Monthly and Seasonal Forecasts at ECMWF

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Seasonal Forecast Team:
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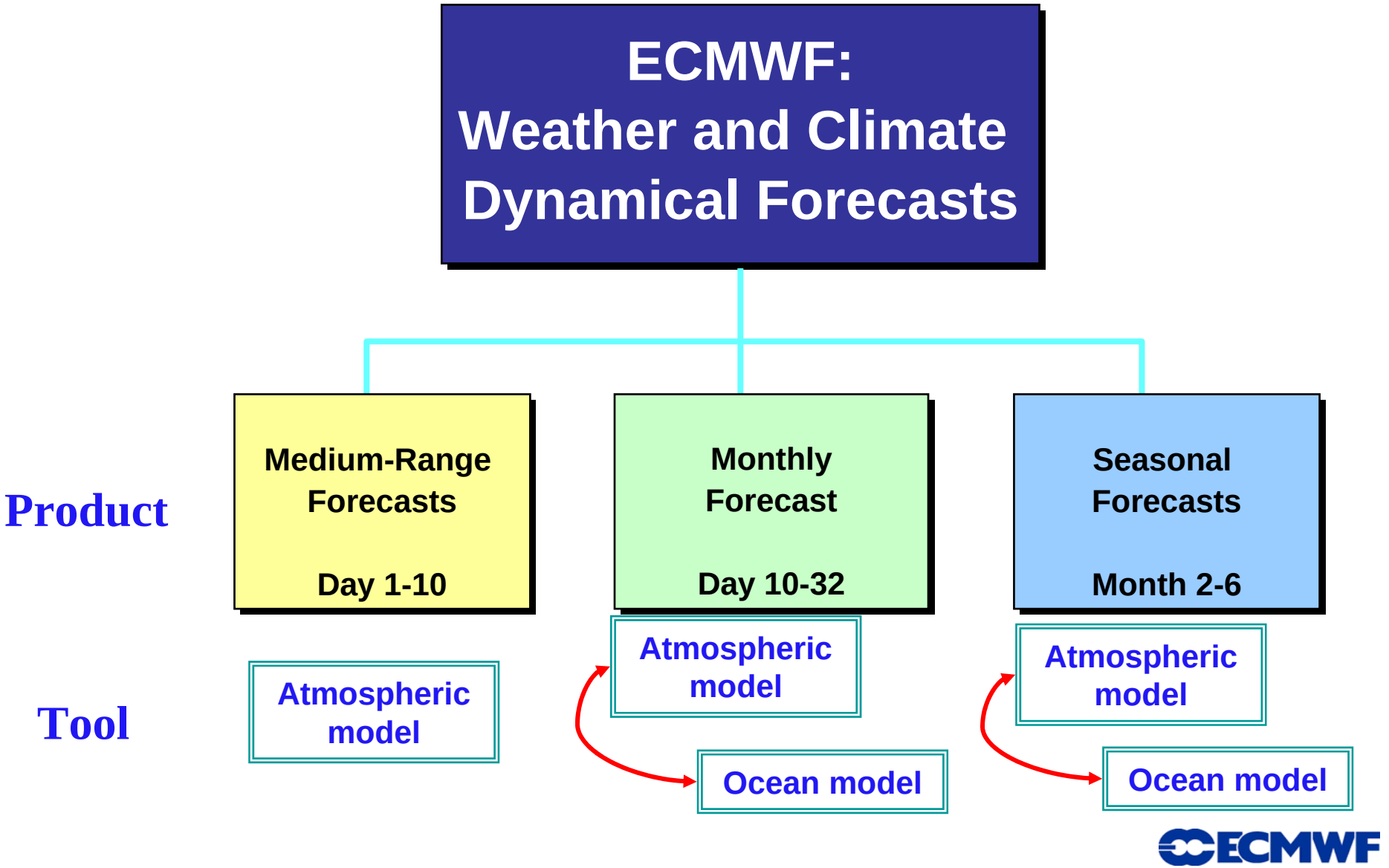
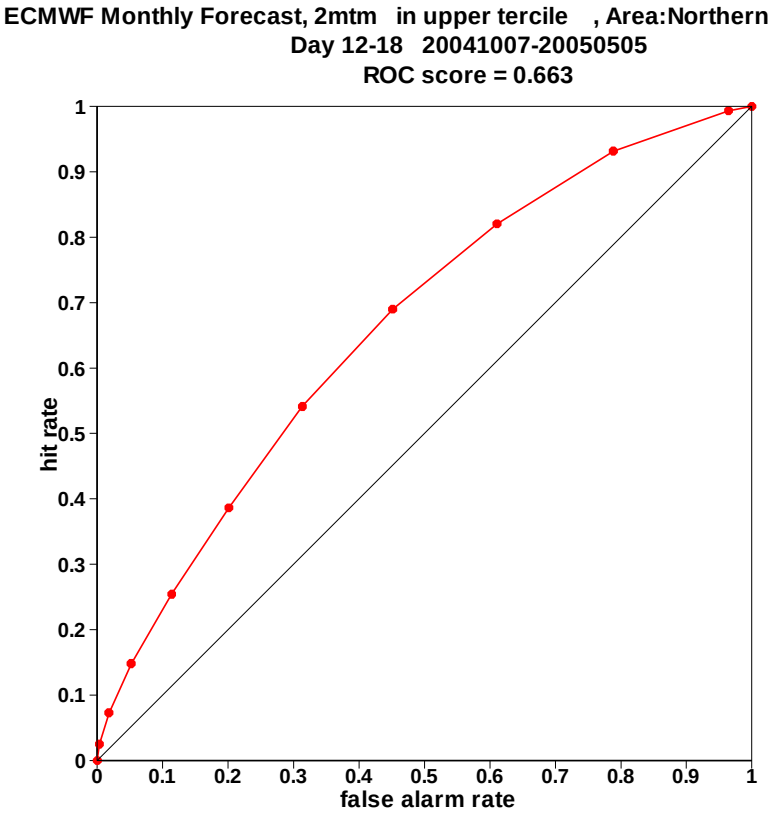
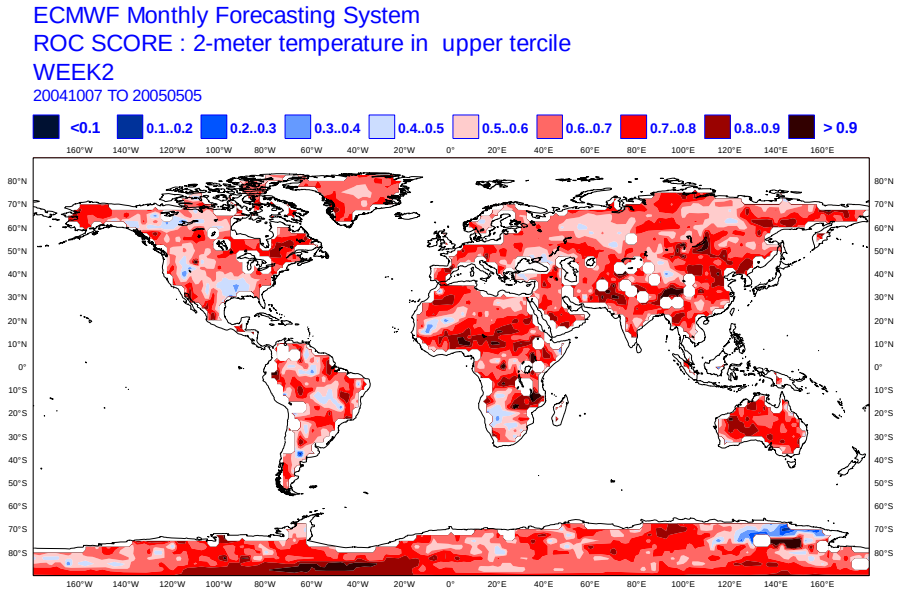

ECMWF:
Weather and Climate
Dynamical Forecasts
Product
Tool
Medium-Range
Forecasts
Day 1-10
Monthly
Forecast
Day 10-32
Seasonal
Forecasts
Month 2-6
Atmospheric
model
Atmospheric
model
Ocean model
Atmospheric
model
Ocean model
ECMWF

