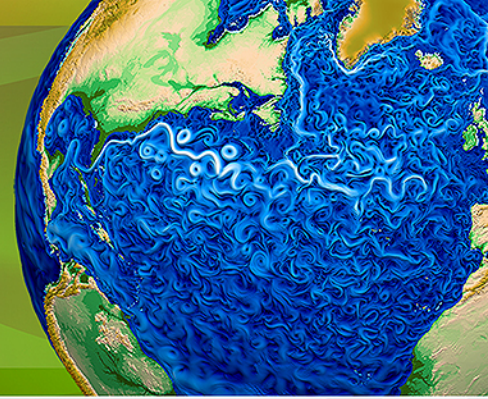




Accelerated Climate Modeling
for Energy



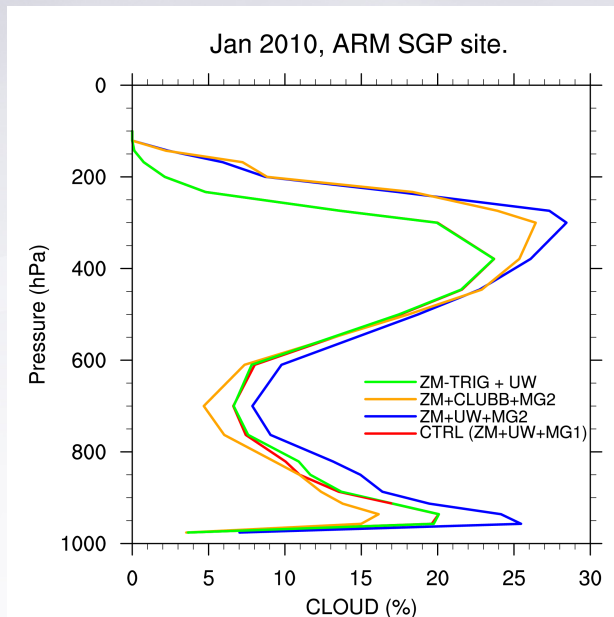
Single-Column Modeling in ACME

Peter Caldwell, Jeff Johnson, Kai Zhang, ... and you?

What is the SCM?

When driven by winds, advective tendencies, and surface fluxes, a single column from the GCM can be run in isolation. This is useful for:

1. Computational efficiency
2. Deep understanding of processes and their interactions



EXAMPLE: The SCM is already being used to test candidate convection schemes (see Fig)

- running many different cases is easy
- the SCM is driven by and hence can be evaluated against observed data

Fig: SCM runs using candidate convection schemes driven by observations for Jan 2010 at ARM SGP site.

SCM Short-term (Q4-Q5) Plans

- We will collect canonical SCM cases spanning important climate regimes and make them available on the web (see Fig)
 - Idealizations for each cases will be added to git Master and triggered by flags in run scripts
 - Input and validation data will be available for download
 - Expected output will also be available for sanity checks
- The SCM will be used for nightly testing (Lead = Jeff Johnson):
 - "Victory conditions" will be established for each canonical case
 - These conditions will be tested by the ACME automated testing system in an SCM test suite/category.


<u>ACME SCM Webpage</u>						
DYCOMS RF01	drizzling subtropical Sc	iop file	run script	output	obs data	notes
MPACE-B	mixed-phase Arctic Sc	iop file	run script	output	obs data	notes
BOMEX	non-precipitating tropical ShCu	iop file	run script	output	obs data	notes
RICO	precipitating tropical ShCu	iop file	run script	output	obs data	notes
TWP-ICE	tropical oceanic DpCu	iop file	run script	output	obs data	notes
SPARTICUS	cirrus	iop file	run script	output	obs data	notes
 <more cases will be added as they are created>						

Fig: Mock-up of the SCM website we plan to create.

SCM Long-Term Plans

- Make SCM work with SE rather than the Eulerian dycore
 - Perhaps using coarse-res GCM w/ prescribed dynamics
- Make GCM write output for re-running a column in SCM mode
 - This can already be done with `-camiop` flag, but only for Eulerian dycore
- develop a strategy for improving relevance of SCM to GCM
 - SCM behavior is often different than that of GCMs. We will explore strategies (like stochastic forcing or higher vertical resolution) to solve this