
Impact of the new stochastic physics scheme (CASBS) on ENSEMBLES stream 1 simulations

Antje Weisheimer, Paco Doblas-Reyes, Judith Berner,
Thomas Jung, Tim Palmer

- **Systematic biases**
- **Seasonal hindcasts**
- **Decadal hindcasts**
- **Atmosphere-only simulations
with the new version 1.2**

**ENSEMBLES stream 1 seasonal simulations
1991-2001**

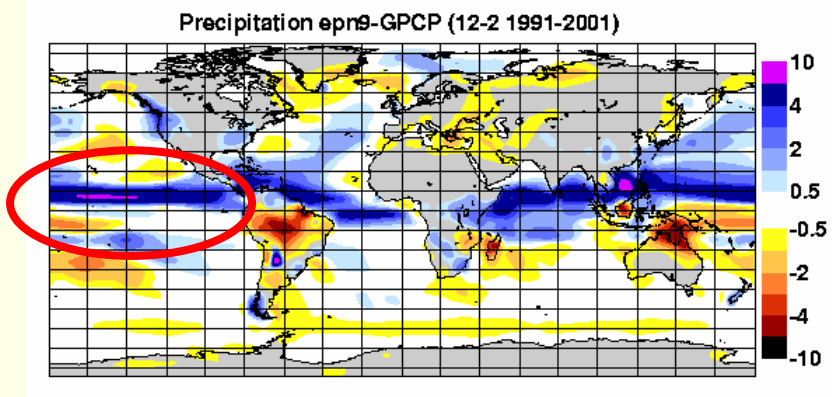
systematic bias

DJF (Nov start dates)

