



NCEP Climate Prediction Center evaluation of inclusion of FNMOG ensemble in week-2 NAEFS forecasts

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Acknowledgements:

Dave Unger, Mike Charles (provided Verification Web Tool)



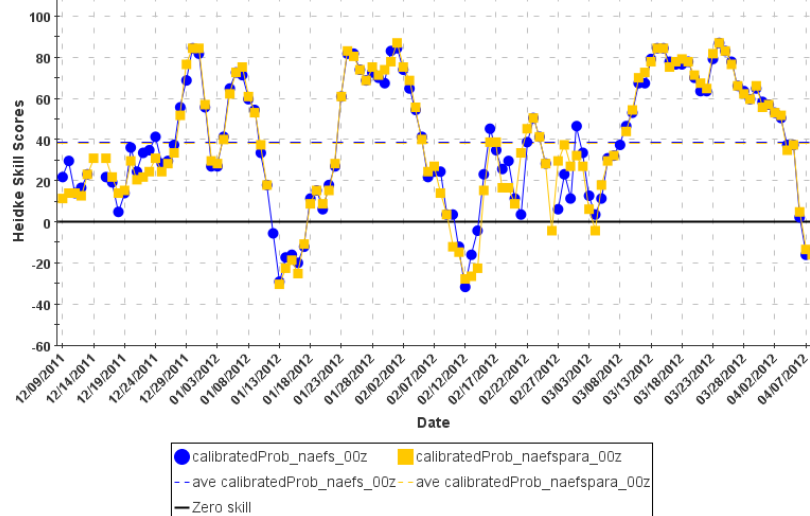
FNMOC evaluation - Outline

- CPC Verification Web Tool
 1. Standard CPC verification metrics / Time series
 1. Heidke Skill Score (Hit Rate as % over climatology)
 2. Rank Probability Skill Score (3 category CDF errors v. climatology)
 3. Reliability (slope of hit rate over forecast probabilities)
- DJFM 2011-2012 for temperature
- JFM 2012 for precipitation
 1. Spin up adaptive PDF bias correction in December 2011
 2. Due to limited time, recalculating bias monthly instead of daily as in operations
- Impact of inclusion of the FNMOE ensemble in February 2012
 - Possible changes in probability forecasts

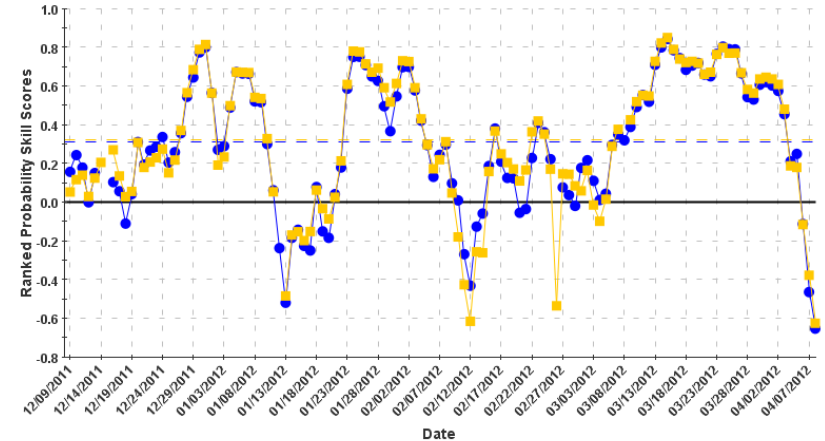


Last Winter (DJFM 2011-12) 6-10 day Temperature Forecast

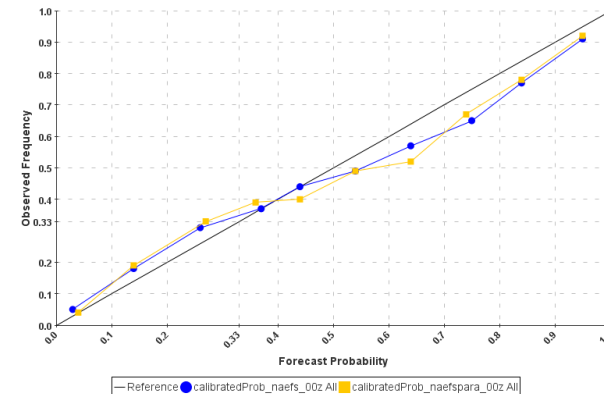
6-10 Day Temperature Heidke Skill Scores for all categories from 12/09/2011 - 04/08/2012



