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

- SST hindcasts
- Precipitation hindcasts
- Systematic biases (DJF, JJA)

6 June 2006

ENSEMBLES stream 1 seasonal simulations 1991-2000

May & Nov start dates

SST

CASBS(Version1.0) vs control CY29R2

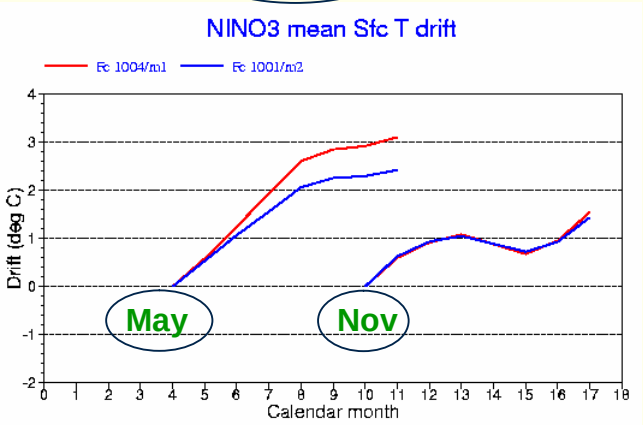
6 June 2006

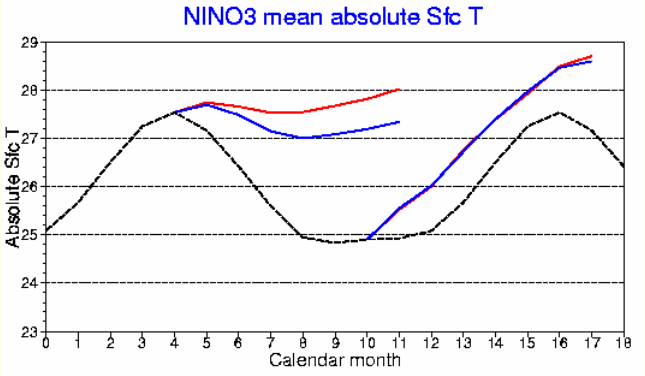
seasonal forecasts 1991-2001 May & Nov start dates: mean drift

SST

ECMWF control — stochastic physics — ERA-40

Nino3

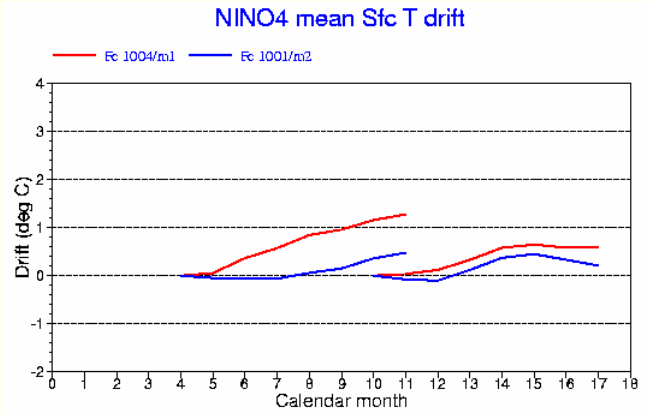


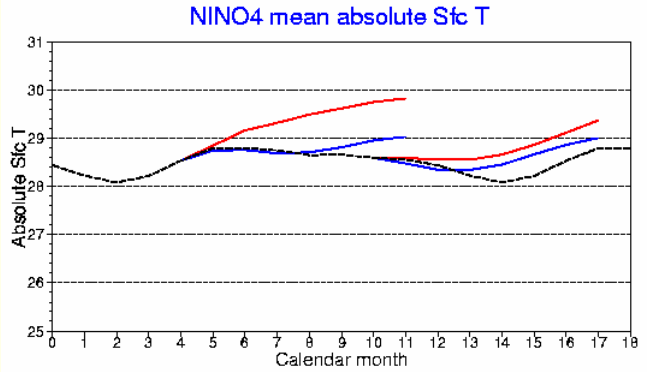


mean drift

mean absolute SST

Nino4

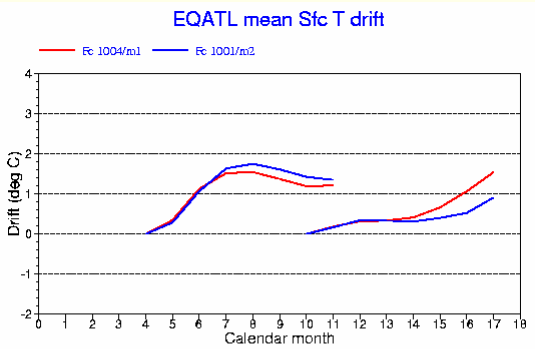
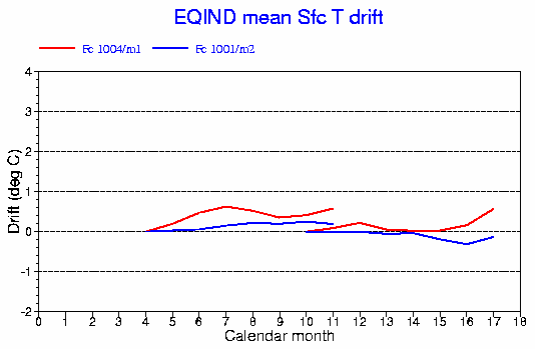
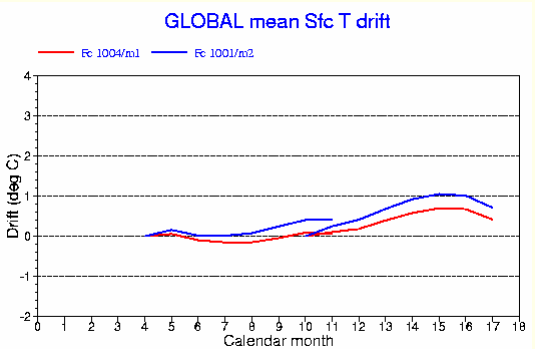
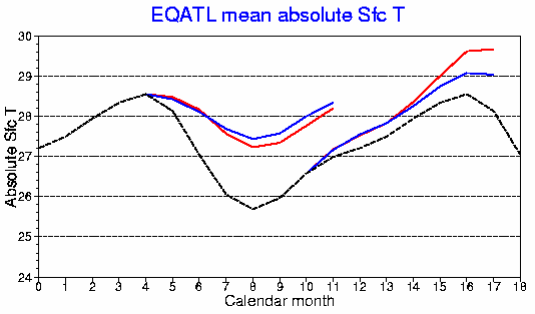
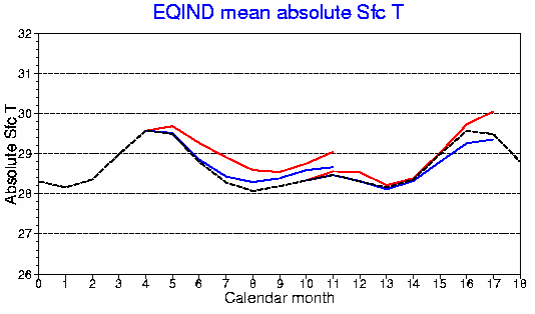
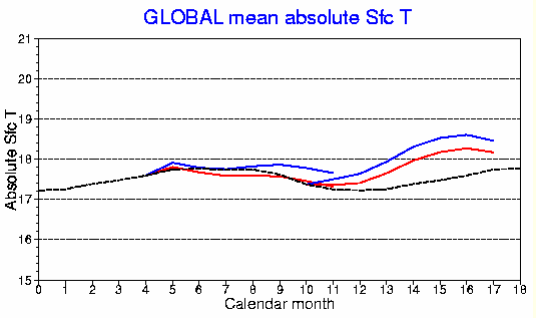




seasonal forecasts 1991-2001 May & Nov start dates: mean drift

SST

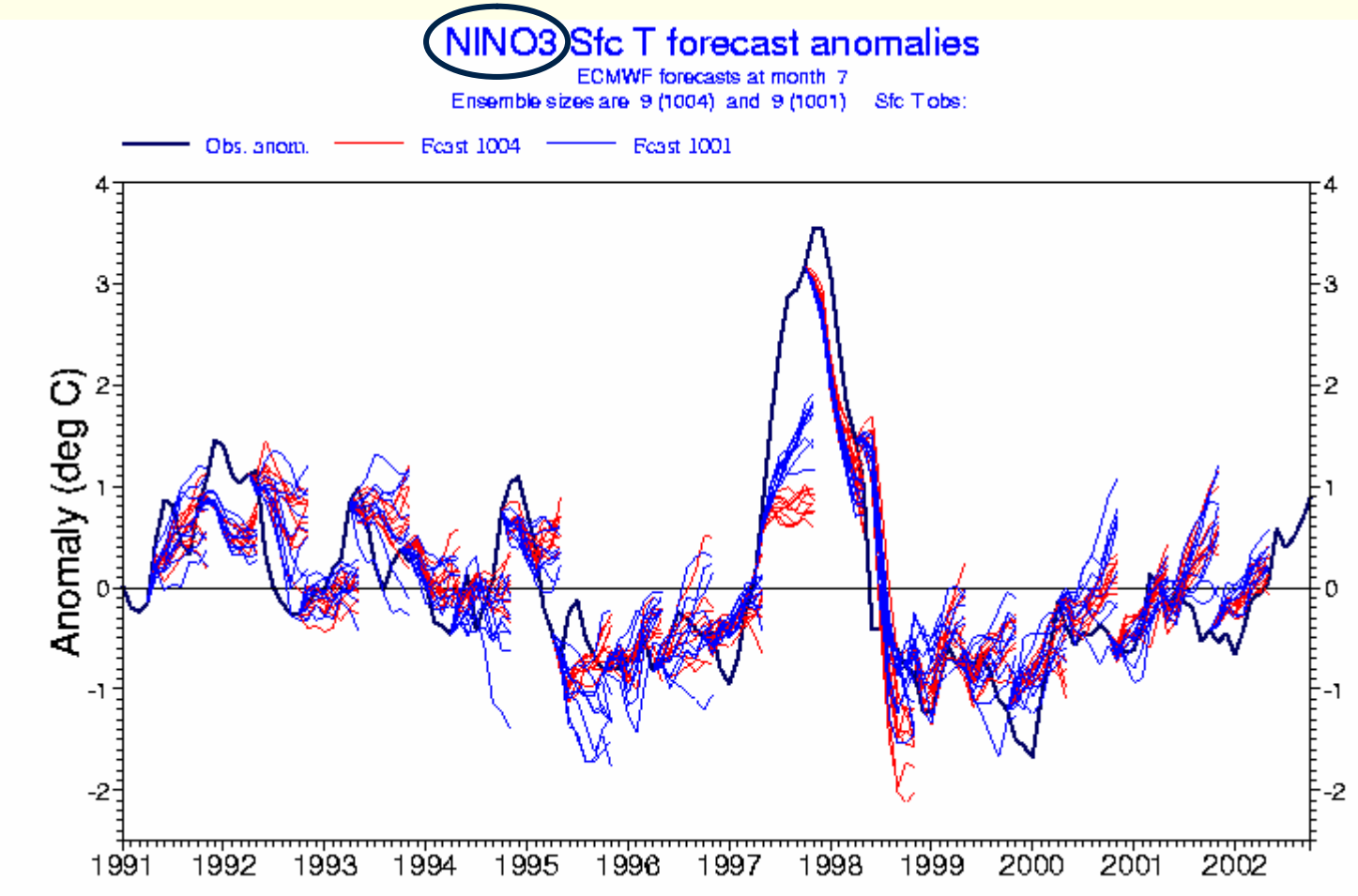
ECMWF control — stochastic physics — ERA-40

	eq. Atlantic	eq. Indian	global ocean
mean drift			
mean absolute SST			

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

SST

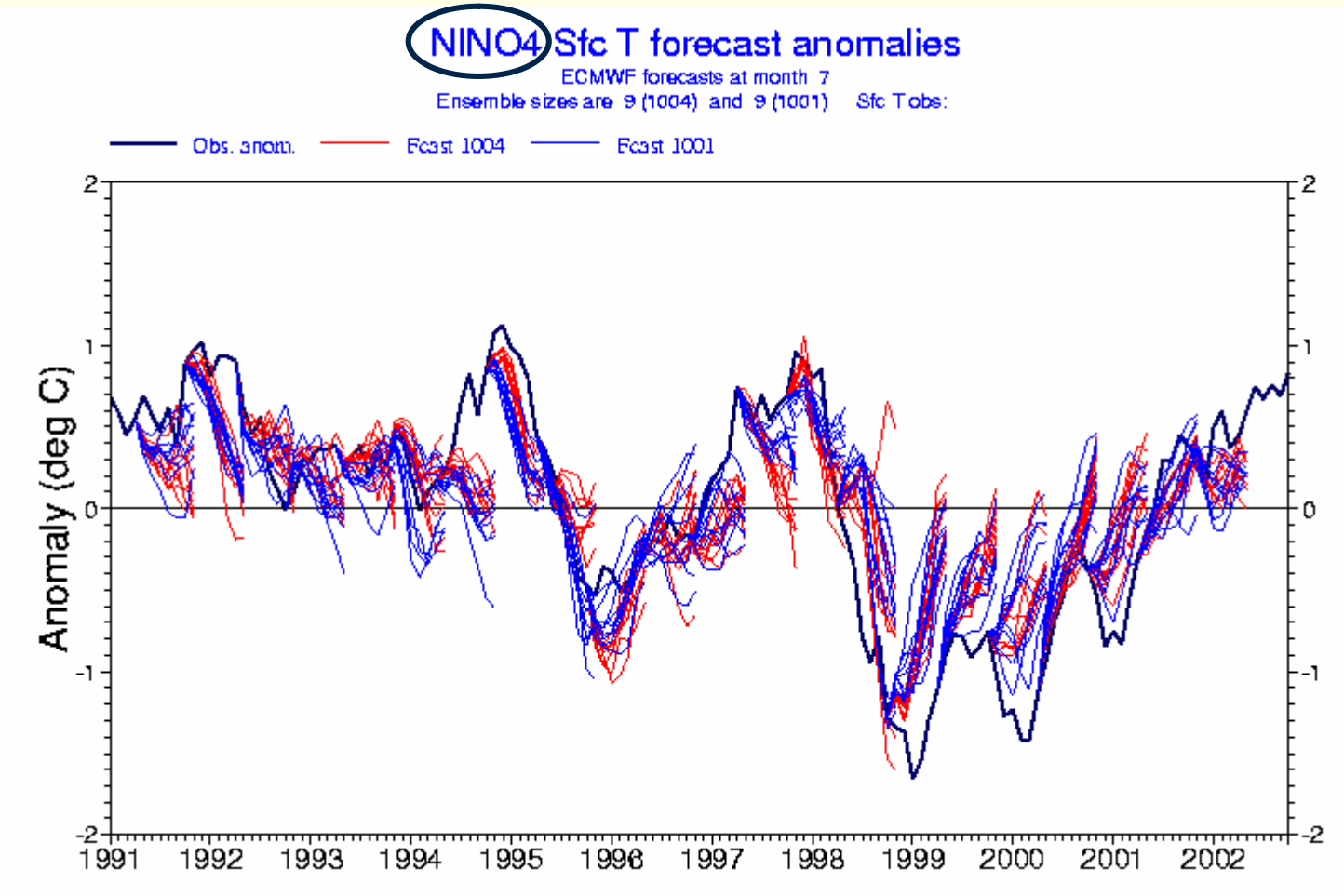
ECMWF control | stochastic physics | ERA-40