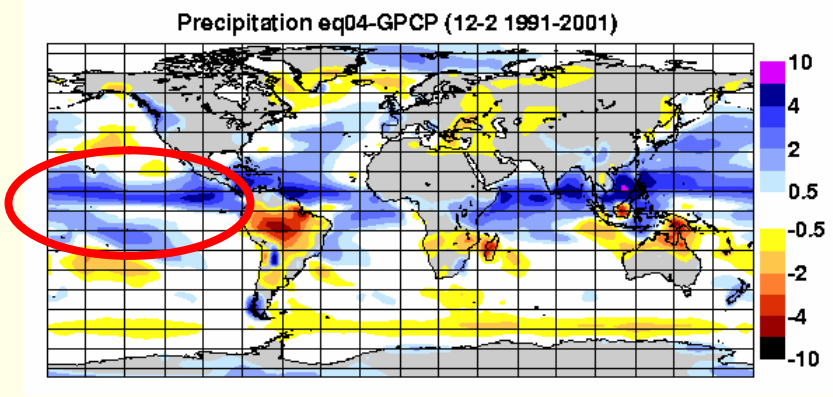
**CASBS(version1.0) vs control
CY29R2**

systematic bias 1991-2001 DJF (Nov start): precipitation

control – GPCP

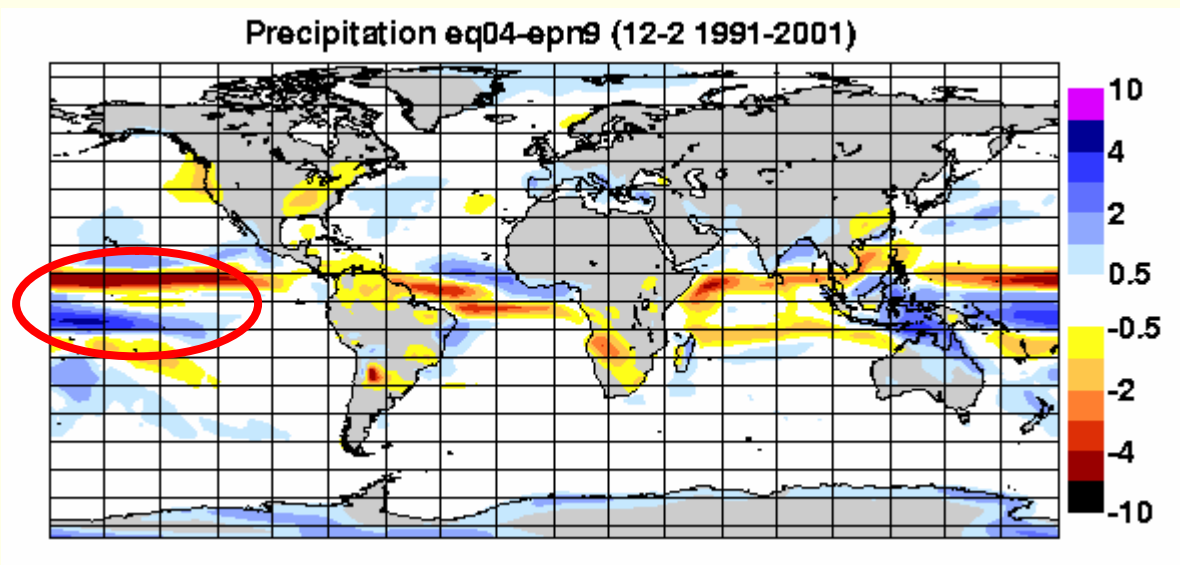


CASBS – GPCP



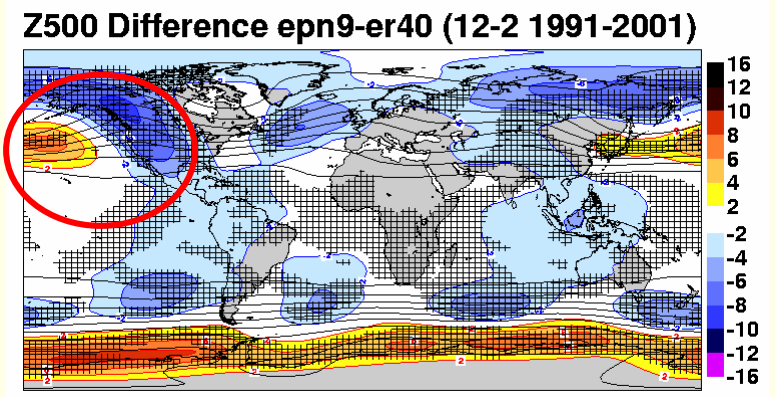
CASBS – control

- improved tropical precipitation

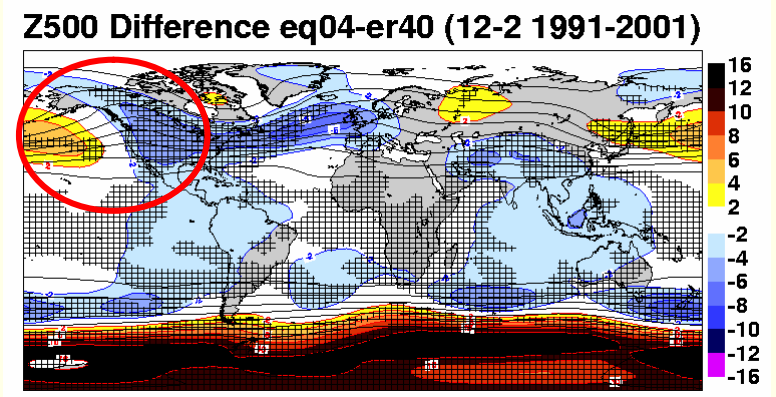


systematic bias 1991-2001 DJF (Nov start): Z500

control – ERA40



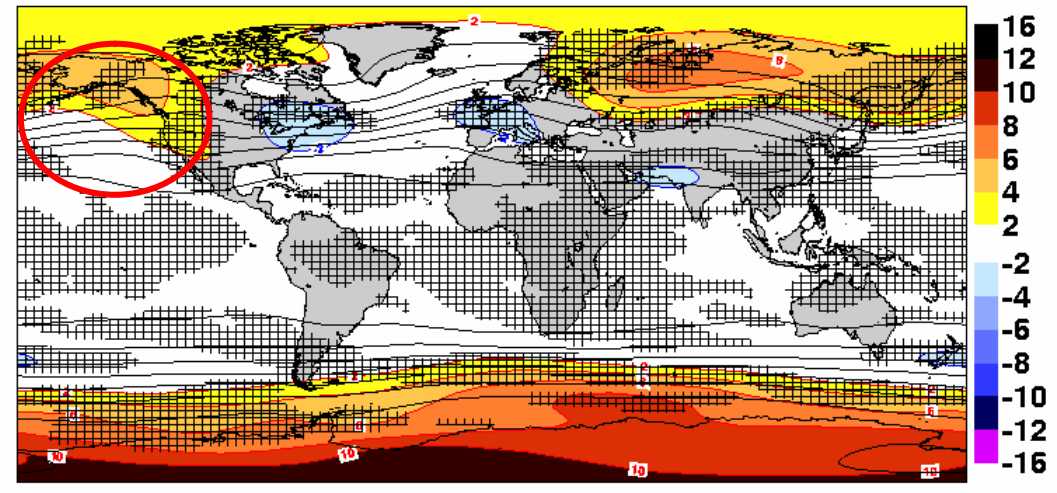
CASBS – ERA40



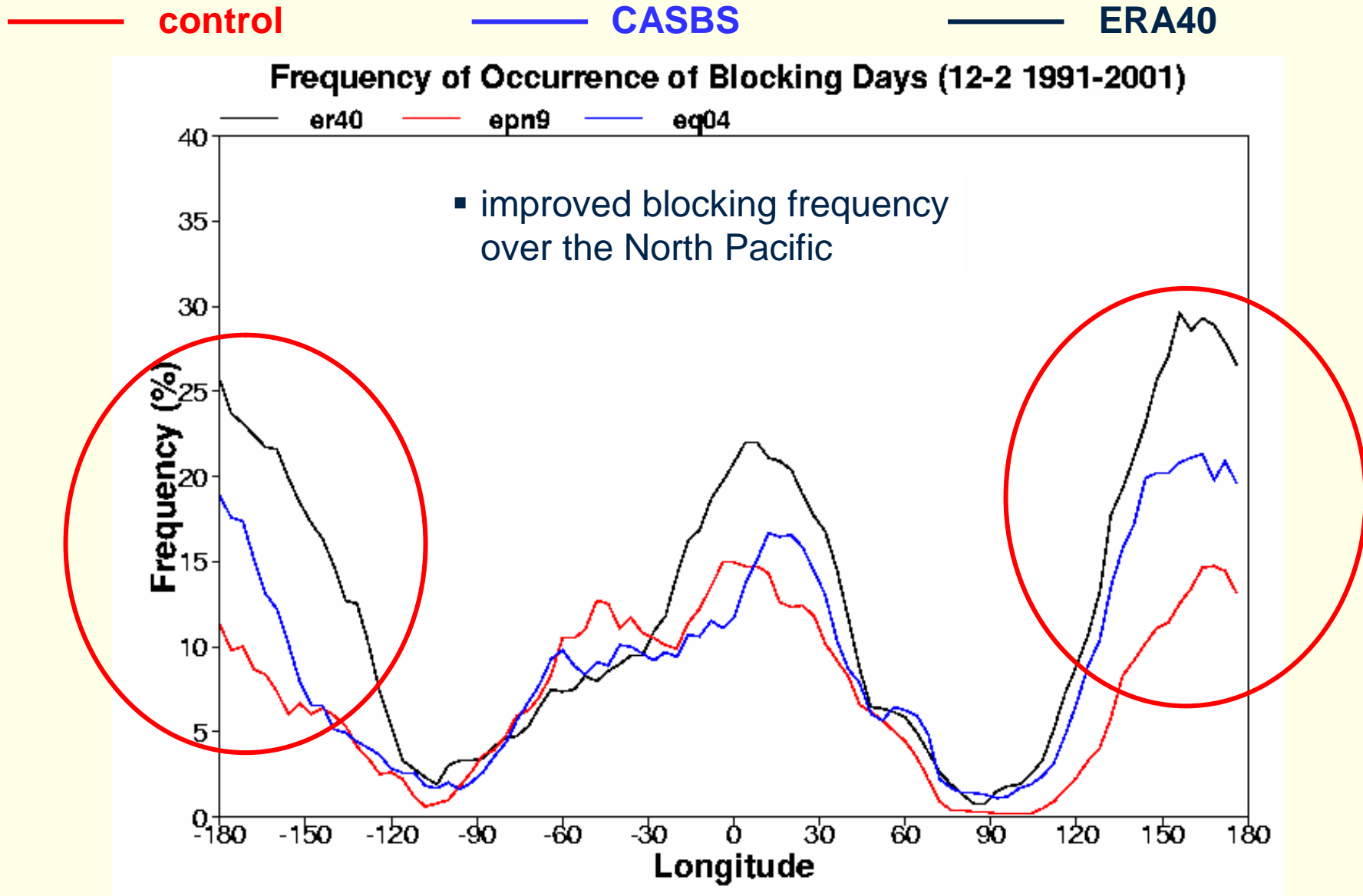
CASBS – control

- reduced systematic error over the North pacific
- Increased error over SH high latitudes

