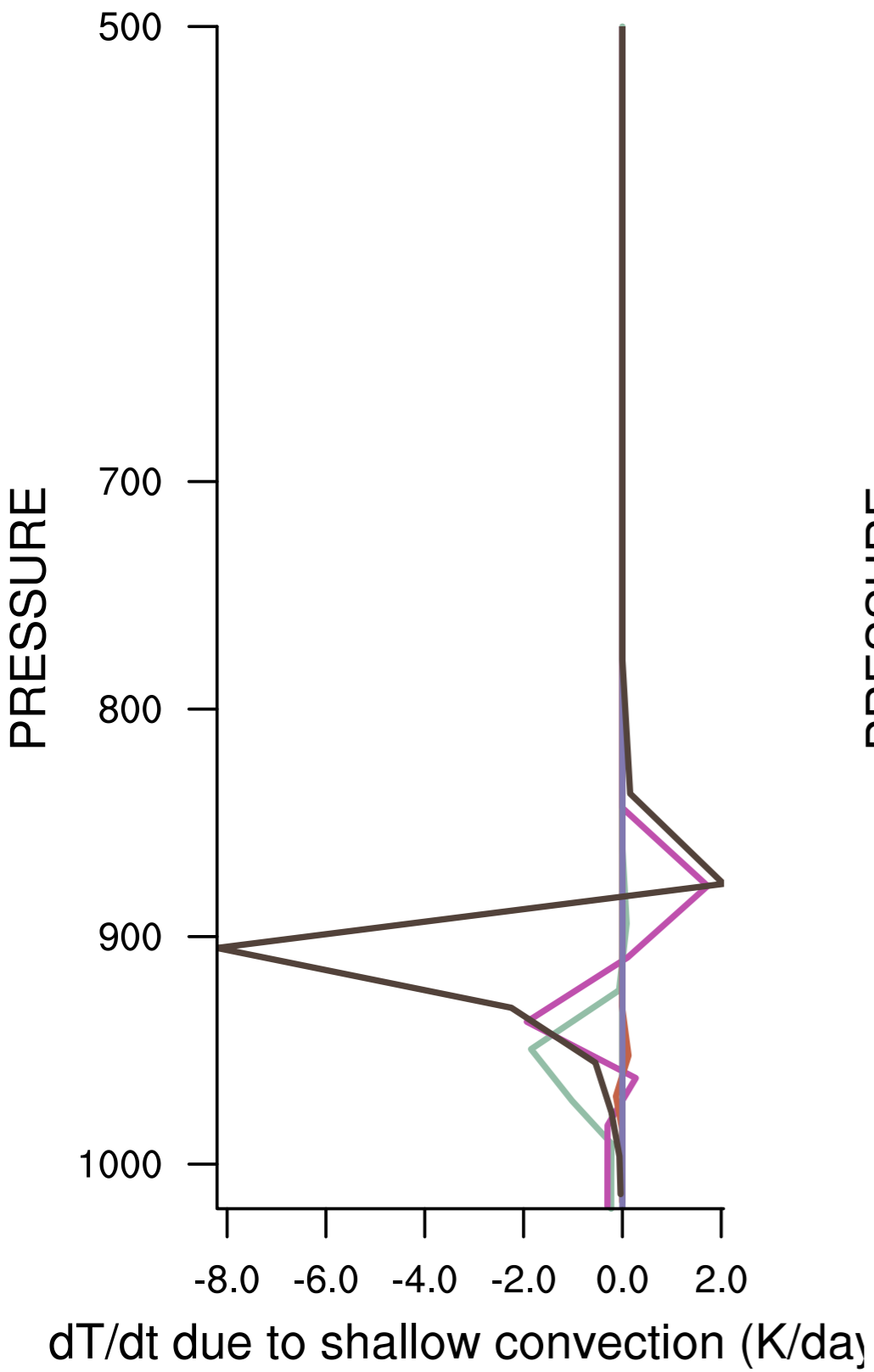


response to 4xCO₂



response to 4xCO₂





Summary & Outlook

- ▶ Warming results are (mostly) consistent with CGILS1
 - alternative “MixedLayerInit” forcing produces (mostly) consistent results
- ▶ 4xCO₂ results:
 - St: positive feedback
 - Sc/Cu: 3+ and 3- , likely related to differing shallow convection response
- ▶ Discussion Topics
 - Should we be looking at different experiments?
 - More models always welcome.