Environment and Climate Change Canada / Environnement et Changement climatique Canada

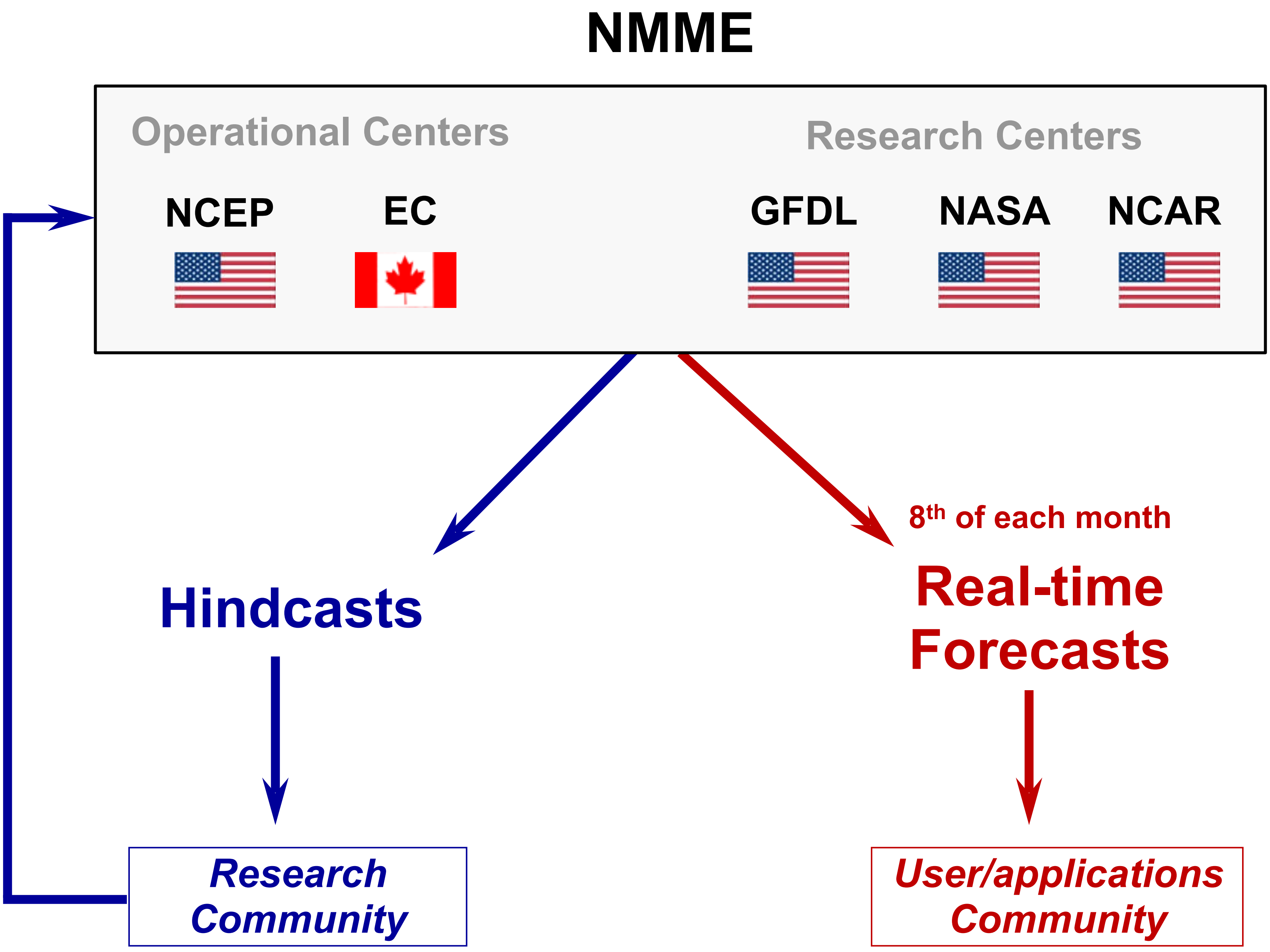
Canada

North American Multi-Model Ensemble (NMME) update

Bill Merryfield

Canadian Centre for Climate Modelling and Analysis (CCCma)