Z500 Difference eq04-epn9 (12-2 1991-2001)

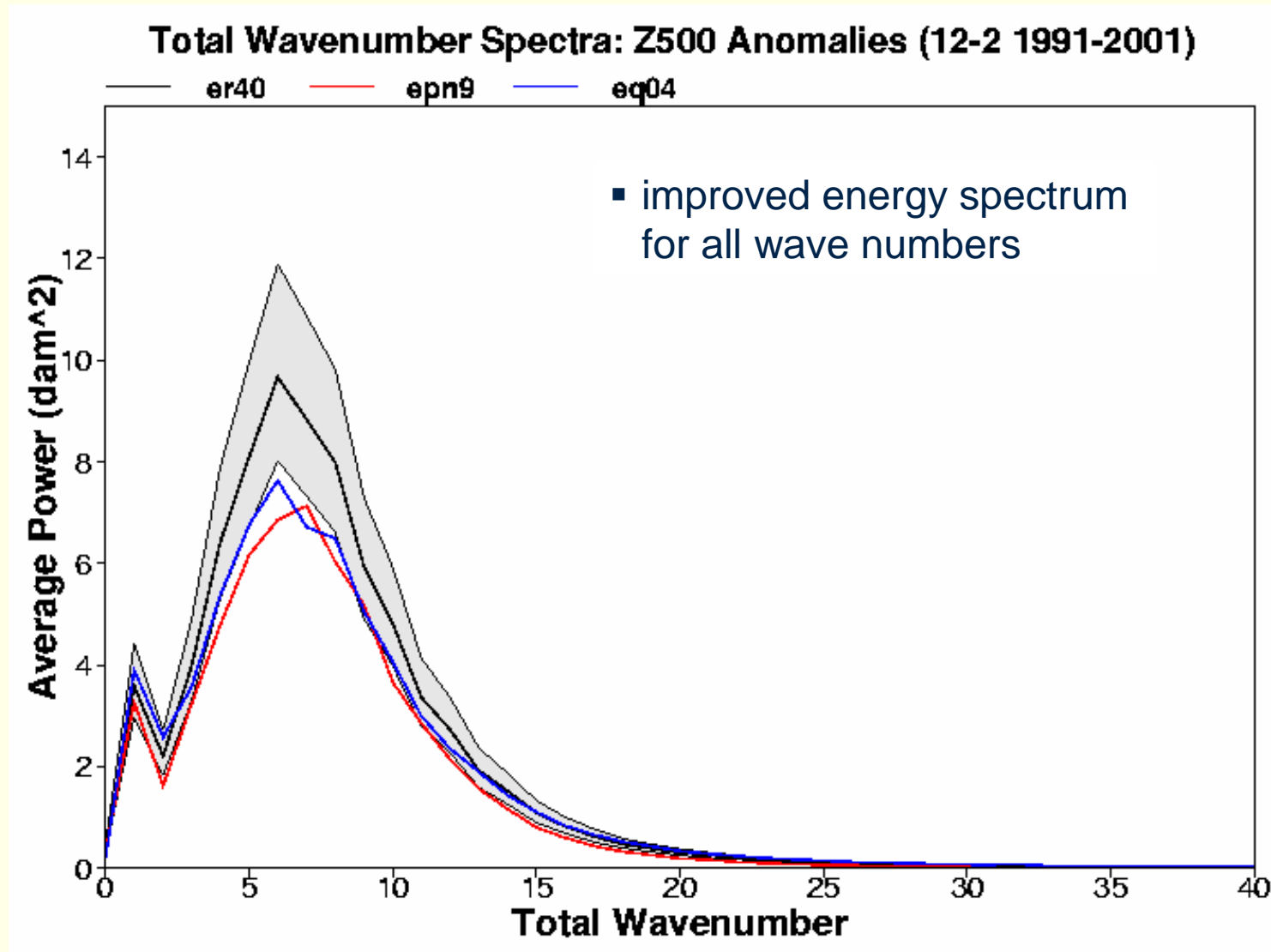


systematic bias 1991-2001 DJF (Nov start): **blocking**



systematic bias 1991-2001 DJF (Nov start): Z500 energy spectrum

control CASBS ERA40



HINDCASTS

**ENSEMBLES stream 1 seasonal simulations
1991-2000**

May & Nov start dates

SST

**CASBS(version1.0) vs control
CY29R2**

seasonal forecasts 1991-2001 May & Nov start dates: mean drift

SST

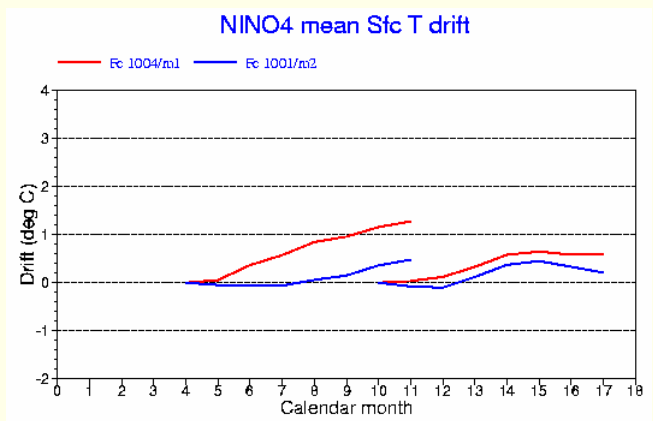
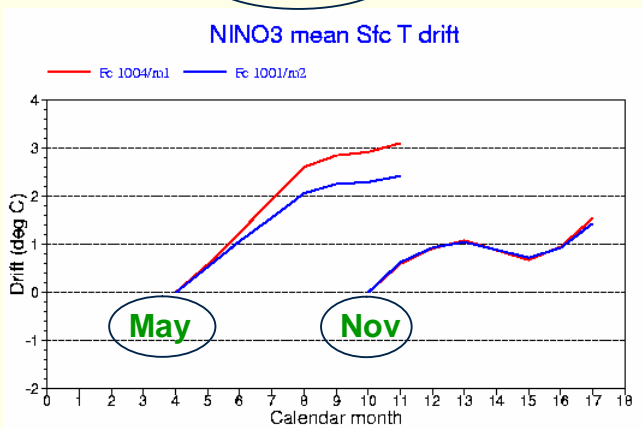
ECMWF control

