IASCLiP FORECAST FORUM (IFF)

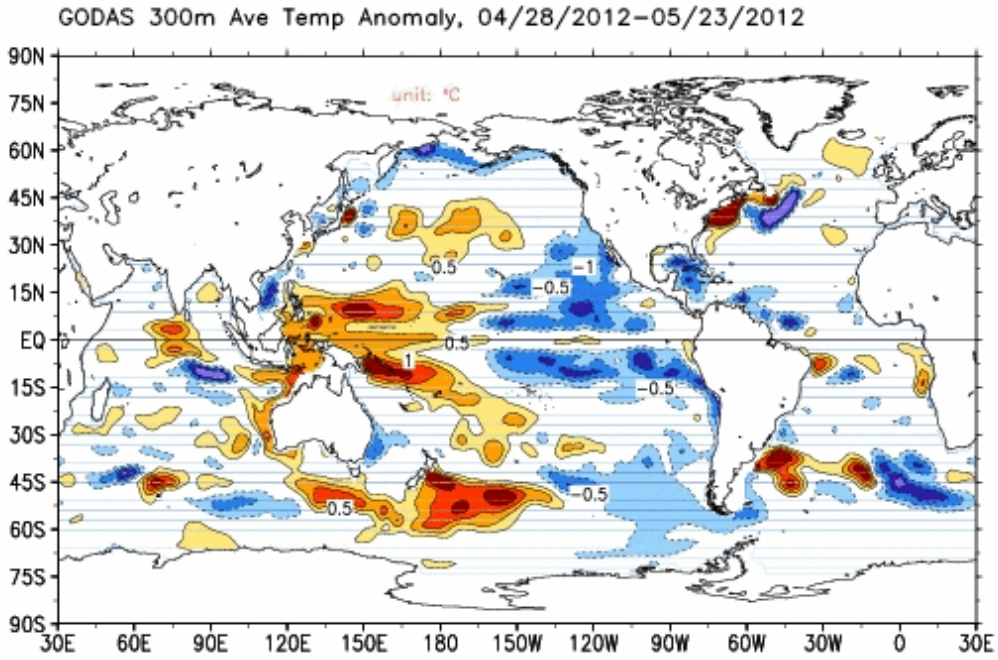
June-July-August 2012

Disclaimer: The forecast and the discussions in this forum in no way reflect the opinion of the contributing personnel's institutions and organizations. These forecasts are experimental with voluntary contributions from the institutions.

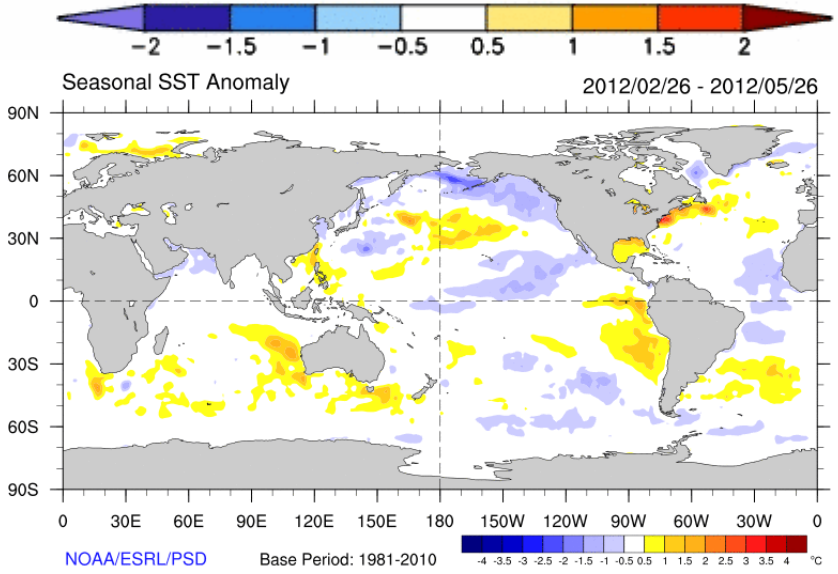
Process: The forecast forum comprises of a coalition of climate scientists working on IASCLiP including the modeling working group of the IASCLiP. We hold discussions analyzing the model forecast and current conditions to come with a "consensus" forecast.

Acknowledgements: We thank NOAA-CPC, Asia Pacific Climate Center (S. Korea), IRI, and the US National Multi-model Ensemble Experiment (NMME) team for making the model forecast data available. We thank Steven DiNapoli of COAPS/ FSU and graduate student Michael Kozar of the Department of Earth, Ocean and Atmospheric Science, FSU for assistance in preparing the figures and in writing the discussion.

Current conditions

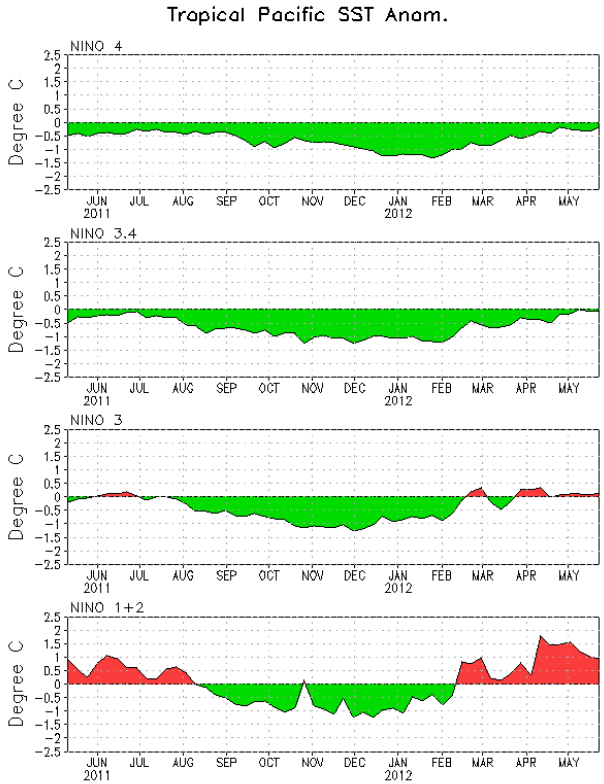


http://www.cpc.ncep.noaa.gov/products/GODAS/pent_gif/xy/pent.anom.xy.h300.30d.gif



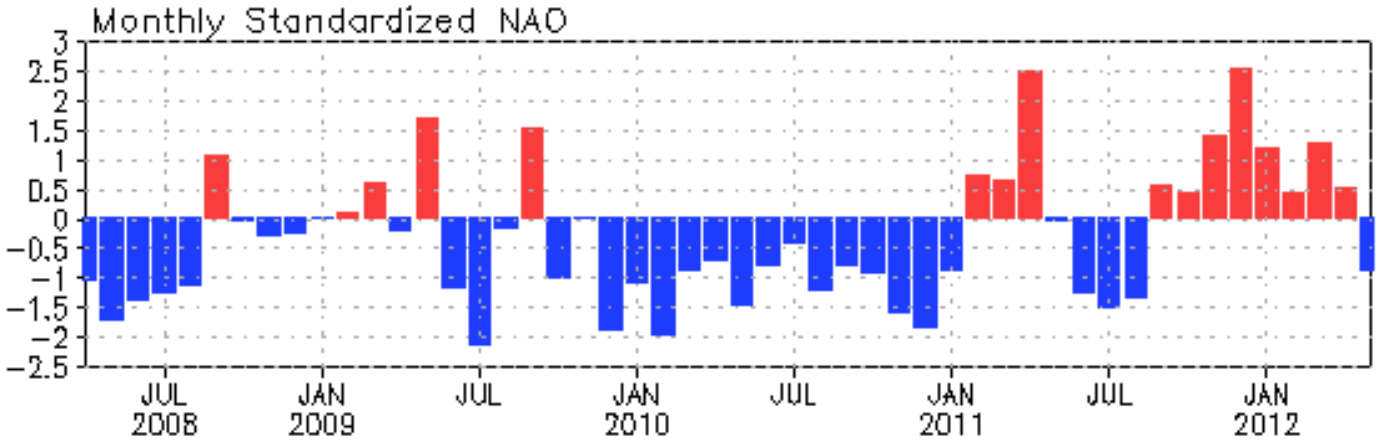
http://www.esrl.noaa.gov/psd/map/images/sst/sst.anom.seasonal.gif

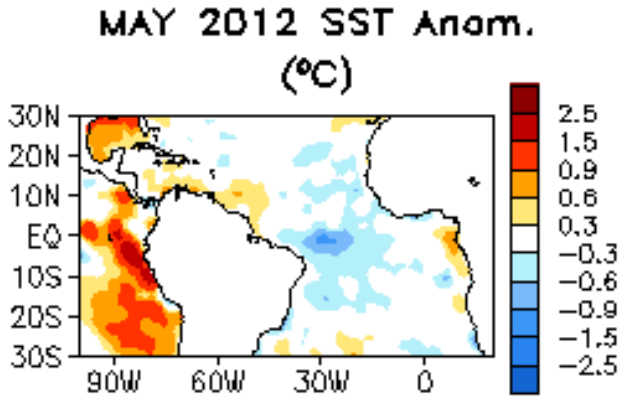
The La Nina from last winter has continued to wane during the spring, and there are signs of a positive SST anomaly developing off the coast of South America (bottom panel). However the heat content in the top 300m of the ocean is still very low in the Eastern Pacific and the Atlantic Warm Pool region (top panel). In addition, SSTs in the AWP region in JJA have historically been related to the previous winter's ENSO. Based on this, we would anticipate a cooler than normal AWP.