WGSIP 18, 23-25 September 2016

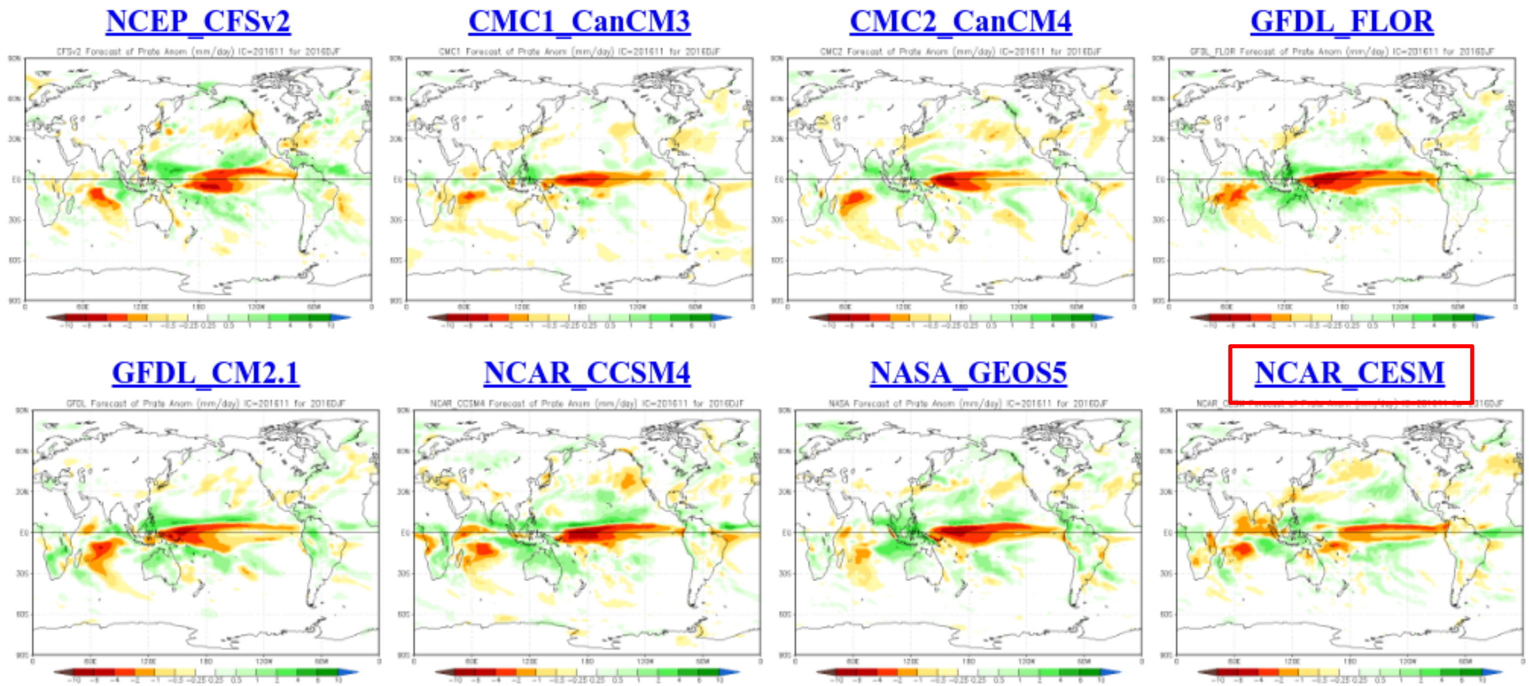

NMME
Operational Centers
Research Centers
NCEP
EC
GFDL
NASA
NCAR
8th of each month
Hindcasts
Real-time Forecasts
Research Community
User/applications Community

Currently contributing models

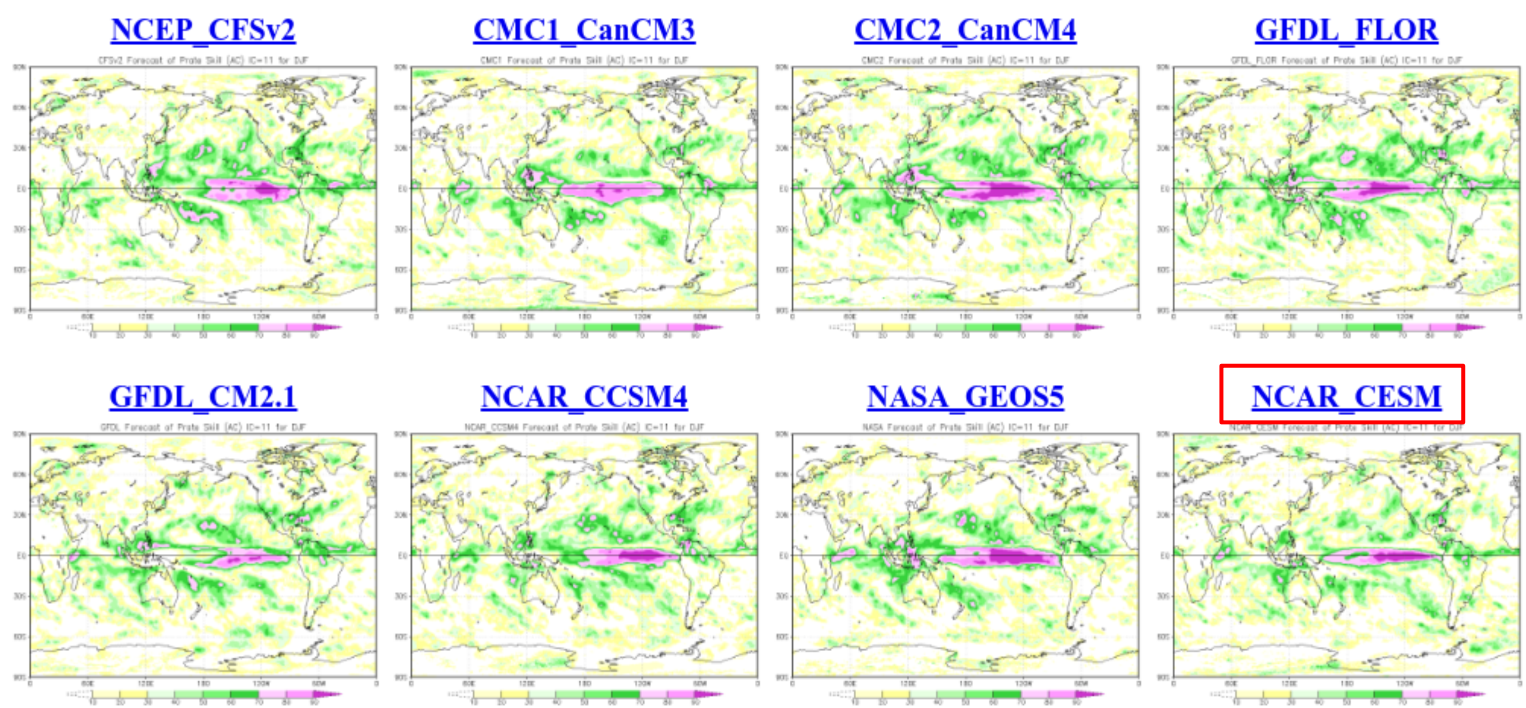
	Model	Center	Ensemble size
	CFSv2	NCEP	24 (28)
	CanCM3	EC/CMC	10
	CanCM4	EC/CMC	10
	FLOR	GFDL	24
	CM2.1	GFDL	10
	CCSM4	NCAR	10
	GEOS-5	NASA	11
NEW	CESM1	NCAR	10
	Total ensemble size		109 (113)

