

Decadal Climate Project model development

OCEANS AND ATMOSPHERE
www.csiro.au

Matt Chamberlain and Decadal Climate team

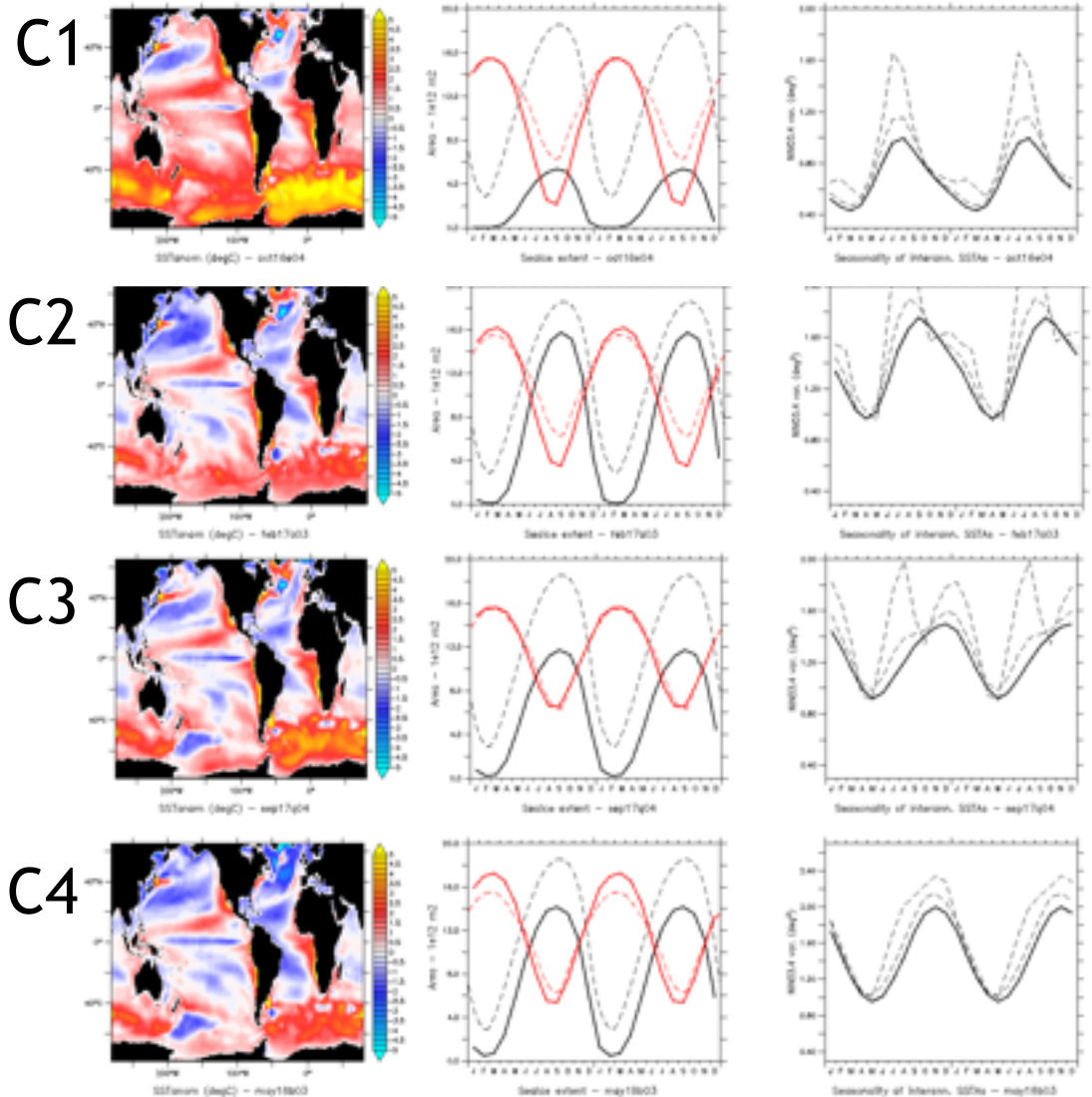


Overview

- Review existing control experiments, and tunings tested over the past 2 years.
- Mention ongoing model developments.
- Introduce Reanalysis experiments currently running: CAFE88, CAFE60.

Control Experiments

- C1 - GFDL CM2.1 namelist (with ACCESS ocean grid).
- C2 - restore ocean T+S below 2000 m.
- C3 - switch to biharmonic friction; higher ice albedos; no deep restoring.
- C4 - use biharmonic +laplacian schemes; differential ice albedo; GM_scaling 0.07 -> 0.10.