6-10 Day Temperature Ranked Probability Skill Scores for all categories from 12/09/2011 - 04/08/2012



6-10 Day Temperature Reliability Scores for category A from 12/09/2011 - 04/08/2012

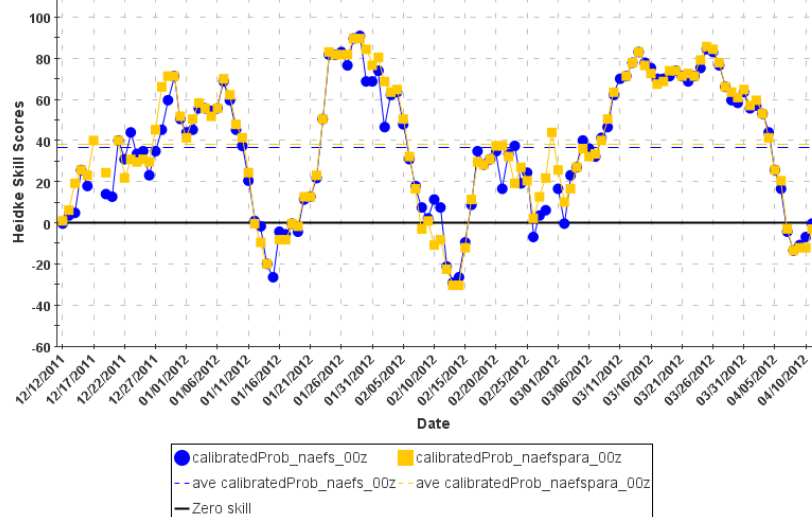


Temperature DJFM2012	6-10 day <u>HSS</u>	6-10 day <u>RPSS</u>
<u>NAEFS</u>	38.9	.31
<u>NAEFS+FN</u>	38.4	.31

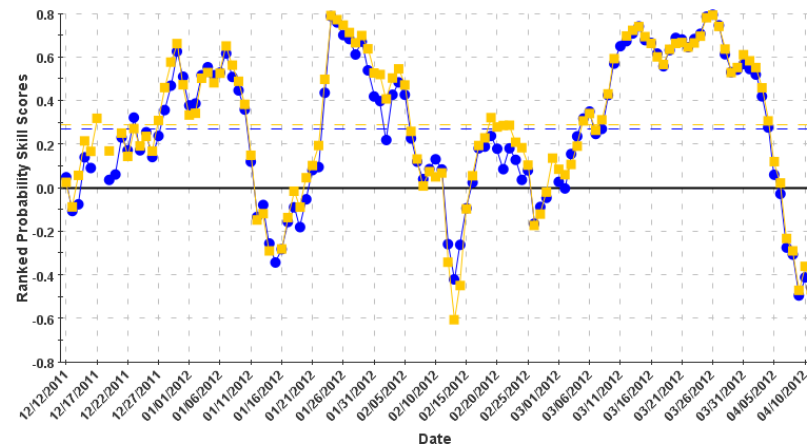


Last Winter (DJFM 2011-12) 8-14 day Temperature Forecast

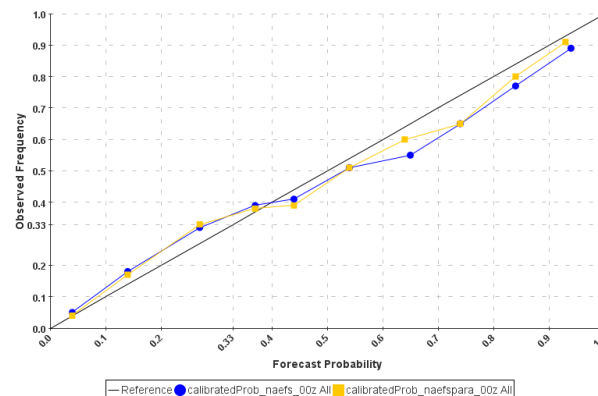
8-14 Day Temperature Heidke Skill Scores for all categories from 12/12/2011 - 04/11/2012