ROC scores- day 12-18

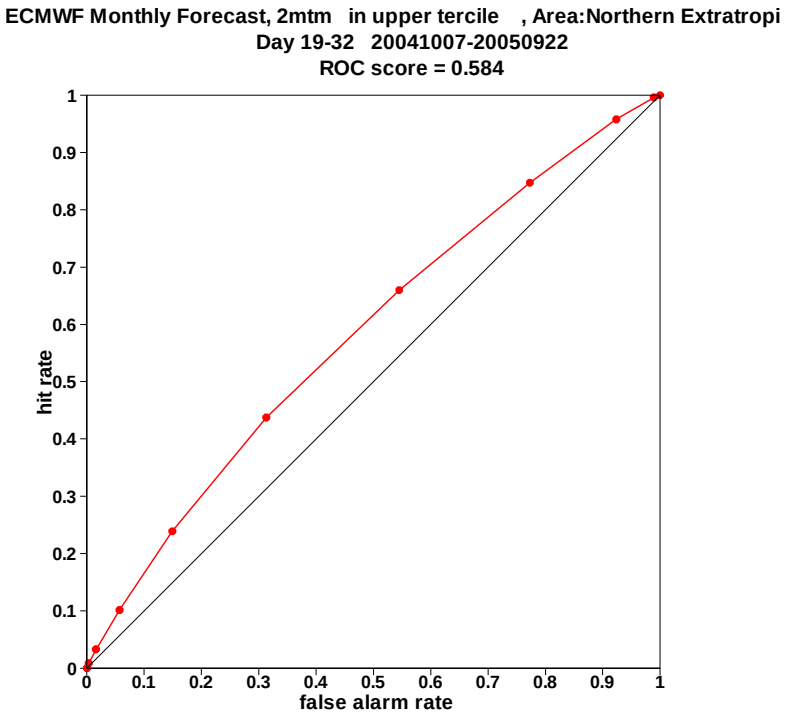
Probability that 2-meter temperature is in upper tercile

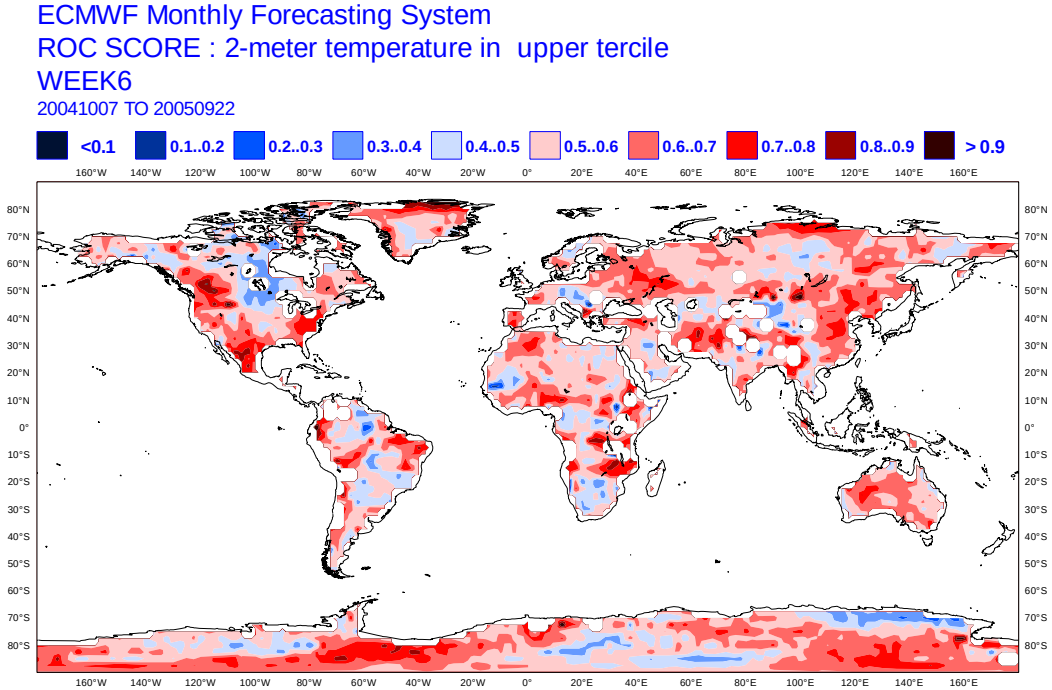




ROC scores- day 19-32

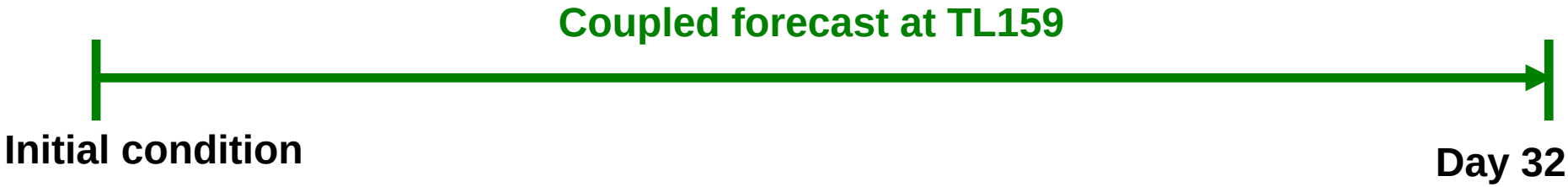
Probability that 2-meter temperature is in upper tercile



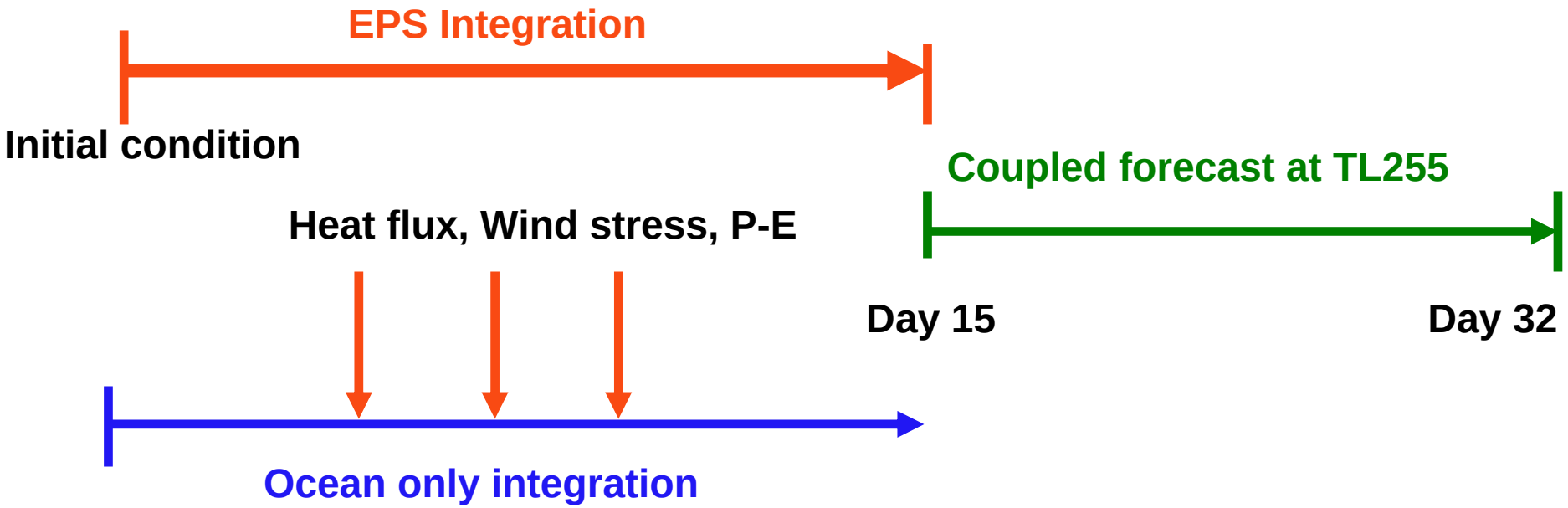


Merging monthly forecasting with VAREPS

Present system:



