



Environment
Canada

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Canada

MSC-CMC Monthly EPS forecast current status and future plans

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Monthly System

- ▣ GEPS based
- ▣ Two components
 - 1) Real time forecasting system
 - 2) Hindcast (model statistics)



Real time forecasting system

- Extend GEPS to 32 days once a week (00Z Thursday)
- Upgraded with GEPS system
- GEM 4.4, 0.6x0.6L40
- Atmosphere-only model, 2-tier system
- Persistent SST anomaly with time-evolving boundary condition
- 20 members



Hindcasts

- To generate GEPS climate statistics, in order to calibrate real time forecasts (model drift, spread change)
 - For the same date, past 15 years
 - 4 members each year, total of 60 members
 - Use 5 weeks centered at the date of the current Thursday, total of 300 members
-
- Can be done any time before the real time forecasting, when the computer is available



Proposed products

Forecast products of weekly average T2m and PR over Canada

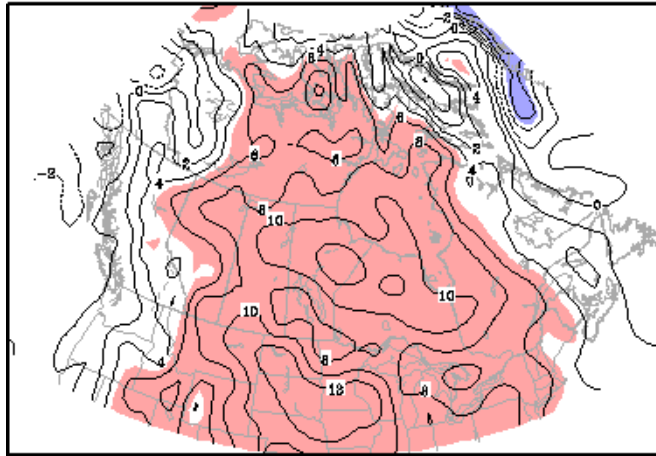
Week 1: days 5-11; Week 2: days 12-18...

