



Environment and  
Climate Change Canada

Environnement et  
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Canada



# Environment and Climate Change Canada / GPC Montreal

*Assessment, research and development*

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**Canadian Centre for Climate Modelling and Analysis (CCCma)**  
**with contributions from colleagues at CCCma and CMC**

# New seasonal forecasting system: CanSIPsv2

*2 models × 10 ensemble members coming 31 July 2019*

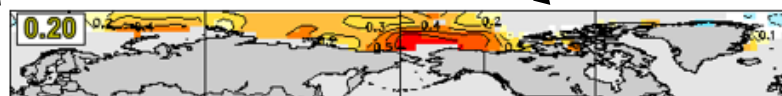
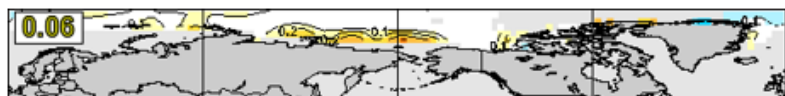
## GEM-NEMO

- Atmosphere: GEM 4.8 1.4° L79 (0.075 hPa)
- Ocean: NEMO 3.6/ORCA1 L50 Sea ice: CICE 4.0 Land: ISBA
- Hind/forecast init: perturbed ERAI/GEPS EnKF atm, ORAP5/GIOPS ocn

## CanCM4i

- CanCM4 with improved ocean & sea ice initialization (ORAP5, modified HadISST2 SIC in hindcasts, statistical SIT in hindcasts & forecasts)
- Still atmosphere CanAM4 2.8° L35 (1 hPa), ocean CanOM 1.4×0.94° L40

Skill measure averaged	CanSIPS	CanSIPsv2
ACC Global T2m Precip DJF lead 0	0.57 0.30	0.60 0.35
ACC Global T2m Precip JJA lead 0	0.54 0.26	0.59 0.29
CRPSS Canada T2m Precip DJF lead 0	0.13 0.04	0.20 0.05
CRPSS Canada T2m Precip JJA lead 0	0.16 0.04	0.18 0.04
ACC Global SST DJF, JJA lead 1 month	0.55 0.56	0.61 0.62
ACC Nino 3.4 all seasons leads 0-9 months	0.81	0.82
ACC September sea ice concentration lead 4 months	0.06	0.20



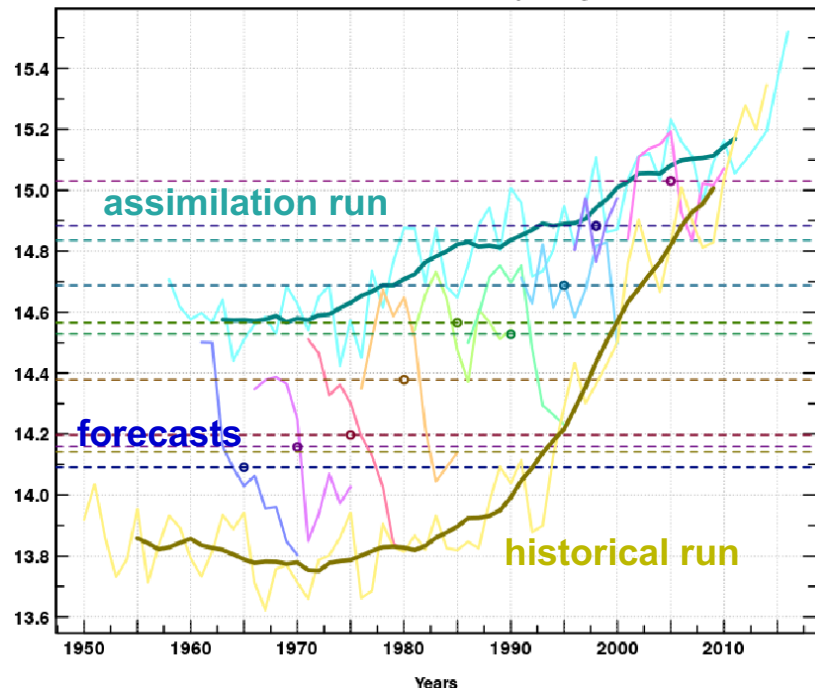
# Decadal predictions for CMIP6

## CanESM5 (CCCma CMIP6 model)

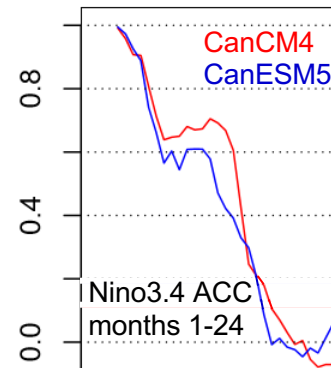
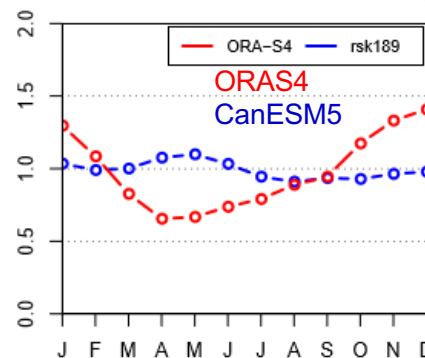
- Atmosphere: CanAM5 2.8° L49 (1 hPa),
- Ocean: NEMO 3.4.1/ORCA1 L50 Sea ice: LIM2 Land: CLASS 3.6
- Init: atm constrained to ERA40/Interim, ocn nudged to ORAS5 T/S
- Decadal hindcasts initialized 1 Jan 1961-2016 completed
- Very high climate sensitivity  $\sim 6^\circ$ , unusual ENSO seasonality but OK skill