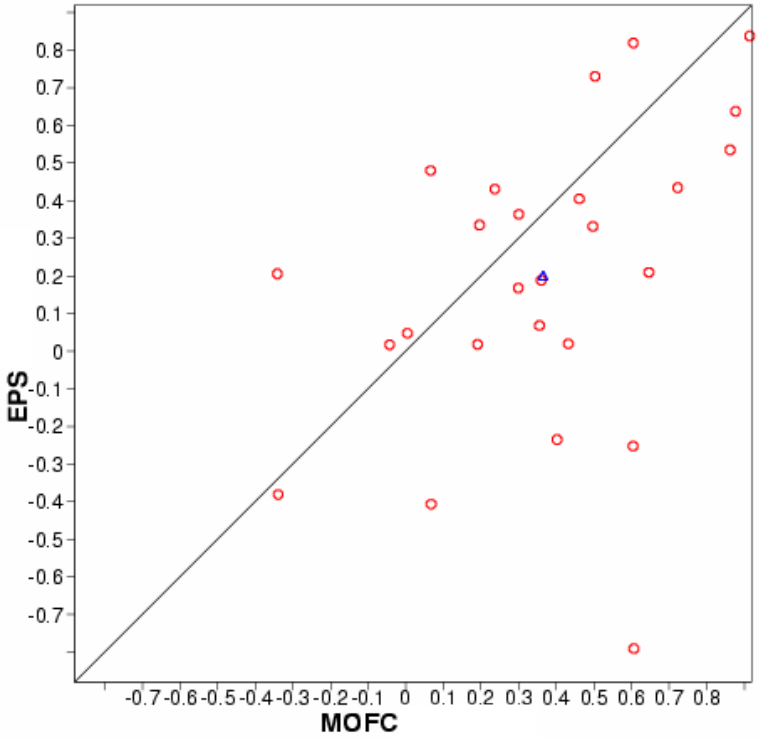
Future system:



Day 12-18

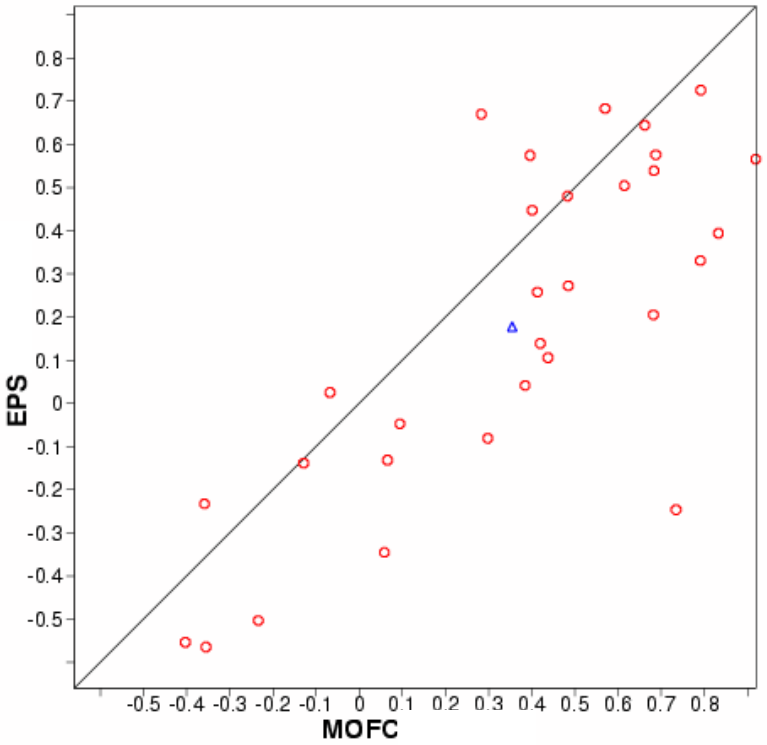
N. PACIFIC

MOFC/EPS: 20/10 (92% sign)

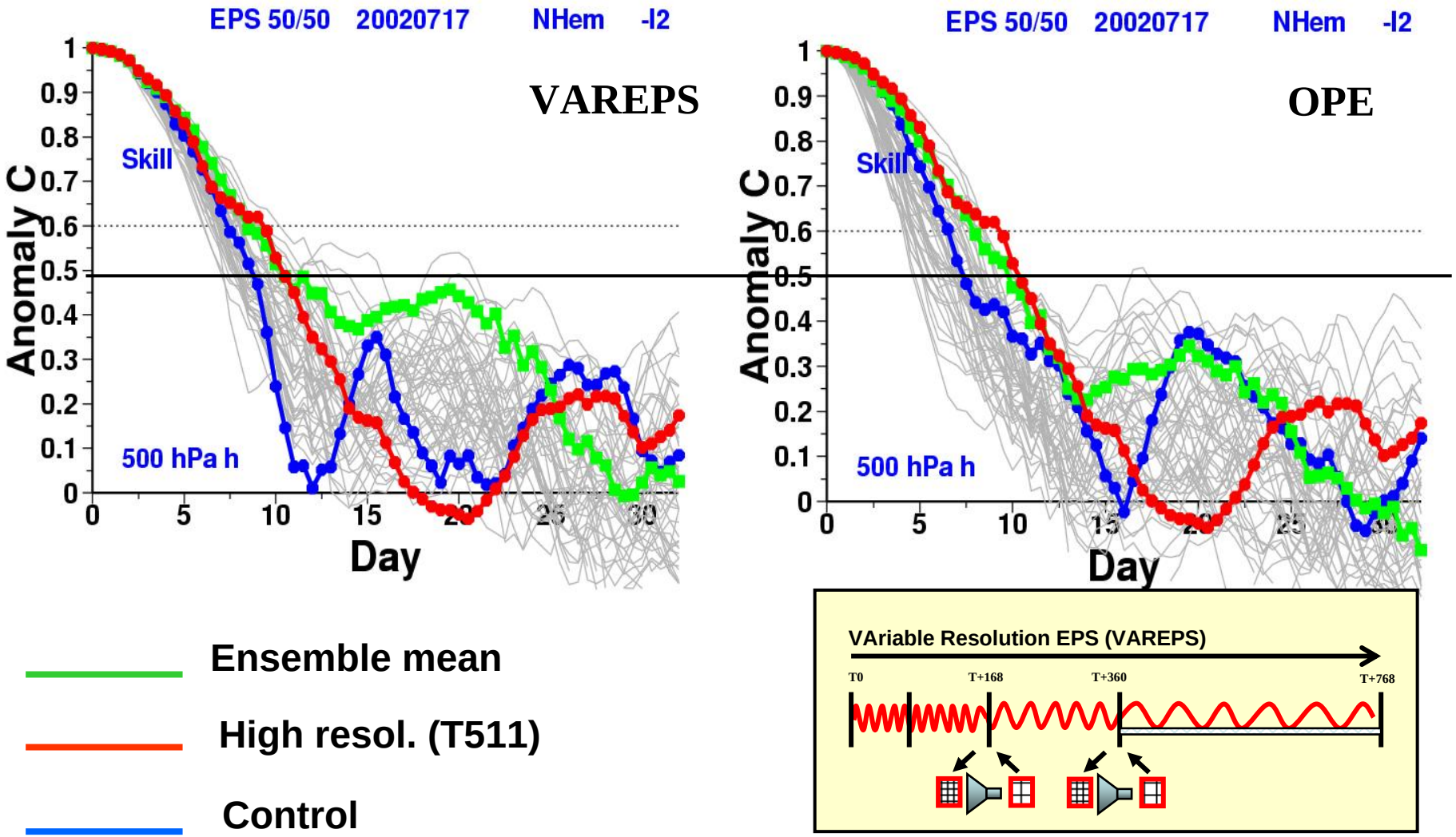


EAST ASIA

MOFC/EPS: 24/6 (95% sign)