stochastic physics

ERA-40

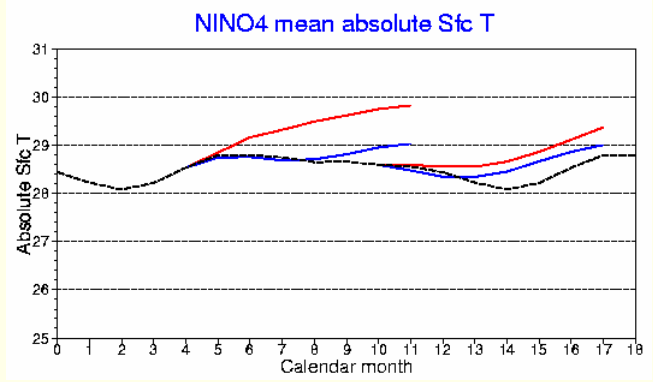
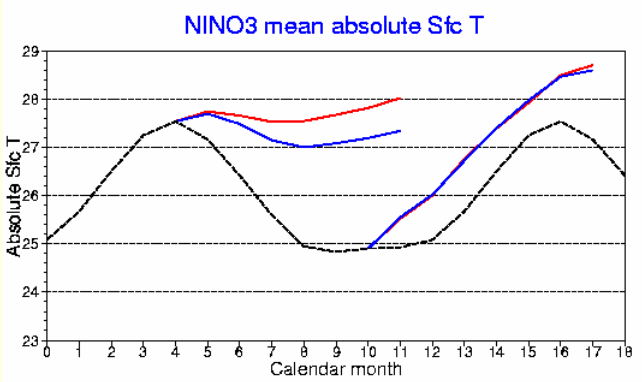
Nino3