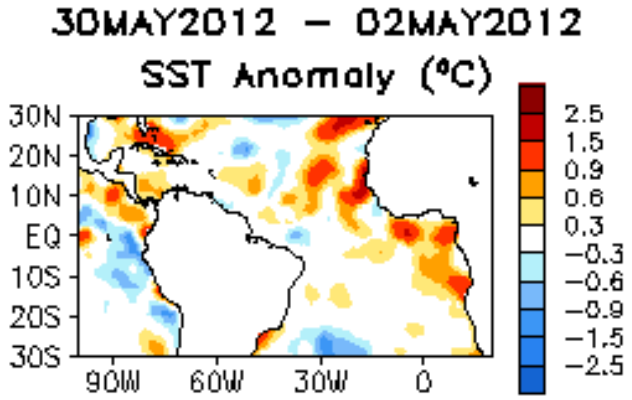


http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_new/wkly_nino.gif

Current conditions







In the last month, NAO has shifted from a positive phase to a negative phase and SST anomalies have warmed to near normal. This could counteract the effects of last winter's La Nina and result in a near-normal AWP this summer.

http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_gif/global_ocean_monitoring_current.ppt

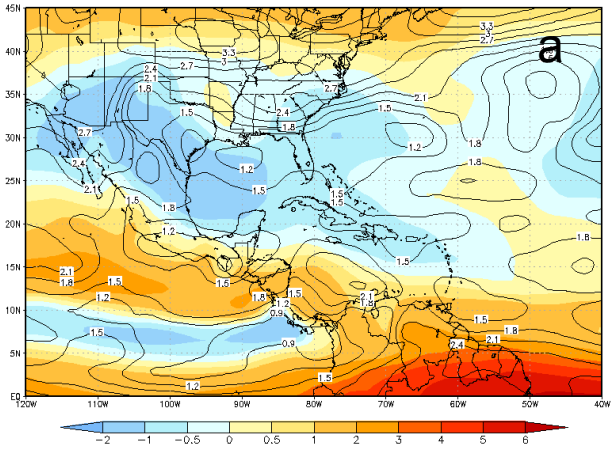
Model Forecasts

Model	Reference	No. of Ensemble members	Coupled to ocean?
NCEP CFS v2	A	20	Yes
COLA-RSMAS-CCSM3	B	6	Yes
NASA GMAO	C	9	Yes
POAMA	D	30	Yes
GFDL	E	10	
FCI-FSU (previously ECPC)	F	12	No. Prescribed (persisted SST & IRI forecasted SST)
CWB	G	10	Yes
IRI-ECHAM4p5 (Anom)	H	12	Yes
IRI-ECHAM4p5 (direct)	I	12	Yes

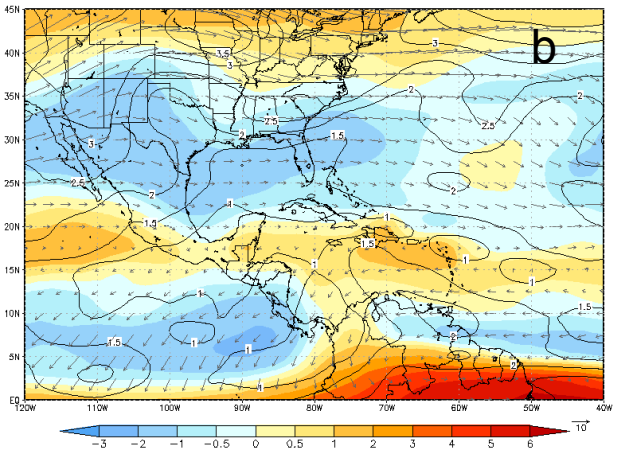
Index	Reference
A	http://cfs.ncep.noaa.gov/menu/doc/
B	http://journals.ametsoc.org/doi/abs/10.1175/2009MWR2672.1
C	http://gmao.gsfc.nasa.gov/research/modeling/cgcm/
D	http://poama.bom.gov.au/
E	http://iridl.ldeo.columbia.edu/SOURCES/.Models/.NMME/.GFDL-CM2p1/
F	http://ecpc.ucsd.edu/projects/GSM_model.html
G	http://www.cwb.gov.tw/V6/climate/other-subject/WPGM_CWB2tier_CFS.pdf
H	http://iridl.ldeo.columbia.edu/SOURCES/.Models/.NMME/.IRI-ECHAM4p5-AnomalyCoupled/
I	http://iridl.ldeo.columbia.edu/SOURCES/.Models/.NMME/.IRI-ECHAM4p5-DirectCoupled/

NCEP CFS v2

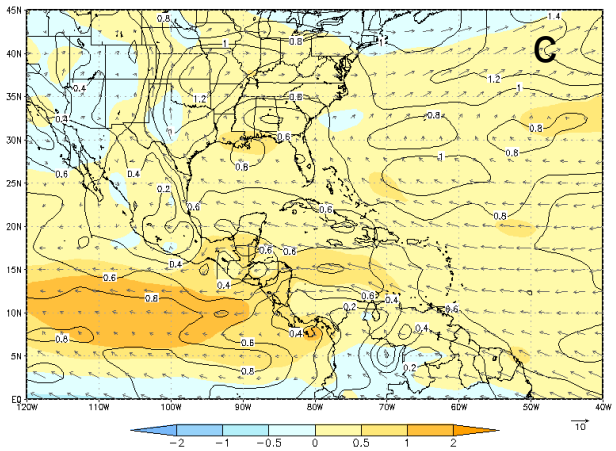
Vertical wind shear (200-850 hpa, in m s^{-1})



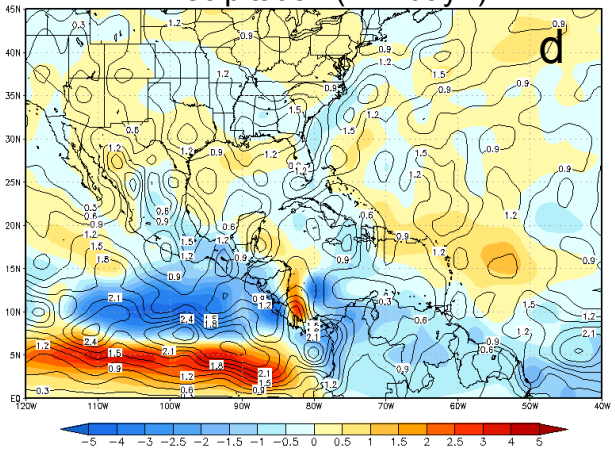
200 hPa winds m s^{-1}



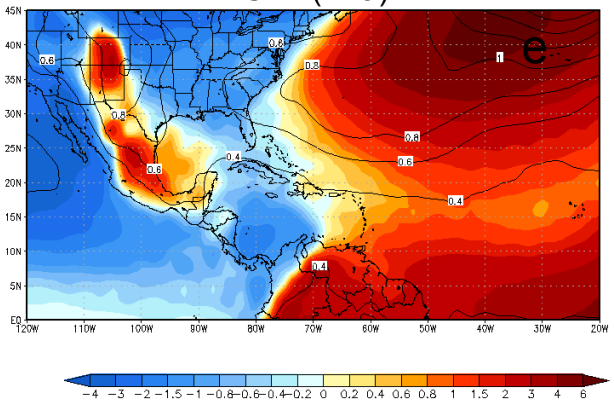
850 hPa winds m s^{-1}



Precipitation (mm day^{-1})

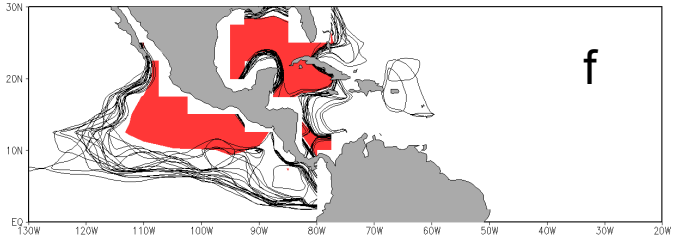


MSLP (hPa)

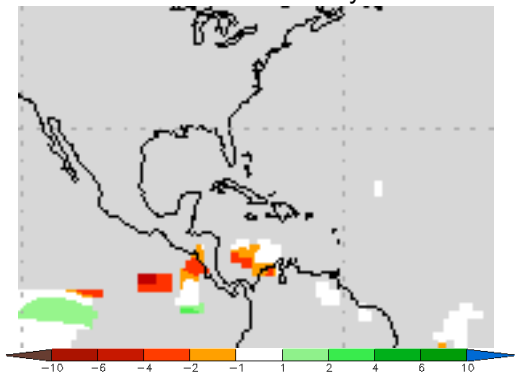


Contours are intra-ensemble spread and shading is anomaly of the ensemble mean in a, b, c, d, and e. In f model climatology of the 28.5°C isotherm is shaded in red and the 28.5°C isotherm from the individual ensemble forecasts are contoured.