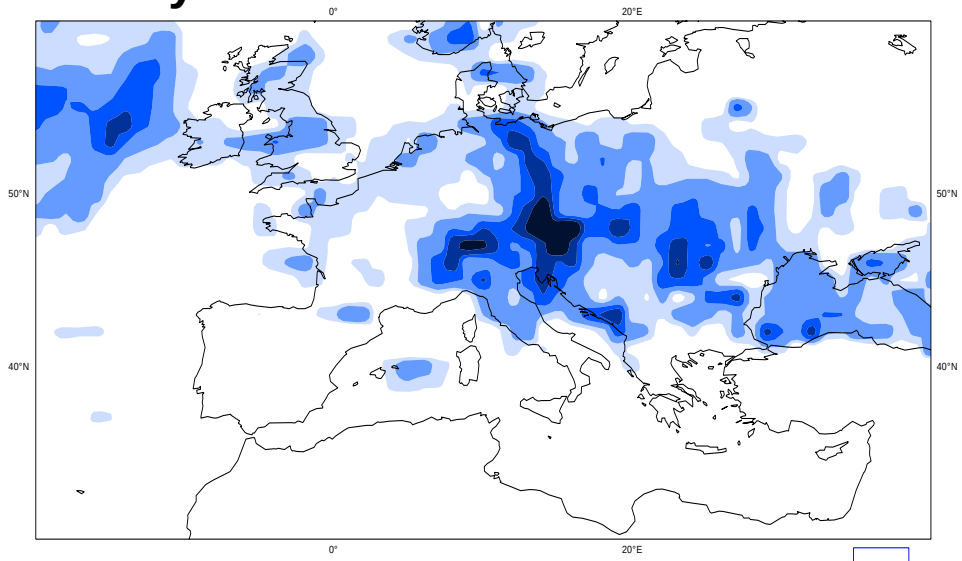


CY29R2 first case of a 3-legs VAREPS (17 July 2002)

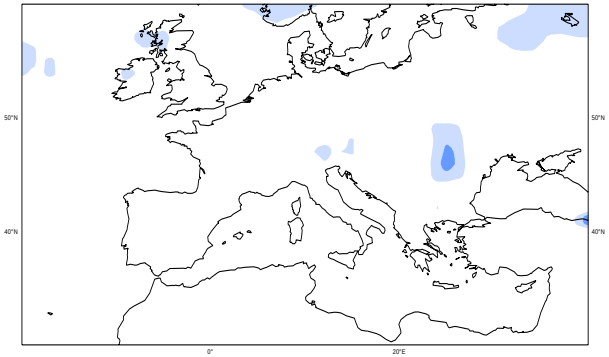


Case study: Precipitation over Central Europe
1st August 2002-18 August 2002
(day 15-32)

Analysis:

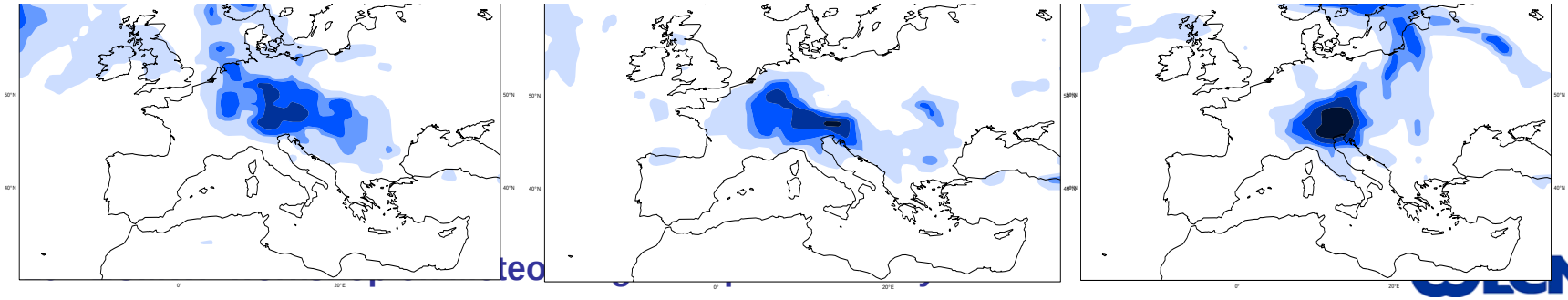


clim:



< 4cm | 4.. 6 | 6.. 10 | 10.. 14 | 14.. 20 | > 20cm

3 best ensemble members of VAREPS



Preliminary results: 12 5-ensemble member cases. CY29r2

Probability that T850 is in the upper tercile.