Nino4



mean drift

- reduced drift for May starts



mean absolute SST

seasonal forecasts 1991-2001 May & Nov start dates: **mean drift**

SST

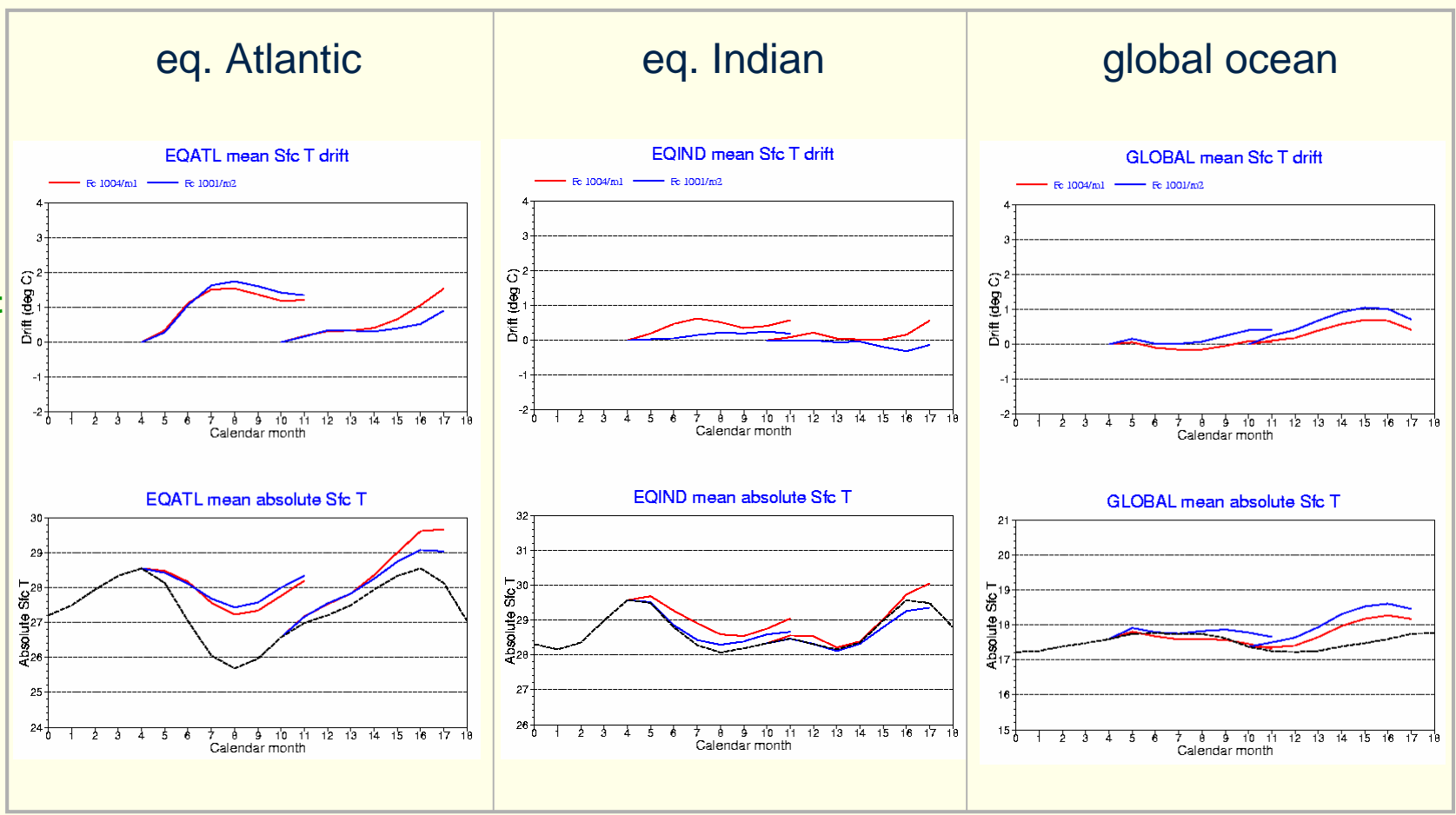
— **ECMWF control**

— **stochastic physics**

- - - **ERA-40**

mean drift

mean absolute SST



seasonal forecasts 1991-2001 May & Nov start dates: RMSE and spread

SST

ECMWF control

stochastic physics

RMSE persistence

Nino3

Nino4

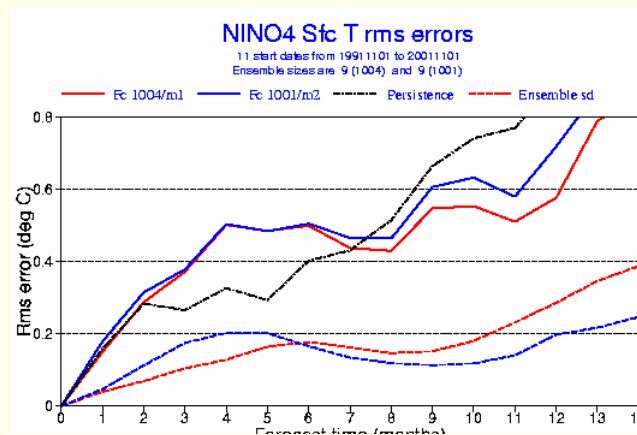
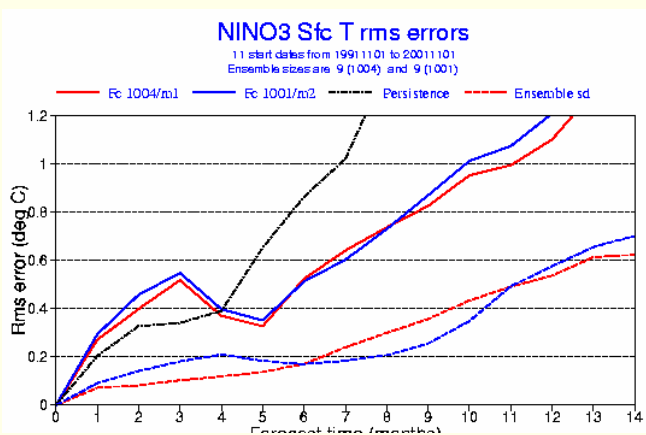
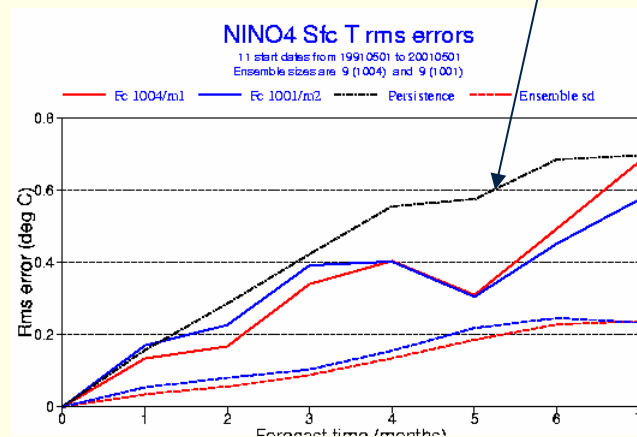
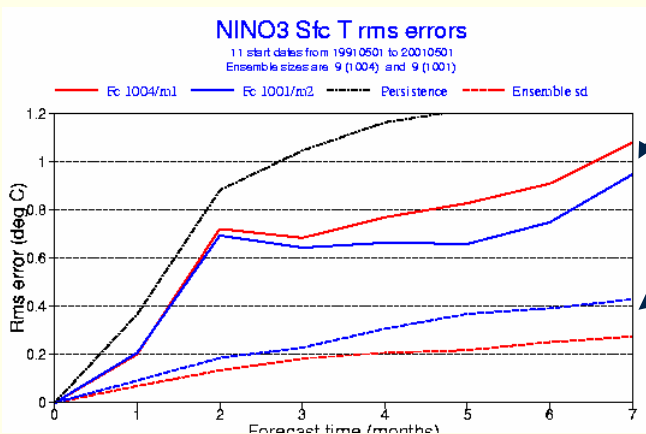
RMSE

spread

May starts

- reduced error & larger spread for May starts in Nino3

Nov starts



seasonal forecasts 1991-2001 May & Nov start dates: **anomaly correlation**

SST

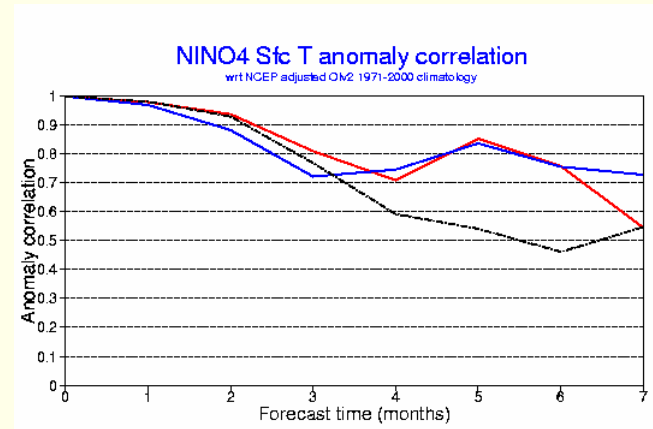
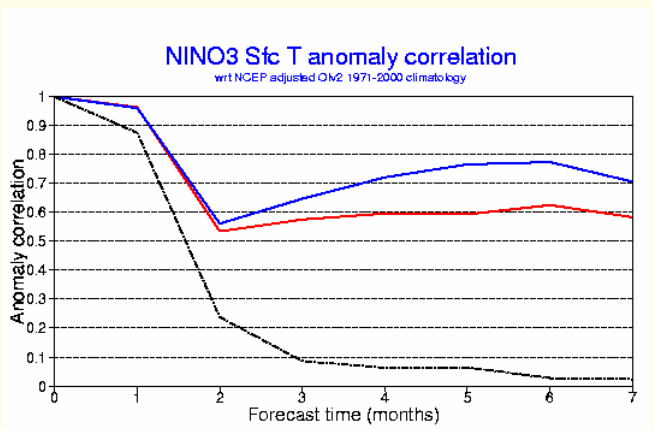
ECMWF control