Individual model forecasts

2016 DJF
Lead 1 mon

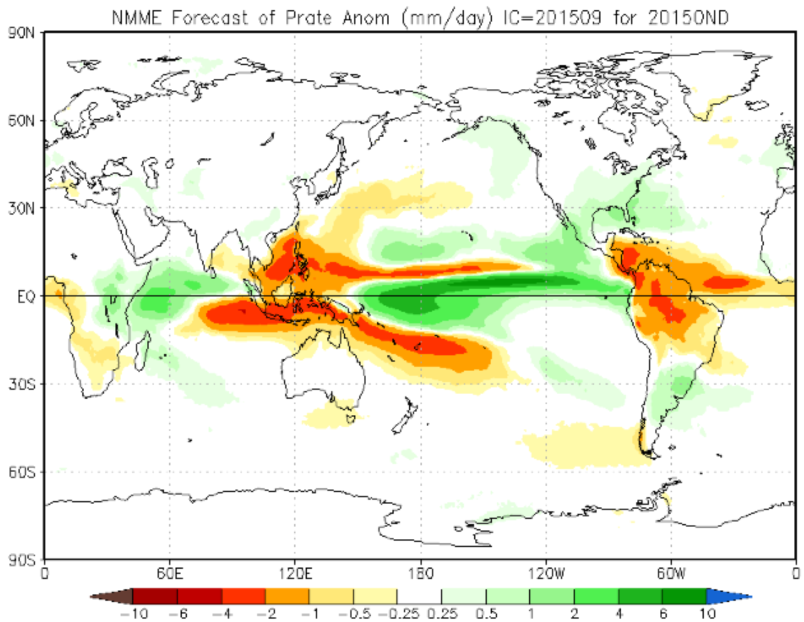


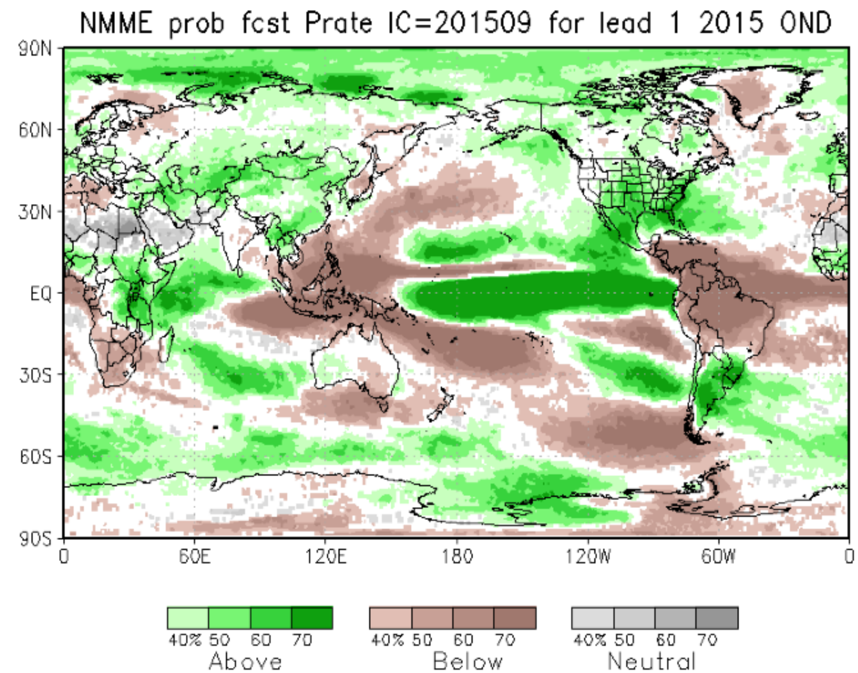
Individual model skills



Deterministic and probabilistic forecasts

Prate 2015 OND from 201509





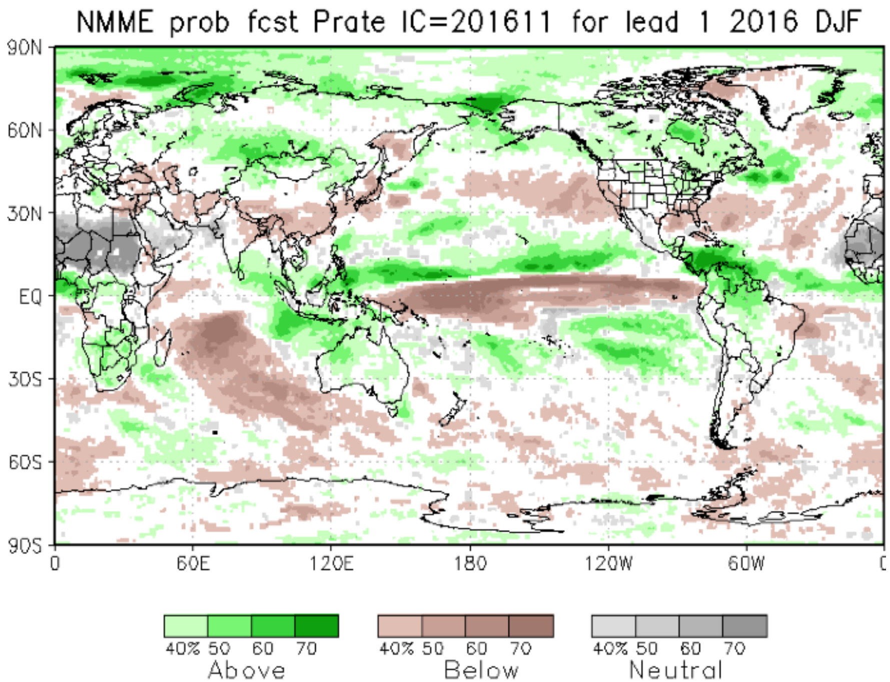
Deterministic
Models weighted equally

Probabilistic
*Ensemble members weighted equally**

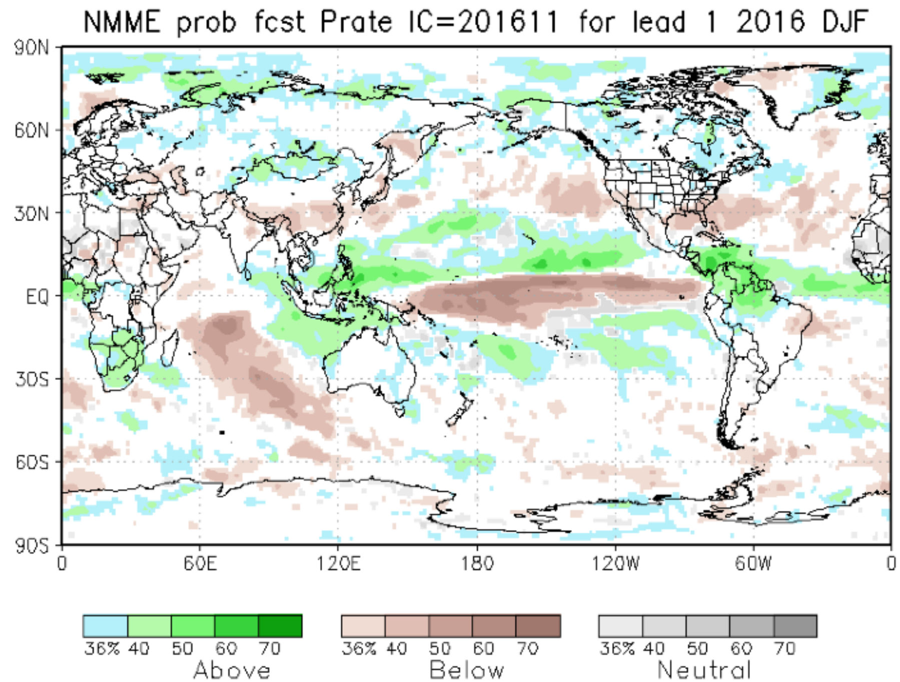
*Anomalies and tercile boundaries computed separately for each model

Raw and calibrated probabilistic forecasts

Prate 2016 DJF from 201511



Raw probabilistic
(overconfident)



Calibrated probabilistic
(more reliable)

NMME Subseasonal Experiment

- Weekly initialization
- Forecast length ≥ 32 days (45 days encouraged)
- Hindcast period 1999-2015 (additional years encouraged)
- ≥ 4 ensemble members (more encouraged)
- Hindcasts and real-time forecasts (product based, like seasonal NMME)
- Models can differ from seasonal NMME, e.g. CMC GEM model contributing to S2S will replace CanCM3/4

NMME Phase 1 Data at IRI

Hindcasts +

real time forecasts

Real-Time Monthly fields (8)

- 2m T daily max
- 2m T daily min
- 2m temperature
- 200 mb Geopotential
- Total precipitation
- Total soil moisture
- Surface temperature (SST+land)
- Surface runoff

Models NMME options | Help | Expert Mode

SOURCES | Models | NMME

IRI