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

SST

ECMWF control | stochastic physics | ERA-40



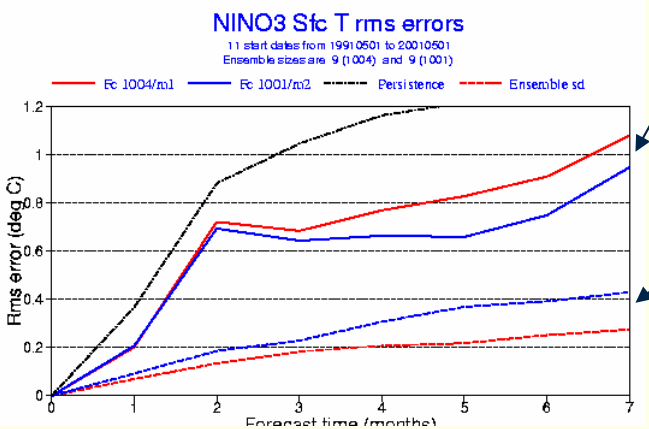
seasonal forecasts 1991-2001 May & Nov start dates: RMSE and spread

SST

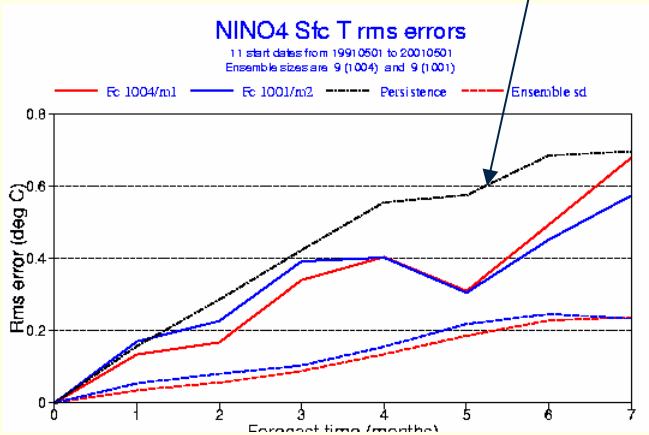
ECMWF control — stochastic physics — RMSE persistence

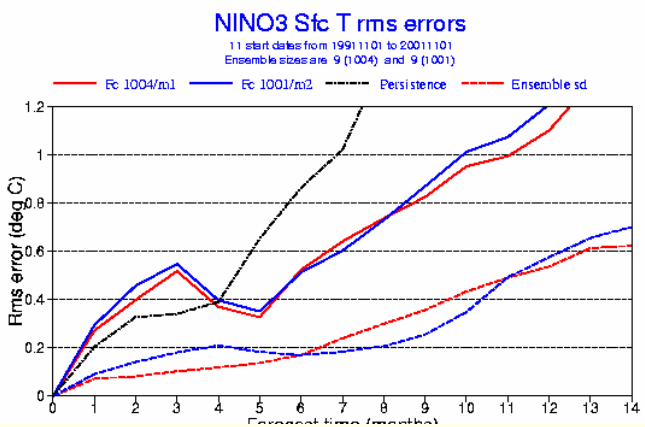
Nino3 — Nino4

RMSE — **spread**

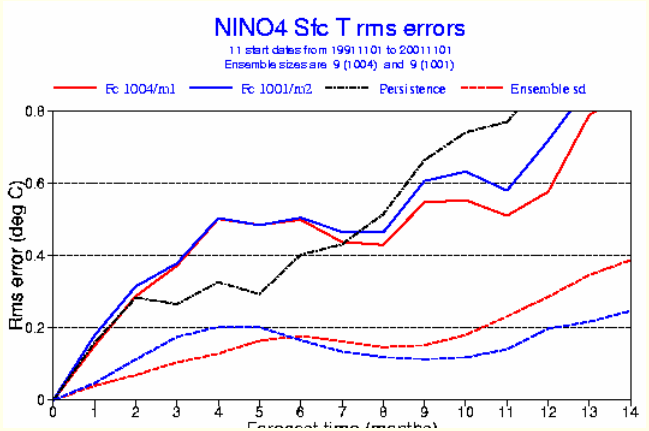


May starts





Nov starts

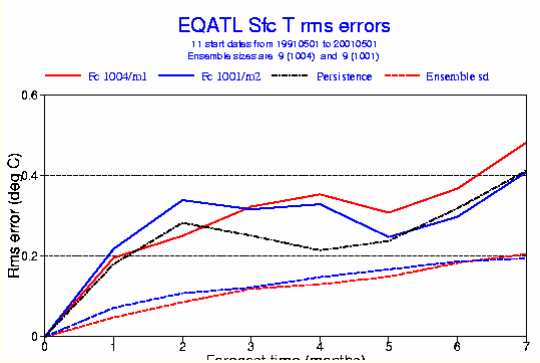
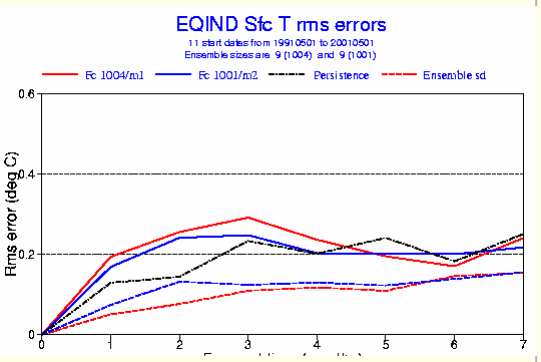
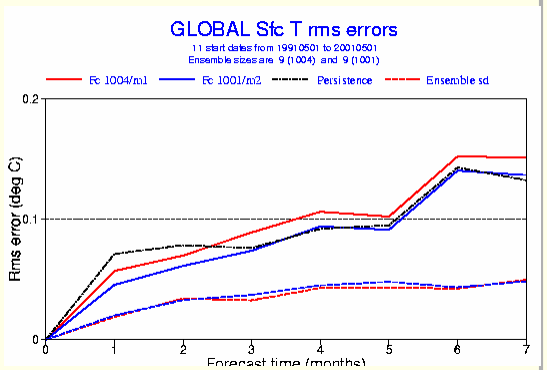
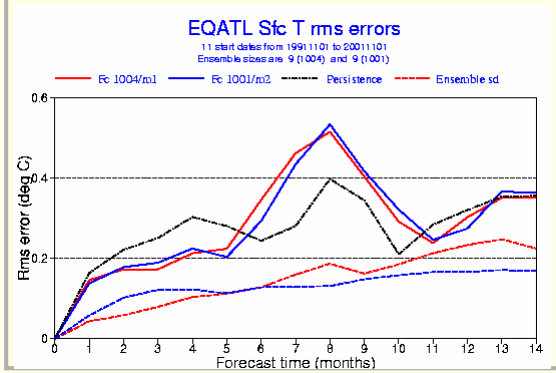
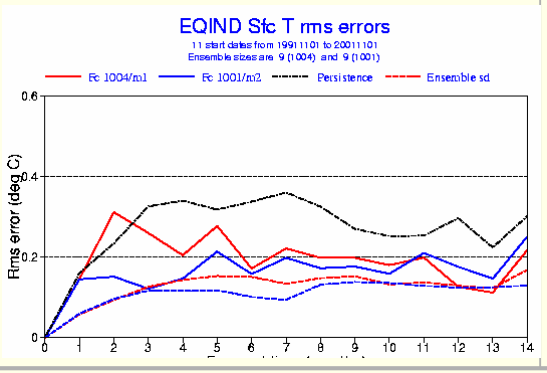
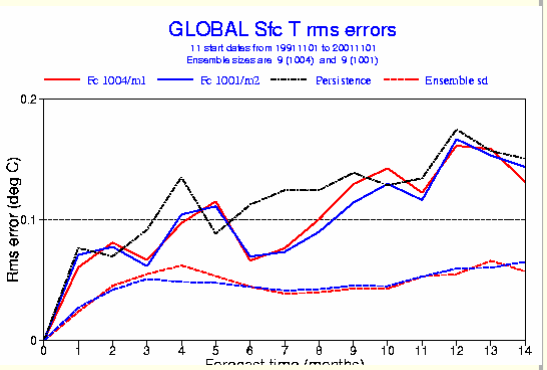


seasonal forecasts 1991-2001 May & Nov start dates: RMSE and spread

SST

ECMWF control — stochastic physics — RMSE persistence

RMSE ..... **spread**

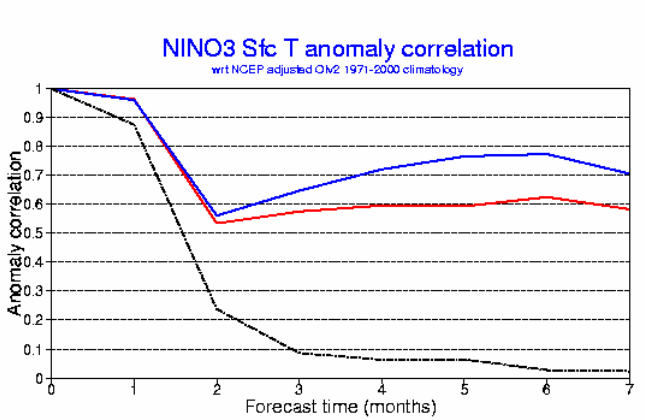
	eq. Atlantic	eq. Indian	global ocean
May			
Nov			

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

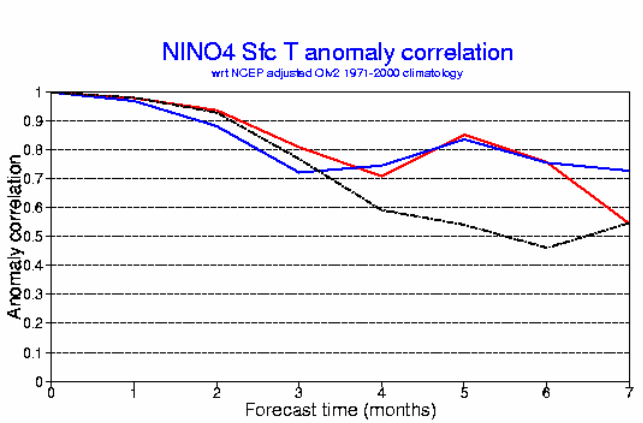
SST

ECMWF control — stochastic physics — RMSE persistence

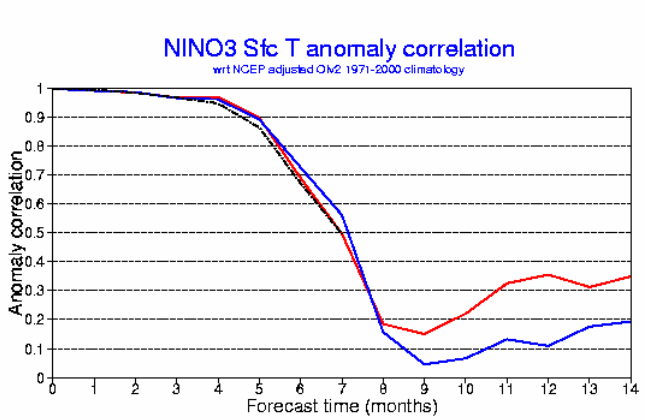
Nino3



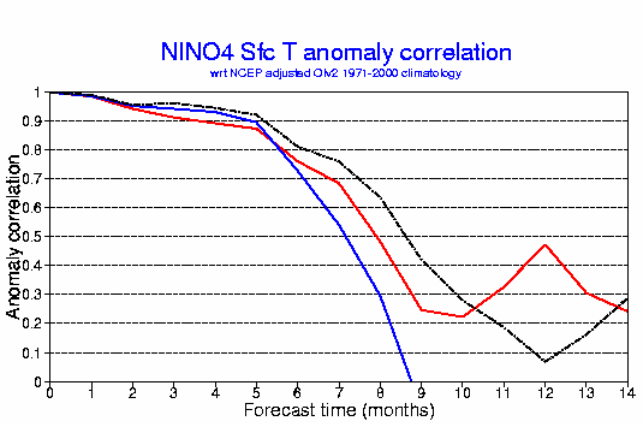
Nino4



May starts



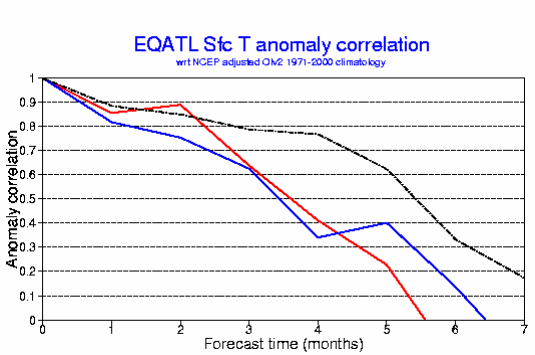
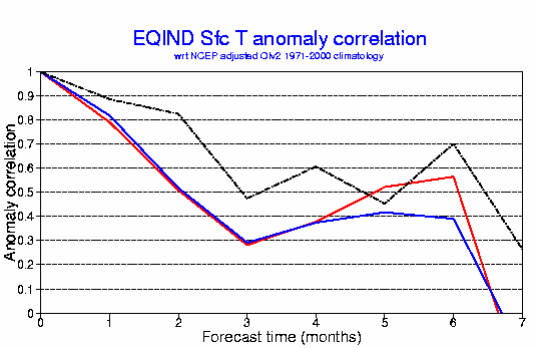
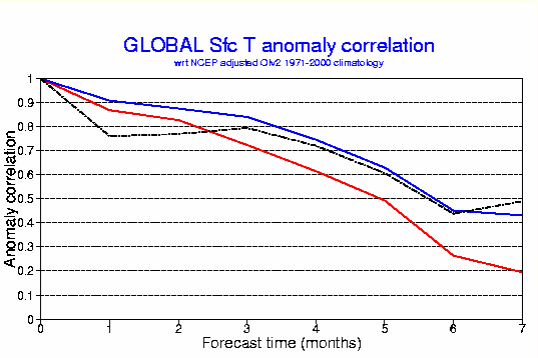
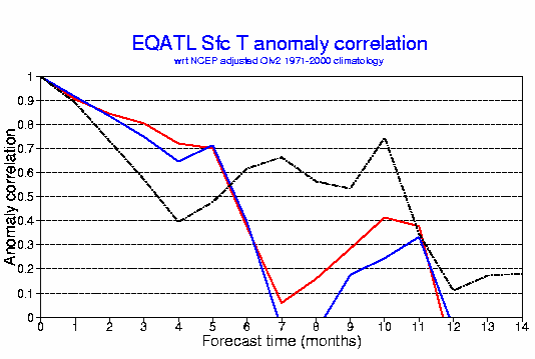
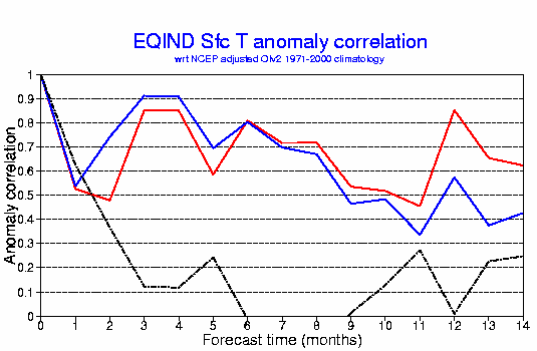
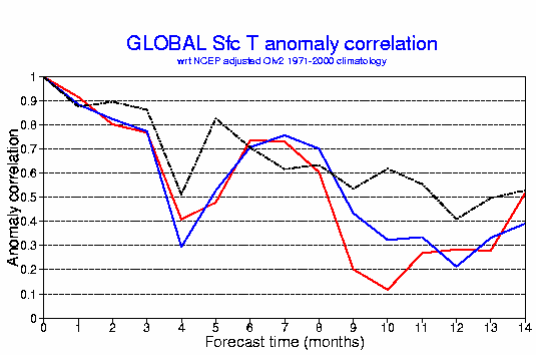
Nov starts