- Ensemble mean anomaly maps
- Probability maps for above, below and near normal

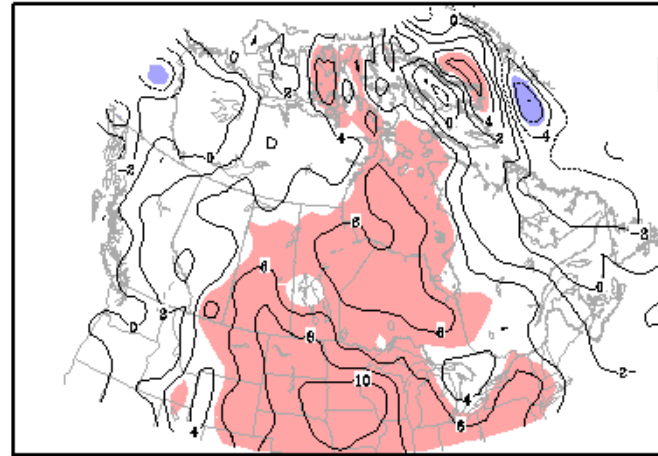


Example: March 2012 heat wave

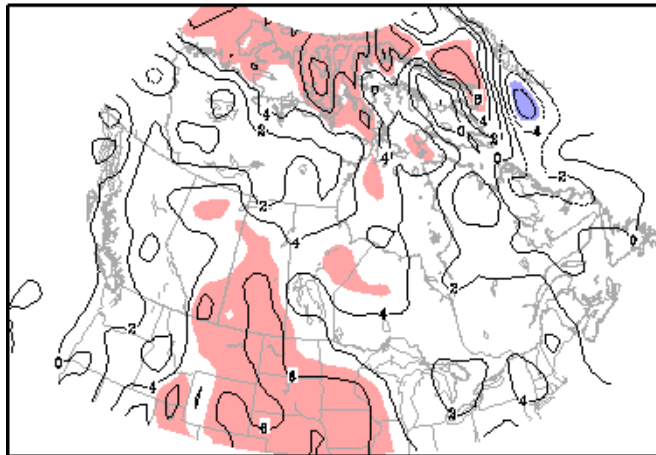
a) TTanom Week: 20120312-20120318



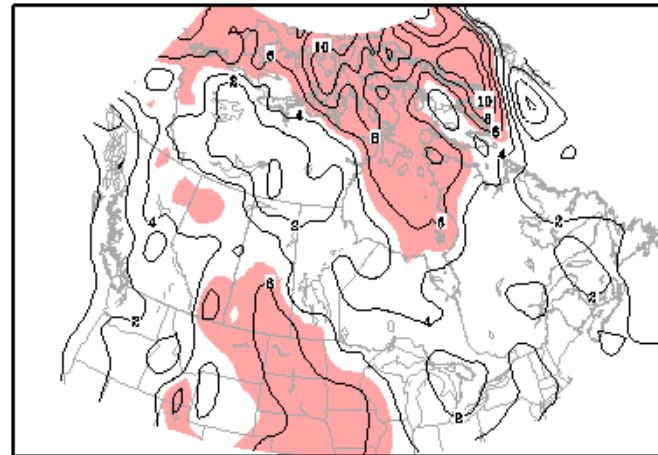
b) TTanom Week: 20120319-20120325



c) TTanom Week: 20120326-20120401



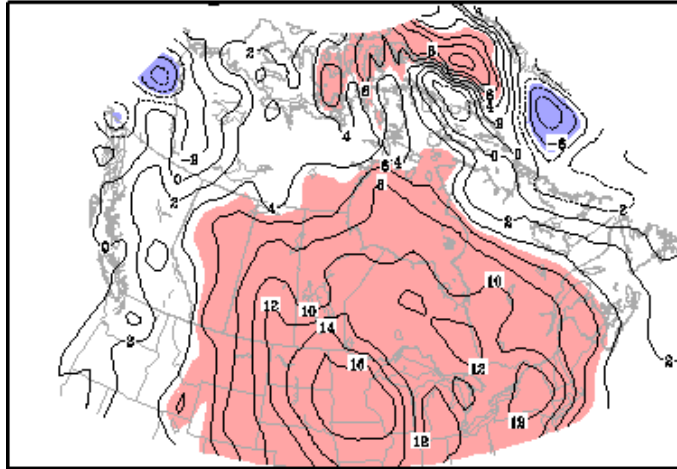
d) TTanom Week: 20120402-20120408



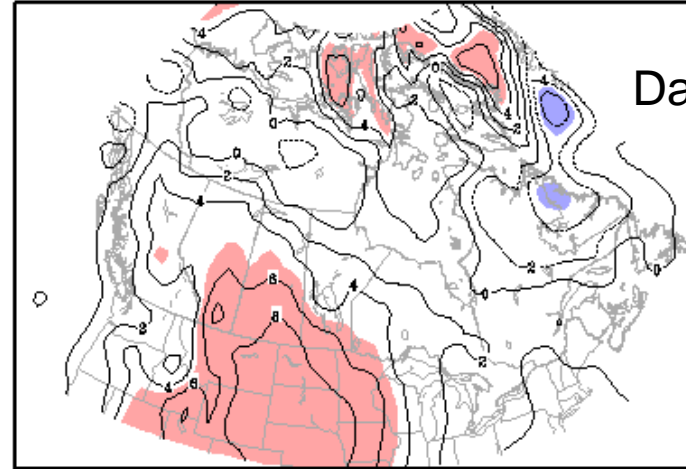
Forecast initialized at 00Z March 8, 2012