Data Library

Finding Data Tutorial

Questions and Answers

Function Documentation

help

Models NMME

Models NMME from SOURCES: the IRI/LDEO collection of climate data.

Documents

overview	an outline showing sub-datasets of this dataset
CTB home	Climate Test Bed
NMME Home	Information about the NMME project

Semantic Documents

auxinfo.owl

Datasets and variables

CMC1-CanCM3	Models NMME CMC1-CanCM3[**FORECAST HINDCAST**]
CMC2-CanCM4	Models NMME CMC2-CanCM4[**FORECAST HINDCAST**]
COLA-RSMAS-CCSM3	Models NMME COLA-RSMAS-CCSM3[**MONTHLY**]
CPC-CMAP	Models NMME CPC-CMAP[**prate**]
CPC-PRECIP	Models NMME CPC-PRECIP[**prate**]
GFDL-CM2p1	Models NMME GFDL-CM2p1[**MONTHLY**]
GFDL-CM2p1-aer04	Models NMME GFDL-CM2p1-aer04[**MONTHLY**]
GFDL-CM2p5-FLOR-A06	Models NMME GFDL-CM2p5-FLOR-A06[**MONTHLY**]
GFDL-CM2p5-FLOR-B01	Models NMME GFDL-CM2p5-FLOR-B01[**MONTHLY**]
GHCN_CAMS	Models NMME GHCN_CAMS[**temp**]
IRI-ECHAM4p5-AnomalyCoupled	Models NMME IRI-ECHAM4p5-AnomalyCoupled[**MONTHLY**]
IRI-ECHAM4p5-DirectCoupled	Models NMME IRI-ECHAM4p5-DirectCoupled[**MONTHLY**]
LSMASK	Models NMME LSMASK[**land**]
NASA-GMAO	Models NMME NASA-GMAO[**MONTHLY**]
NASA-GMAO-062012	Models NMME NASA-GMAO-062012[**MONTHLY**]
NCDC-OISST	Models NMME NCDC-OISST[**sst**]
NCEP-CFSv1	Models NMME NCEP-CFSv1[**MONTHLY**]
NCEP-CFSv2	Models NMME NCEP-CFSv2[**MONTHLY**]

