Improved Hindcast Skill of MPI model

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IFM-GEOMAR

Introduction

Major improvements in the simulated climate, particularly in the tropics, have translated into better hindcast skill

Model Description

ECHAM5 (T63L31) and MPI-OM (1.5 degree, 40 vertical levels) coupled with OASIS3

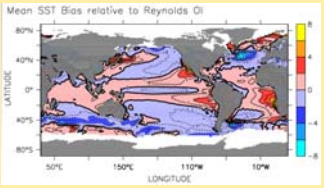
Major Changes from DEMETER model

•ECHAM resolution increased from T42L19 and MPI-OM 0.5 degree equatorial refinement **removed**

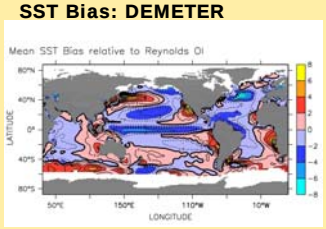
•Surface currents included in the calculation of windstress

Control Climate

SST Bias: ENSEMBLES

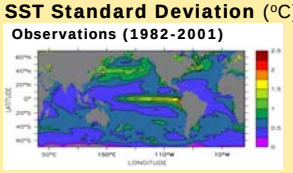


SST Bias: DEMETER

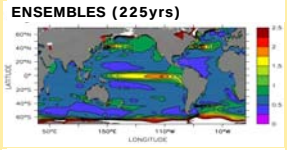


SST Standard Deviation (ºC)

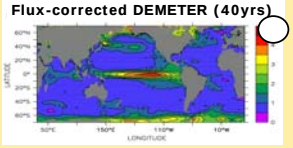
Observations (1982-2001)



ENSEMBLES (225yrs)



Flux-corrected DEMETER (40yrs)



Hindcast Initialisation

•Three coupled runs (1950-2004) with strong SST nudging in tropics, and full transient forcings

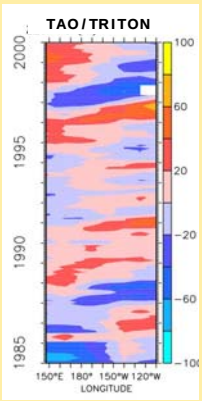
•Initial conditions for nine ensemble members taken from these runs

Major Changes from DEMETER setup

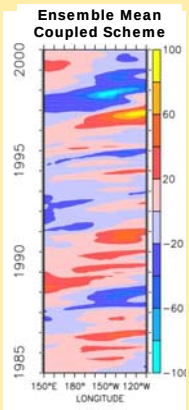
•DEMETER initial conditions were taken from one coupled run and ensemble members created from lagged atmosphere states

Equatorial Z20 Anomalies

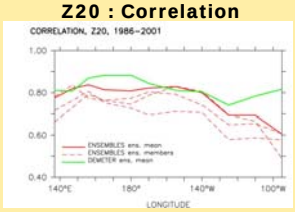
TAO/TRITON



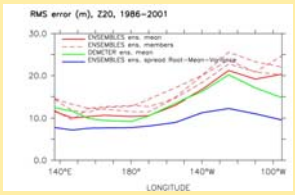
Ensemble Mean Coupled Scheme



Z20 : Correlation

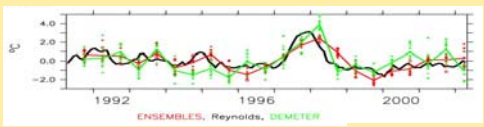


Z20 : RMS Error

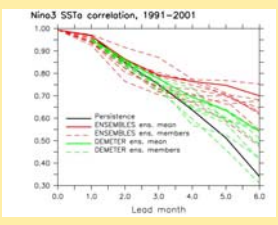


Hindcast Skill

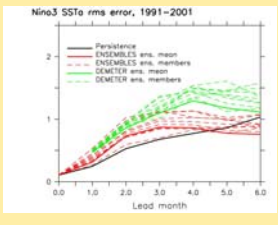
Nino3 SSTA Anomalies at 6-months lead



Correlation

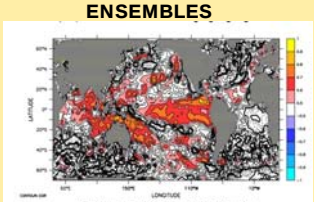


RMS-error

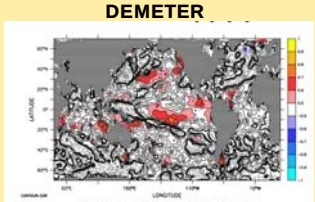


SSTA: Correlation with Observation at 6-months lead

ENSEMBLES

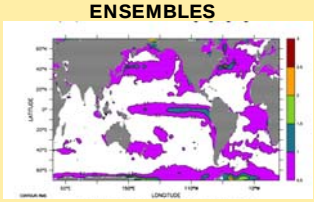


DEMETER

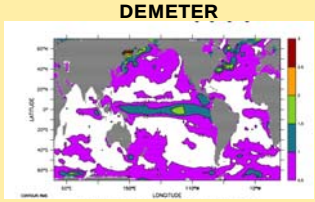


SSTA: Correlation with Observation at 6-months lead

ENSEMBLES



DEMETER



Outlook

•Complete first set of decadal hindcasts

•Improve the initialisation of decadal hindcasts to rectify decadal drift

•Extending hindcasts to other seasons & earlier periods

•Ensembles generation with perturbed SST patterns and SVD methods

•Hindcasts with ocean initial conditions EnKF scheme of the KNMI