8-14 Day Temperature Ranked Probability Skill Scores for all categories from 12/12/2011 - 04/11/2012



8-14 Day Temperature Reliability Scores for category A from 12/12/2011 - 04/11/2012



Temperature
DJFM2012

8-14 day
HSS

8-14 day
RPSS

NAEFS

36.8

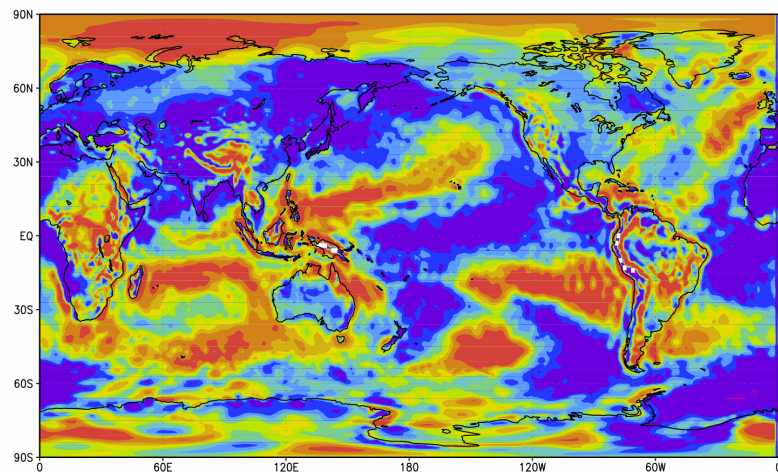
.27

NAEFS+FN

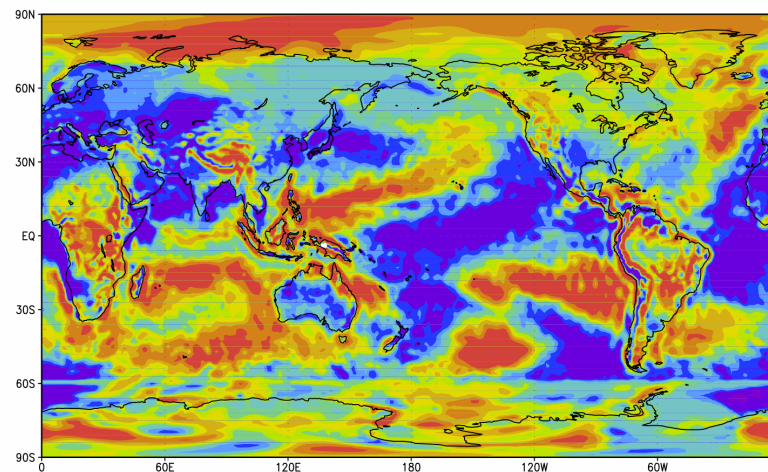
38.4

.29

Probability of Above Normal from NAEFS and with FNMOG ensemble February 15th

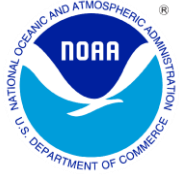


GrADS: COLA/IGES 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2012-05-03-04:34



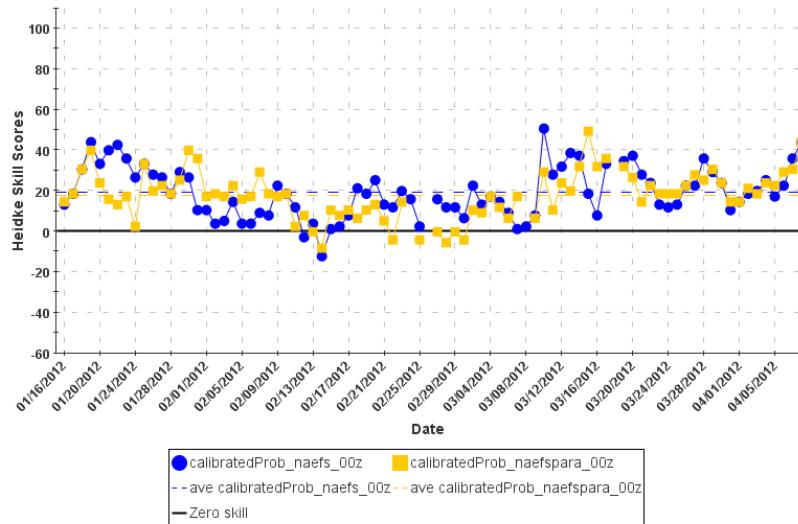
GrADS: COLA/IGES 0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2012-05-03-04:31

Anomaly in FN model in February only modestly alters probabilities and only over some regions, mostly outside the U.S.