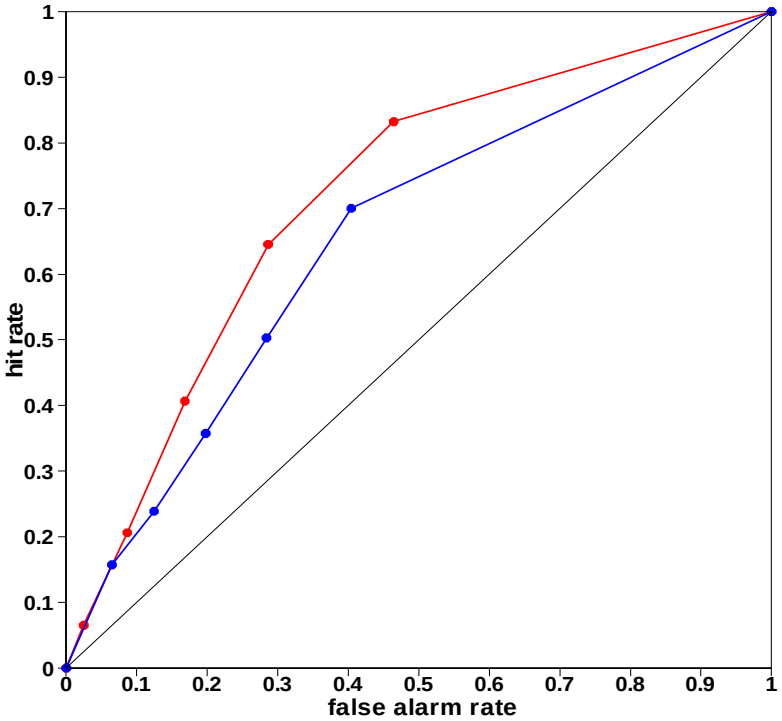
Northern Extratropics

VAREPS

Op.TL159

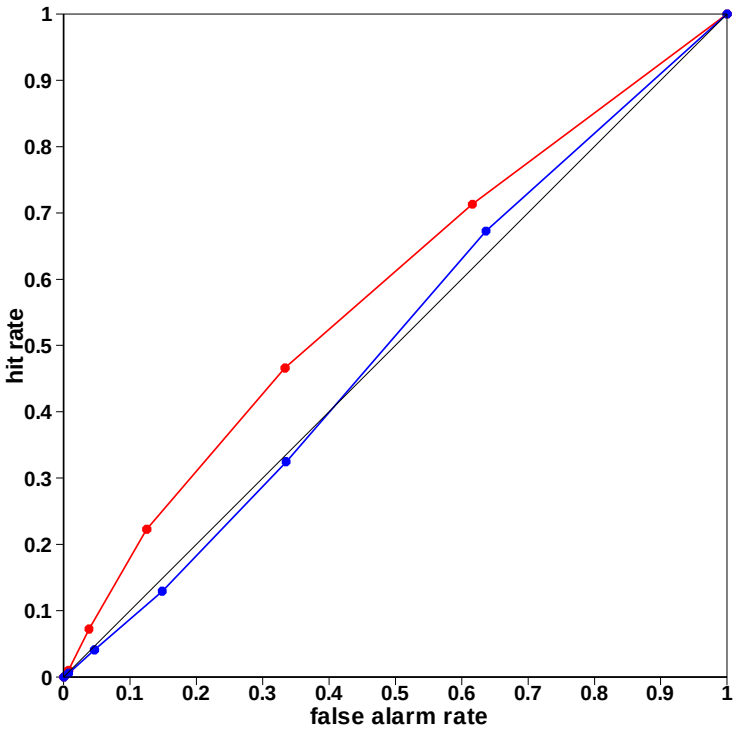
DAY 12-18

ROC AREA: 0.72 0.65



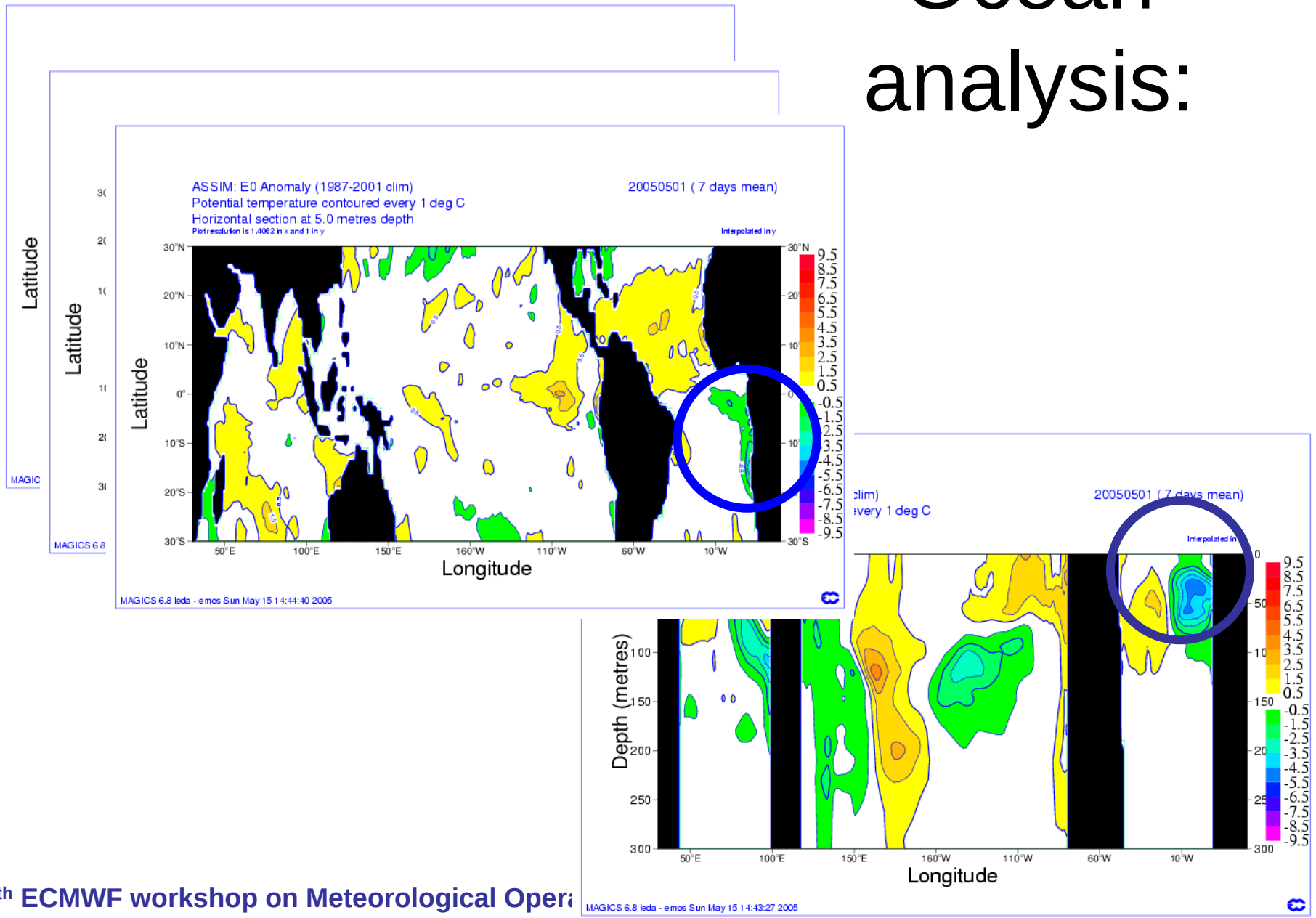
DAY 19-32

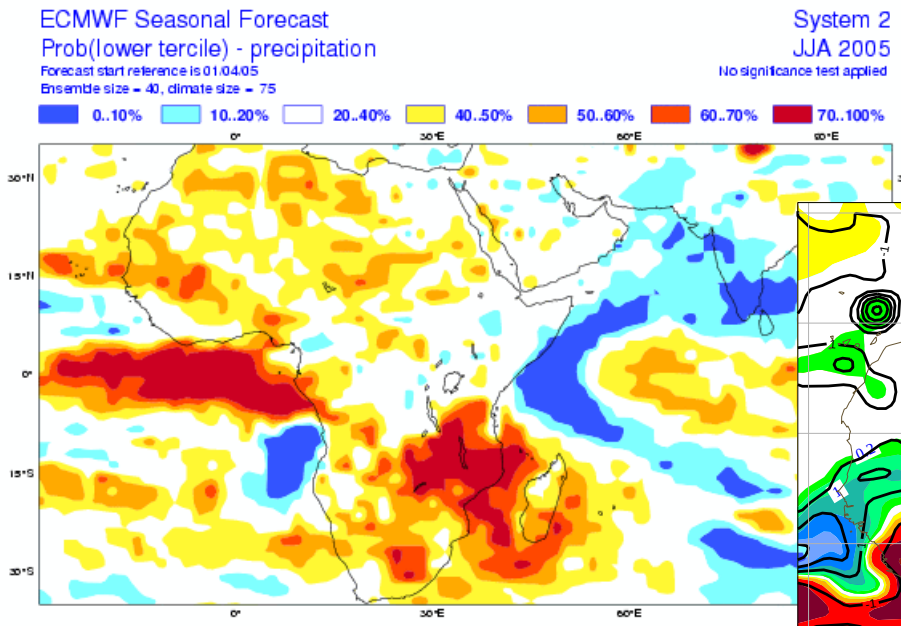
ROC AREA: 0.58 0.50

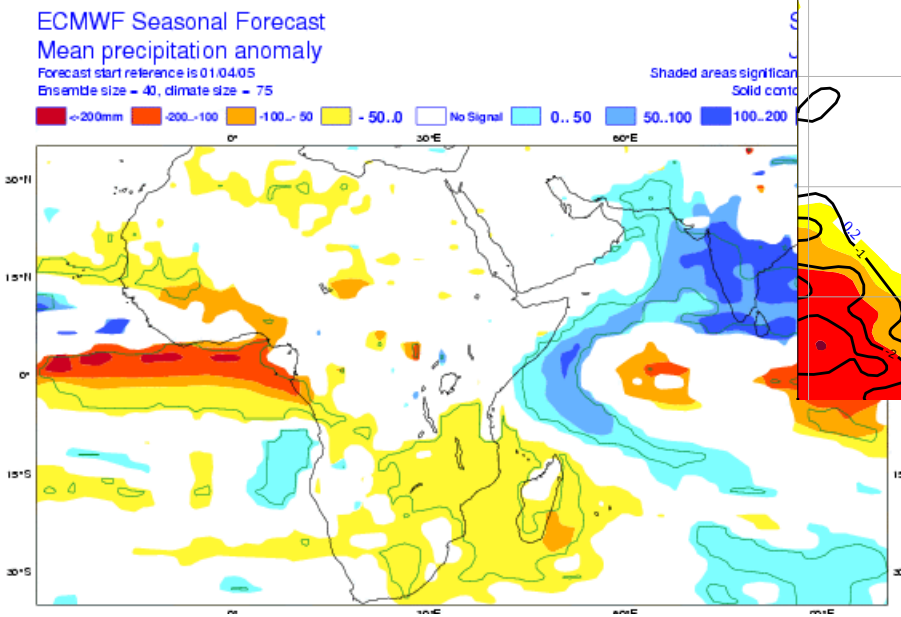


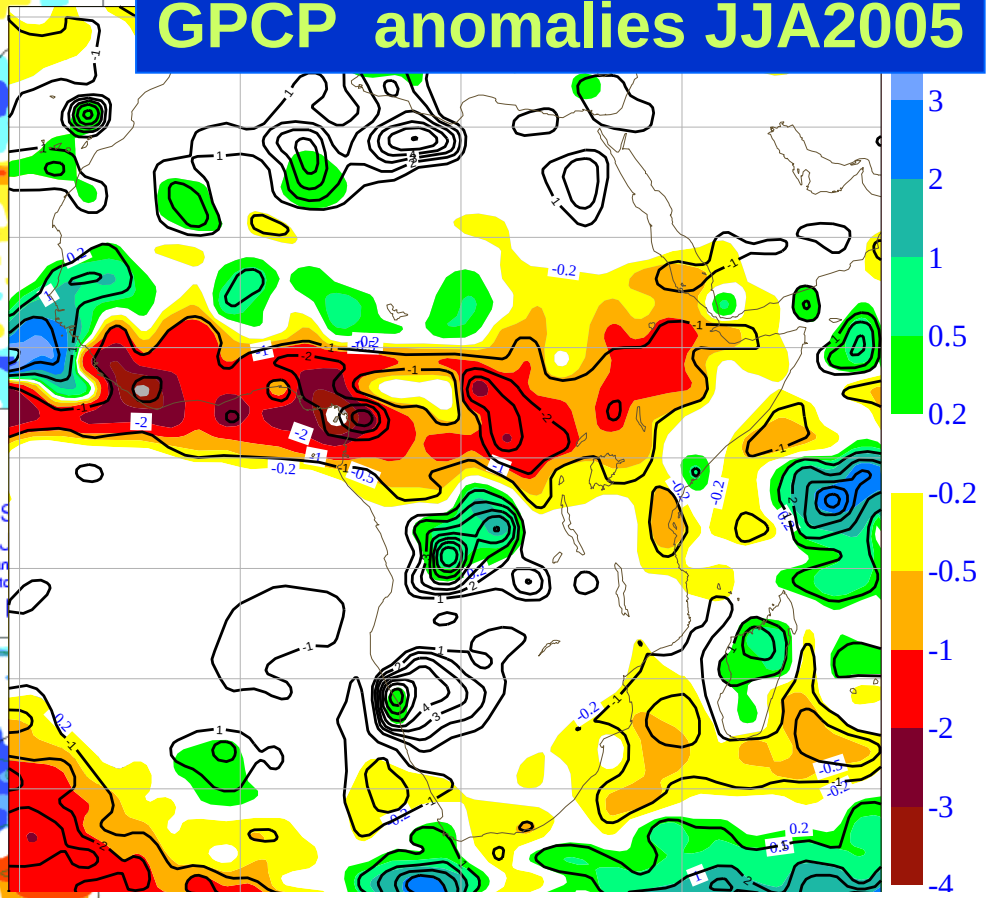
Present system	The coupled model	Next system
Atmosphere (IFS): Cy 23R4, T95, L40, semi-Lagrangian Ocean (HOPE): L29 ~0.3 eq. ~1 midlat.		Atmosphere (IFS): Cy 30R1, T159, L62, semi-Lagrangian Ocean (HOPE): L29 ~0.3 eq. ~1 midlat.
5 member ensemble of ocean analysis (wind perturbations)	Ocean analysis	5 member ensemble of an improved ocean analysis (wind perturbations)
40 forecasts start 1st of month	Ensemble generation	41 forecasts with SV start 1st of month