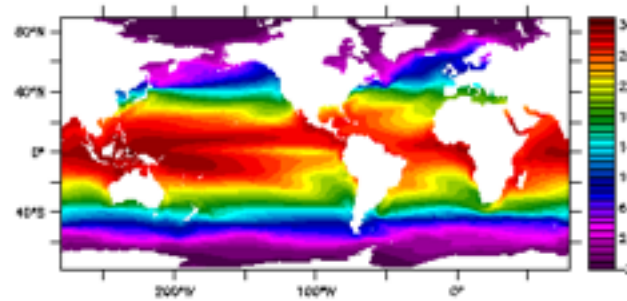
SSTanom

IceArea

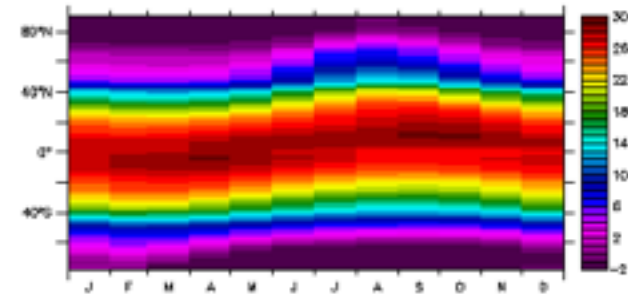
Nino3.4 cycle

Wave mixing

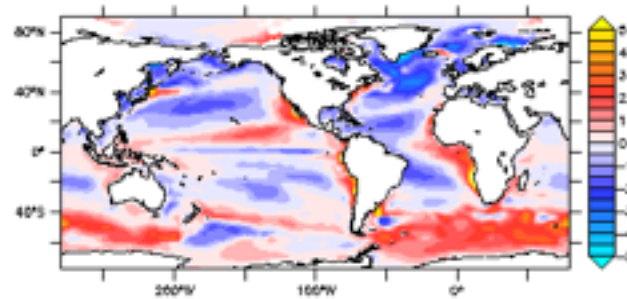
- Fox & Kemper 2015, added by Russ.
- Aimed at improving Southern Ocean warm summer bias (middle).
- Some improvement, effects are global (bottom).