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

SST

ECMWF control — stochastic physics — RMSE persistence

	eq. Atlantic	eq. Indian	global ocean
May			
Nov			

ENSEMBLES stream 1 seasonal simulations 1991-2000

May & Nov start dates

precipitation

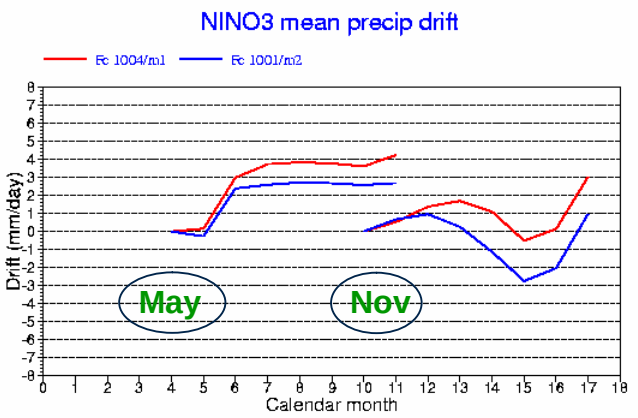
CASBS(Version1.0) vs control CY29R2

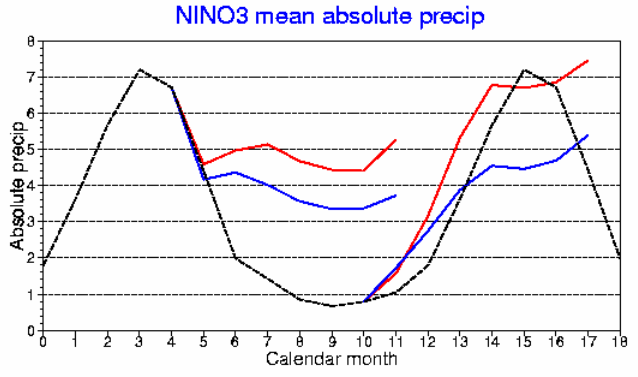
seasonal forecasts 1991-2001 May & Nov start dates: mean drift

precipitation

ECMWF control — stochastic physics — ERA-40

Nino3

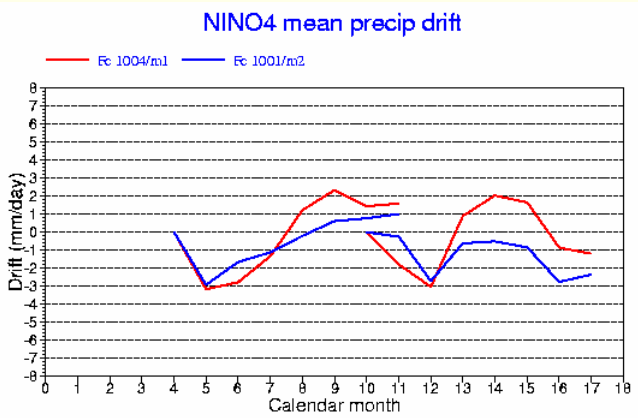


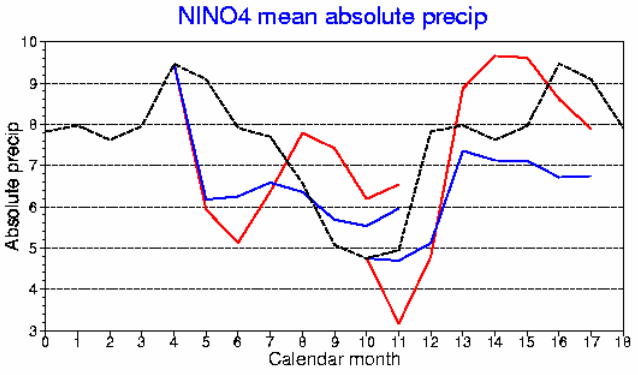


mean drift

mean absolute precipitation

Nino4

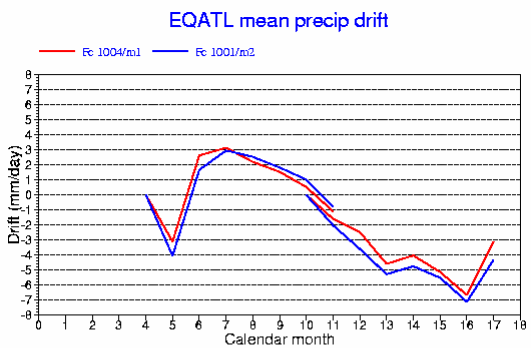
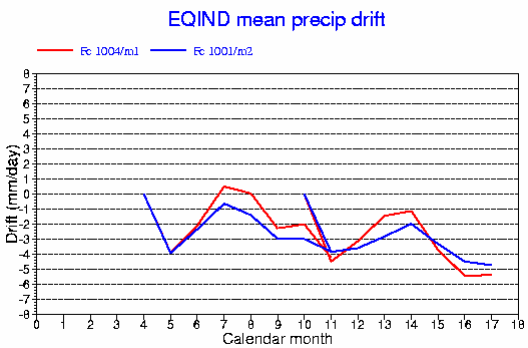
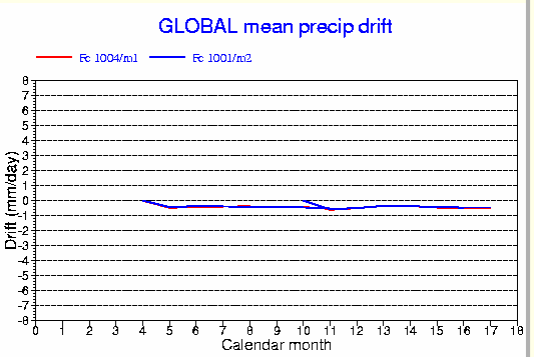
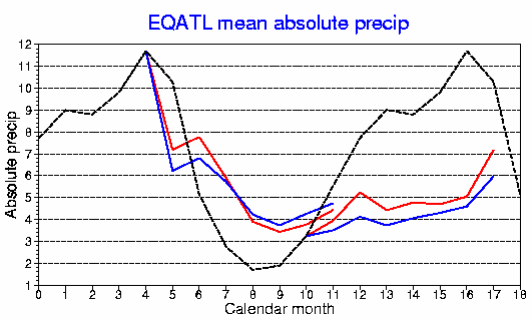
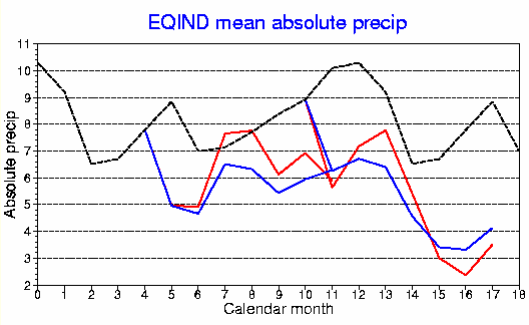
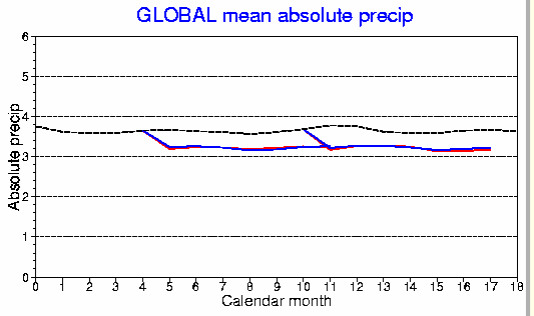




seasonal forecasts 1991-2001 May & Nov start dates: mean drift

precipitation

ECMWF control — stochastic physics — ERA-40

	eq. Atlantic	eq. Indian	global ocean
mean drift			
mean absolute SST			

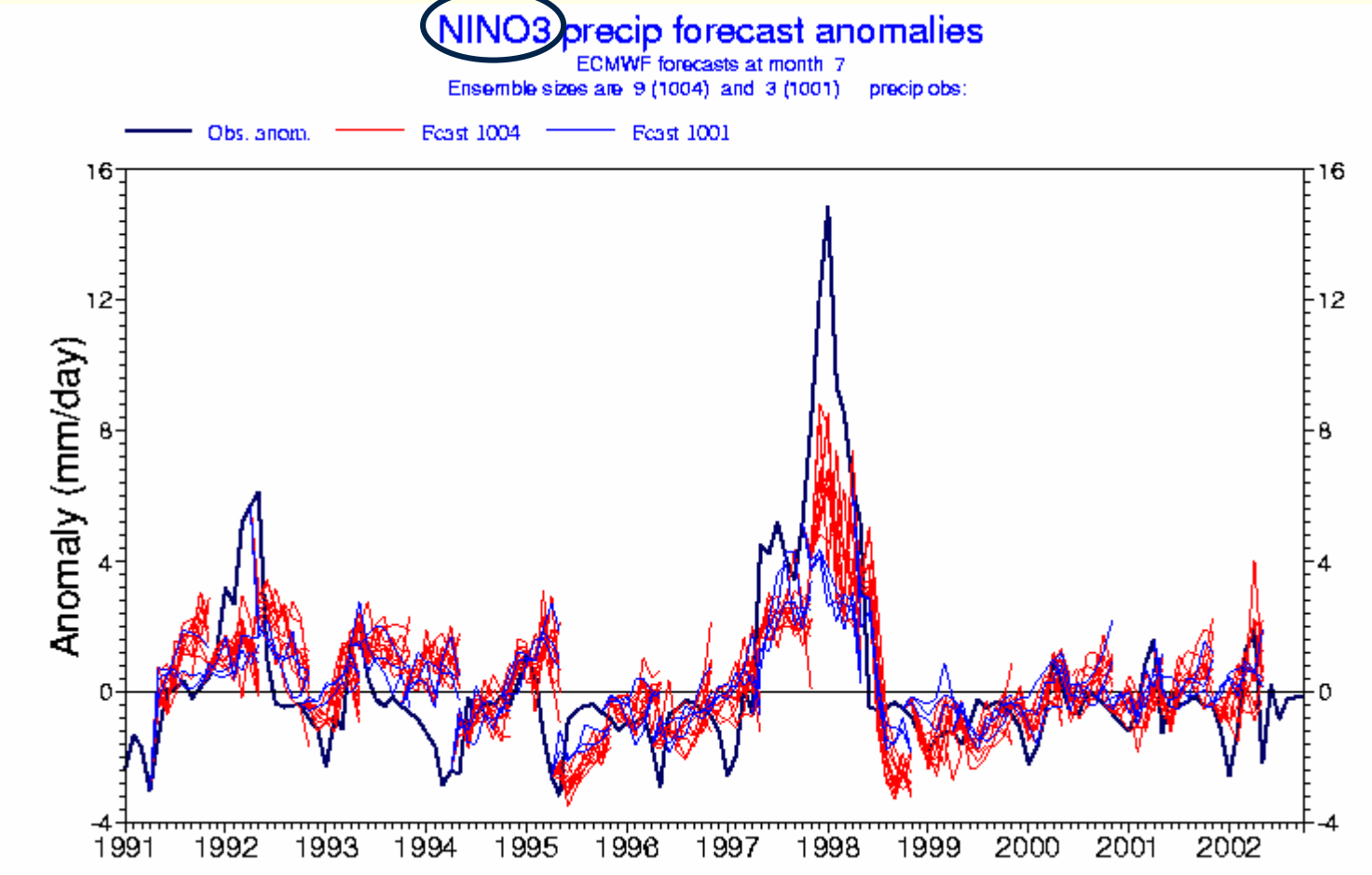
seasonal forecasts 1991-2001 May & Nov start dates: **forecasts**

precipitation

ECMWF control

stochastic physics

ERA-40



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

precipitation

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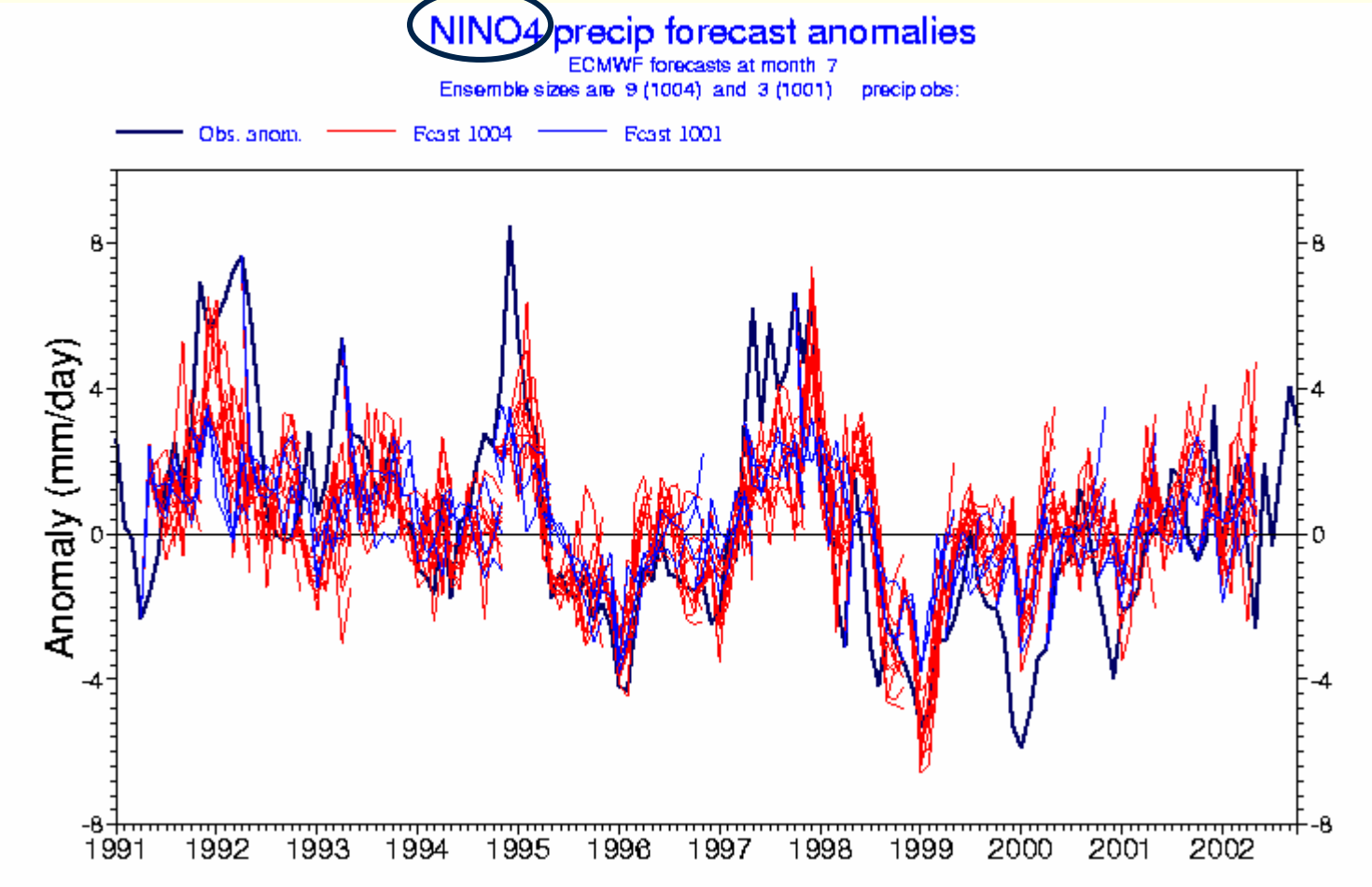
ERA-40