stochastic physics

RMSE persistence

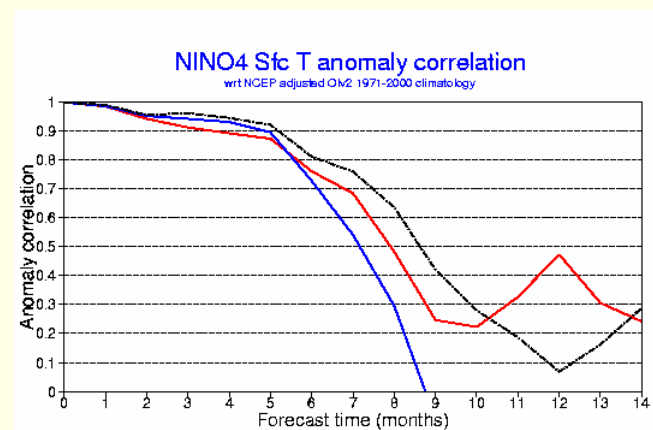
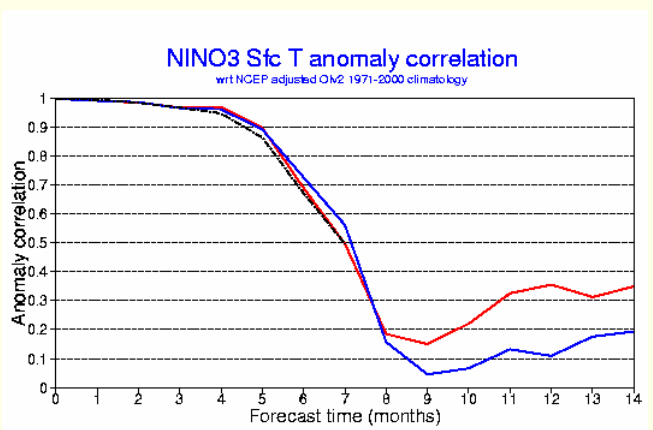
Nino3

Nino4



May starts

- increased ACC for May starts in Nino3



Nov starts

HINDCASTS

**ENSEMBLES stream 1 seasonal simulations
1991-2000**

May & Nov start dates

precipitation

**CASBS(version1.0) vs control
CY29R2**

seasonal forecasts 1991-2001 May & Nov start dates: RMSE and spread

precipitation

ECMWF control

stochastic physics

RMSE persistence

Nino3

Nino4

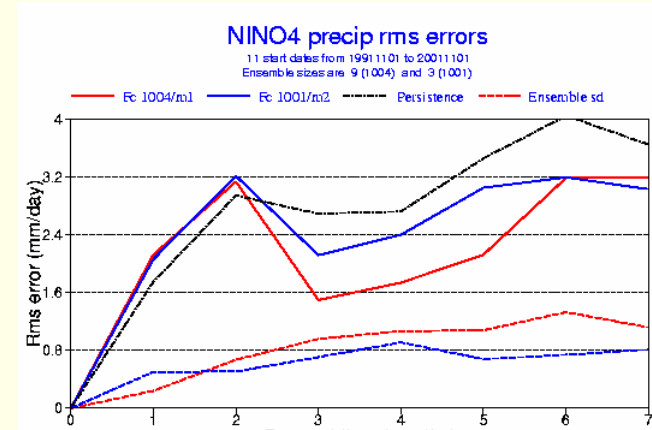
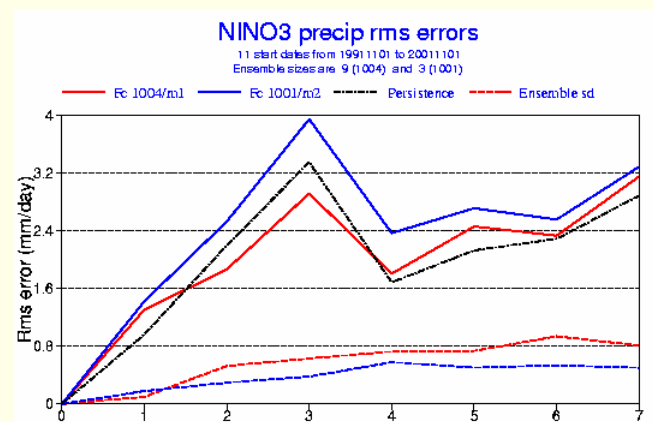
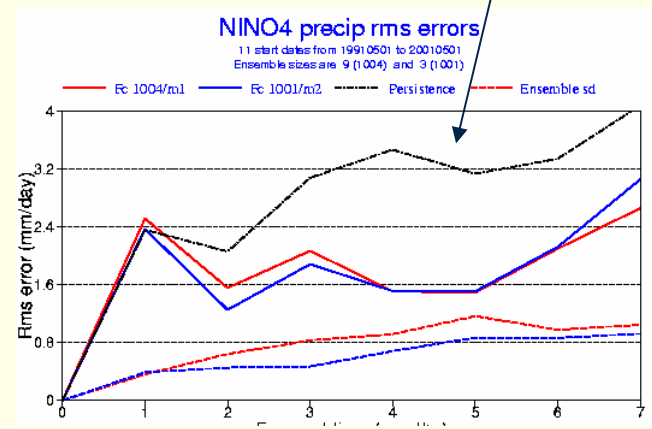
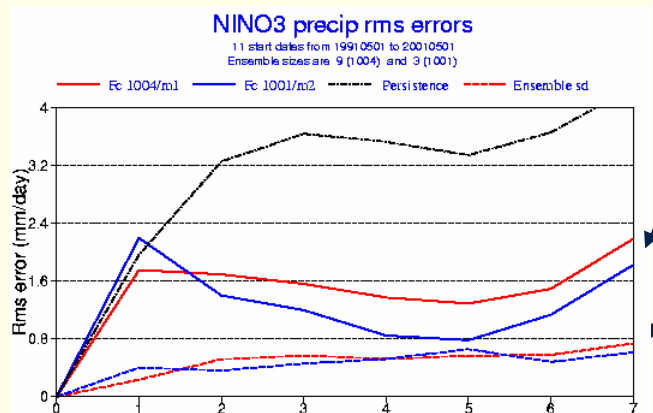
RMSE