http://iridl.ldeo.columbia.edu/SOURCES/.Models/.NMME

Earth System Grid

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NMME Phase 2 Data on the ESG

https://www.earthsystemgrid.org/search.html?Project=NMME

Search Results

Project
NMME remove

Search | Clear Search | Search Help

Institute
- CCCMA (5331)
- NASA-GMAO (365)
- NCEP (3)
- NOAA-GFDL (1660)
- UM-RSMAS (1115)

Model
- CCSM4 (1115)
- CFSV2-2011 (3)
- CanCM3 (2660)
- CanCM4 (2671)
- FLORB-01 (1660)
- GEOS-5 (365)

...Show Fewer

Experiment
- 19800101 (4)
- 19800201 (4)
- 19800301 (4)
- 19800401 (4)
- 19800501 (4)

...Show More

Frequency
- 3-Hourly (339)
- 6-Hourly (3)
- Daily (2679)
- Monthly (5453)

1 - 20 of 8474 results   Show: 20 50 100

☐ Download Selected

- ☐ project=NMME, model=CanCM3, experiment=19810101, time_frequency=day, modeling realm=atmos
- ☐ project=NMME, model=CanCM3, experiment=19810101, time_frequency=day, modeling realm=land
- ☐ project=NMME, model=CanCM3, experiment=19810101, time_frequency=mon, modeling realm=atmos
- ☐ project=NMME, model=CanCM3, experiment=19810101, time_frequency=mon, modeling realm=land
- ☐ project=NMME, model=CanCM3, experiment=19810101, time_frequency=mon, modeling realm=landIce
- ☐ project=NMME, model=CanCM3, experiment=19810101, time_frequency=mon, modeling realm=ocean
- ☐ project=NMME, model=CanCM3, experiment=19810101, time_frequency=mon, modeling realm=seaIce
- ☐ project=NMME, model=CanCM3, experiment=19810201, time_frequency=day, modeling realm=atmos
- ☐ project=NMME, model=CanCM3, experiment=19810201, time_frequency=day, modeling realm=land
- ☐ project=NMME, model=CanCM3, experiment=19810201, time_frequency=mon, modeling realm=atmos
- ☐ project=NMME, model=CanCM3, experiment=19810201, time_frequency=mon, modeling realm=land

Overview
Projects
Seminars
Meetings
Documents
Open Problems Board
S&TI Climate Bulletin

NMME (North-American Multi-Model Ensemble) is to improve intra-seasonal to interannual (ISI) operational predictions based on the leading US and Canada climate models.

NMME

NORTH AMERICAN MULTI-MODEL ENSEMBLE

Publications 2015

Data Analyses and Applications

Antonietta Capotondi, Andrew T. Wittenberg, Matthew Newman, Emanuele Di Lorenzo, Jin-Yi Yu, Pascale Braconnot, Julia Cole, Boris Dewitte, Benjamin Giese, Eric Guilyardi, Fei-Fei Jin, Kristopher Karnauskas, Benjamin Kirtman, Tong Lee, Niklas Schneider, Yan Xue, and Sang-Wook Yeh, 2015: Understanding ENSO diversity. *Bull. Amer. Meteor. Soc.*, 96, 921–938. doi: http://dx.doi.org/10.1175/BAMS-D-13-00117.1

Yoo-Geun Ham and Jong-Seong Kug, 2015: Improvement of ENSO simulation based on intermodel diversity. J. Climate, 28, 998–1015. doi: http://dx.doi.org/10.1175/JCLI-D-14-00376.1

Johnna M. Infanti, Ben P. Kirtman, 2015: North American rainfall and temperature prediction response to the diversity of ENSO. *Clim. Dyn.*, e-View. doi: http://dx.doi.org/10.1007/s00382-015-2749-0

Hye-Mi Kim, Edmund K. M. Chang, and Minghua Zhang, 2015: Statistical-dynamical seasonal forecast for tropical cyclones affecting New York State. *Wea. Forecasting*, 30, 295-307. doi:http://dx.doi.org/10.1175/WAF-D-14-00089.1

Ben Kirtman, 2015: Current status of ENSO prediction and predictability. *US CLIVAR VARIATIONS*, 13, 10-15. http://www.usclivar.org/sites/default/files/documents/2015/Variations2015Winter_0.pdf#page=10

Sarah M. Larson and Ben P. Kirtman, 2015: Revisiting ENSO coupled instability theory and SST error growth in a fully coupled model. *J. Climate*, 28, 4724–4742. doi: http://dx.doi.org/10.1175/JCLI-D-14-00731.1

Shuyan Liu, Julian X. L. Wang, Xin-Zhong Liang, and Vernon Morris, 2015: A hybrid approach to improving the skills of seasonal climate outlook at the regional scale. *Clim. Dyn.*, 1-12. doi: http://dx.doi.org/10.1007/s00382-015-2594-1