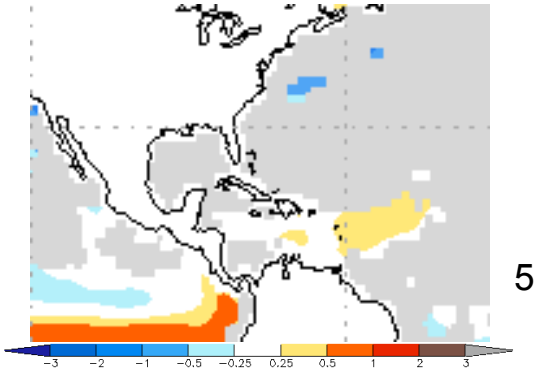
28.5°C isotherm of SST



Skill masked rainfall anomaly for JJA2012

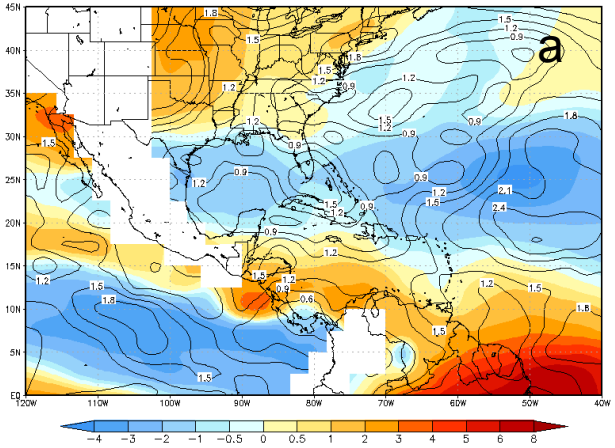


Skill masked SSTA for JJA2012

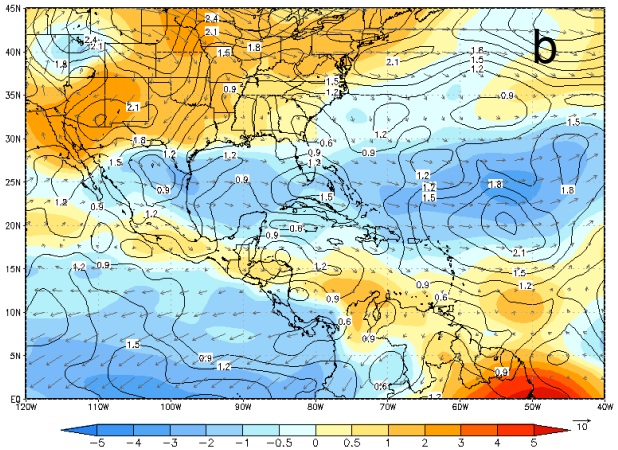


NASA GMAO

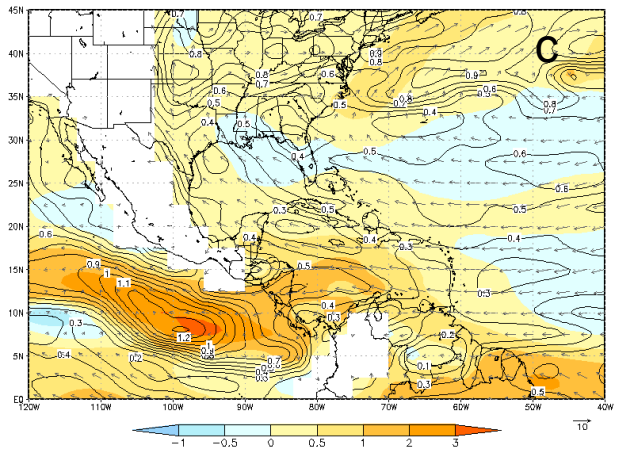
Vertical wind shear (200-850 hpa, in m s^{-1})



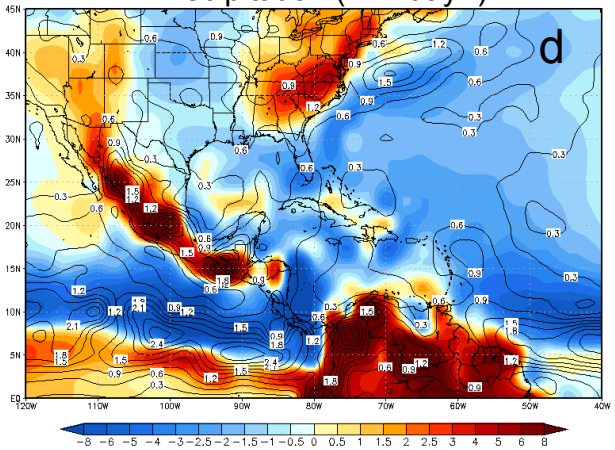
200 hPa winds m s^{-1}



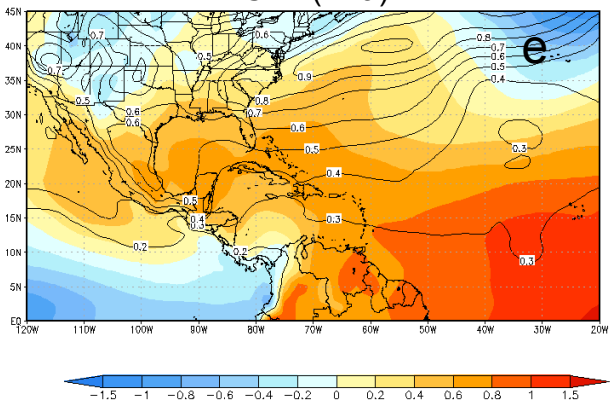
850 hPa winds m s^{-1}



Precipitation (mm day^{-1})



MSLP (hPa)



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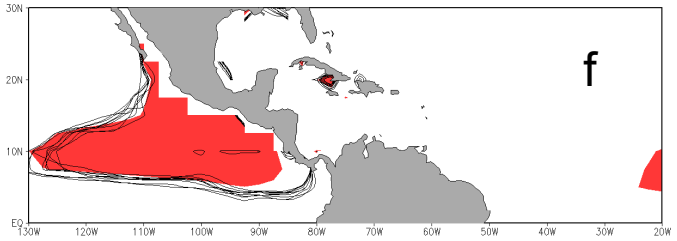

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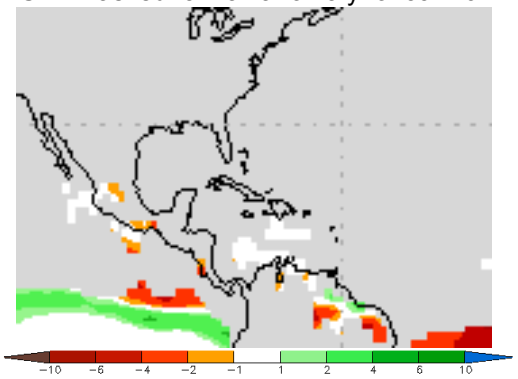
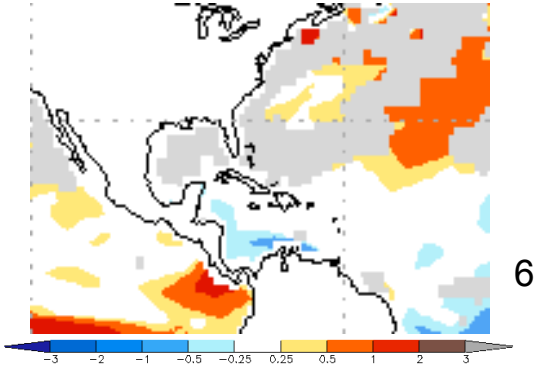
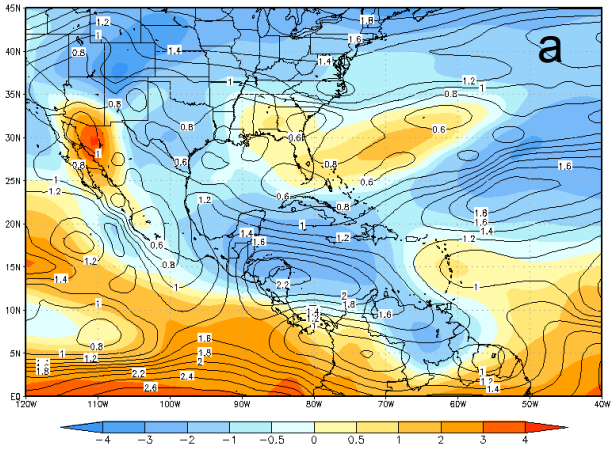


Skill masked SSTA for JJA2012

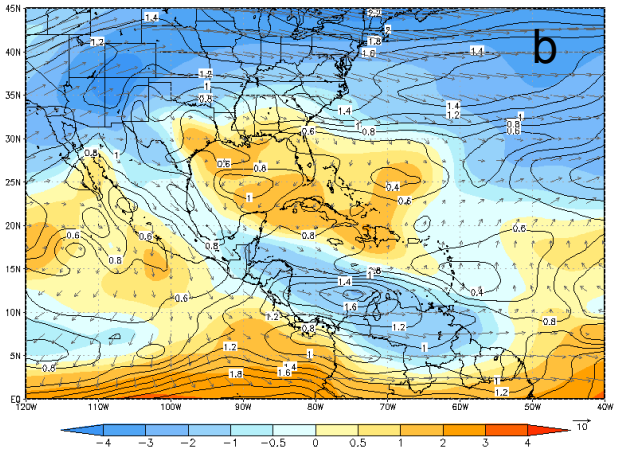


POAMA

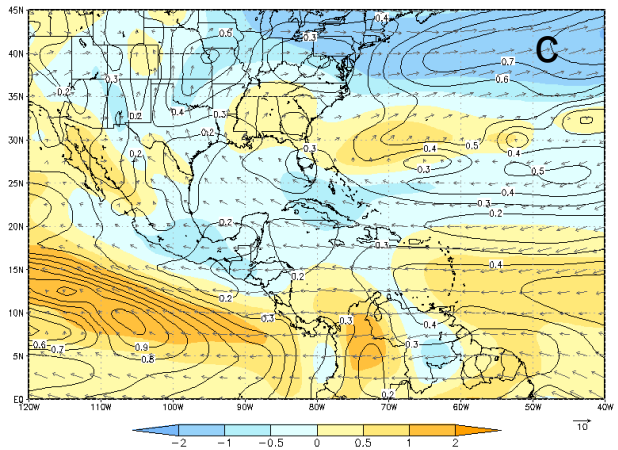
Vertical wind shear (200-850 hpa, in m s^{-1})