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

precipiation

ECMWF control

stochastic physics

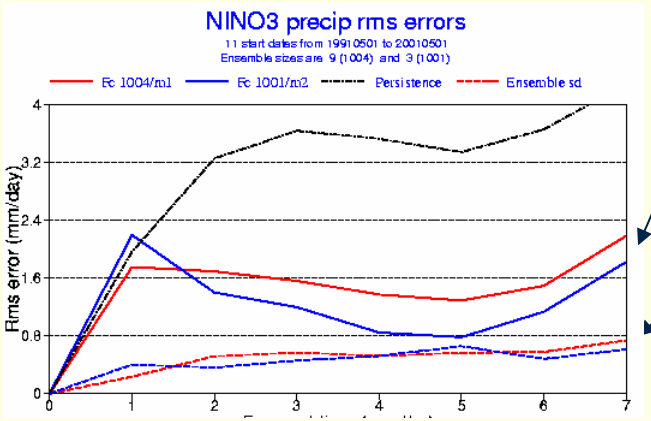
RMSE persistence

Nino3

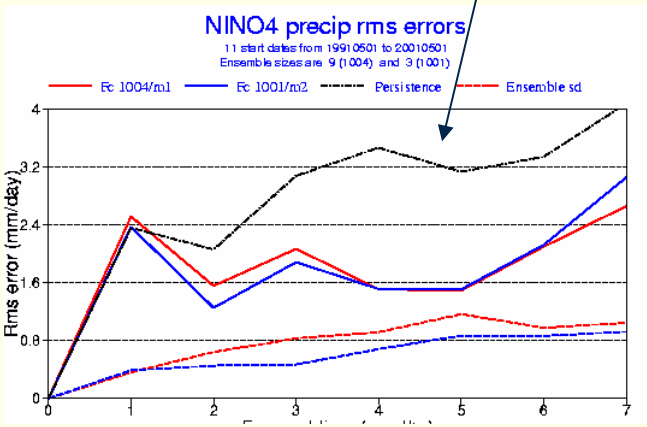
Nino4

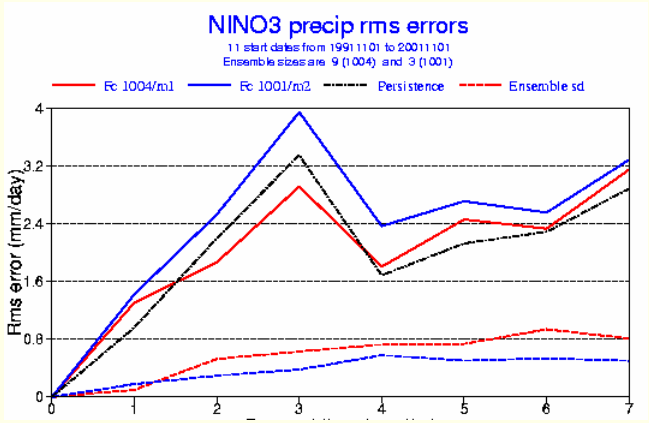
RMSE

spread

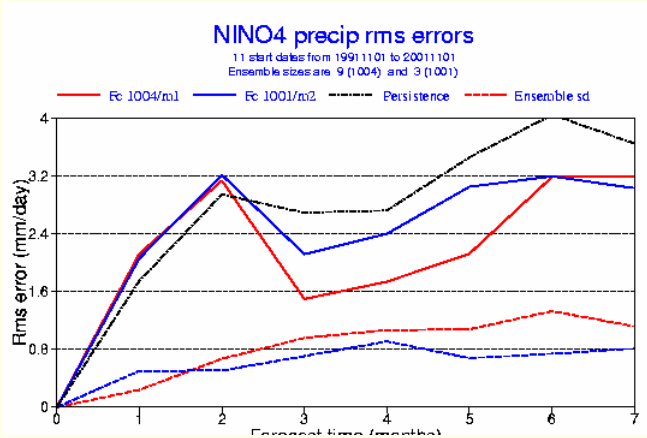


May starts





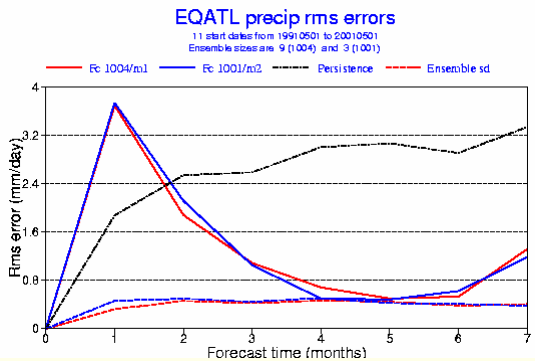
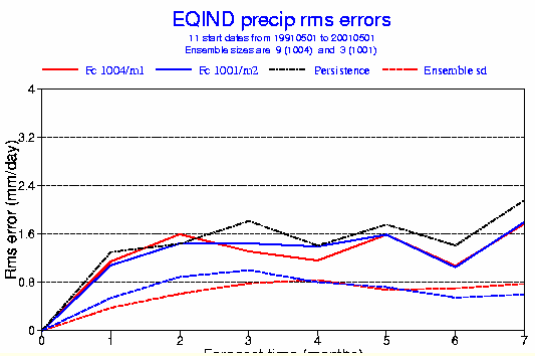
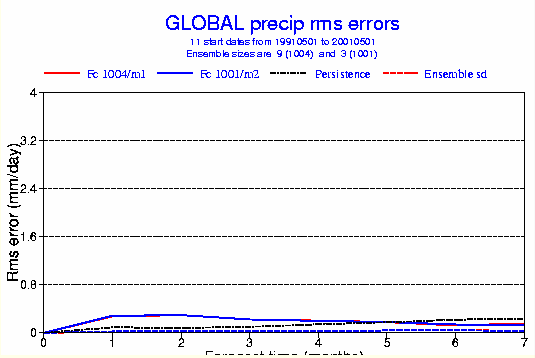
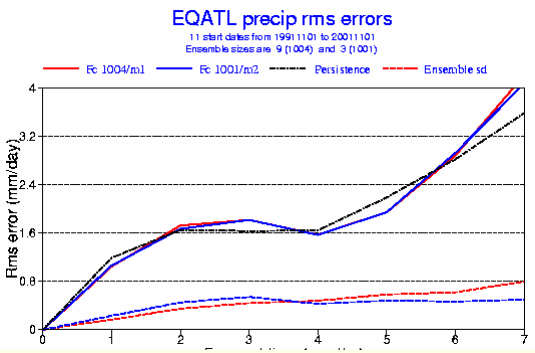
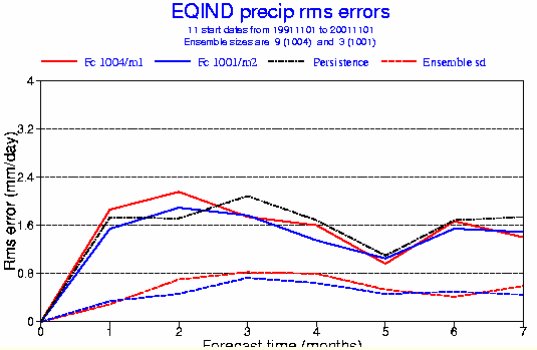
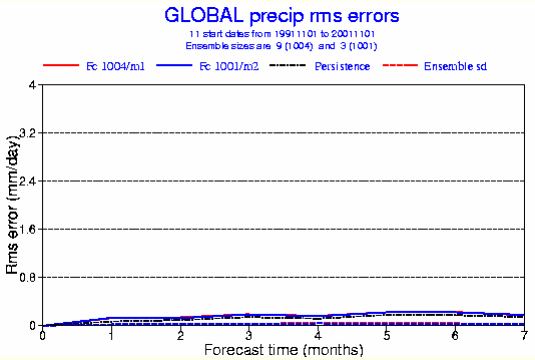
Nov starts



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

precipitation ECMWF control stochastic physics RMSE persistence

RMSE **..... spread**

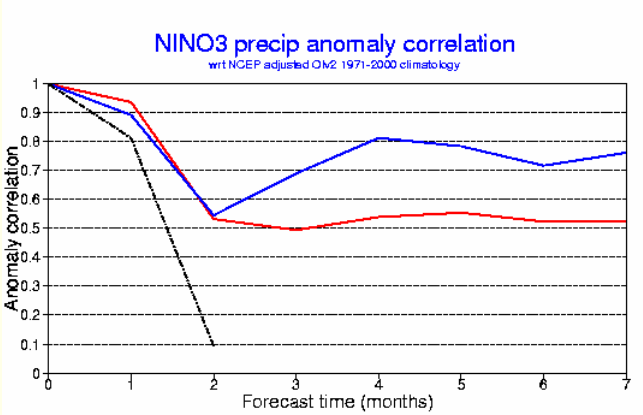
	eq. Atlantic	eq. Indian	global ocean
May			
Nov			

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

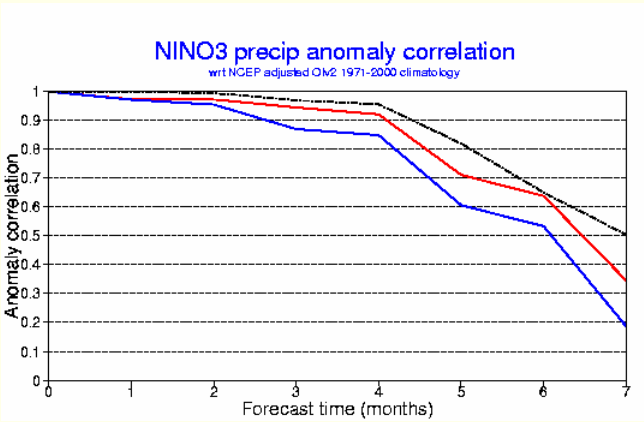
precipitation

ECMWF control — stochastic physics — RMSE persistence

Nino3

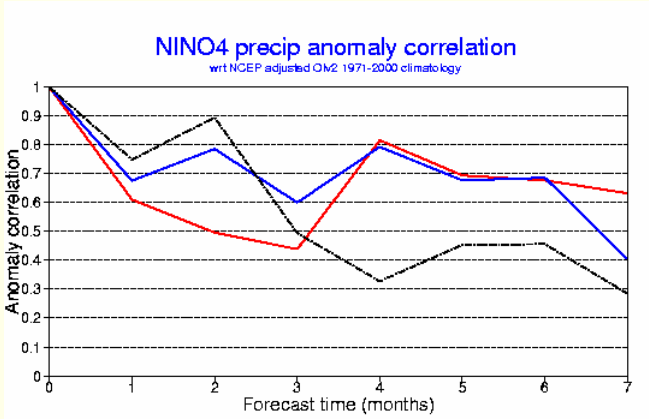


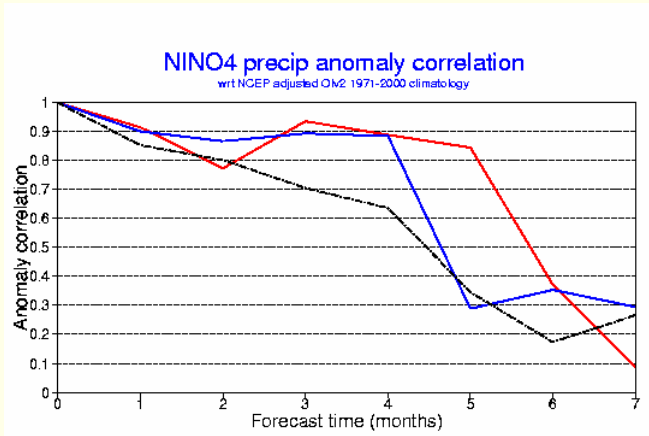
May starts



Nov starts

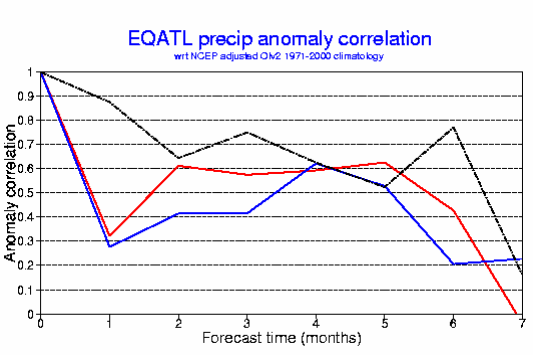
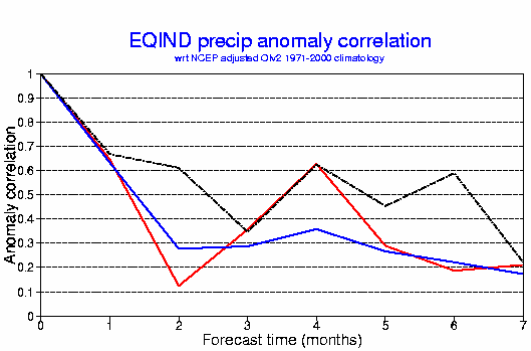
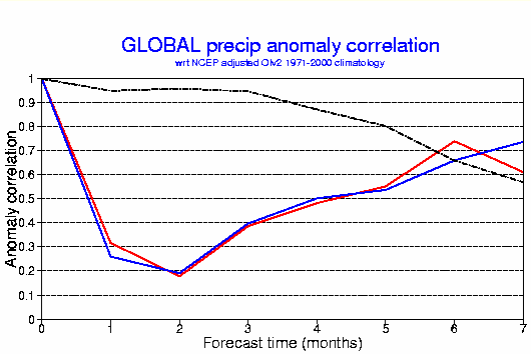
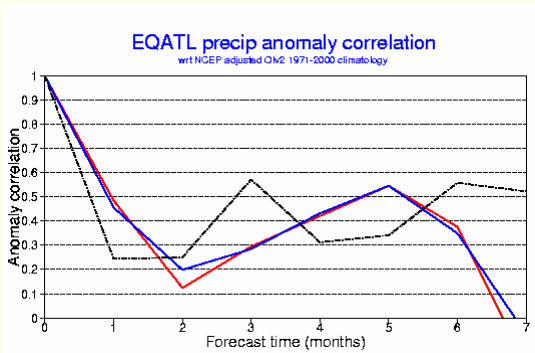
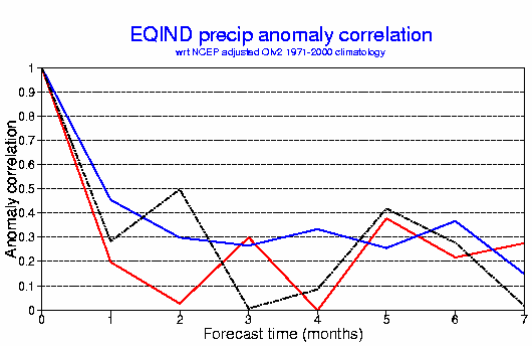
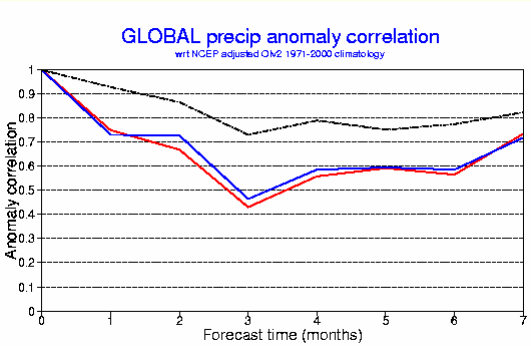
Nino4





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

precipitation ECMWF control stochastic physics RMSE persistence

	eq. Atlantic	eq. Indian	global ocean
May			
Nov			

ENSEMBLES stream 1 seasonal simulations
1991-2000

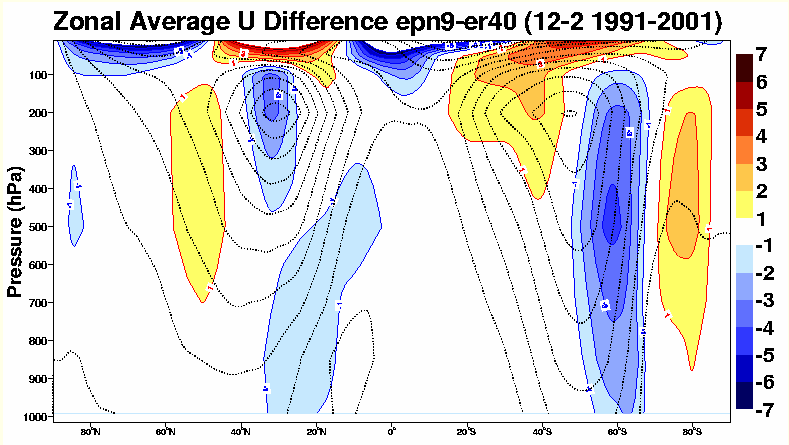
systematic bias

DJF (Nov start dates)