Feng Ma, Aizhong Ye, Xiaoxue Deng, Zheng Zhou, Xiaojie Liu, Qingyun Duan, Jing Xu, Chiyuan Miao, Zhenhua Di, and Wei Gong, 2015: Evaluating the skill of NMME seasonal precipitation ensemble predictions for 17 hydroclimatic regions in continental China. *Int. J. Climatol.*. doi: http://dx.doi.org/10.1002/joc.4333

Feng Ma, Xing Yuan and Aizhong Ye, 2015: Seasonal drought predictability and forecast skill over China, *J. Geophys. Res. Atmos.*, 120, doi:http://dx.doi.org/10.1002/2015JD023185

Kingtse C. Mo and Bradfield Lyon, 2015: Global meteorological drought prediction using the North American Multi-Model Ensemble. *J. Hydrometeor.*, 16, 1409–1424. doi: http://dx.doi.org/10.1175/JHM-D-14-0192.1

Andrew W. Robertson, Arun Kumar, Malaquias Peña, and Frederic Vitart, 2015: Improving and promoting subseasonal to seasonal prediction. *Bull. Amer. Meteor. Soc.*, 96, ES49–ES53. doi: http://dx.doi.org/10.1175/BAMS-D-14-00139.1

Joshua K. Roundy, Xing Yuan, John Schaake, and Eric F. Wood, 2015: A framework for diagnosing seasonal prediction through canonical event analysis. *Mon. Wea. Rev.*, 143, 2404–2418. doi: http://dx.doi.org/10.1175/MWR-D-14-00190.1

Richard Seager, Martin Hoerling, Siegfried Schubert, Hailan Wang, Bradfield Lyon, Arun Kumar, Jennifer Nakamura, and Naomi Henderson, 2015: Causes of the 2011–14 California drought. *J. Climate*, 28, 6997–7024. doi: http://dx.doi.org/10.1175/JCLI-D-14-00860.1

Shraddhanand Shukla, Mohammad Safeeq, Amir AghaKouchak, Kaiyu Guan and Chris Funk, 2015: Temperature impacts on the water year 2014 drought in California. *Geophys. Res. Lett.*, 42, 4384–4393. doi: http://dx.doi.org/10.1002/2015GL063666

Md. Safat Sikder, Xiaodong Chen, Faisal Hossain, Jason B. Roberts, Franklin Robertson, C K Shum, Francis J Turk, 2015: Are General Circulation Models Ready for Operational Streamflow Forecasting for Water Management in Ganges and Brahmaputra River basins? *J. Hydrometeoro.*, e-View, doi: http://dx.doi.org/10.1175/JHM-D-14-0099.1

Wassila M. Thiaw and Vadlamani B. Kumar, 2015: NOAA's African desk: twenty years of developing capacity in weather and climate forecasting in Africa. *Bull. Amer. Meteor. Soc.*, 96, 737–753. doi: http://dx.doi.org/10.1175/BAMS-D-13-00274.1

Stephan Thober, Rohini Kumar, Justin Sheffield, Juliane Mai, David Schäfer, Luis Samaniego, 2015: Seasonal soil moisture drought prediction over Europe using the North American Multi-Model Ensemble (NMME). *J. Hydrometeor.*, e-View. doi: http://dx.doi.org/10.1175/JHM-D-15-0053.1

Eric F. Wood, Siegfried D. Schubert, Andrew W. Wood, Christa D. Peters-Lidard, Kingtse C. Mo, Annarita Mariotti, and Roger S. Pulwarty, 2015: Prospects for advancing drought understanding, monitoring, and prediction. *J. Hydrometeor.*, 16, 1636–1657. doi: http://dx.doi.org/10.1175/JHM-D-14-0164.1

Xing Yuan, Joshua K. Roundy, Eric F. Wood, and Justin Sheffield, 2015: Seasonal forecasting of global hydrologic extremes: system development and evaluation over GEWEX basins. *Bull. Amer. Meteor. Soc.*, e-View. doi: http://dx.doi.org/10.1175/BAMS-D-14-00003.1

Lixia Zhang and Tianjun Zhou, 2015: Drought over East Asia: A review. *J. Climate*, 28, 3375–3399. doi: http://dx.doi.org/10.1175/JCLI-D-14-00259.1

Xianliang Zhang, Zhe Xiong, Xuezhen Zhang, Ying Shi, Jiyuan Liu, Quanqin Shao, and Xiaodong Yan, 2015: Using multi-model ensembles to improve the simulated effects of land use/cover change on temperature: a case study over northeast China. *Clim. Dyn.*, 1-14. doi:http://dx.doi.org/10.1007/s00382-015-2611-4

Jieshun Zhu, Arun Kumar, Hui Wang, and Bohua Huang, 2015: Sea surface temperature predictions in NCEP CFSv2 using a simple ocean initialization scheme. *Mon. Wea. Rev.*, 143, 3176–3191. doi: http://dx.doi.org/10.1175/MWR-D-14-00297.1

Model and System Improvements

Anthony G. Barnston, Michael K. Tippett, Huug M. van den Dool, and David A. Unger, 2015: Toward an improved multimodel ENSO prediction. *J. Appl. Meteor. Climatol.*, 54, 1579–1595. doi: http://dx.doi.org/10.1175/JAMC-D-14-0188.1

Timothy DelSole, Michael K. Tippett, 2015: Forecast comparison based on random walks. *Mon. Wea. Rev.*, e-View. doi: http://dx.doi.org/10.1175/MWR-D-15-0218.1