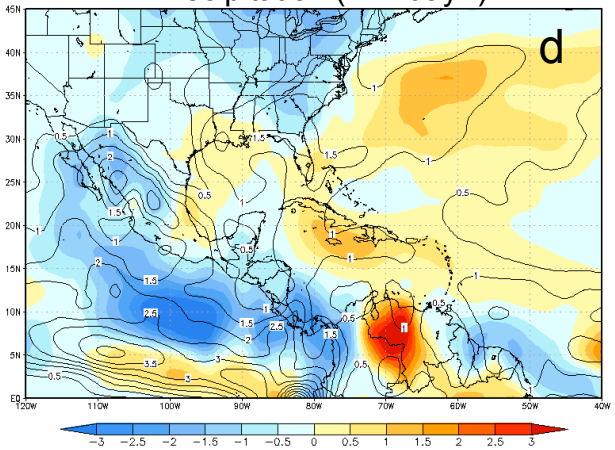
200 hPa winds m s^{-1}



850 hPa winds m s^{-1}



Precipitation (mm day^{-1})



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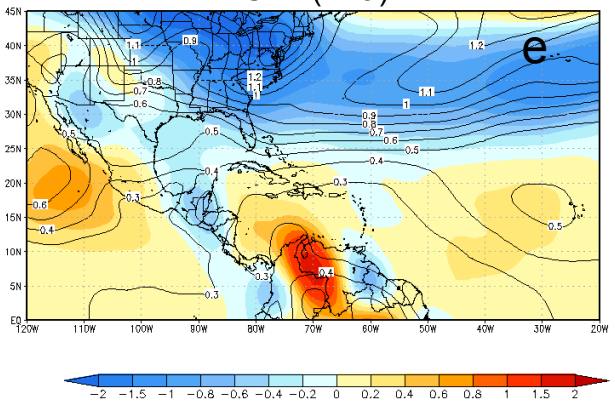

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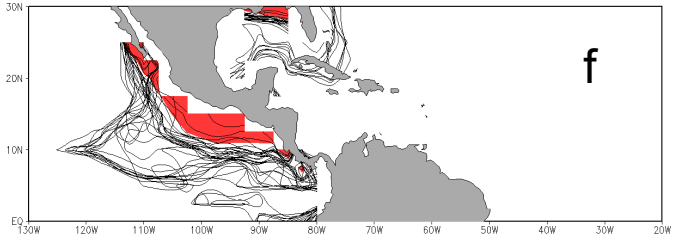
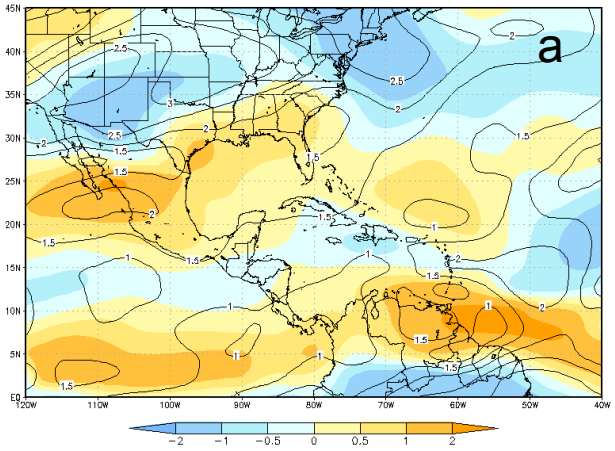
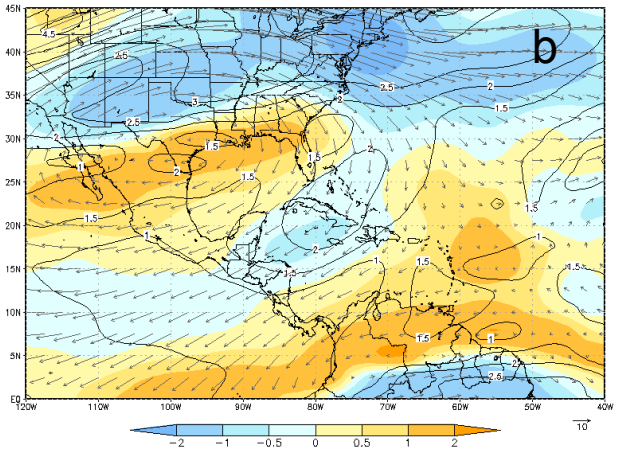


CWB

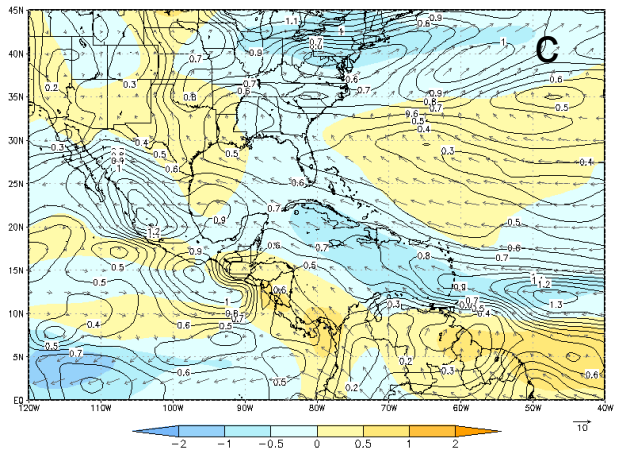
Vertical wind shear (200-850 hpa, in m s^{-1})



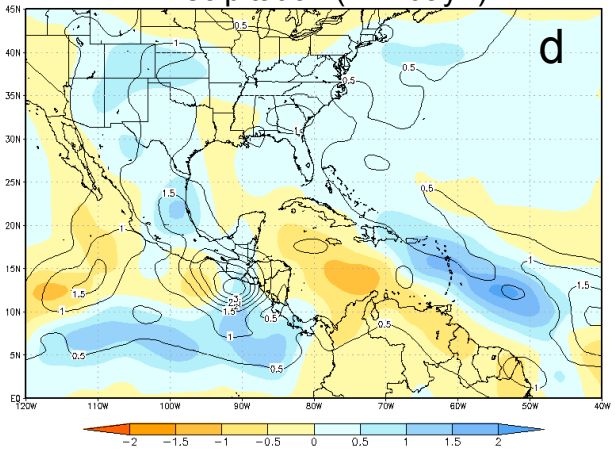
200 hPa winds m s^{-1}



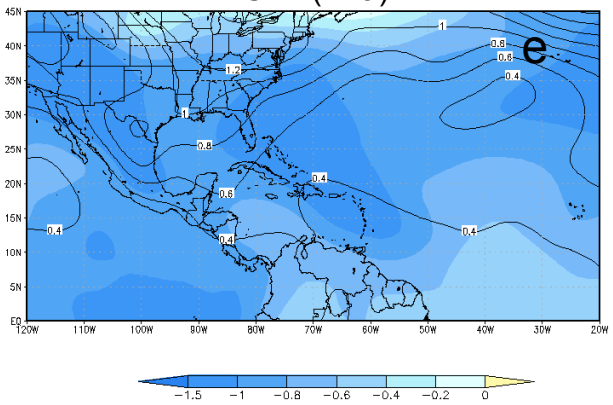
850 hPa winds m s^{-1}



Precipitation (mm day^{-1})



MSLP (hPa)



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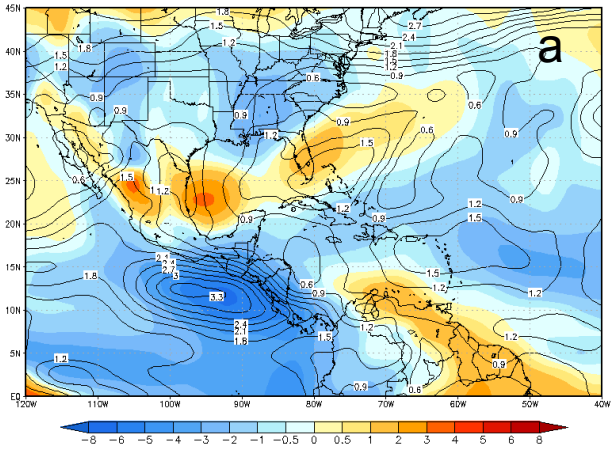
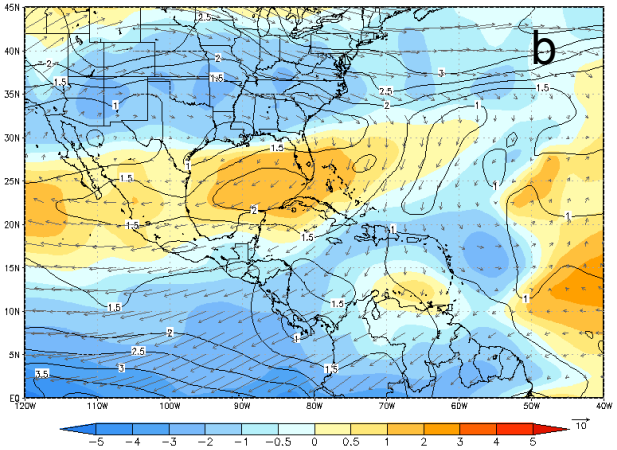
FCI-FSU