CASBS(version1.0) vs control
CY29R2

systematic bias 1991-2001 DJF (Nov start): zonal averaged u-wind

control – ERA40



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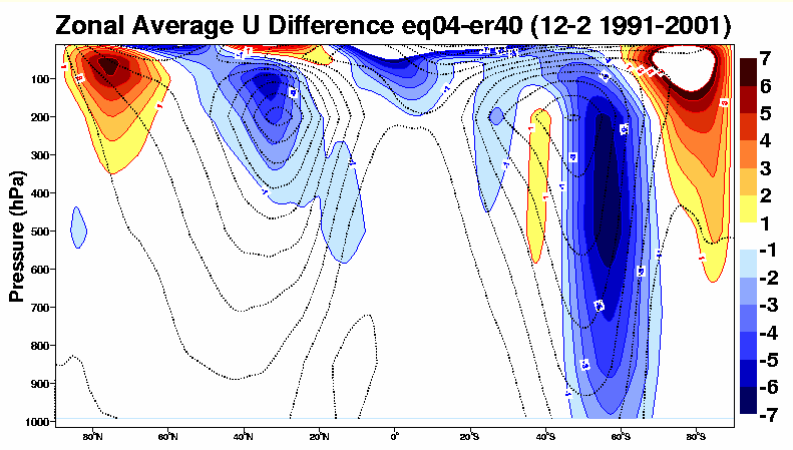
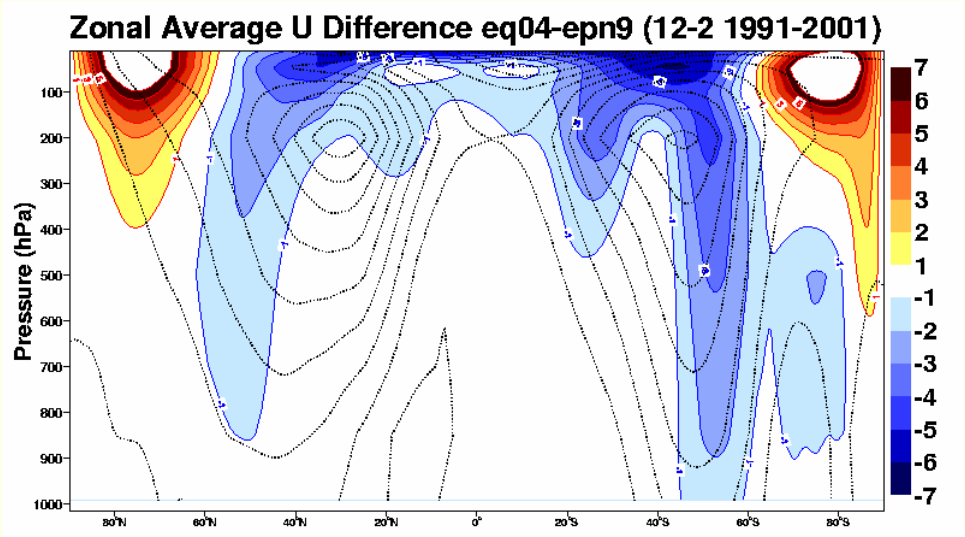
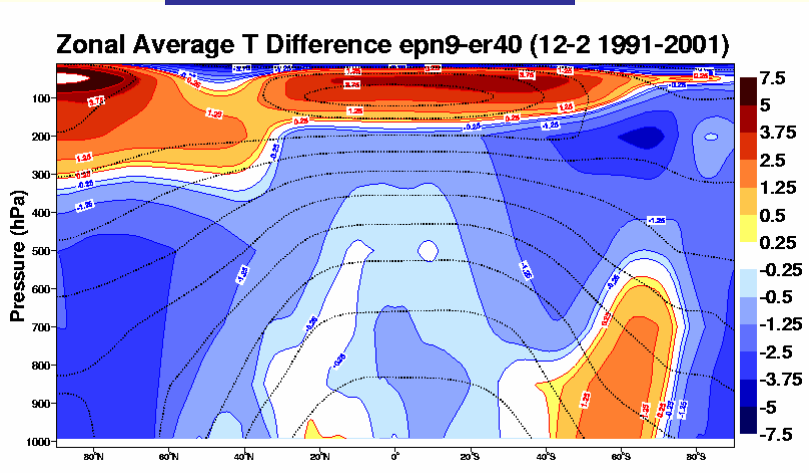