Liwei Jia, Xiaosong Yang, Gabriel A. Vecchi, Richard G. Gudgel, Thomas L. Delworth, Anthony Rosati, William F. Stern, Andrew T. Wittenberg, Lakshmi Krishnamurthy, Shaoqing Zhang, Rym Msadek, Sarah Kapnick, Seth Underwood, Fanrong Zeng, Whit G. Anderson, Venkatramani Balaji, and Keith Dixon, 2015: Improved seasonal prediction of temperature and precipitation over land in a high-resolution GFDL climate model. *J. Climate*, 28, 2044–2062. doi: http://dx.doi.org/10.1175/JCLI-D-14-00112.1

H. Murakami, G. A. Vecchi, S. Underwood, T. Delworth, A.T. Wittenberg, W. Anderson, J. -H. Chen, R. Gudgel, L. Harris, S. -J. Lin, F. Zeng, 2015: Simulation and prediction of category 4 and 5 hurricanes in the high-resolution GFDL HiFLOR coupled climate model. *J. Climate*; e-View. doi: http://dx.doi.org/10.1175/JCLI-D-15-0216.1

Rajesh R. Shrestha, Markus A. Schnorbus, and Alex J. Cannon, 2015: A dynamical climate model–driven hydrologic prediction system for the Fraser River, canada. *J. Hydrometeor.*, 16, 1273–1292. doi: http://dx.doi.org/10.1175/JHM-D-14-0167.1

Xing Yuan, Eric F. Wood, and Zhuguo Ma, 2015: A review on climate-model-based seasonal hydrologic forecasting: physical understanding and system development. *WIREs Water*, 2, 523–536. doi: http://dx.doi.org/10.1002/wat2.1088

NMME (North-American Multi-Model Ensemble) is to improve intra-seasonal to interannual (ISI) operational predictions based on the leading US and Canada climate models.

NMME

NORTH AMERICAN MULTI-MODEL ENSEMBLE

Publications 2014

NMME Overview Paper

Ben P. Kirtman, Dughong Min, Johnna M. Infanti, James L. Kinter, III, Daniel A. Paolino, Qin Zhang, Huug van den Dool, Suranjana Saha, Malaquias Pena Mendez, Emily Becker, Peitao Peng, Patrick Tripp, Jin Huang, David G. DeWitt, Michael K. Tippett, Anthony G. Barnston, Shuhua Li, Anthony Rosati, Siegfried D. Schubert, Michele Rienecker, Max Suarez, Zhao E. Li, Jelena Marshak, Young-Kwon Lim, Joseph Tribbia, Kathleen Pegion, William J. Merryfield, Bertrand Denis, and Eric F. Wood, 2014: The North American multimodel ensemble: phase-1 seasonal-to-interannual prediction; phase-2 toward developing intraseasonal prediction. *Bull. Amer. Meteor. Soc.*, 95, 585–601. doi: http://dx.doi.org/10.1175/BAMS-D-12-00050.1

Data Analyses and Applications

Emily Becker, Huug van den Dool, and Qin Zhang, 2014: Predictability and forecast skill in NMME. *J. Climate*, 27, 5891–5906. doi: http://dx.doi.org/10.1175/JCLI-D-13-00597.1

Bruce Cornuelle, James Hansen, Benjamin Kirtman, Scott Sandgathe, and Steve Warren, 2014: Issues and challenges with using ensemble-based prediction to probe the weather–climate interface. *Bull. Amer. Meteor. Soc.*, 95, ES213–ES215. doi: http://dx.doi.org/10.1175/BAMS-D-13-00235.1

Johnna M. Infanti and Ben P. Kirtman, 2014: Southeastern U.S. rainfall prediction in the North American Multi-Model Ensemble. *J. Hydrometeor*, 15, 529–550. doi: http://dx.doi.org/10.1175/JHM-D-13-072.1

Arun Kumar, Peitao Peng, and Mingyue Chen, 2014: Is there a relationship between potential and actual skill?. *Mon. Wea. Rev.*, 142, 2220–2227. doi: http://dx.doi.org/10.1175/MWR-D-13-00287.1

Sarah M. Larson and Ben P. Kirtman, 2014: The Pacific meridional mode as an ENSO precursor and predictor in the North American multimodel ensemble. *J. Climate*, 27, 7018–7032. doi: http://dx.doi.org/10.1175/JCLI-D-14-00055.1

Haiqin Li, Vasubandhu Misra, 2014: Global seasonal climate predictability in a two tiered forecast system. part II: boreal winter and spring seasons. *Climate Dyn.*, 42, 1449–1468. doi:http://dx.doi.org/10.1007/s00382-013-1813-x

Hosmay Lopez and Ben P. Kirtman, 2014: WWBs, ENSO predictability, the spring barrier and extreme events. *J. Geophys. Res.: Atmos.*, 119, 10,114–10,138. doi:http://dx.doi.org/10.1002/2014JD021908

Vasubandhu Misra, and H. Li, 2014: The seasonal climate predictability of the Atlantic Warm Pool and its teleconnections, *Geophys. Res. Lett.*, 41, 661–666, doi:http://dx.doi.org/10.1002/2013GL058740.

Vasubandhu Misra, H. Li, Z. Wu, and S. Dinapoli, 2014: Global seasonal climate predictability in a two tiered forecast system: part I: boreal summer and fall seasons. *Climate Dyn.*, 42, 1425–1448. doi:http://dx.doi.org/10.1007/s00382-013-1812-y.