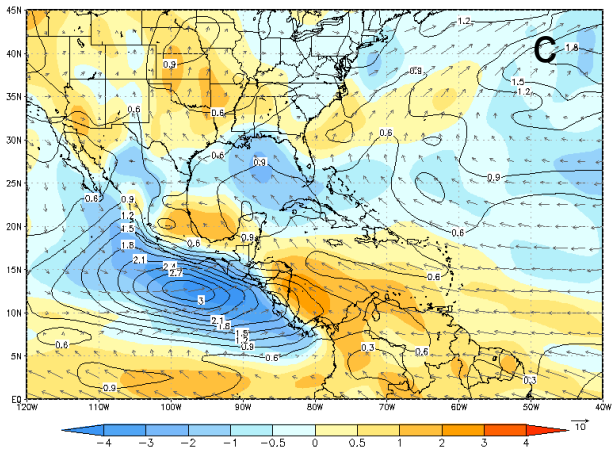
Vertical wind shear (200-850 hpa, in m s^{-1})



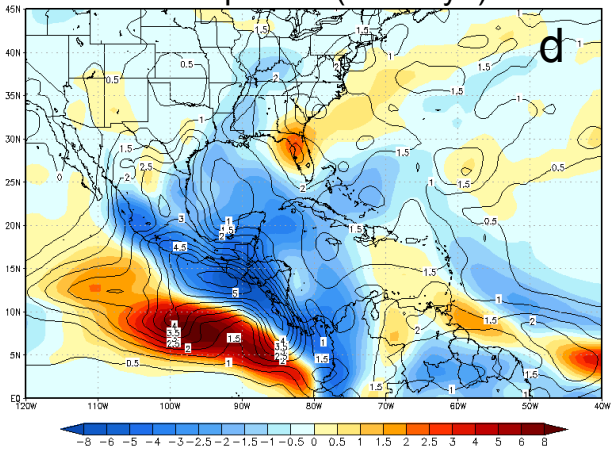
200 hPa winds m s^{-1}



850 hPa winds m s^{-1}



Precipitation (mm day^{-1})



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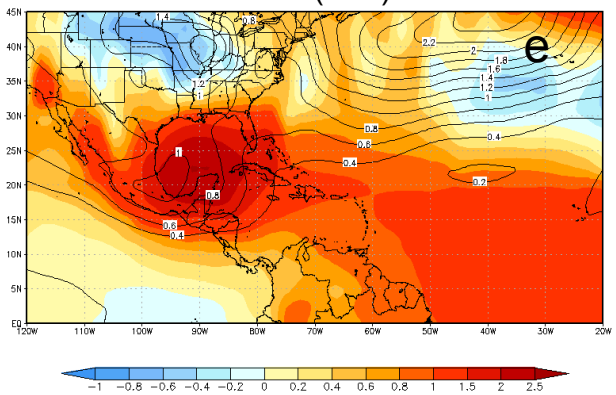
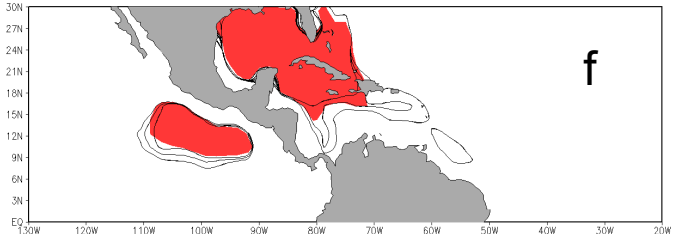


28.5°C isotherm of SST



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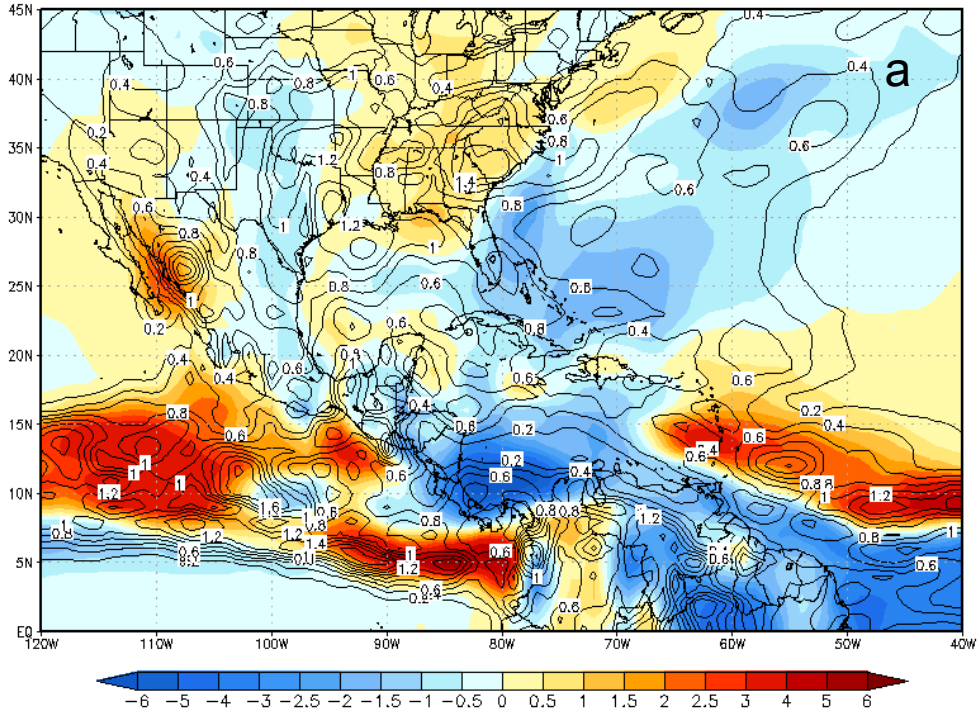
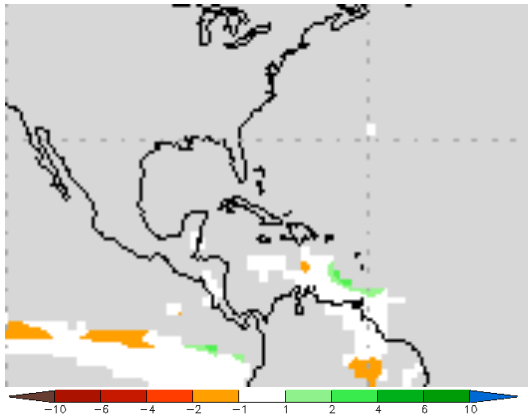
COLA-RSMAS-CCSM3

Precipitation (mm day^{-1})



Skill masked rainfall anomaly for JJA2012



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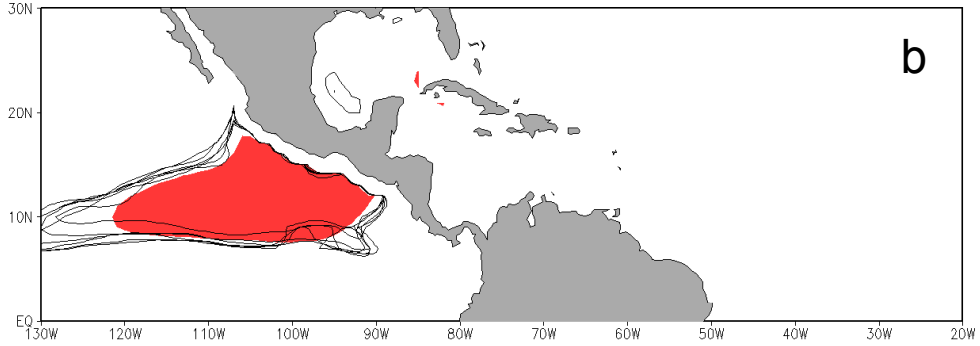
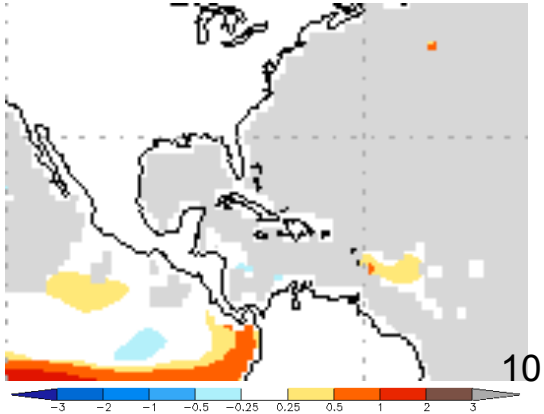
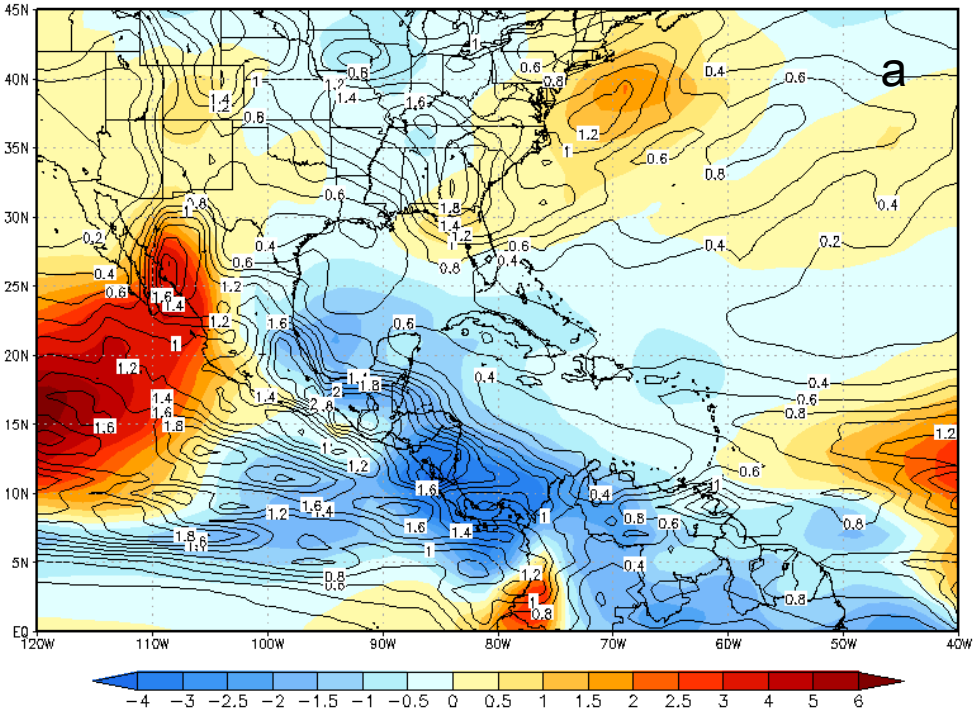