Annual screen temperature over globe

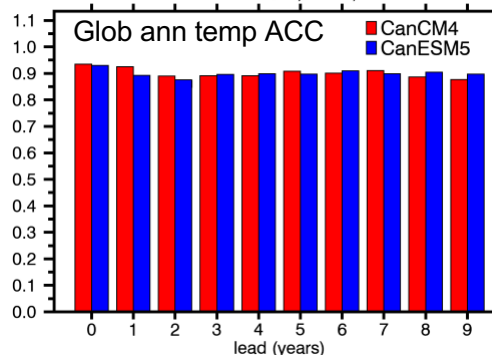
Annual 11-yr moving mean



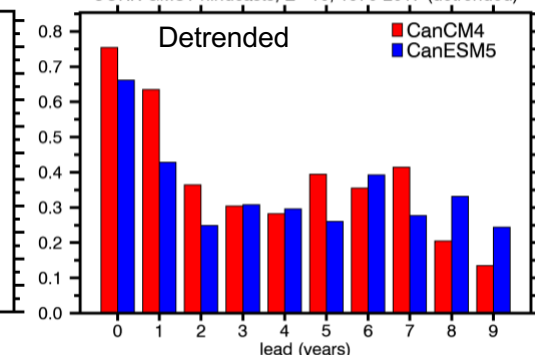
Monthly NINO3.4 STD



CORR GMST hindcasts, E=10, 1970-2017



CORR GMST hindcasts, E=10, 1970-2017 (detrended)



# Interactive seasonal forecasts on web

[CanSIPS forecast](#) | 
 [Hindcasts and observations](#) | 
 [Information on indices](#) | 
 [Information on CanSIPS](#) | 
 [CanSIPS datamart](#)

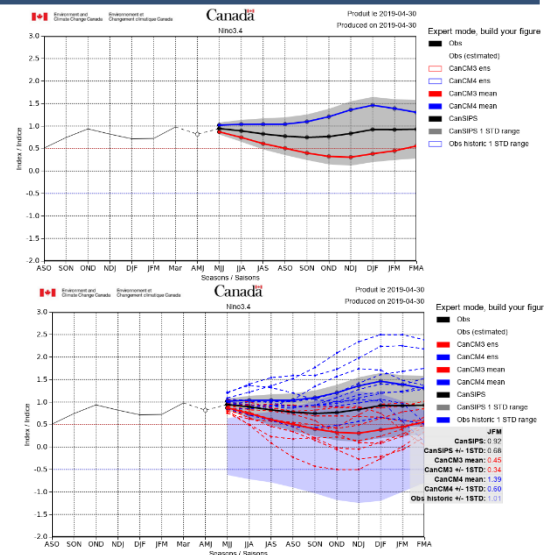
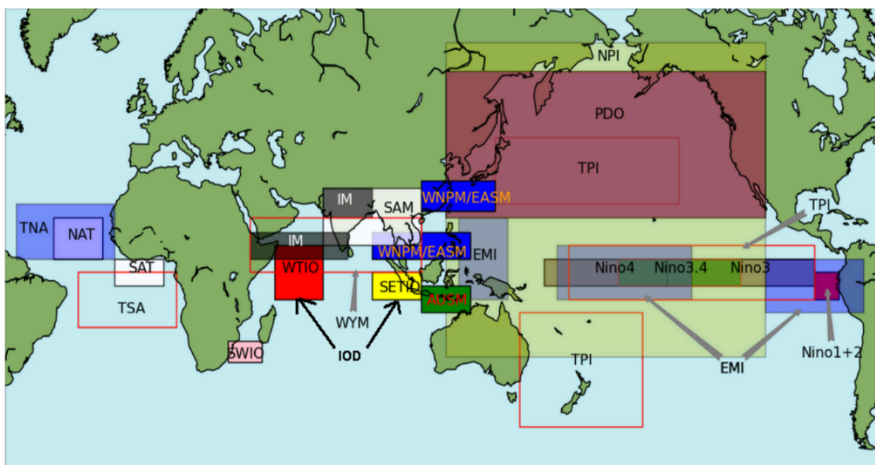
[Contact us](#)