Kingtse C. Mo and Dennis P. Lettenmaier, 2014: Hydrologic prediction over the Conterminous United States using the National Multi-Model Mnsemble. *J. Hydrometeor*, 15, 1457–1472. doi: http://dx.doi.org/10.1175/JHM-D-13-0197.1

Luis Ricardo Lage Rodrigues, Javier García-Serrano, and Francisco Doblas-Reyes, 2014: Seasonal forecast quality of the West African monsoon rainfall regimes by multiple forecast systems, *J. Geophys. Res.: Atmos.*, 119, 7908–7930. doi:http://dx.doi.org/10.1002/2013JD021316

Shraddhanand Shukla, Christopher Funk and Andrew Hoell, 2014: Using constructed analogs to improve the skill of National Multi-Model Ensemble March–April–May precipitation forecasts in equatorial East Africa. *Environ. Res. Lett.*, 9, 094009 (9pp). http://iopscience.iop.org/1748-9326/9/9/094009

Jingzhi Su, Baoqiang Xiang, Bin Wang and Tim Li, 2014: Abrupt termination of the 2012 Pacific warming and its implication on ENSO prediction. *Geophys. Res. Lett.*, 41, 9058–9064. doi:http://dx.doi.org/10.1002/2014GL062380

Stephan Thober, Juliane Mai, Matthias Zink and Luis Samaniego, 2014: Stochastic temporal disaggregation of monthly precipitation for regional gridded data sets. *Water Resour. Res.*, 50, 8714–8735. doi:http://dx.doi.org/10.1002/2014WR015930

Di Tian, Christopher J. Martinez, Wendy D. Graham, and Syewoon Hwang, 2014: Statistical downscaling multimodel forecasts for seasonal precipitation and surface temperature over the southeastern United States. *J. Climate*, 27, 8384–8411. doi: http://dx.doi.org/10.1175/JCLI-D-13-00481.1

Hailan Wang, Siegfried Schubert, Randal Koster, Yoo-Geun Ham, and Max Suarez, 2014: On the role of SST forcing in the 2011 and 2012 extreme U.S. heat and drought: A study in contrasts. *J. Hydrometeor.*, 15, 1255-1273. doi: http://dx.doi.org/10.1175/JHM-D-13-069.1

Hui Wang, 2014: Evaluation of monthly precipitation forecasting skill of the National Multi-model Ensemble in the summer season. *Hydrological Processes*, 28, 4472–4486. doi: http://dx.doi.org/10.1002/hyp.9957

Model and System Improvements

Timothy DelSole, Jyothi Nattala and Michael K. Tippett, 2014: Skill improvement from increased ensemble size and model diversity. *Geophys. Res. Lett.*, 41(20), 7331-7342. doi:http://dx.doi.org/10.1002/2014GL060133

Timothy DelSole and Michael K. Tippett, 2014: Comparing forecast skill. *Mon. Wea. Rev.*, 142, 4658–4678. doi: http://dx.doi.org/10.1175/MWR-D-14-00045.1

Suranjana Saha, Shrinivas Moorthi, Xingren Wu, Jiande Wang, Sudhir Nadiga, Patrick Tripp, David Behringer, Yu-Tai Hou, Hui-ya Chuang, Mark Iredell, Michael Ek, Jesse Meng, Rongqian Yang, Malaquias Peña Mendez, Huug van den Dool, Qin Zhang, Wanqiu Wang, Mingyue Chen, and Emily Becker, 2014: The NCEP Climate Forecast System Version 2. *J. Climate*, 27, 2185–2208. doi: http://dx.doi.org/10.1175/JCLI-D-12-00823.1

G. A. Vecchi, T. Delworth, R. Gudgel, S. Kapnick, A. Rosati, A. T. Wittenberg, F. Zeng, W. Anderson, V. Balaji, K. Dixon, L. Jia, H.-S. Kim, L. Krishnamurthy, R. Msadek, W. F. Stern, S. D. Underwood, G. Villarini, X. Yang, and S. Zhang, 2014: On the Seasonal Forecasting of Regional Tropical Cyclone Activity. *J. Climate*, 27, 7994–8016. doi: http://dx.doi.org/10.1175/JCLI-D-14-00158.1

http://www.nws.noaa.gov/ost/CTB/nmme_pub.htm

57 NMME publications as of 2015

NMME Phase 2 Data at NCAR

- *Common 1° grid*
- *NetCDF4*
- *Available 2014-15*

Daily atmospheric and land surface fields (22)

Variable	Var. Name
Surface temperature (SST+land)	Ts
2m T daily max	Tasmax
2m T daily min	Tasmin
Mean sea level pressure	Psl
Snow water equivalent	swe
Total soil moisture	Mrsov
Total precipitation*	prlr
Downward surface solar	Rsds
Downward surface longwave	Rlds
Net surface solar	Rss
Net surface longwave	Rls
Top net solar	Rst
Top net longwave	Rlt
Surface latent flux	Hflsd
Surface sensible flux	Hfssd
Surface stress (x)	Tauu
Surface stress (y)	Tauv
2m temperature	Tas
Total cloud cover	Clt
10m wind (u)	Uas
10m wind (v)	Vas
Surface specific humidity	huss

Daily atmospheric pressure level fields (5)
Provided at 850, 500, 200, 100, 50 hPa

Variable	Var. Name
Geopotential	G
Temperature	Ta
Zonal velocity	ua
Meridional velocity	va
Specific humidity	hus

Monthly sea ice fields (2)

Variable	Var. Name
Sea ice concentration	sic
Sea ice thickness	sit

Monthly ocean fields (7)
3D ocean fields thetao/so/uo/vo/wo are provided at 125.0, 150.0, 200.0, 250.0, 300.0, and 400.0 m

Variable	Var. Name
Potential temperature	thetao
Salinity	so
Zonal velocity	uo
Meridional velocity	vo
Vertical velocity	wo
Sea level	zoh
Mixed layer depth	zmlo