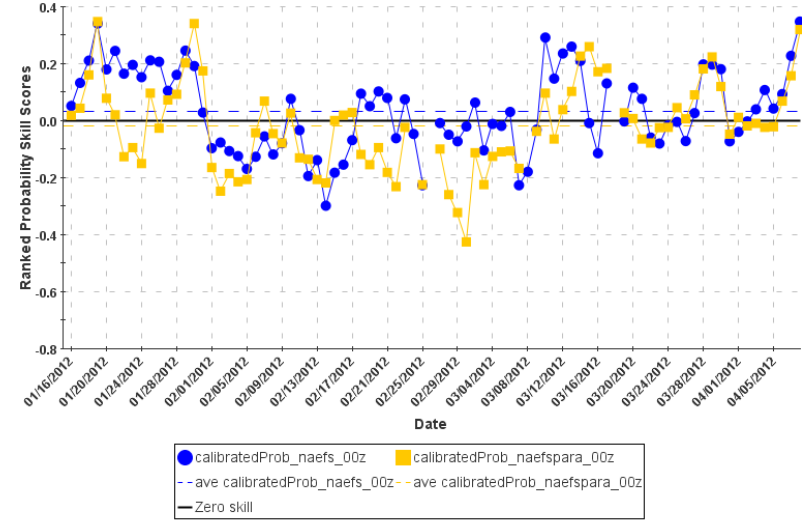


Last Winter (DJFM 2011-12) 6-10 day Precipitation Forecast

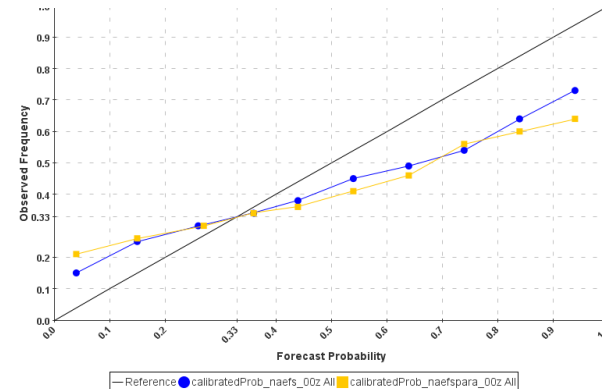
6-10 Day Precipitation Heidke Skill Scores for all categories from 01/16/2012 - 04/08/2012

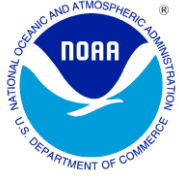


6-10 Day Precipitation Ranked Probability Skill Scores for all categories from 01/16/2012 - 04/08/2012



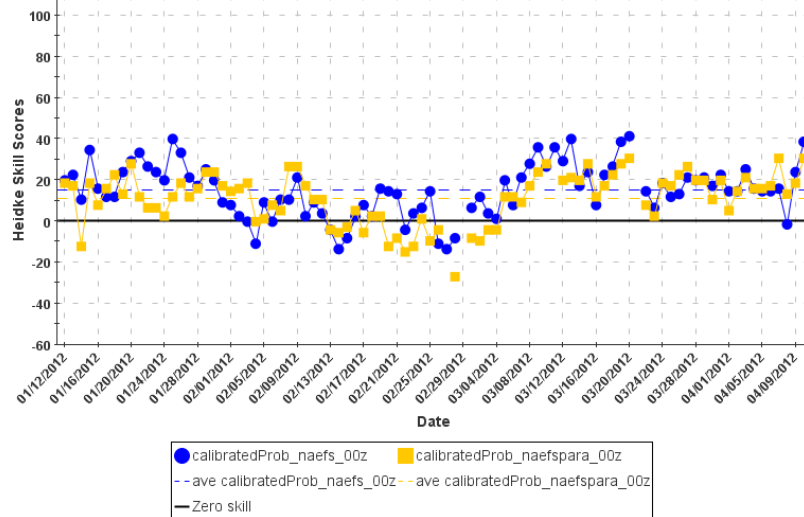
Precipitation DJFM2012	6-10 day <u>HSS</u>	6-10 day <u>RPSS</u>
<u>NAEFS</u>	19.0	.03
<u>NAEFS+FN</u>	17.7	-.02