Skill masked SSTA for JJA2012

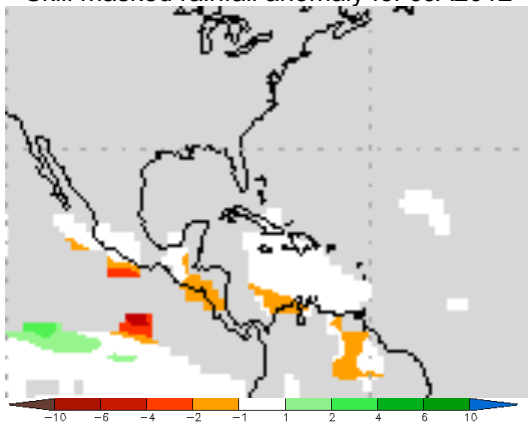


GFDL-C2Mp1

Precipitation (mm day^{-1})



Skill masked rainfall anomaly for JJA2012



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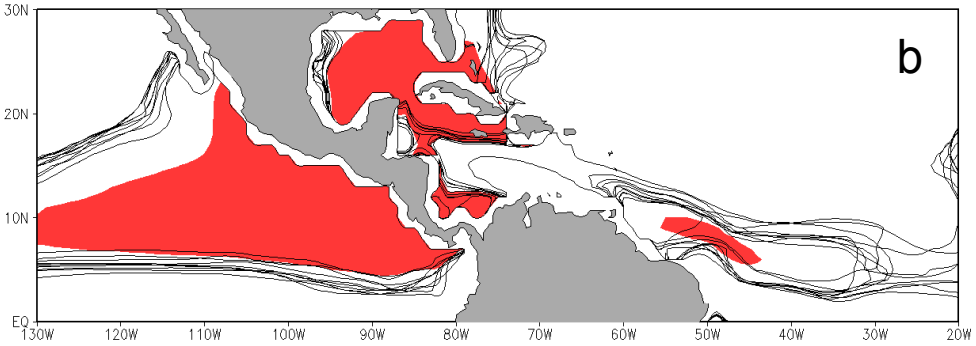

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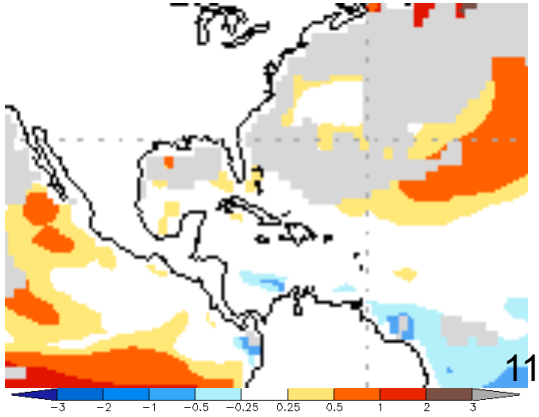
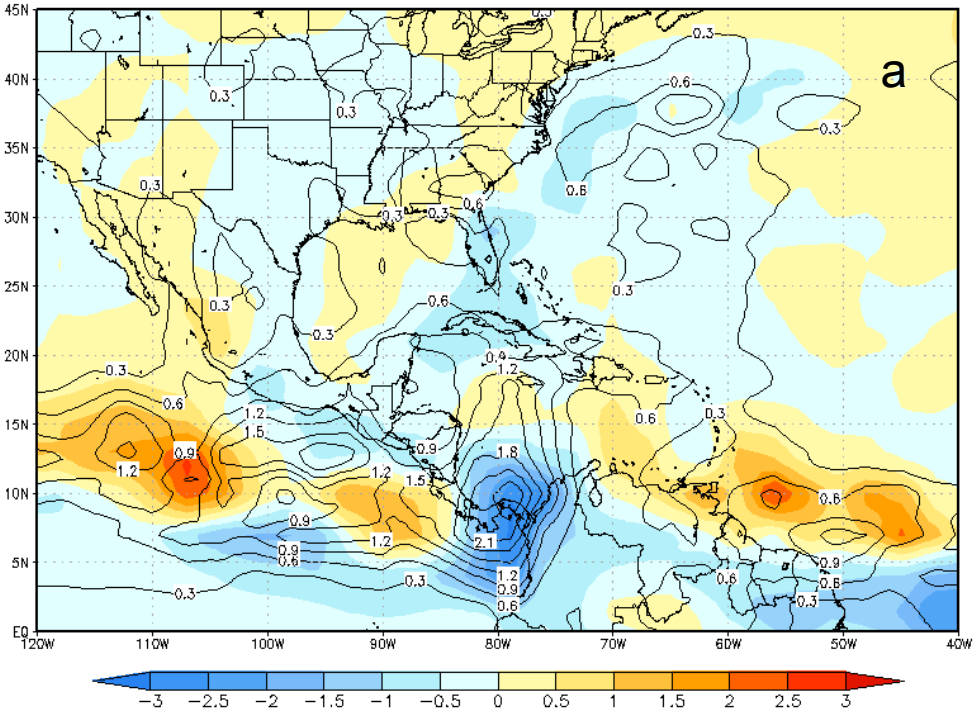
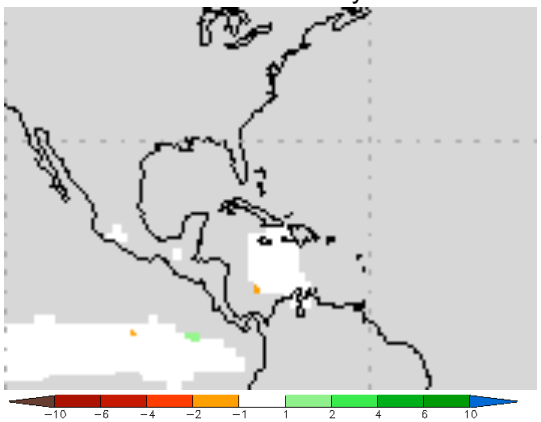


IRI-ECHAM4p5 (Anomaly Coupled)

Precipitation (mm day^{-1})

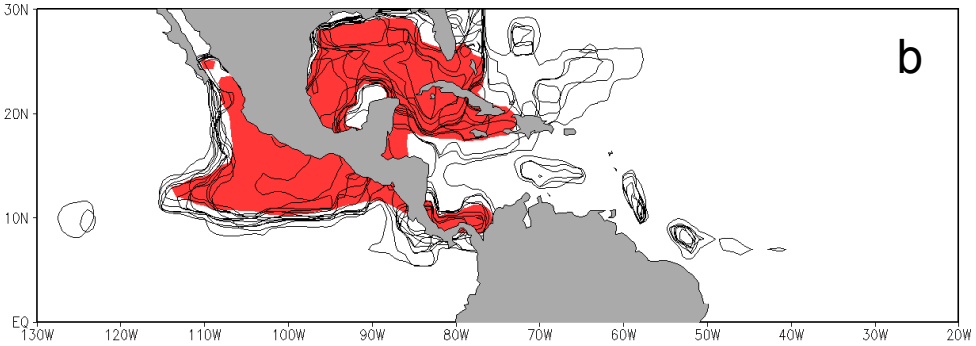


Skill masked rainfall anomaly for JJA2012

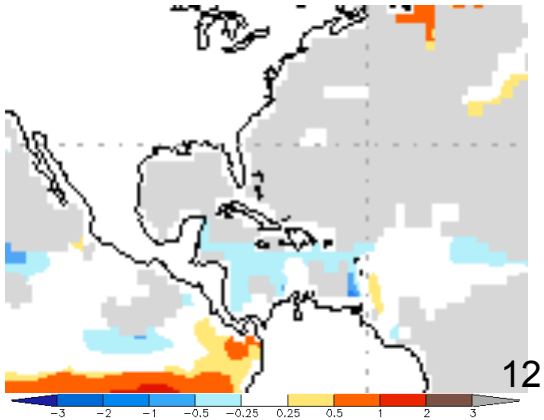


Contours are intra-ensemble spread and shading is anomaly of the ensemble mean in a. In b model climatology of the 28.5°C isotherm is shaded in red and the 28.5°C isotherm from the individual ensemble forecasts are contoured.