From 1987 to 2001 5 members	Calibration period	From 1981 to 2005 11 members

Ocean analysis:









GPCP anomalies JJA2005

April forecasts

ECMWF

EUROSIP multi-model system:

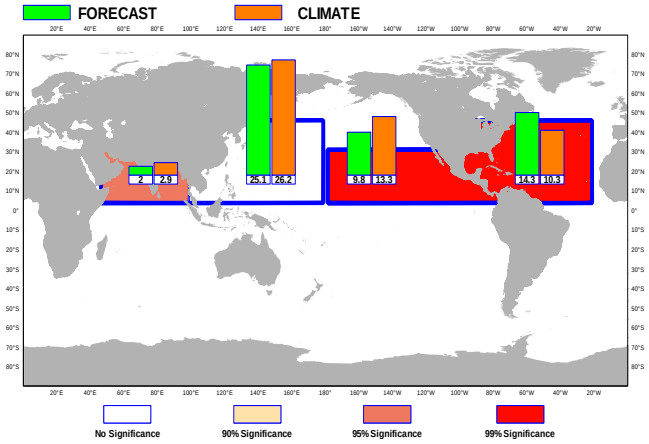
3 Coupled Systems: ECMWF, Météo France, Met Office

- **Ensemble generation for the 3 systems is different**
- **Hind-cast period: 1987-2001 for Ecmwf/Met Off. 1993-2004 for Météo France**
- **Met Office and Meteo-France systems are both running at ECMWF**
- **Development of multi-model products is ongoing**

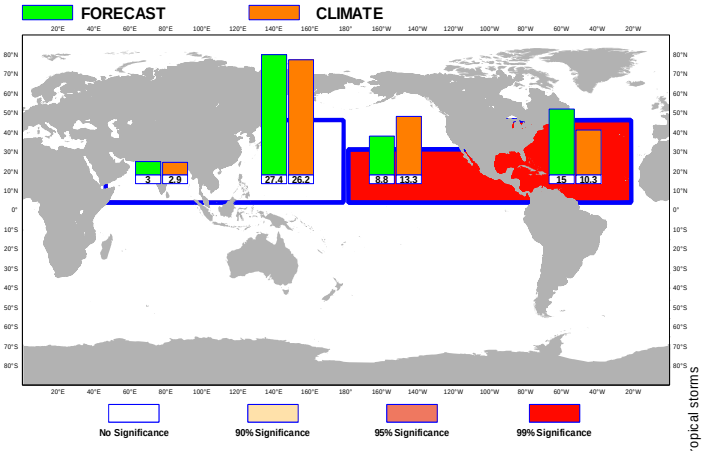
Tropical Storms

Forecasts starting on 1st June 2005: JASON

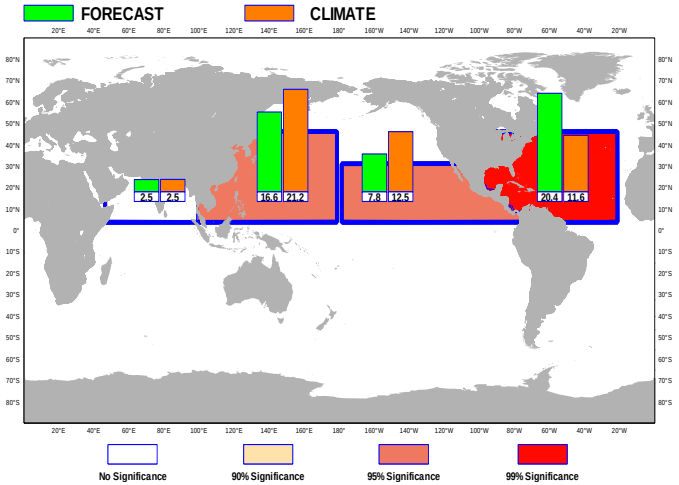
ECMWF



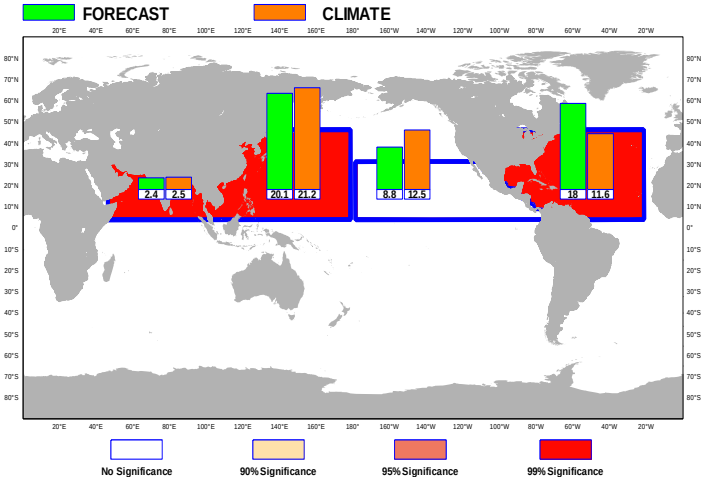
Met Office



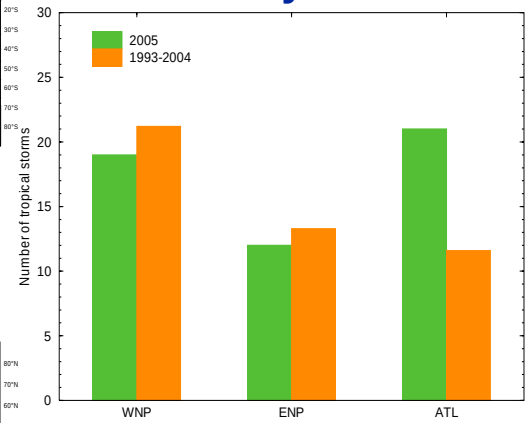
Meteo-France



Multimodel



Obs 1st May-mid Nov.