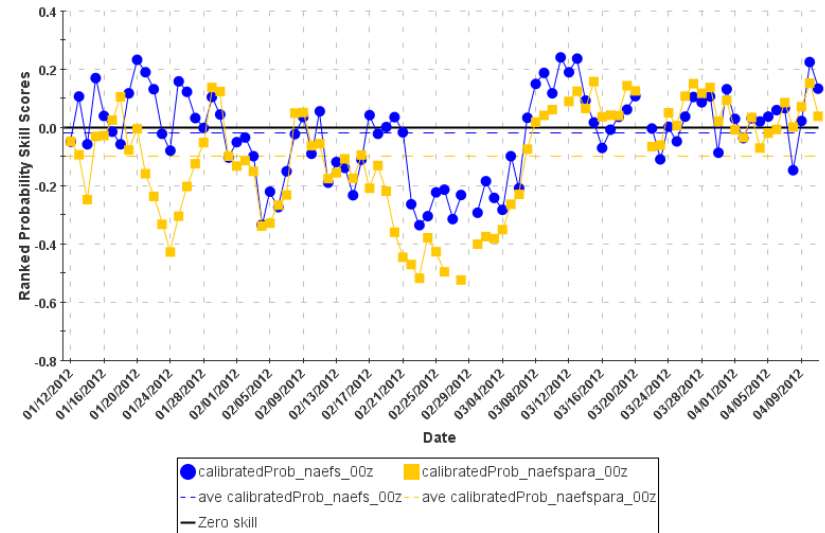


Last Winter (DJFM 2011-12) 8-14 day Precipitation Forecast

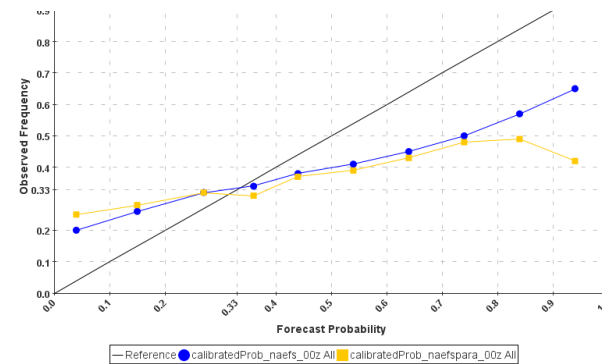
8-14 Day Precipitation Heidke Skill Scores for all categories from 01/12/2012 - 04/11/2012



8-14 Day Precipitation Ranked Probability Skill Scores for all categories from 01/12/2012 - 04/11/2012



Precipitation JFM2012	8-14 day <u>HSS</u>	8-14 day <u>RPSS</u>
<u>NAEFS</u>	14.9	-0.2
<u>NAEFS+FN</u>	11.0	-1.0





Comparing NCEP/Environment Canada to 3-model with FNMOC for Dec 2011 – Mar 2012



Temperature DJFM2012	6-10 day <u>HSS</u>	6-10 day <u>RPSS</u>	8-14 day <u>HSS</u>	8-14 day <u>RPSS</u>
<u>NCEP/EC</u>	38.9	.31	36.8	.27
<u>NCEP/EC/FN</u>	38.4	.31	38.4	.29

Precipitation JFM2012	6-10 day <u>HSS</u>	6-10 day <u>RPSS</u>	8-14 day <u>HSS</u>	8-14 day <u>RPSS</u>
<u>NCEP/EC</u>	19.0	.03	14.9	-.02
<u>NCEP/EC/FN</u>	17.7	-.02	11.0	-.10