spread

May starts

reduced error for May starts in Nino3

Nov starts



seasonal forecasts 1991-2001 May & Nov start dates: **anomaly correlation**

precipitation

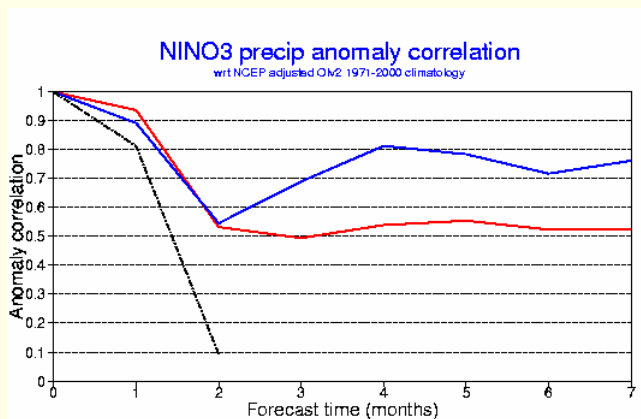
ECMWF control

stochastic physics

RMSE persistence

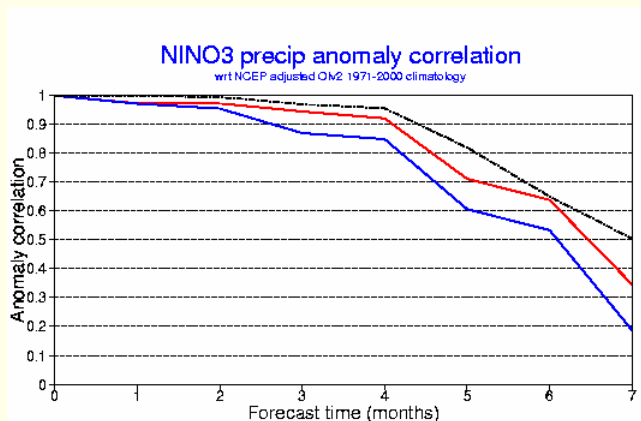
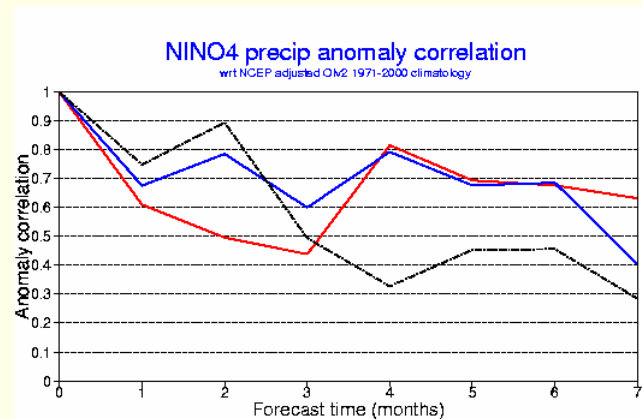
Nino3

Nino4

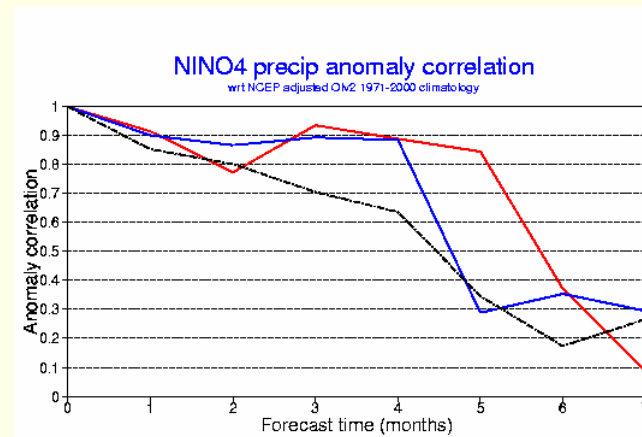


May starts

- increased ACC for May starts in Nino3



Nov starts



ENSEMBLES stream 1 decadal simulations
1994

SST

CASBS(version1.1) vs control
CY30R1

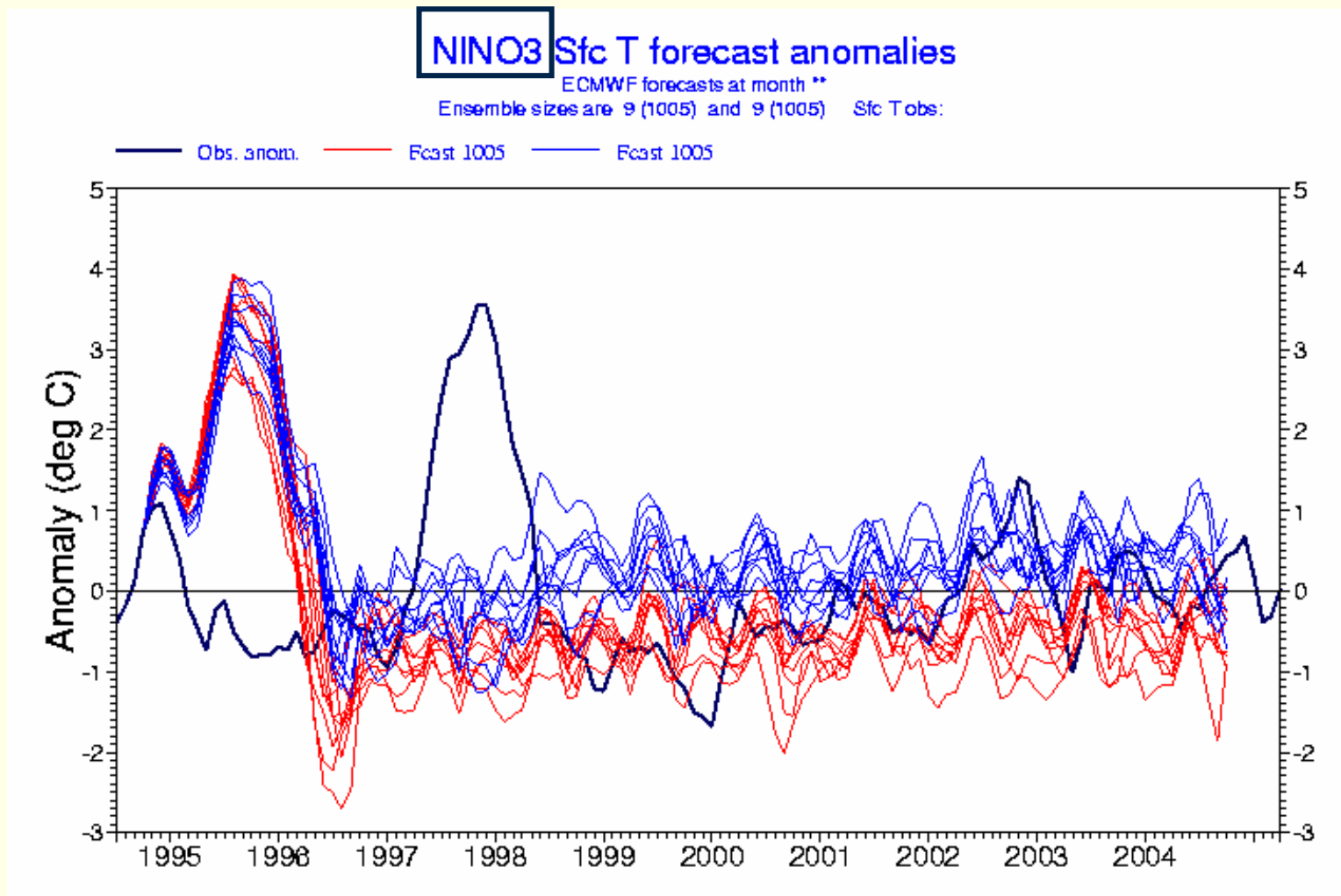
decadal forecast 1994 : forecast anomalies