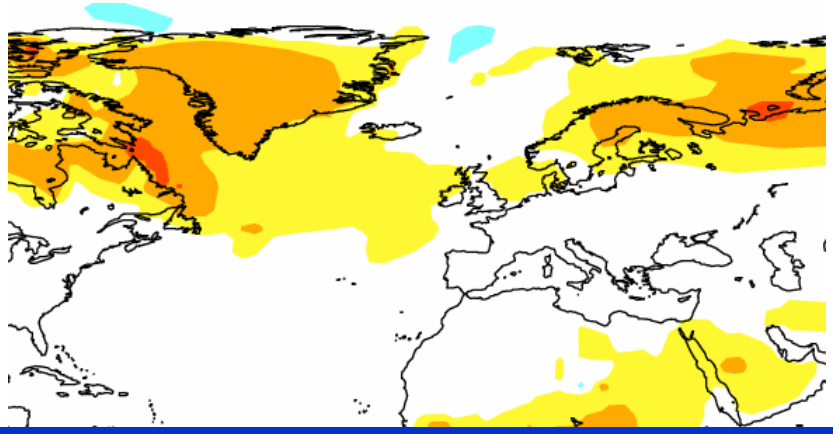


W-Pac **E-Pac** **ATL**

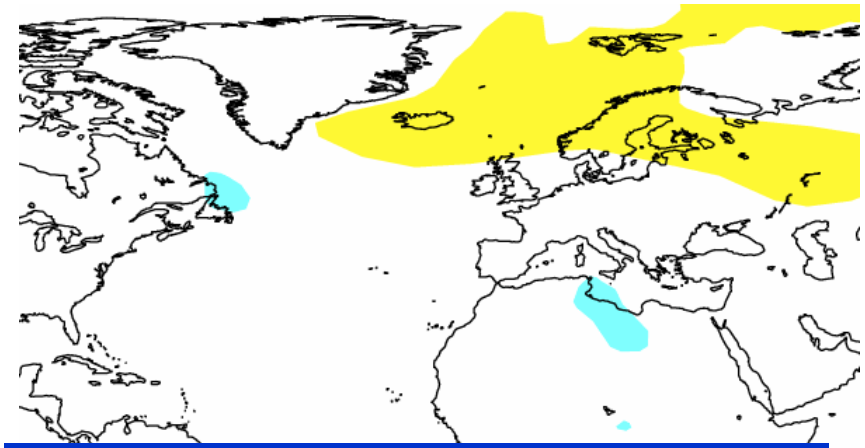
ECMWF

EUROSIP predictions for DJF 2006

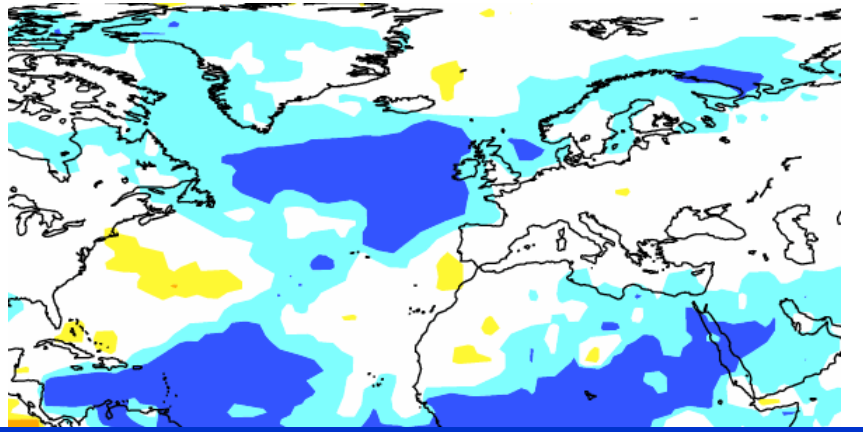
Forecast started Nov 2005



2m temp ens. mean anomaly



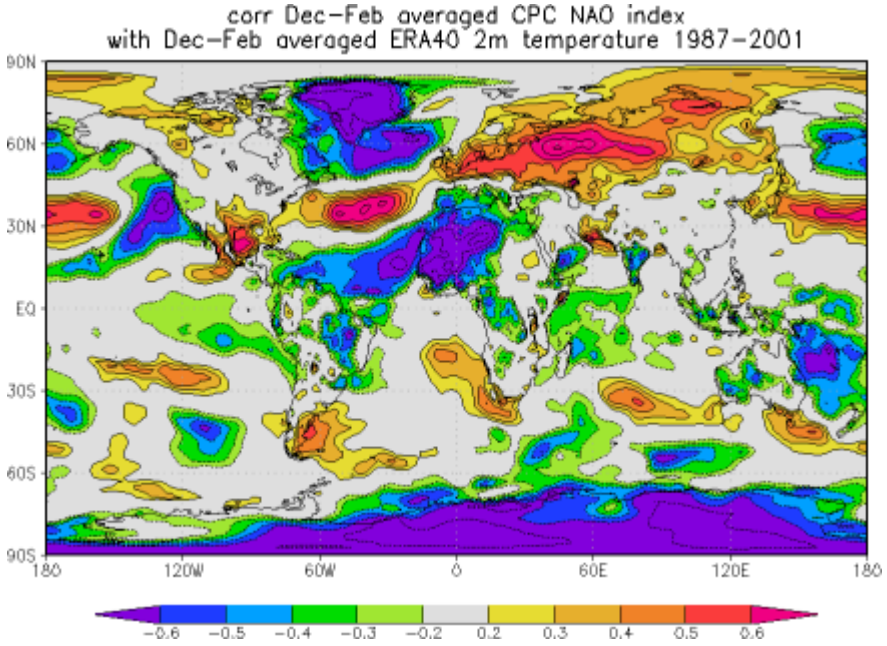
MSLP ens. mean anomaly



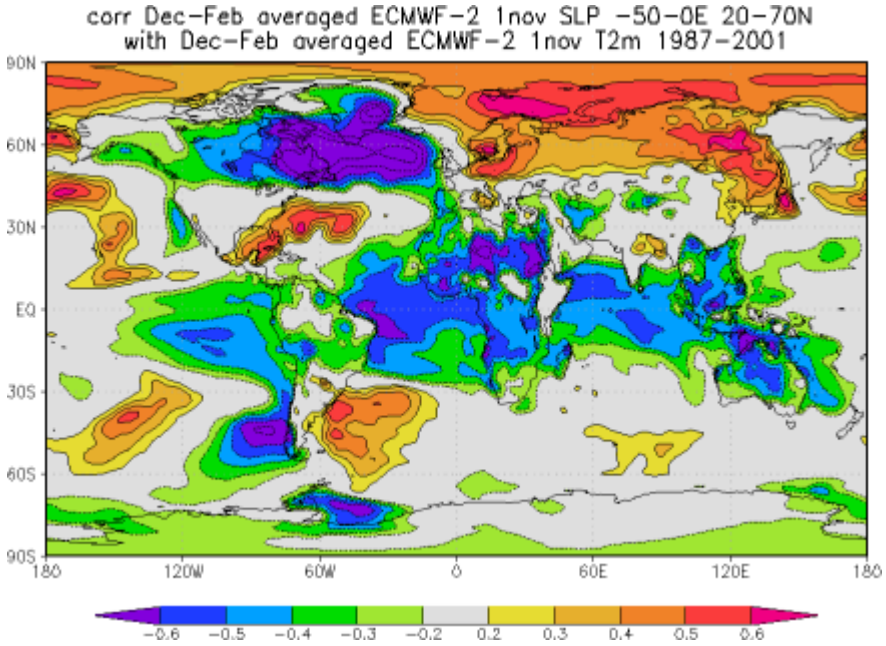
Prob(2mtemp <lower tercile)

Correlation
NAO – 2 m temperature
Dec - Feb (1987-2001)

ERA-40



ECMWF Seasonal forecast



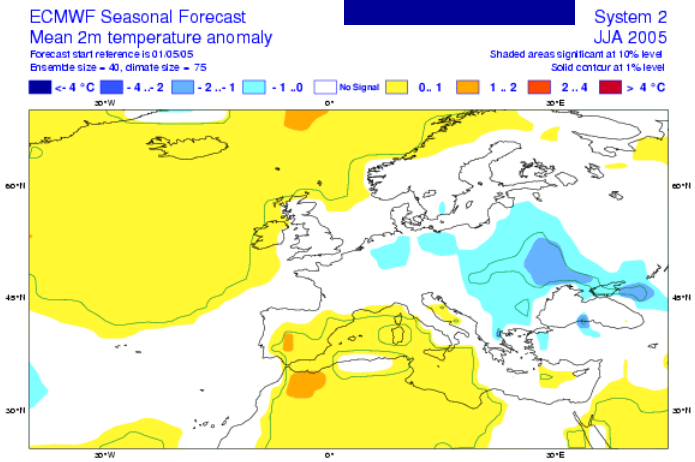
Monthly forecast:

- Beyond forecast day 15 the effect of the coupling becomes relevant.
- The prototype of the future monthly system using a 3-legs VAREPS gives promising results.