Comparing NCEP/Environment Canada to 3-model with FNMOC for Dec 2011 – Mar 2012



Temperature DJFM2012	<u>6-10 day Brier Above</u>	<u>6-10 day Brier Below</u>	<u>8-14 day Brier Above</u>	<u>8-14 day Brier Below</u>
<u>NCEP/EC</u>	.23	-.47	.21	-.46
<u>NCEP/EC/FN</u>	.20	-.29	.21	-.32



FNMOC evaluation - Summary

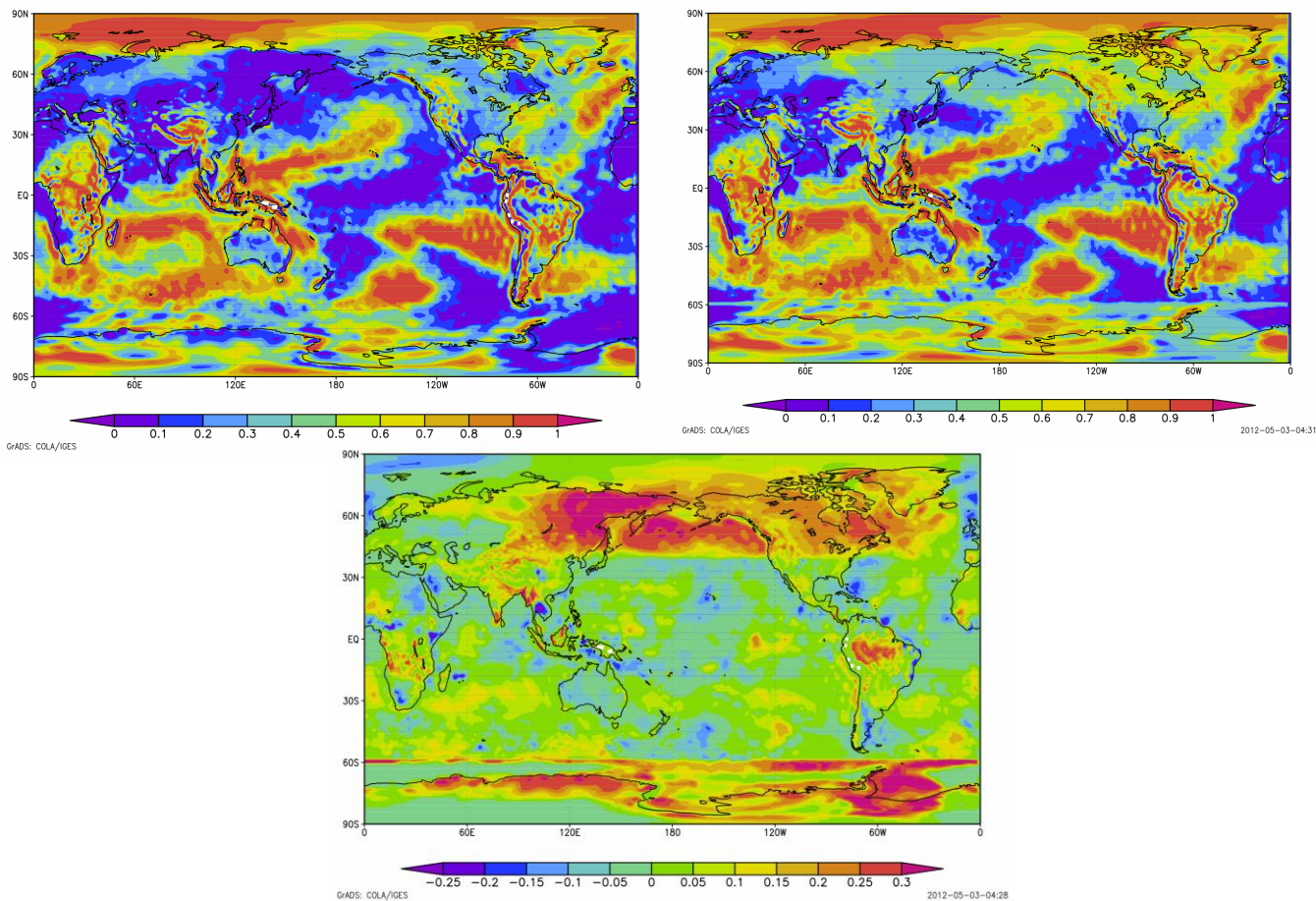
1. Issue with high latitude temperature anomaly in FN ensemble in February
 - In general, positive anomaly over high latitudes compared to NCEP and Environment Canada ensembles
2. Bias-correction and calibration of probabilities reduces the impact on skill
 1. Probabilities of Above normal only increase by ~20 % locally
 2. Mostly north of the contiguous U.S. (where CPC verification system)
3. Skill measures appear mostly unchanged. Three ensembles very similar to two.
4. Bias-correction of NAEFS precipitation with FNMOC is not complete
5. Addition of precipitation ensemble without completed correction reduces skill of bias-corrected precipitation forecasts