Example: March 2012 heat wave

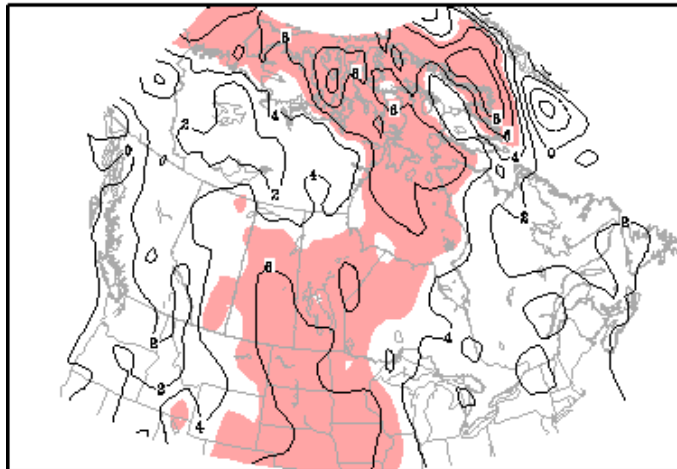
a) TTanom Week: 20120319-20120325



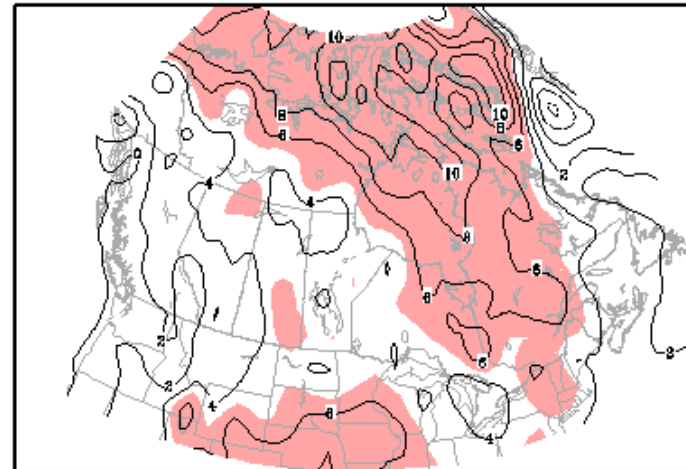
b) TTanom Week: 20120326-20120401



c) TTanom Week: 20120402-20120408



d) TTanom Week: 20120409-20120415



Forecast initialized at 00Z March 15, 2012

Evaluation

- Winter (January and February)
- Summer (July and August)
- Past three years (24 forecasts for each season)
- Correlation skill for ensemble mean 500 hPa geopotential height and T2m
- Probabilistic forecast score for T2m and PR

The following maps are based on previous GEPS version GEM3.2.8 0.9x0.9L28

Comparison with previous EC Seasonal+monthly Forecasting System

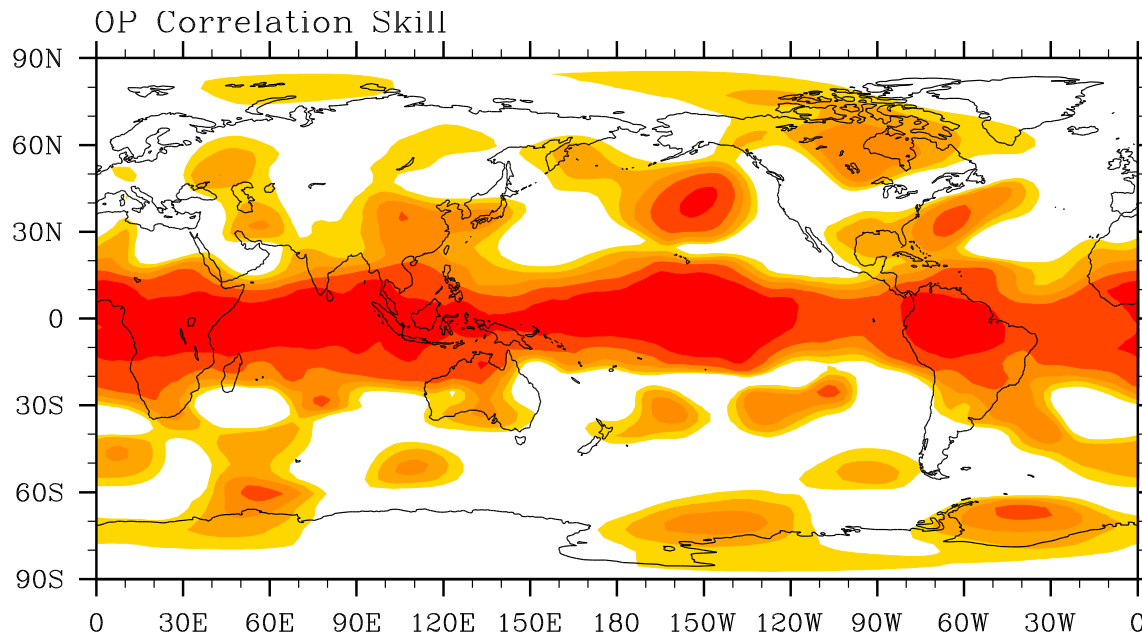
Main features:

- Multi-model ensemble approach
- 4 AGCMs: GEM-CLIM, SEF, GCM2 and GCM3
- 10 members for each model, lagged initial conditions
- 2-tier system
- Persistent SST anomaly
- 4-month integration
- 1st month → monthly forecast