CASBS – control

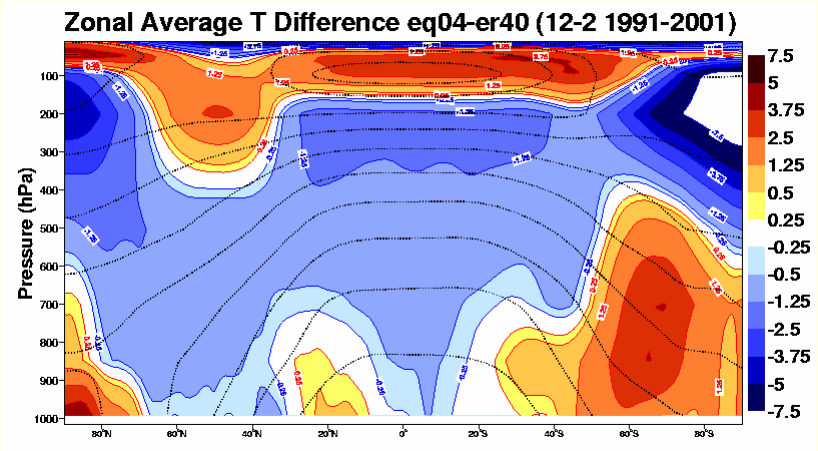


systematic bias 1991-2001 DJF (Nov start): zonal averaged temperature

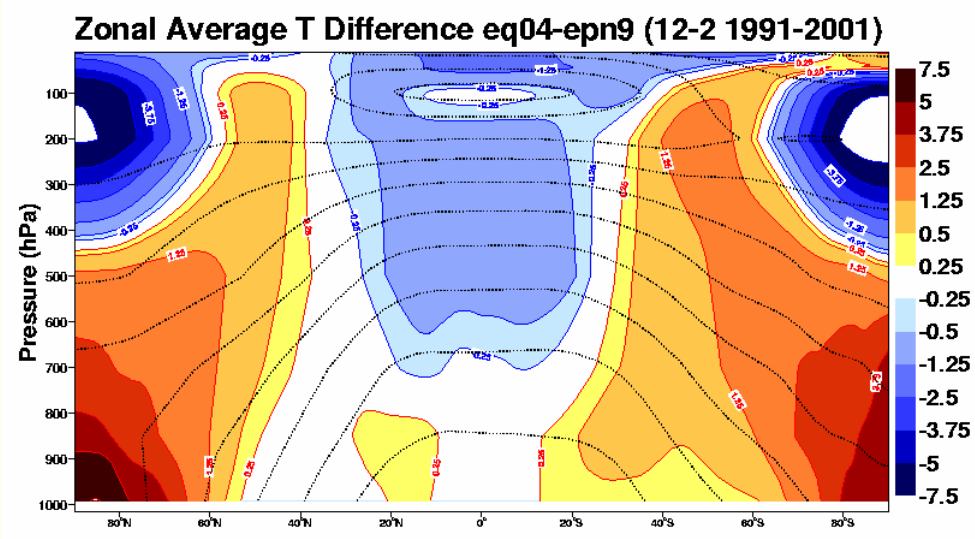
control – ERA40



CASBS – ERA40

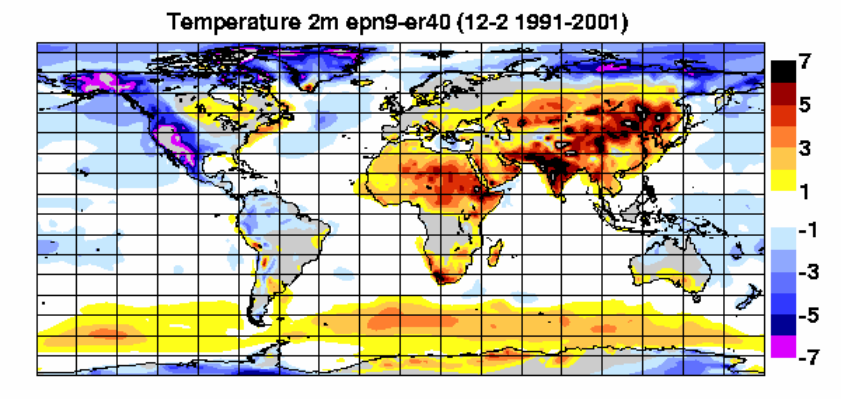


CASBS – control

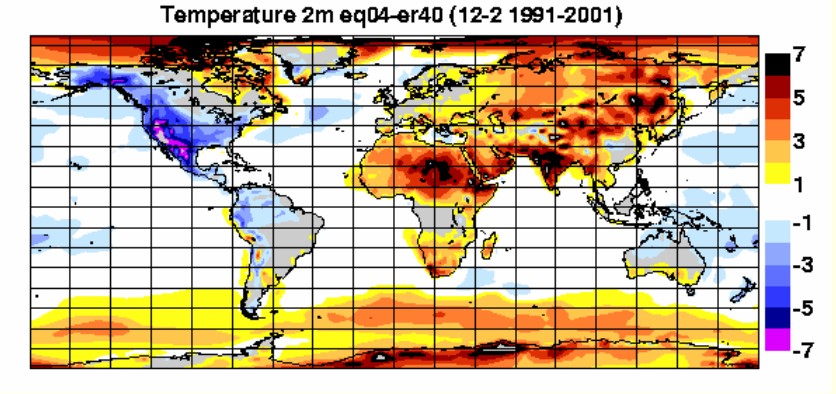


systematic bias 1991-2001 DJF (Nov start): 2m temperature

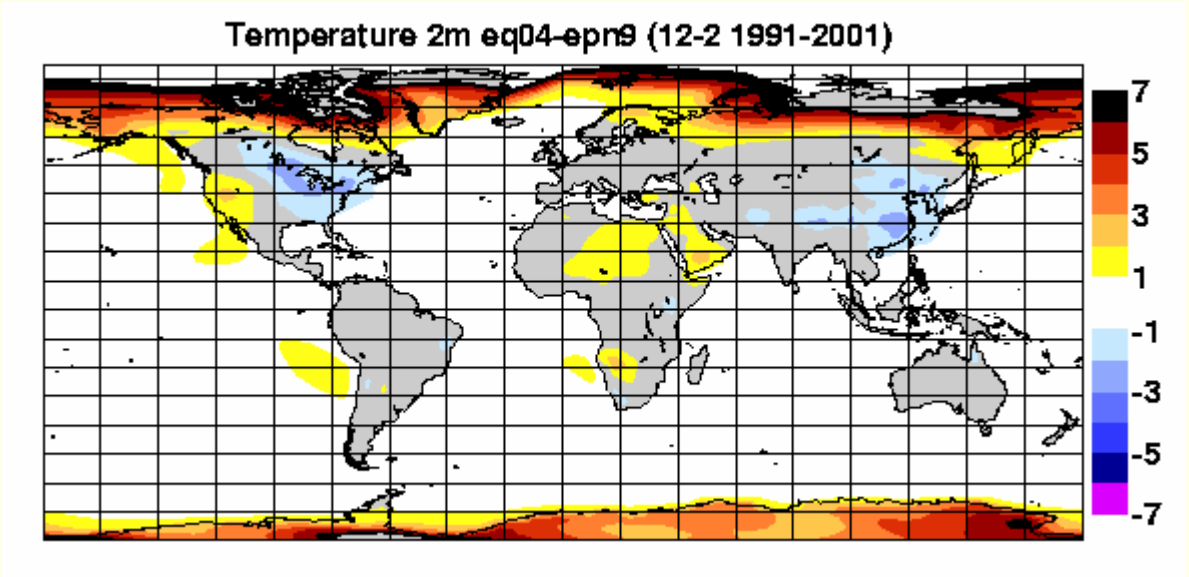
control – ERA40



CASBS – ERA40

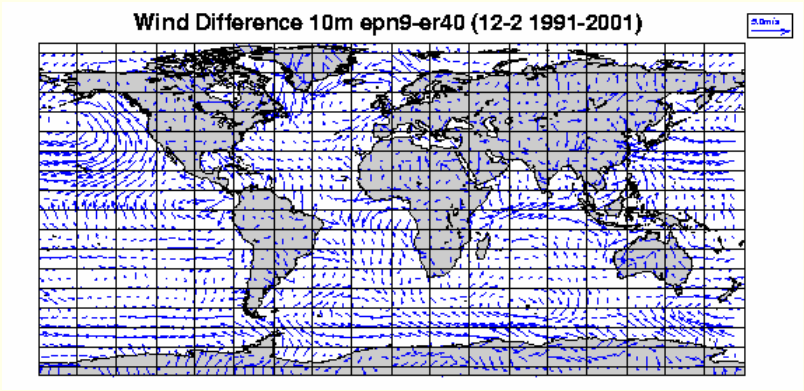


CASBS – control

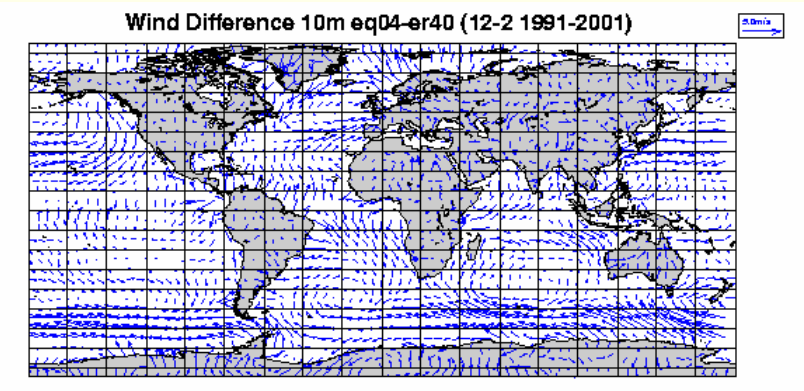


systematic bias 1991-2001 DJF (Nov start): 10m wind

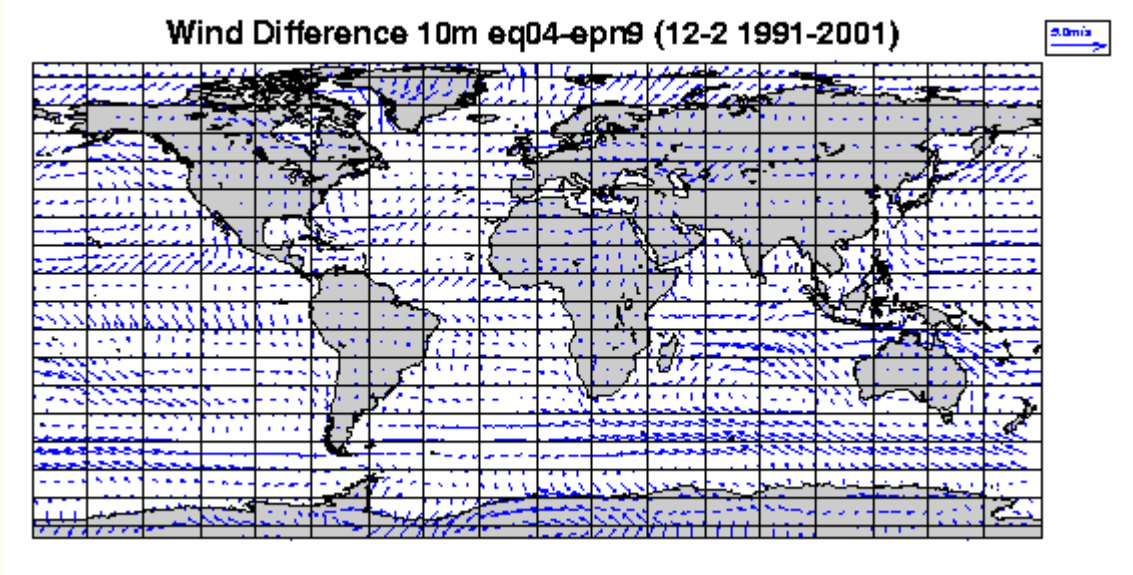
control – ERA40



CASBS – ERA40

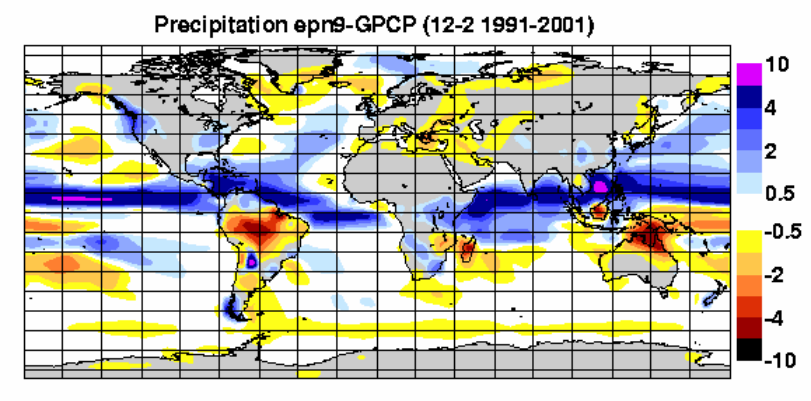


CASBS – control

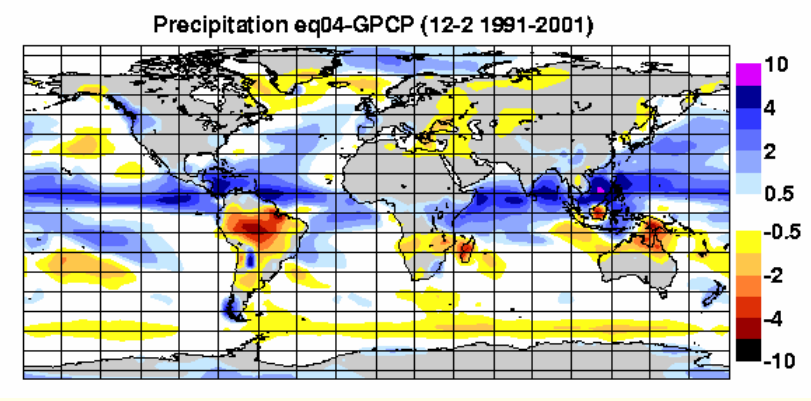


systematic bias 1991-2001 DJF (Nov start): precipitation

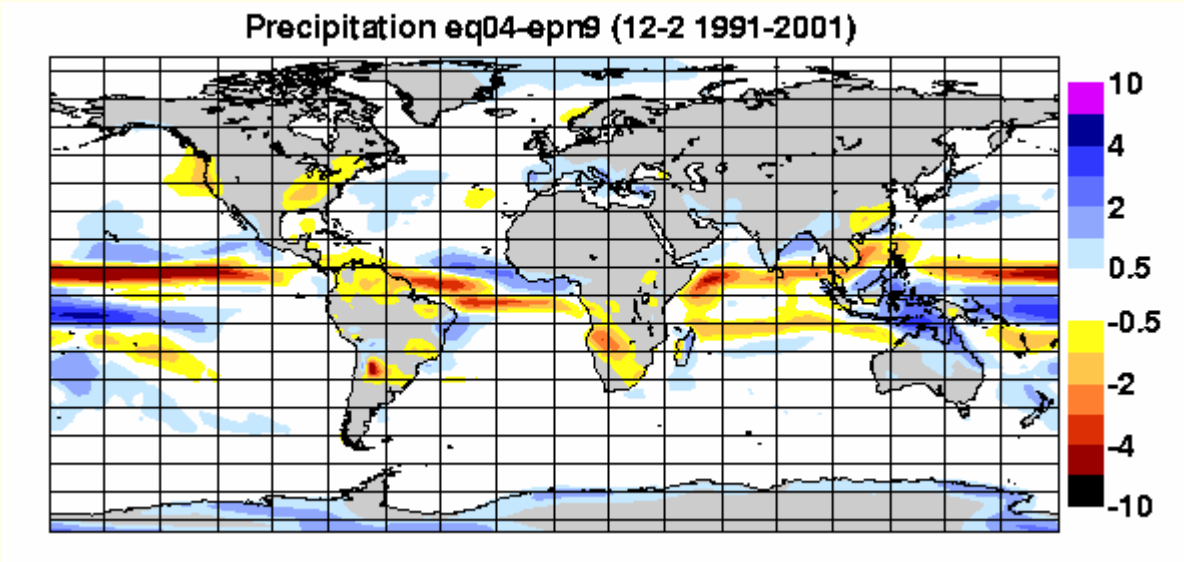
control – GPCP



CASBS – GPCP

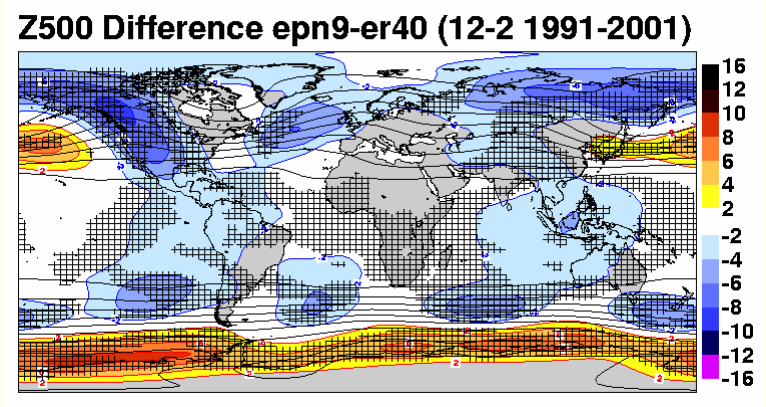


CASBS – control

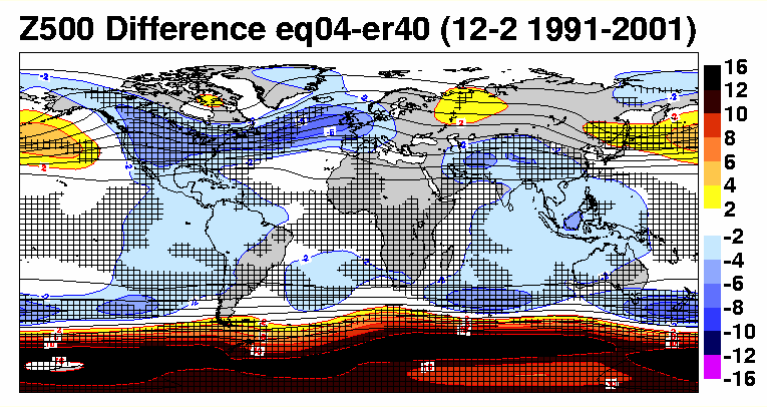


systematic bias 1991-2001 DJF (Nov start): Z500

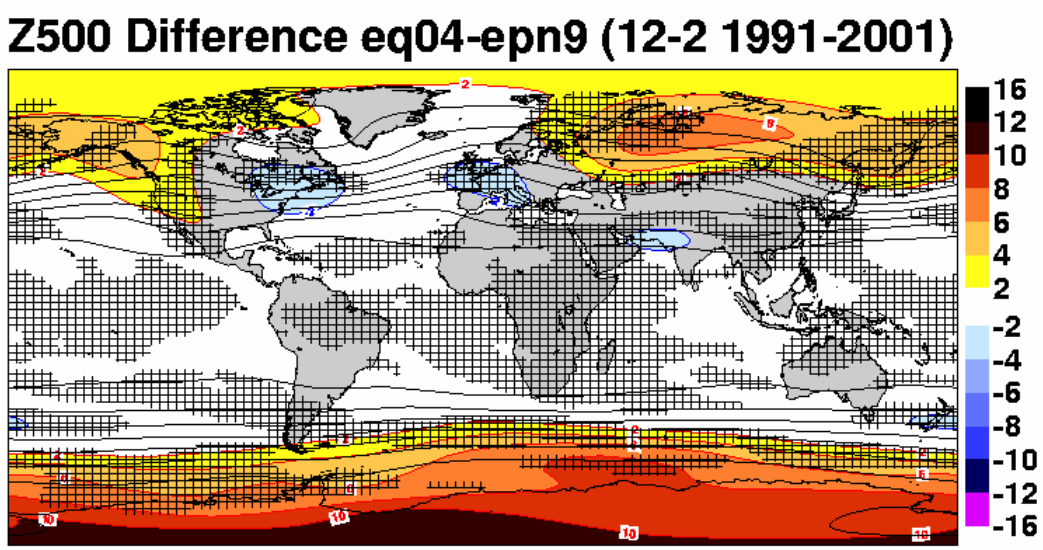
control – ERA40



CASBS – ERA40

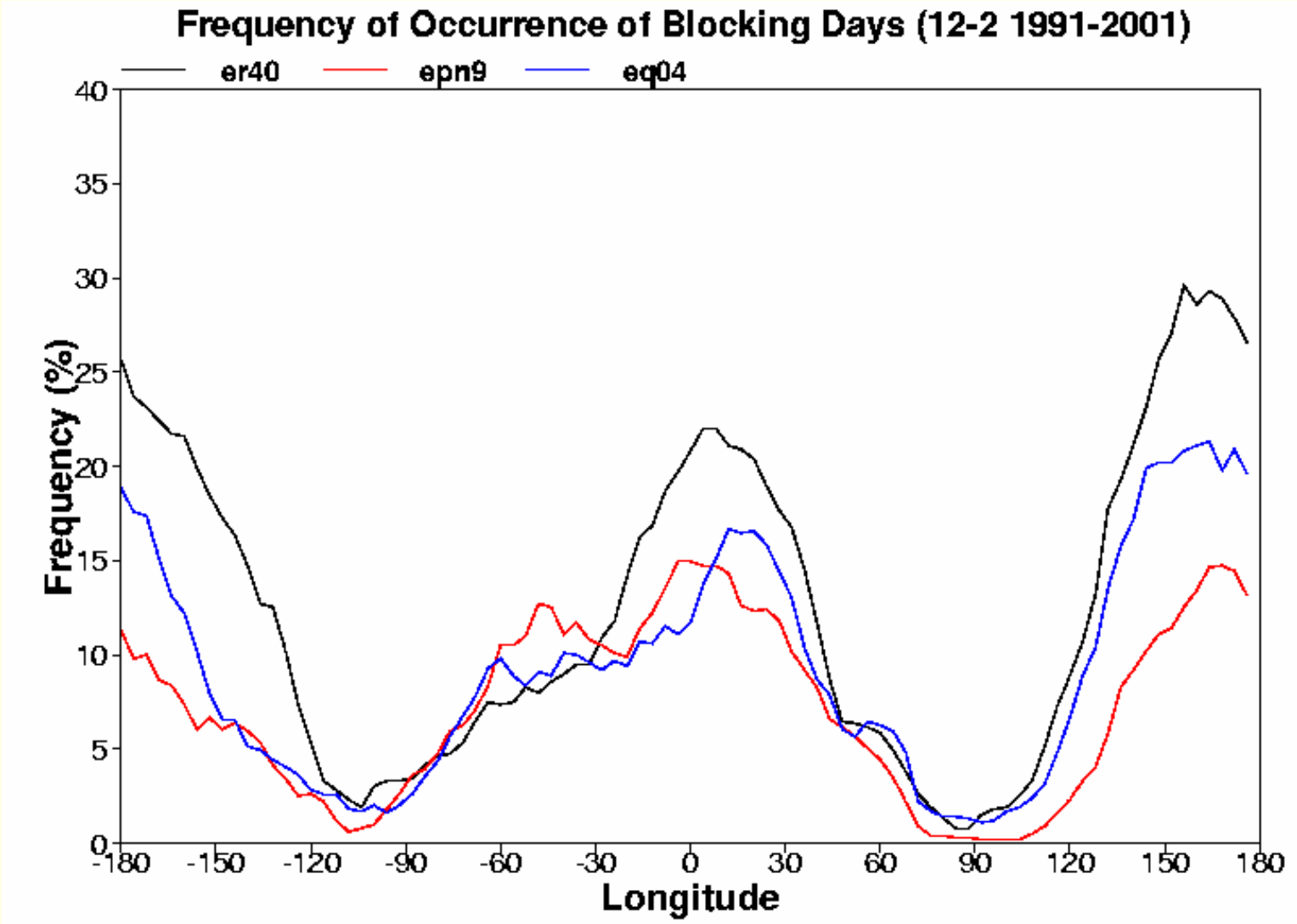


CASBS – control



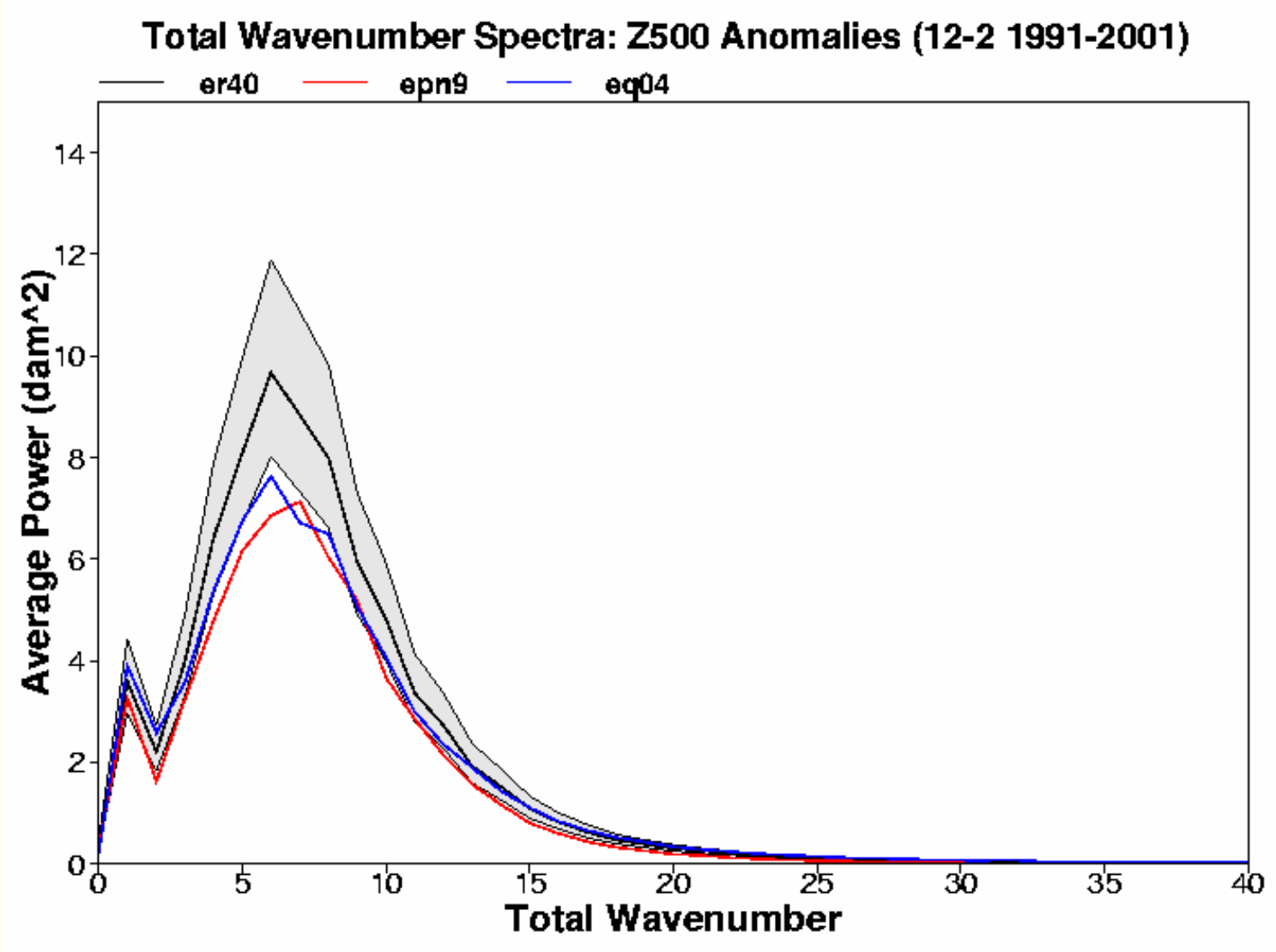
systematic bias 1991-2001 DJF (Nov start): blocking

control CASBS ERA40



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

control CASBS ERA40



ENSEMBLES stream 1 seasonal simulations
1991-2000

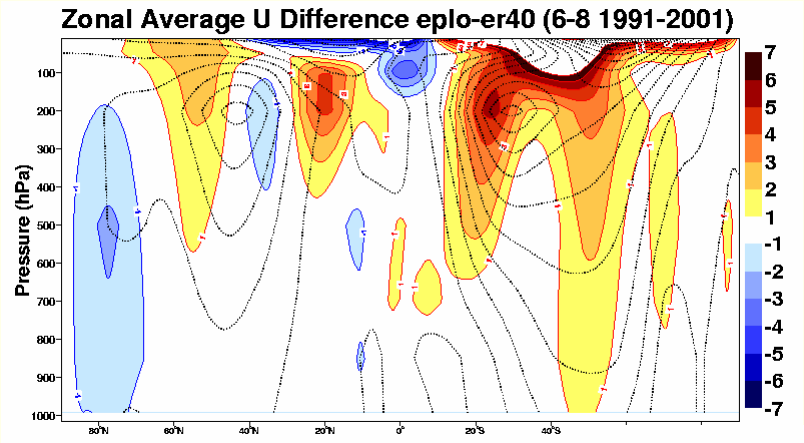
systematic bias

JJA (May start dates)