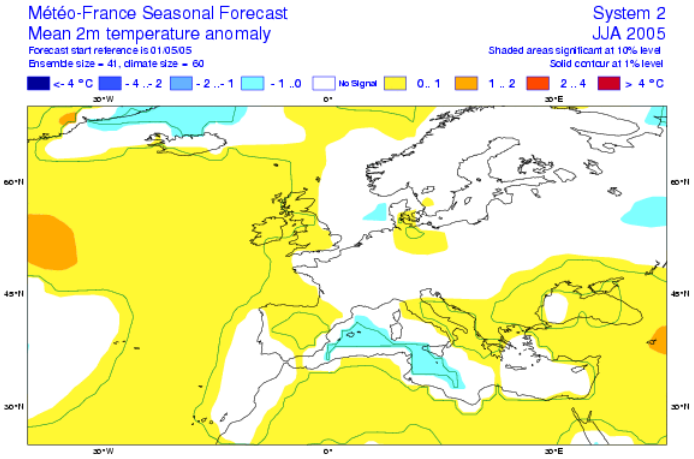
Seasonal Forecast:

- Good West-African monsoon predictions – this case indicates some of the advantages of the coupled versus the uncoupled approach.
- The very active Atlantic tropical storm season was well predicted.
- Predictions for the coming winter : enhanced probability of an anomalous high over Northern Atlantic (negative NAO) but absence of large temperature anomalies over Europe.

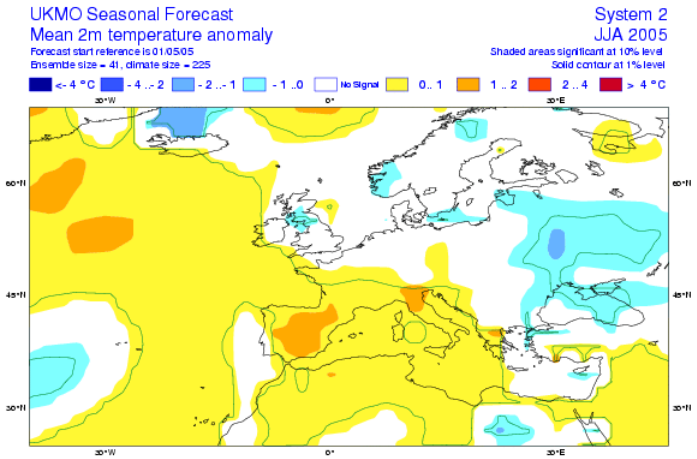
Ecmwf



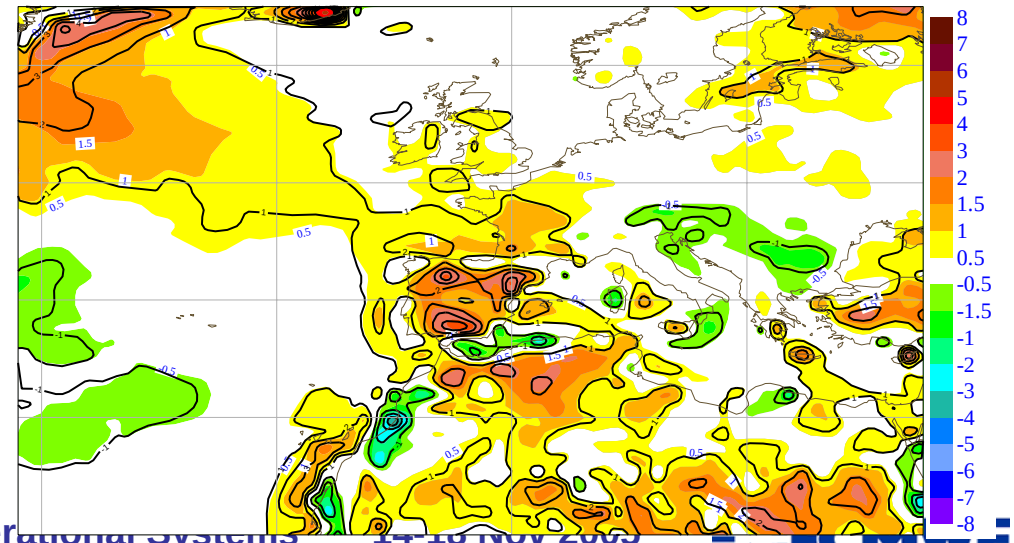
Météo France



Met Office



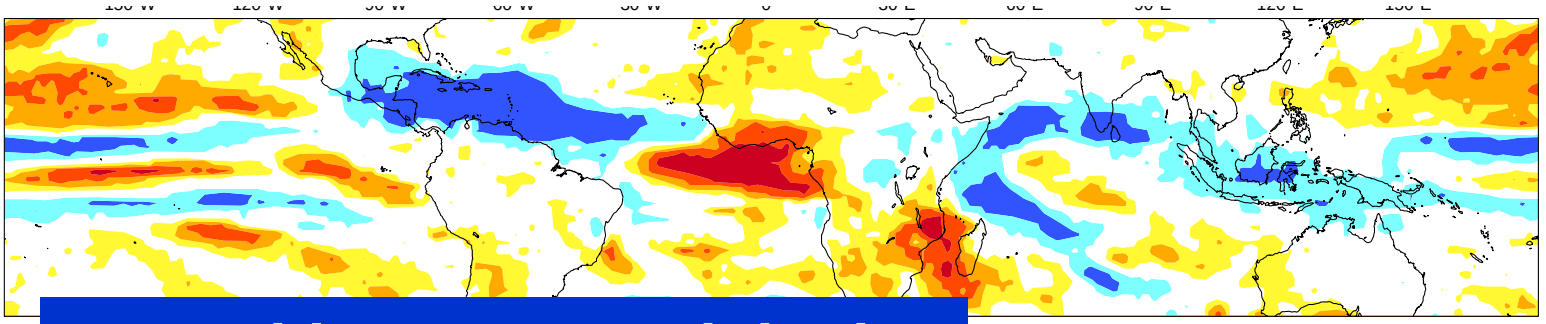
JJA 2005 2m temp anomalies



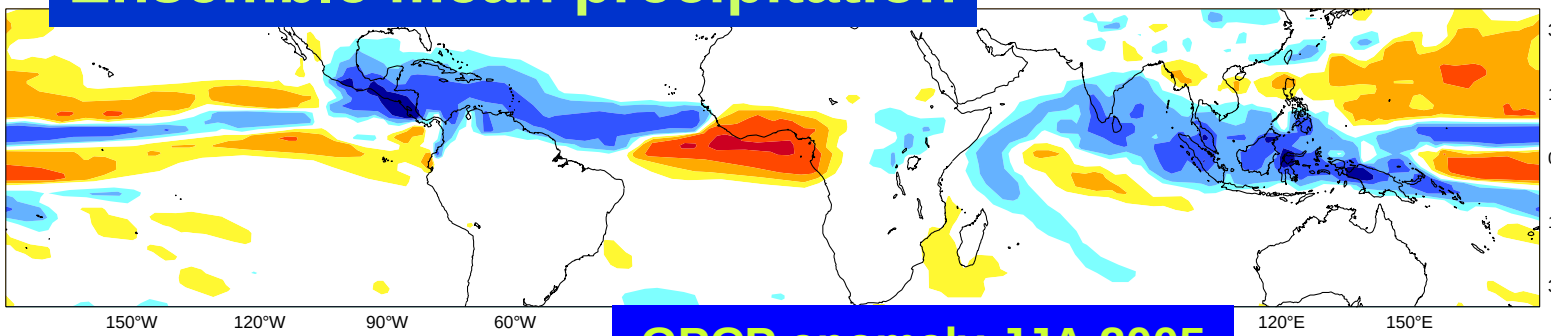
Precipitation EUROSIP probability

JJA 2005

Probability (precip < lower tercile)



Ensemble mean precipitation



GPCP anomaly JJA 2005