Seasonal forecasting system has been replaced on December 1, 2011

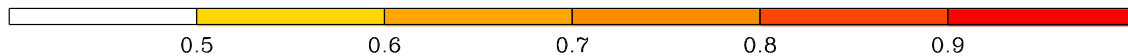
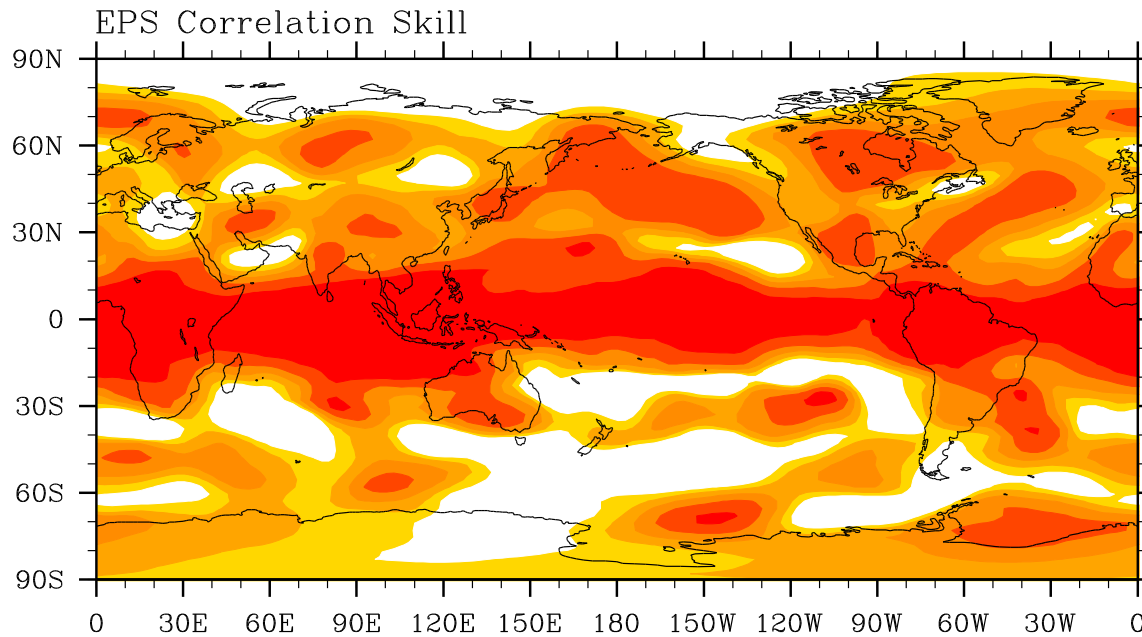