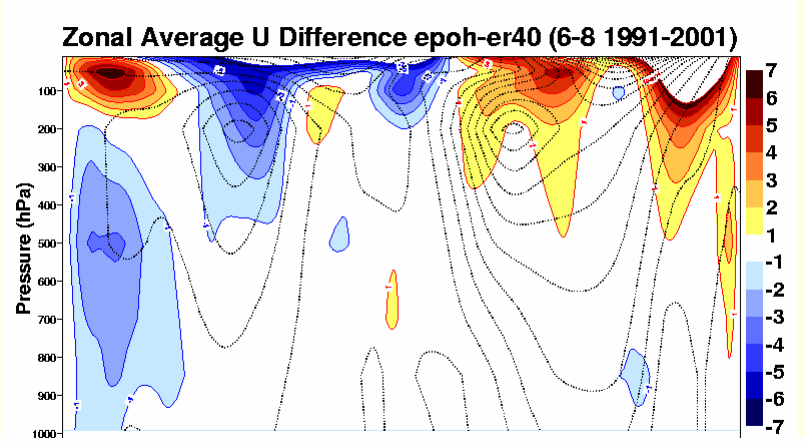
CASBS(version1.0) vs control
CY29R2

systematic bias 1991-2001 JJA (May start): zonal averaged u-wind

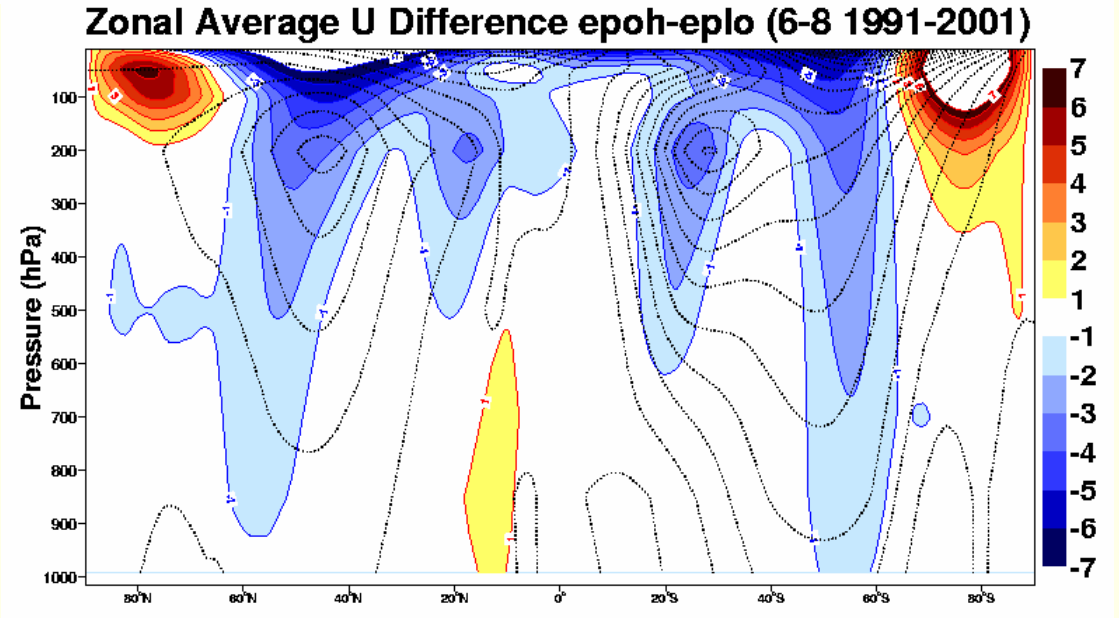
control – ERA40



CASBS – ERA40

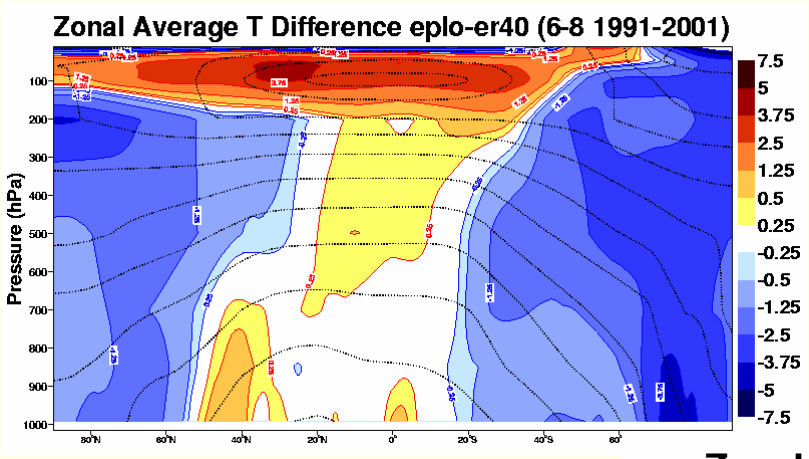


CASBS – control

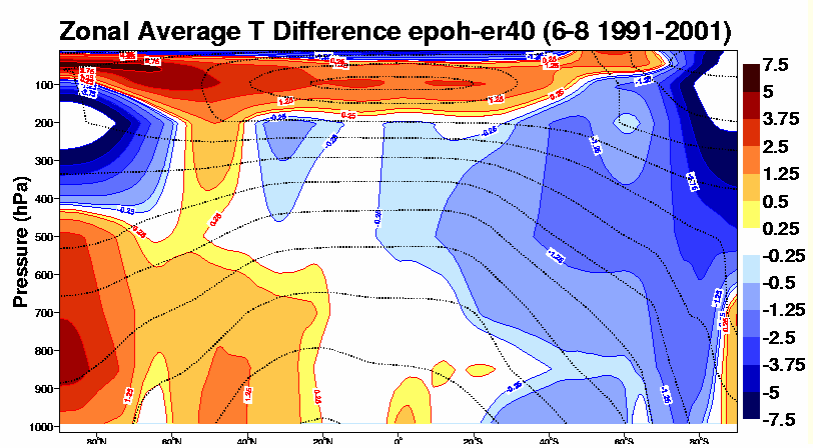


systematic bias 1991-2001 JJA (May start): zonal averaged temperature

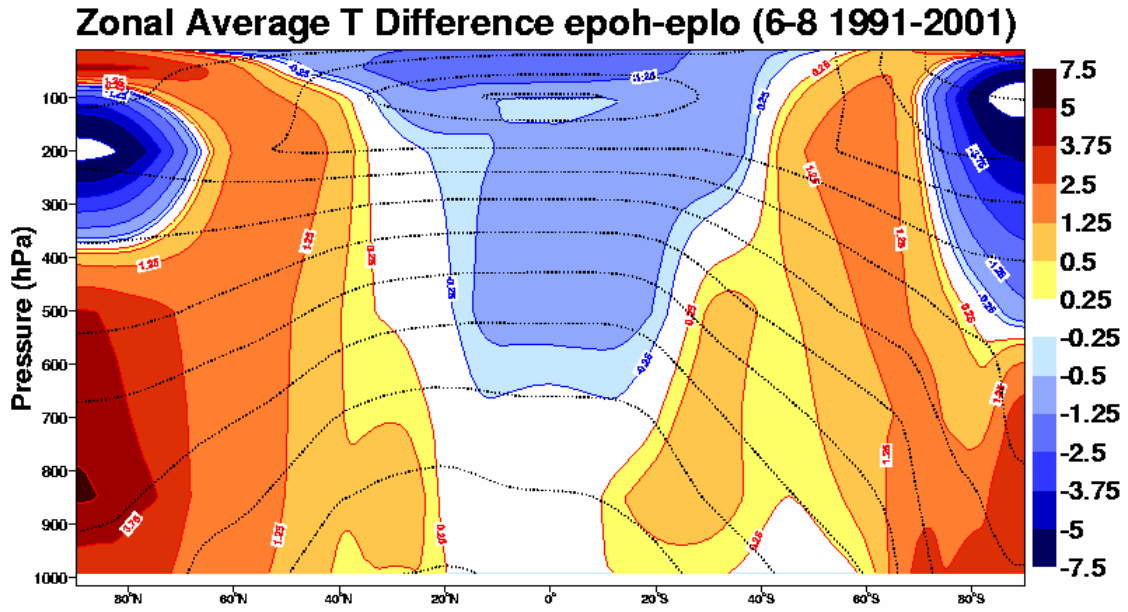
control – ERA40



CASBS – ERA40

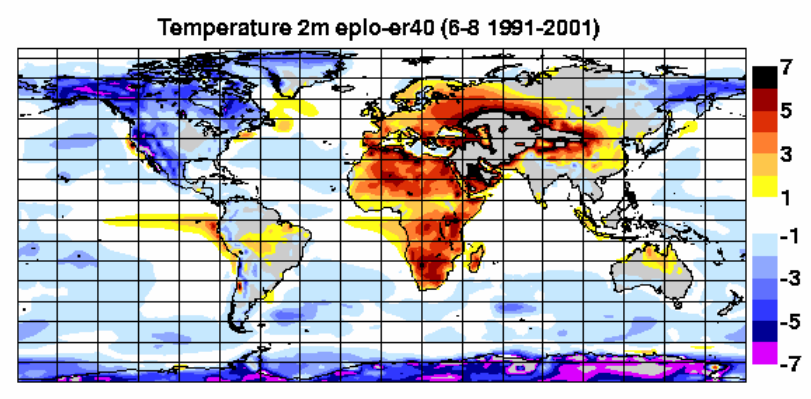


CASBS – control

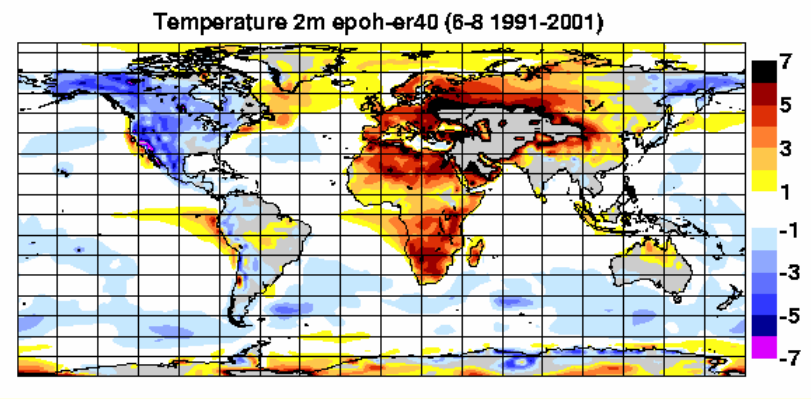


systematic bias 1991-2001 JJA (May start): 2m temperature

control – ERA40



CASBS – ERA40



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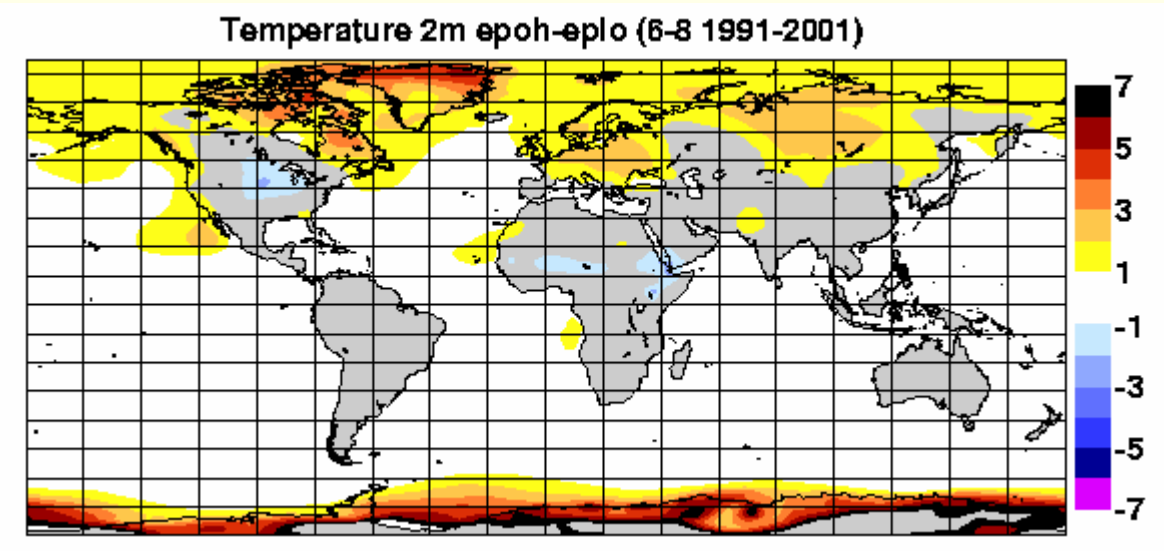
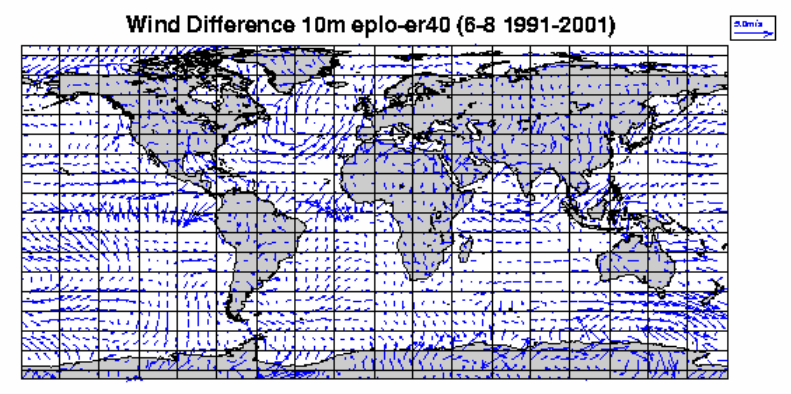