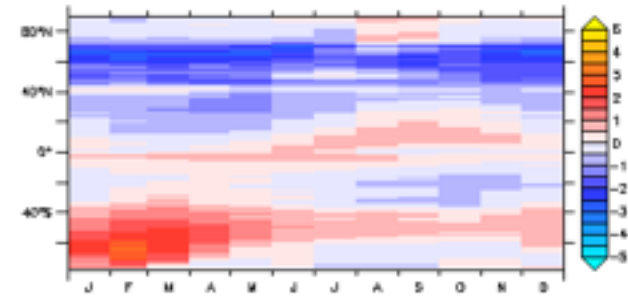
SST avg



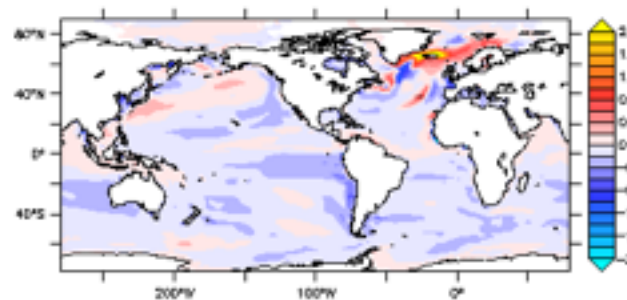
SST Hov



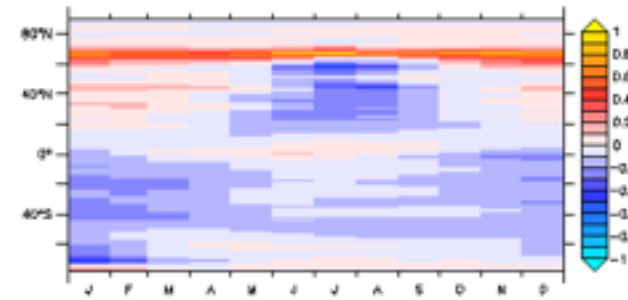
SST-change avg



SST-change Hov



SST-change avg

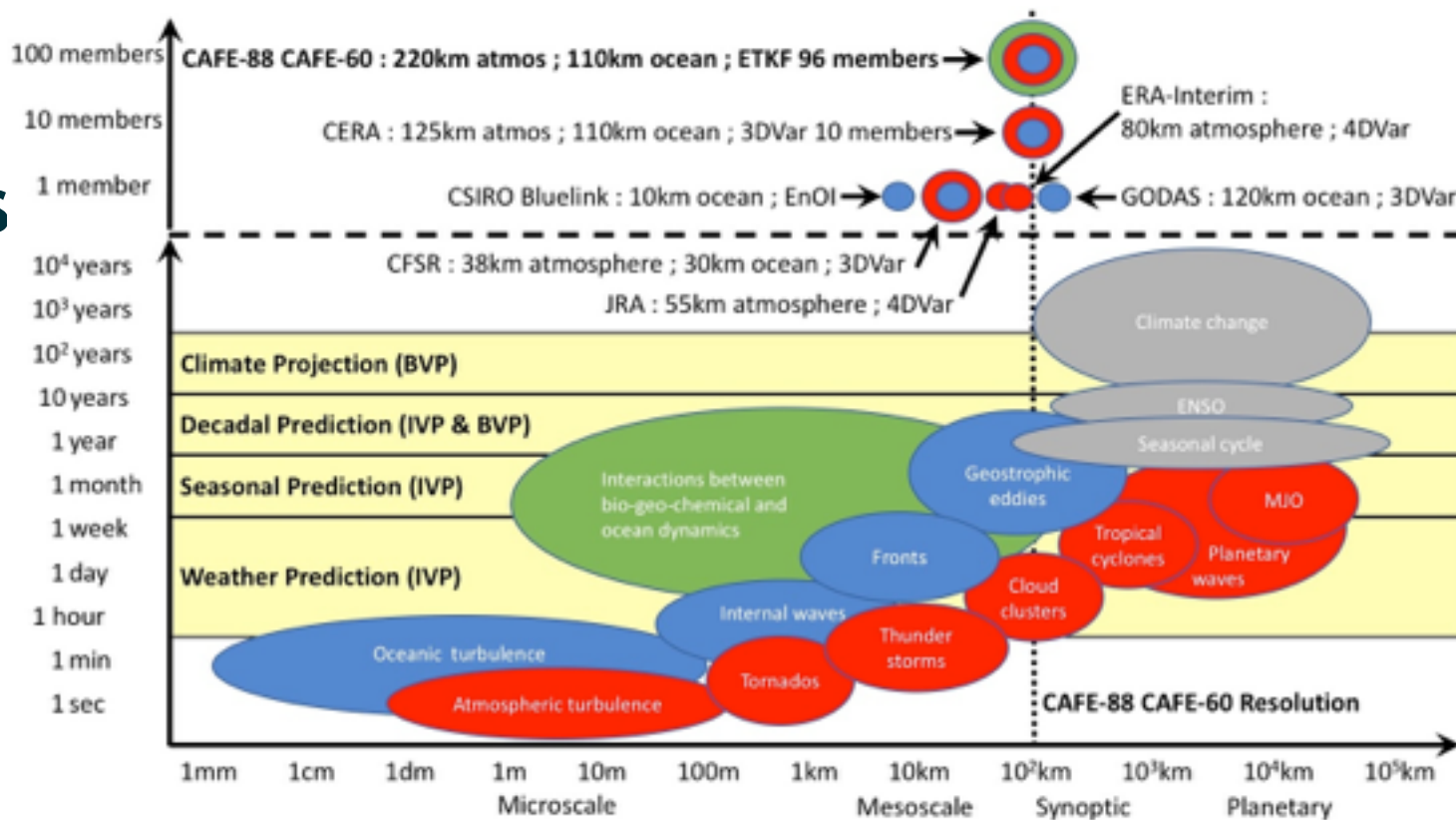


SST-change Hov

Ongoing work

- Plans to evaluate ACCESS-CM1 / ESM configuration (UM-CICE-CABLE-MOM).
- Ocean:
 - 0.25-deg resolution model.
- Atmosphere:
 - testing AM2.5 (50-km res.), cubed-sphere grid. Also includes updated land model (LM3).
 - 'Cubic' grid enables better computer performance.
 - AM4 model.

CAFE Reanalyses



- Assimilate data into fully-coupled model (JRA-55 state for atmosphere, sea ice concentration, ocean obs.)
- 96-member dynamic ensemble.
- CAFE-88: daily DA cycle, start 1988. To initialise forecasts each month.
- CAFE-60: monthly DA cycle, start 1960. Forecast for each 1-Nov for WMO/ Decadal Climate Prediction Project.