28.5°C isotherm of SST

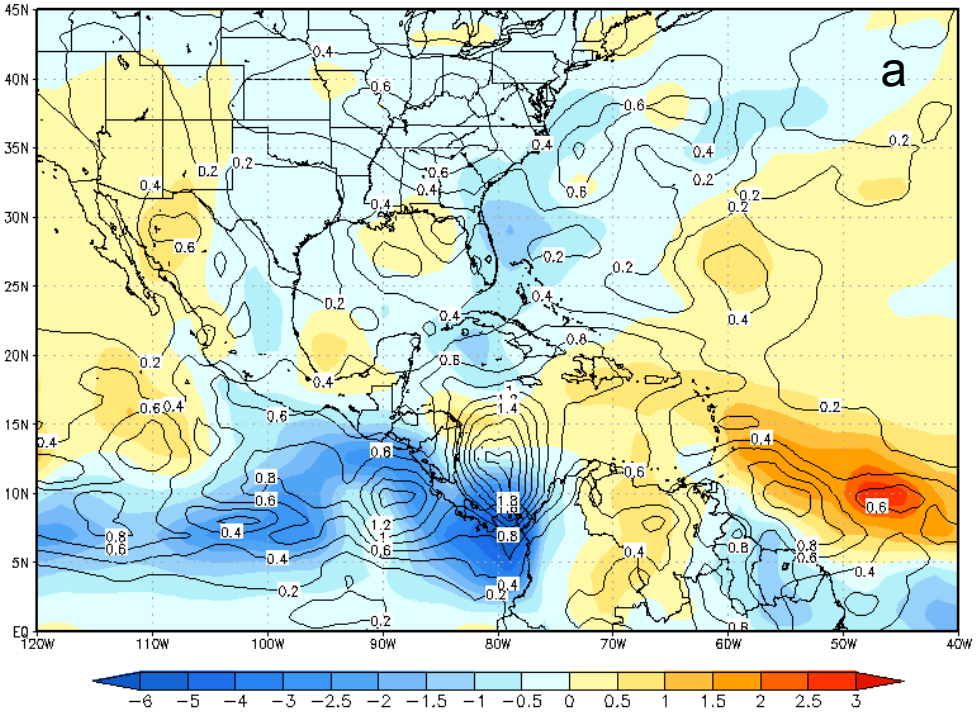


Skill masked SSTA for JJA2012

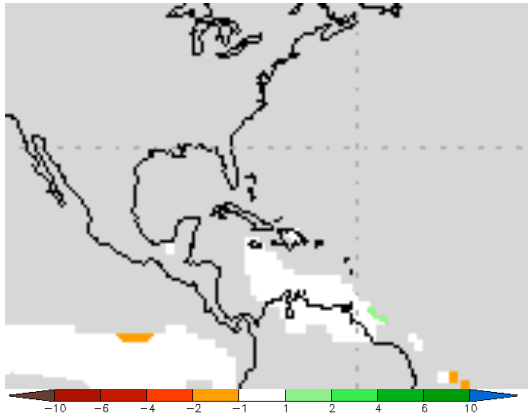


IRI-ECHAM4p5 (Direct Coupled)

Precipitation (mm day^{-1})



Skill masked rainfall anomaly for JJA2012



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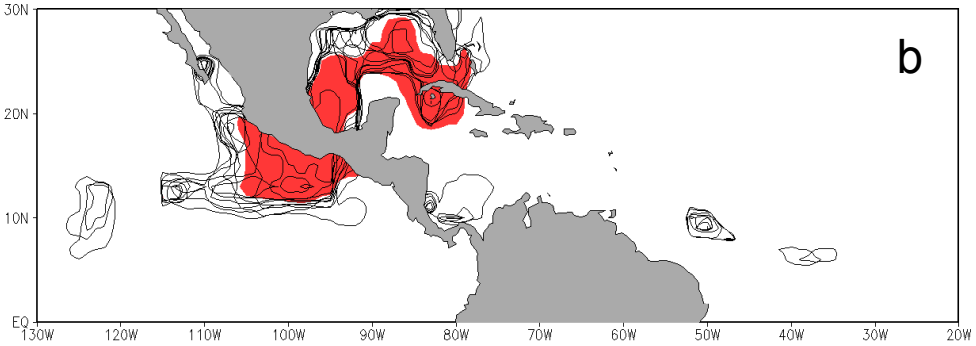
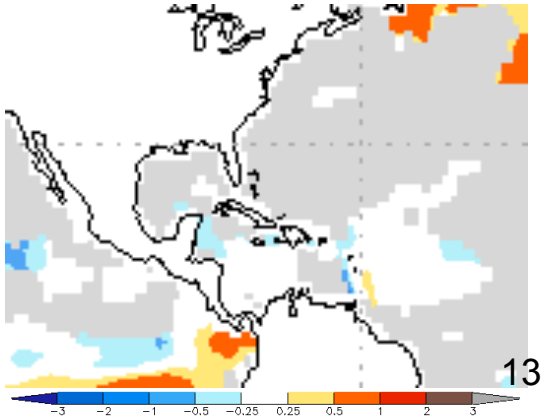
28.5°C isotherm of SST