systematic bias 1991-2001 JJA (May start): 10m wind

control – ERA40



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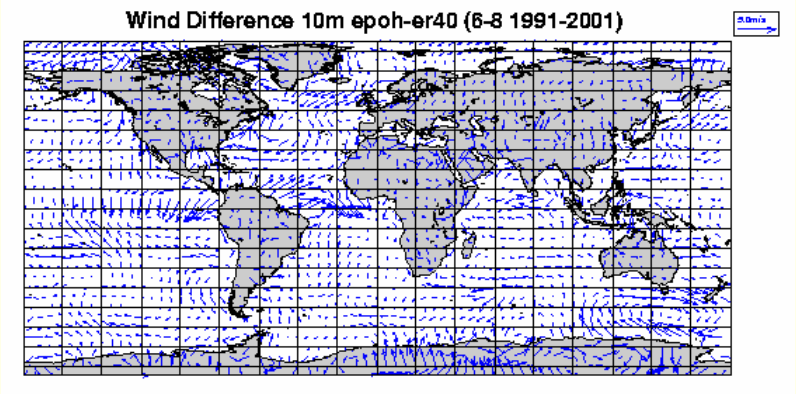
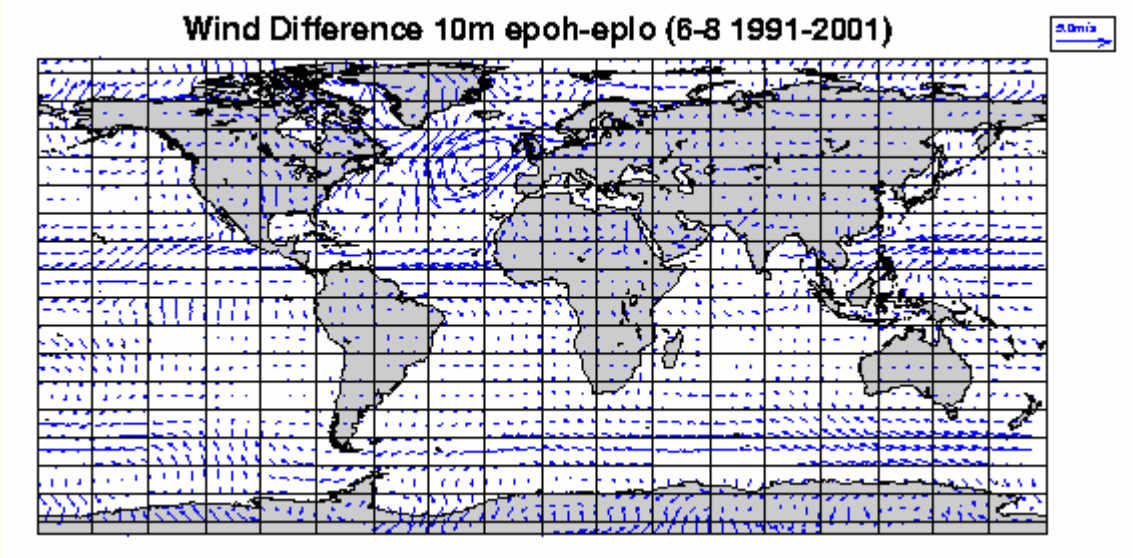
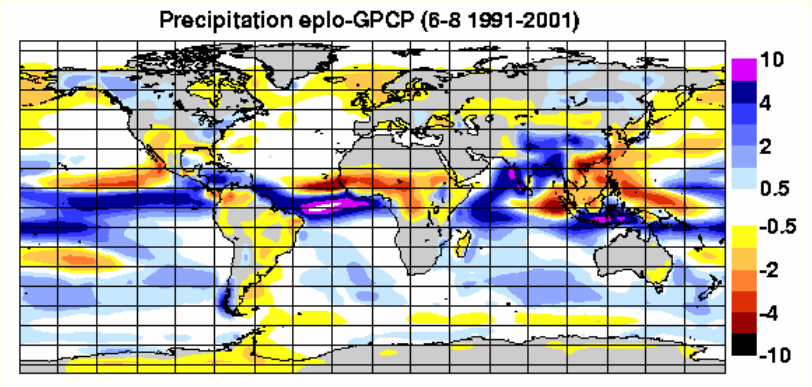


CASBS – control

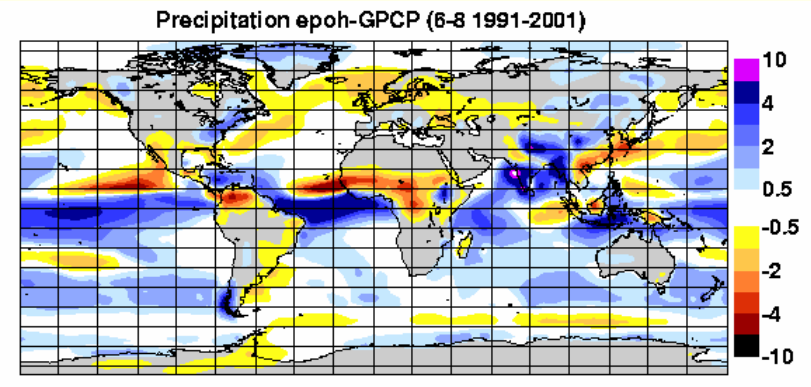


systematic bias 1991-2001 JJA (May start): precipitation

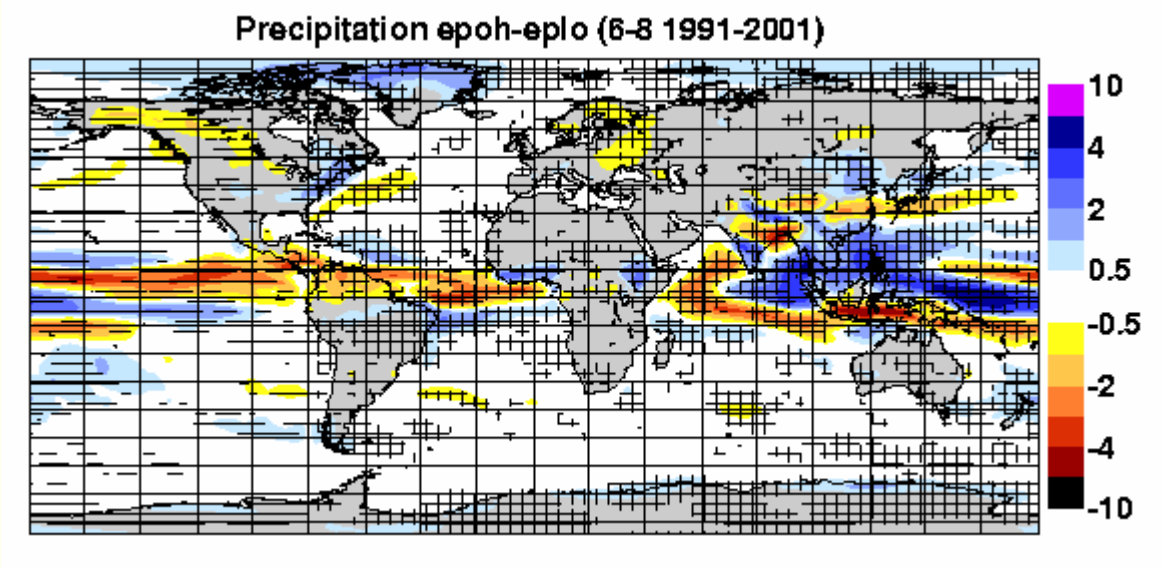
control – GPCP



CASBS – GPCP

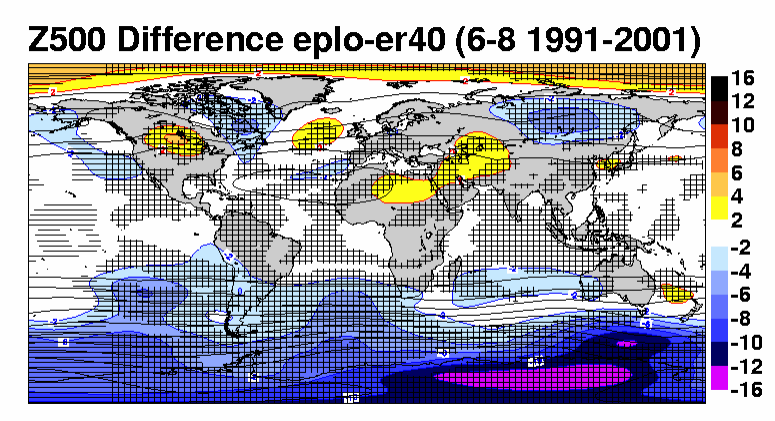


CASBS – control

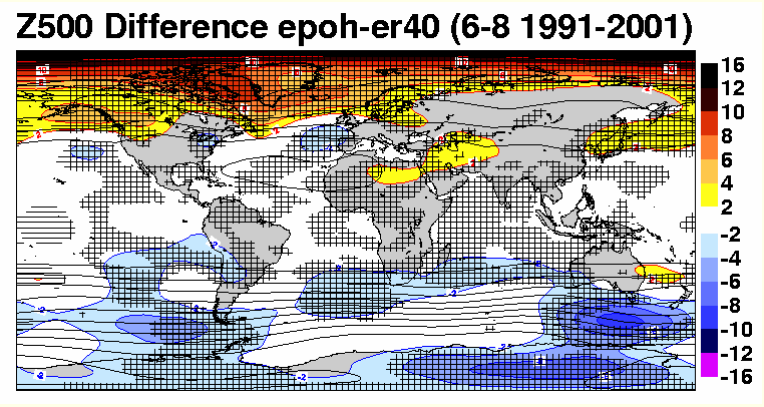


systematic bias 1991-2001 JJA (May start): Z500

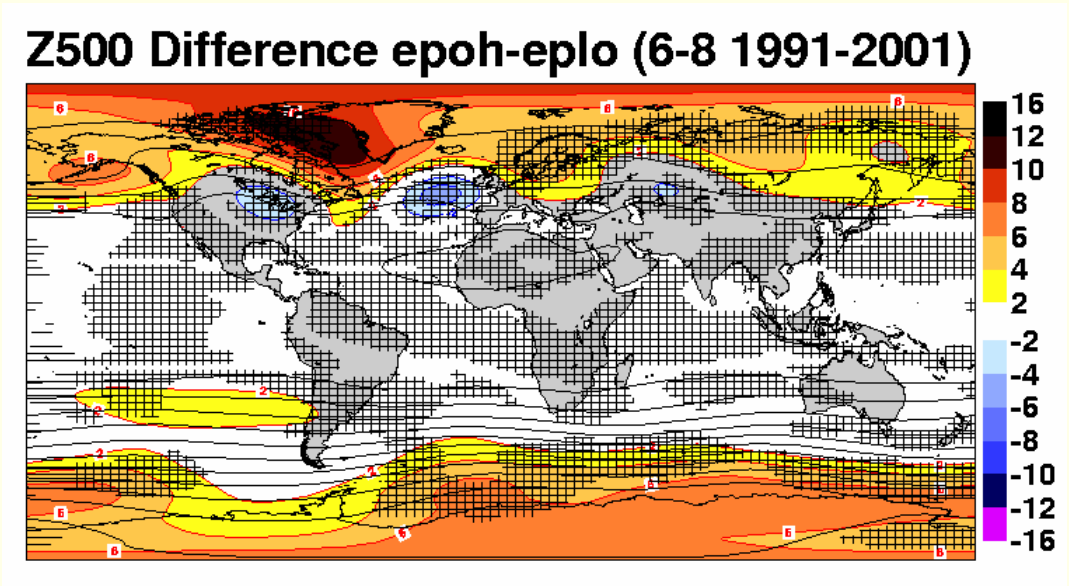
control – ERA40



CASBS – ERA40

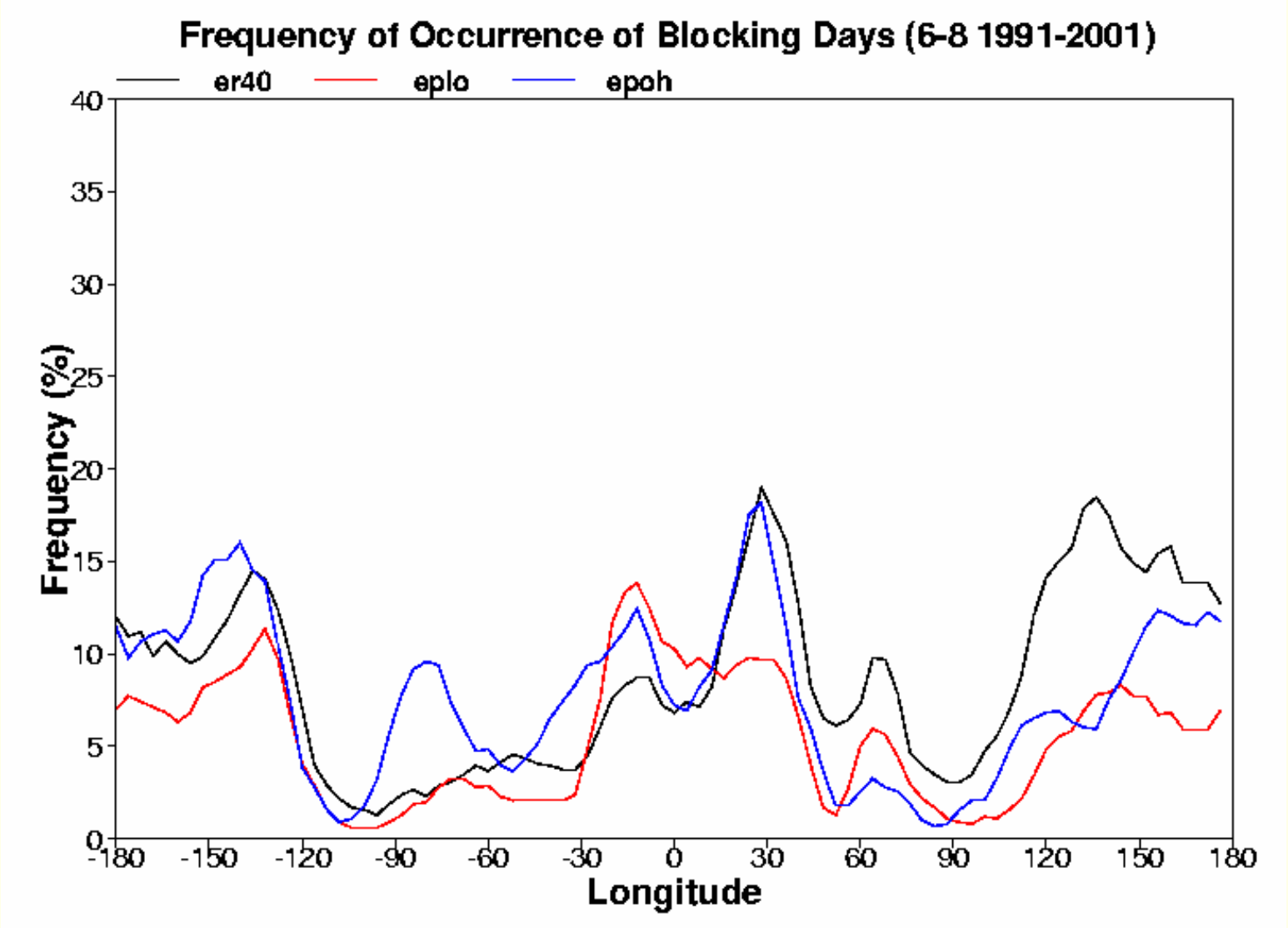


CASBS – control



systematic bias 1991-2001 JJA (May start): blocking

control CASBS ERA40



systematic bias 1991-2001 JJA (May start): Z500 energy spectrum

control CASBS ERA40