The End

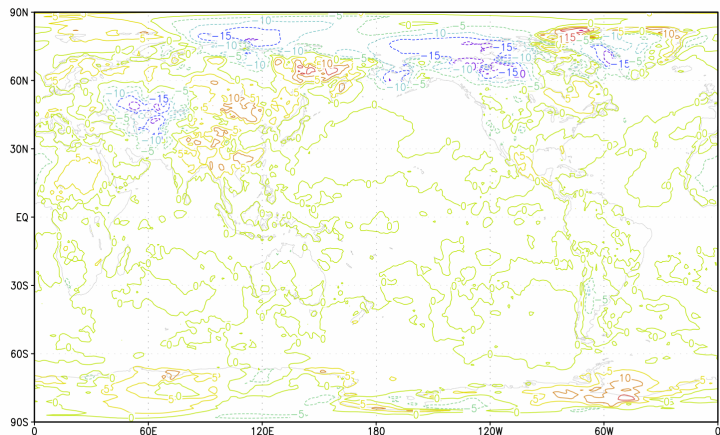
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Probability of Above Normal from NAEFS and with FNMOG ensemble February 15th





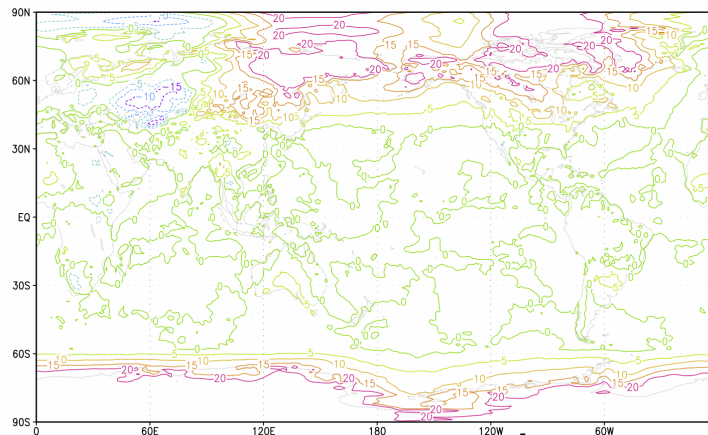
FNMOC minus GEFS ensemble February 1st and 15th



GRADS: COLA/IGES

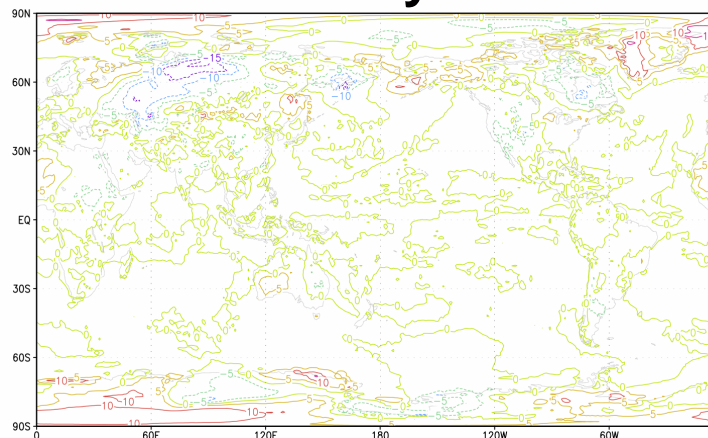
February 1st

2012-05-03-03:51



February 15th

FN-GEFS



February 15th

GRADS: COLA/IGES

2012-05-03-07:59

CMCE-GEFS