Skill masked SSTA for JJA2012



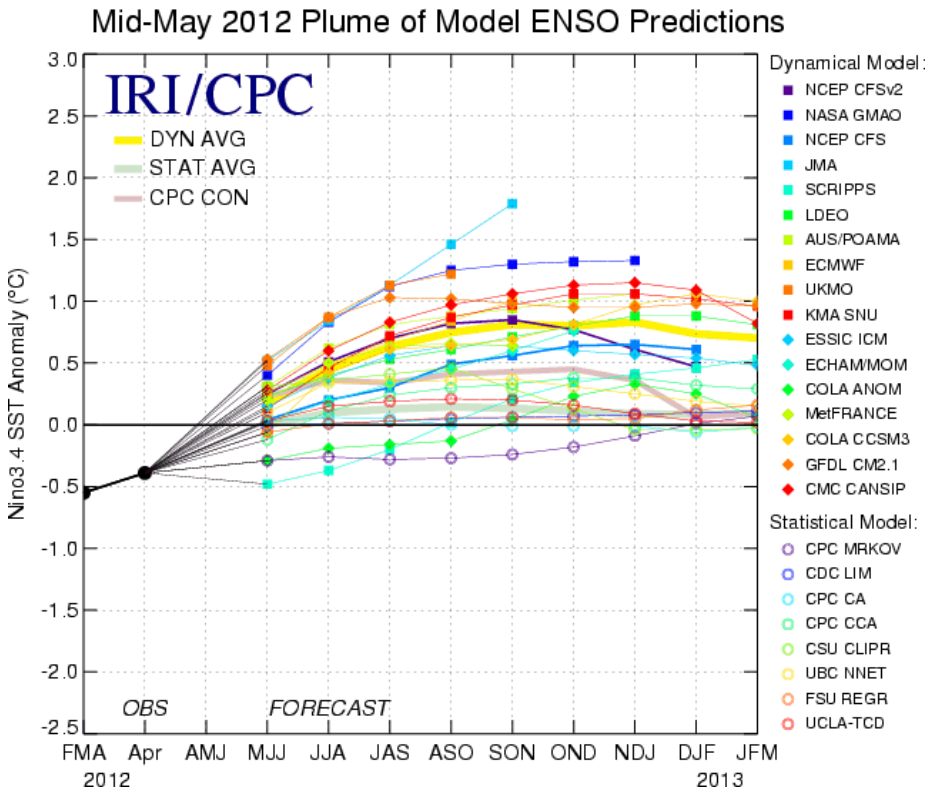
Summary of Model Forecasts

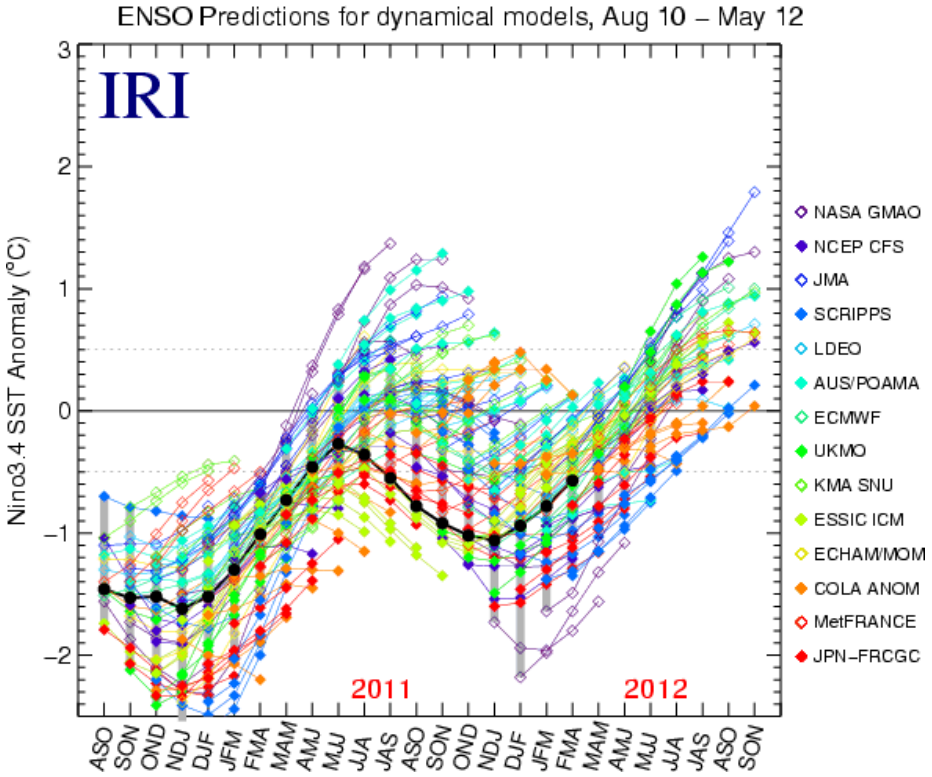
Feature	NCEP CFS v1	NASA GMAO	CCSM 3	CWB	POAMA	FCI-FSU	GFDL-CM2p1	IRI-ECHAM4p5 (anomaly)	IRI-ECHAM4p5 (direct)	Model's CONSEN.
AWP Area Anomaly	Avg.	Avg.	No AWP		No AWP	Lg.	Large	Varies by ensemble	Small	Average
East Pac. Warm Pool	Large	Avg.	Large		Large	Avg.	Large	Avg.	Varies by ensemble	Large
MDR Vertical Shear	Avg.	Slightly Strong		Avg.	Weak	Wk.				Average
Strength of NASH	Very Strong	Slightly Strong		Weak	Weak	Stg.				Slightly Strong

The NMME models unanimously show development of El Nino conditions in the equatorial Eastern Pacific basin.

We are not discussing the rainfall forecast from these models at this time, as the skill masks show a lack of forecasting skill during JJA.

Beyond Summer 2012 forecast

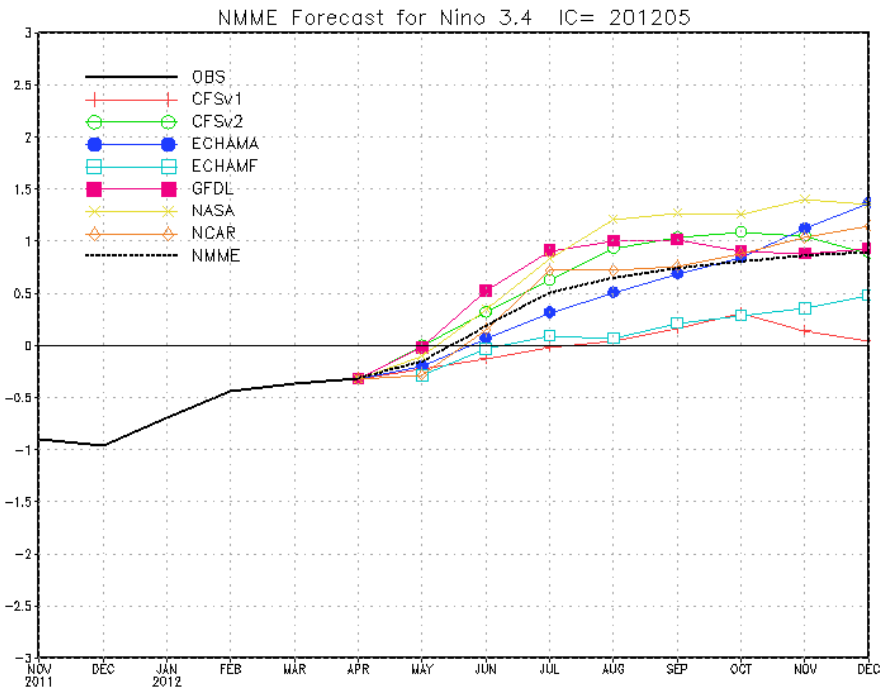


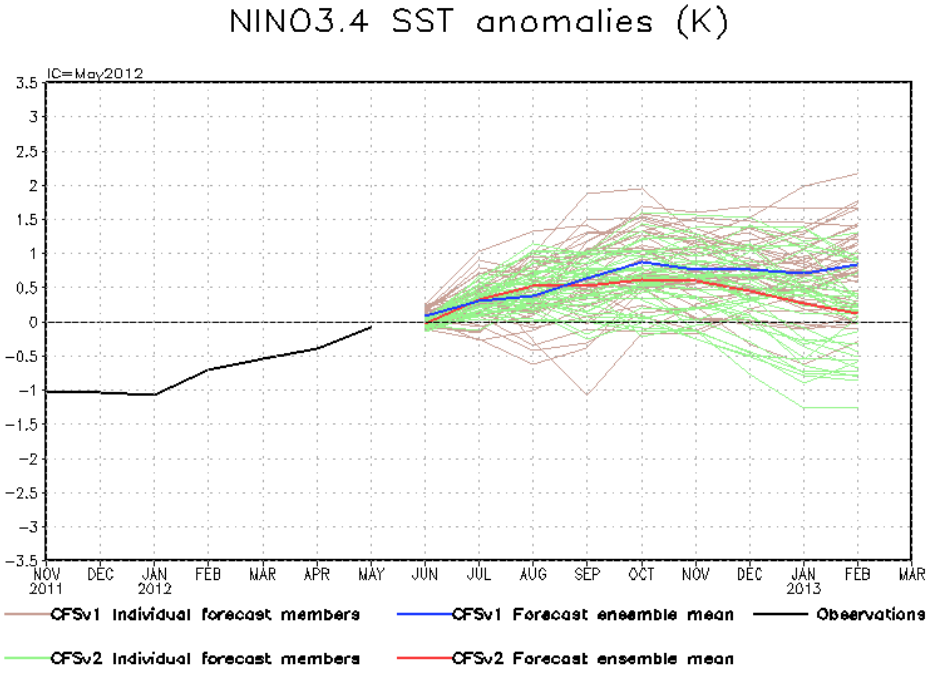


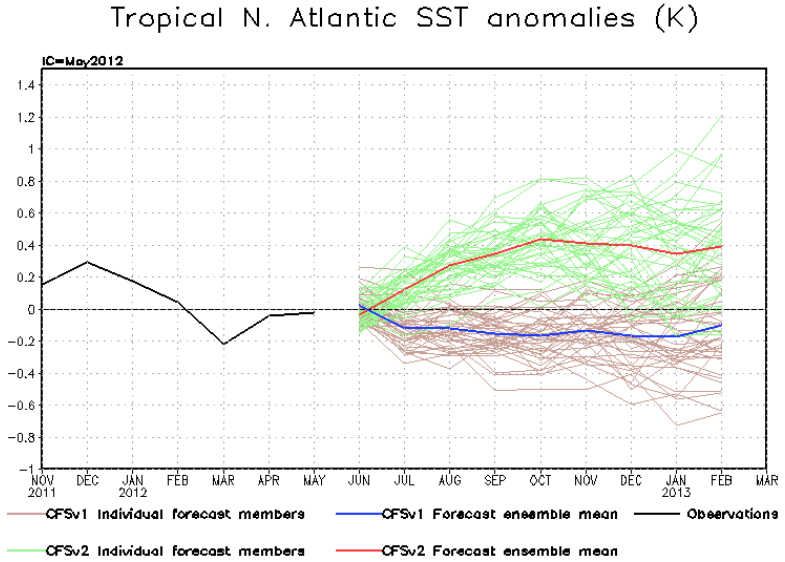
The dynamical models continue to show warming of SSTs in the Eastern Pacific in the upcoming months, with the consensus placing us in a weak El Nino pattern (0.5-1.0°C) by the end of the summer. This pattern is projected to persist through the end of the year (left panel). The dynamical model consensus has generally performed very well over the last two years (right panel). These forecasts have prompted NOAA to issue an El Nino watch.

http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

Beyond Summer 2012 forecast







The NMME and the CFS ensemble members also forecast the development of weak El Nino conditions this summer. However, the summer AWP is usually influenced by the previous boreal winter's ENSO conditions, so there is still a large amount of uncertainty in the AWP forecast this summer.

http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_gif/global_ocean_monitoring_current.ppt

Heuristic model forecasts

Interpreting the model forecasts and the current conditions we anticipate the **likelihood** of the following to happen in JJA 2012 based on our understanding (and research) of the AWP impacts on remote and local climate:

a) A slightly stronger than normal Bermuda/North Atlantic subtropical high
b) A **near normal or slightly smaller** than climatology AWP area
c) Near average vertical wind shear in the Atlantic MDR

Our current research suggest that in small AWP years, typically:
i) Mid-summer drought in central America is enhanced
ii) Strengthens the Great Plains Low level Jet, increases moisture flux and hence increases rainfall over central United States
iii) Enhances vertical shear in the MDR region reducing the Atlantic hurricane activity
iv) Panhandle Florida sea breeze would strengthen
v) Lesser Antilles in the Caribbean would receive less rainfall with retracted AWP and associated colder SST

But the caveat here is that the forecast for AWP area in JJA 2012 is for near normal or slightly smaller than climatology. The JJA 2012 forecast is not for an anomalously very small AWP area. So the above effects associated with small AWP may not be clearly discernible in JJA 2012.

Furthermore if ENSO continues to transition from cold to warm (as the models suggest) and heat content in the AWP remains below normal (as indicated by current observations), we could even have a weaker than usual Atlantic hurricane season.