SST

ECMWF control

stochastic physics

ERA-40



**Preliminary comparison with
uncoupled atmosphere-only simulations**

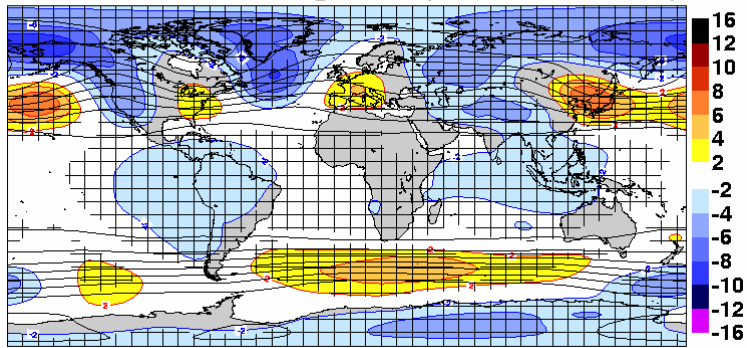
systematic biases

**CASBS(version1.2) vs control
CY30R1 (?)**

Uncoupled systematic bias 1962-1987 DJF (Oct start): Z500

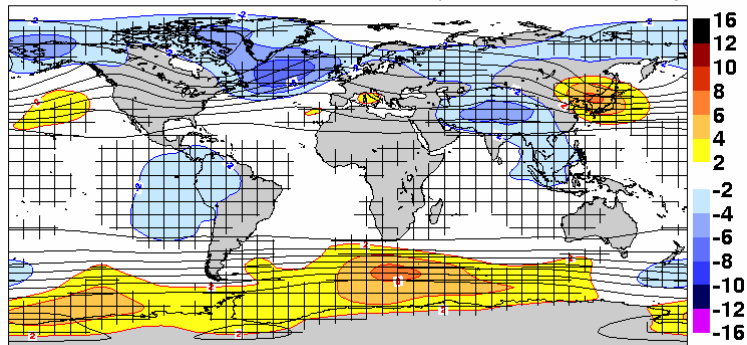
control – ERA40

Z500 Difference erfg-er40 (12-2 1962-1987)



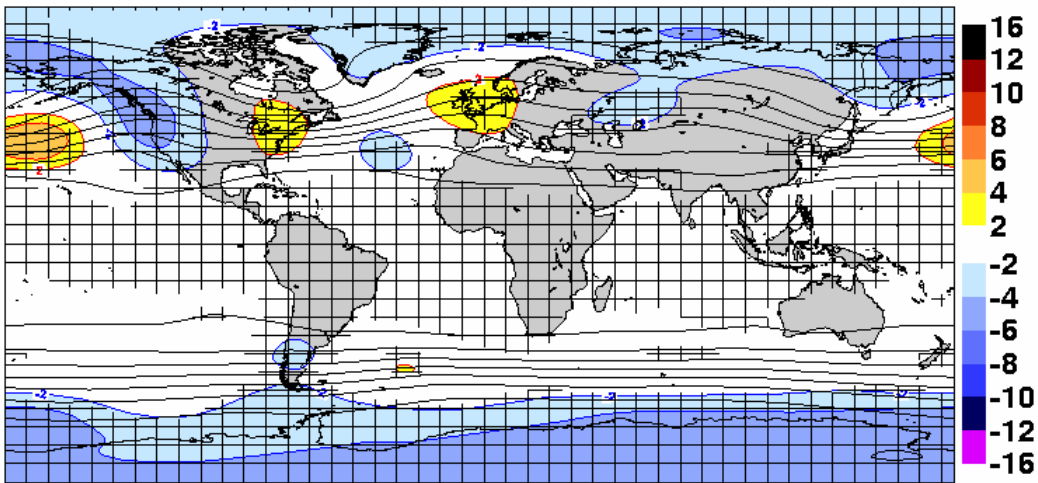
CASBS – ERA40

Z500 Difference es5m-er40 (12-2 1962-1987)



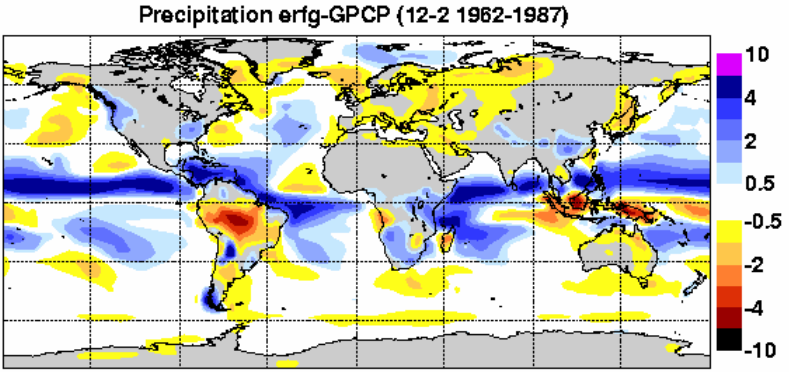
control - CASBS

Z500 Difference erfg-es5m (12-2 1962-1987)

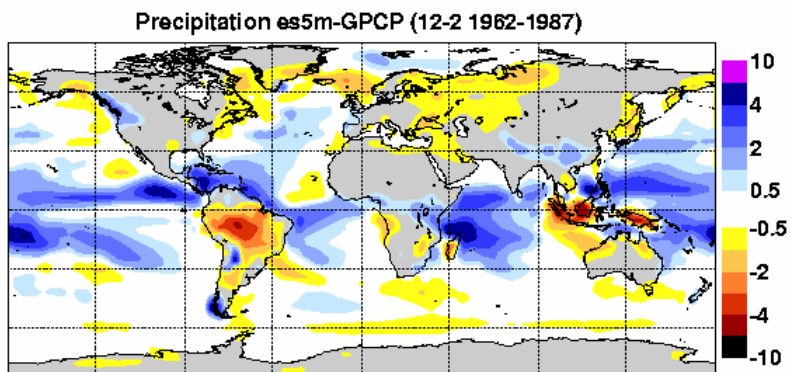


Uncoupled systematic bias 1962-1987 DJF (Oct start): precipitation

control – GPCP



CASBS – GPCP



control - CASBS