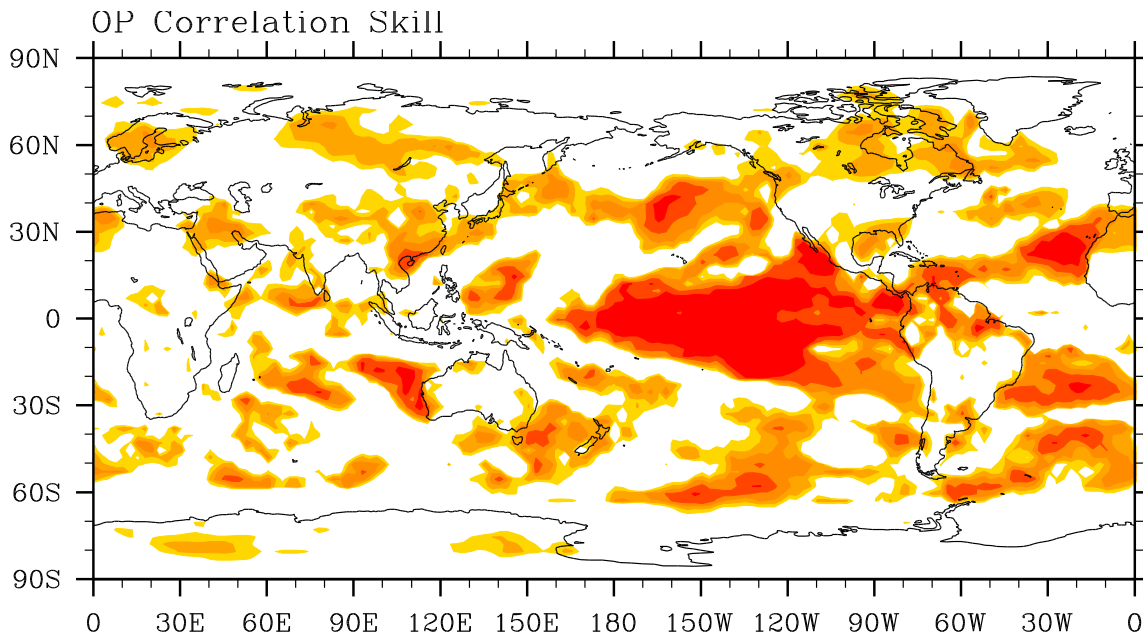
Correlation skill



Winter Z500

30-day average

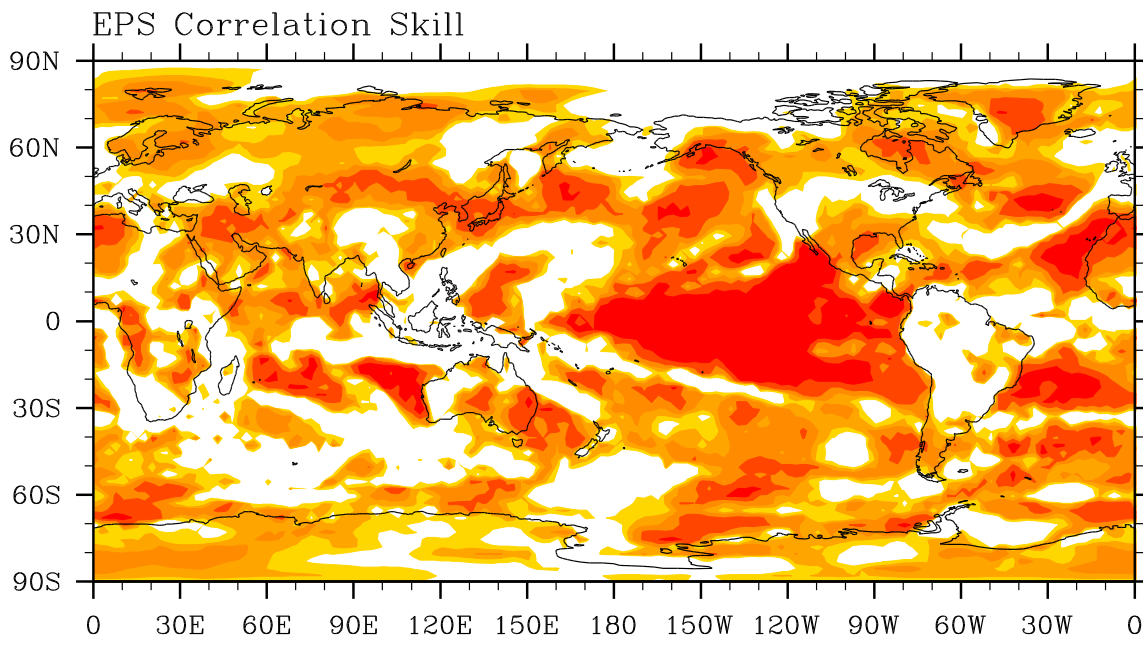




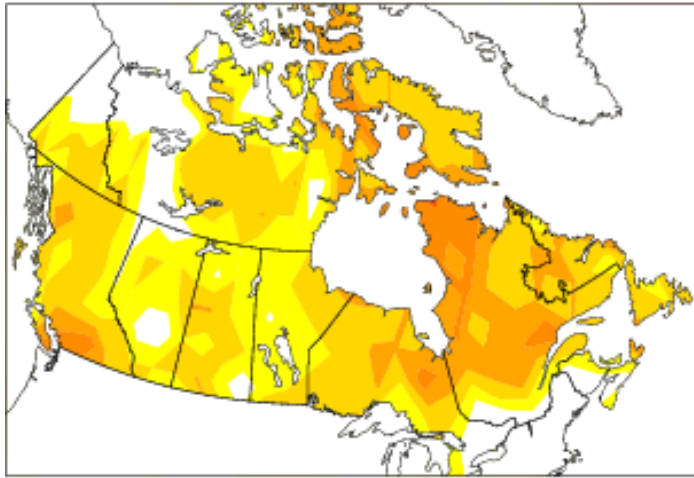
Correlation skill

Winter T2m

30-day average

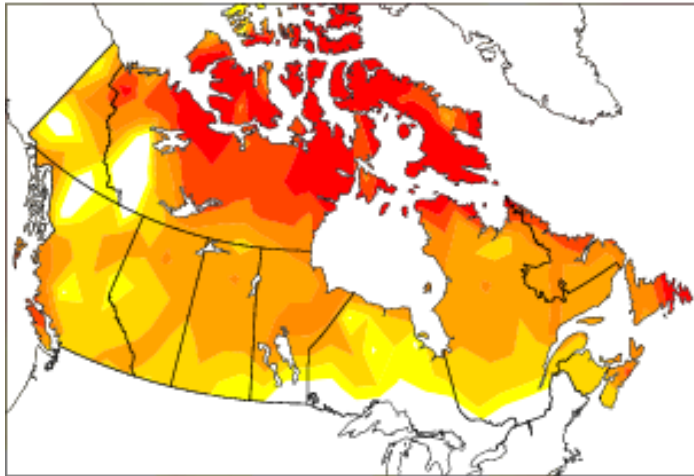


OP Percent Correct



Percent Correct
for categorical forecasts