Index: **Global map**

Period: **Seasonal**

Year: **2019**

Month: **May**



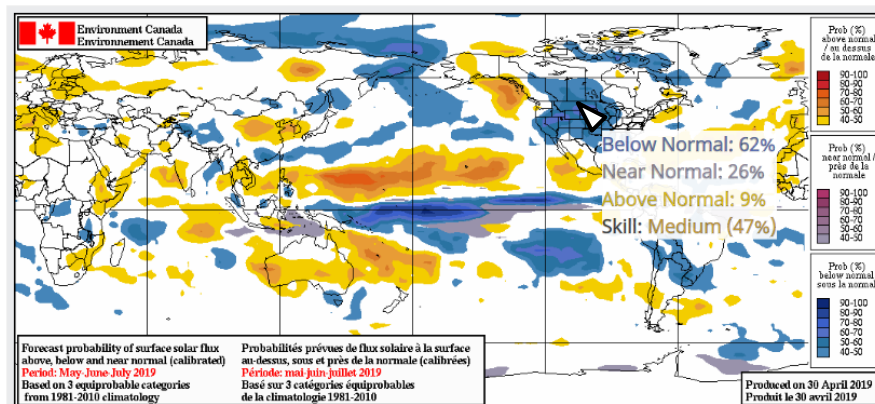
Interactive  
tercile  
maps

Temperature  
 Precipitation  
 Sea surface temperature  
 Snow water equivalent  
 Surface solar radiation  
 Cloud fraction  
 Specific humidity

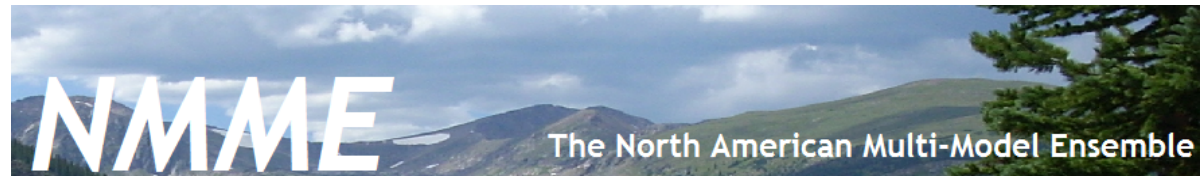
May-Jun-Jul ==> 1-3 month

Output options

- ☒ Forecast map
- ☐ Skill map
- ☐ Reliability



# What's new with NMME

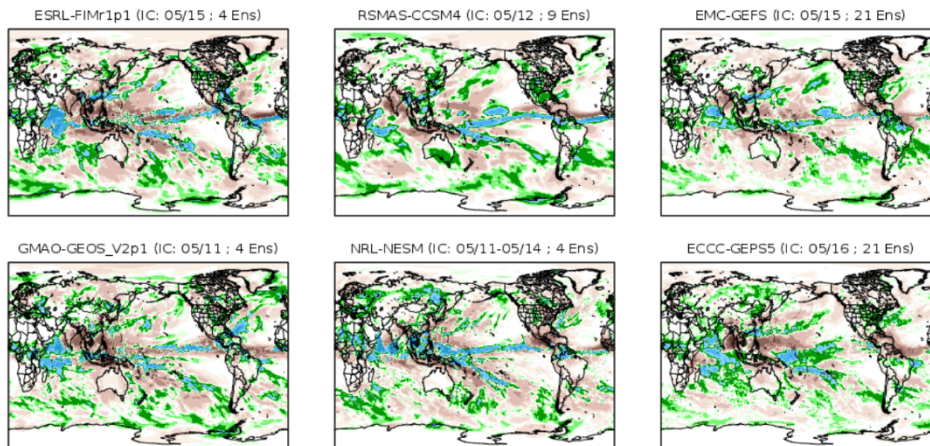


- Daily real time data now available from NCEI→



- SubX subseasonal experiment running experimentally in real time with 6 models/63 ensemble members to 32 days

SubX Week 3-4 Total Precipitation Anomalies (mm): Valid 2 weeks ending JUN 14



- GEM-NEMO+CanCM4i soon to supercede CanCM3+CanCM4 (still 7 models/~100 ens)

Variable	CCSM4	CESM1	CFSV2-2011	CanCM3	CanCM4	FLORB-01	GEOS-5
Precipitation rate	pr	precip	pr	prlr	prlr	pr	pr
Daily Maximum Surface Air Temperature	TREFMXAV	Tasmax	tasmax	tasmax	tasmax	tasmax	tasmax
Daily Minimum Surface Air Temperature	TREFMNAV	Tasmin	tasmin	tasmin	tasmin	tasmin	tasmin
Zonal surface stress	STX	Stx	stx	stx	stx	N/A	stx
Meridional surface stress	STY	Sty	sty	sty	sty	N/A	sty
Sea level pressure	PSL	Psl	psl	psl	psl	N/A	psl
Zonal wind (@850 hPa)	ua	ua	ua	ua	ua	N/A	ua
Meridional wind (@850 hPa)	va	va	va	va	va	N/A	va
Zonal wind (@200 hPa)	ua	ua	ua	ua	ua	N/A	ua
Meridional wind (@200 hPa)	va	va	va	va	va	N/A	va
Net longwave flux at top of model	N/A	Rlt	N/A	rit	rit	N/A	rit
Net solar flux at surface	N/A	Rss	N/A	rss	rss	N/A	N/A
Geopotential height (@500 hPa)	g	G	g	g	g	N/A	g
Specific Humidity	HUS	hus	hus	hus	hus	N/A	hus