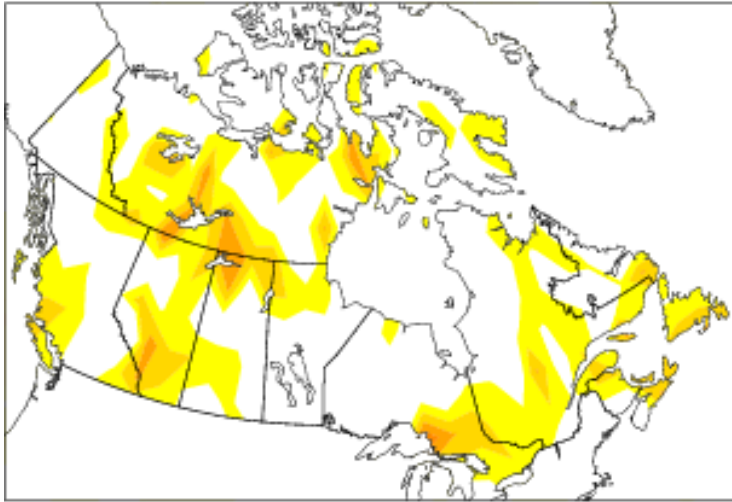
EPS Percent Correct



Winter T2m
30-day average

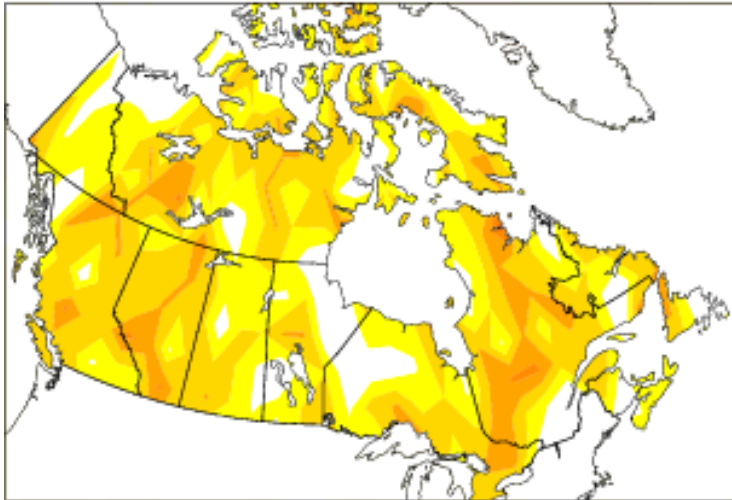


OP Percent Correct



Percent Correct
for categorical forecasts

EPS Percent Correct

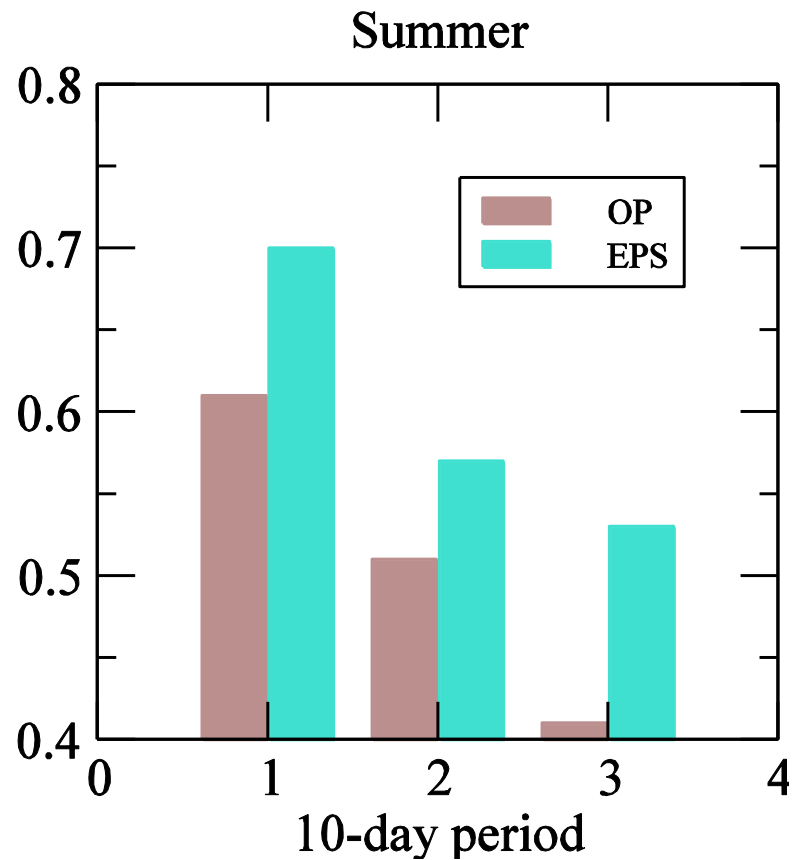
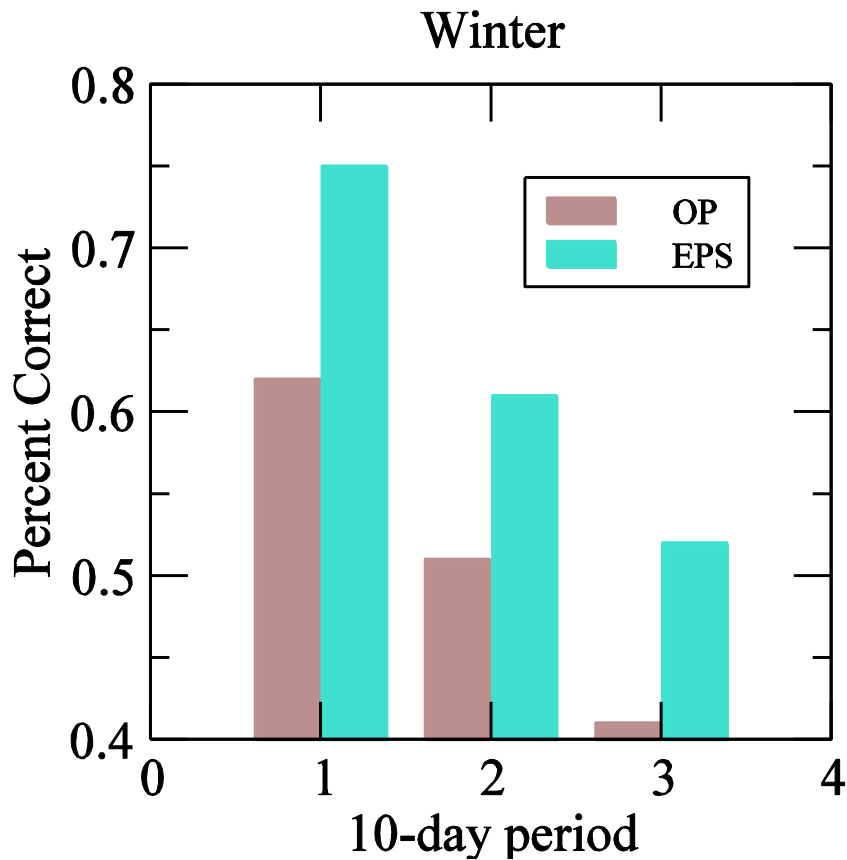


Winter PR
30-day average



10-day average T2m
Over Canada

Percent Correct
for categorical forecasts



Future plan

- Implementation in fall 2012
- The monthly system produced by GEPS will be included in the GEPS 3.0.0



Next 2-3 years

- coupled GEM
ocean-ice NEMO
land surface assimilation system
- Use of coupled GEM in ensemble monthly forecasts

