- CanSIPS -
The Canadian Seasonal to Interannual Prediction System

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&

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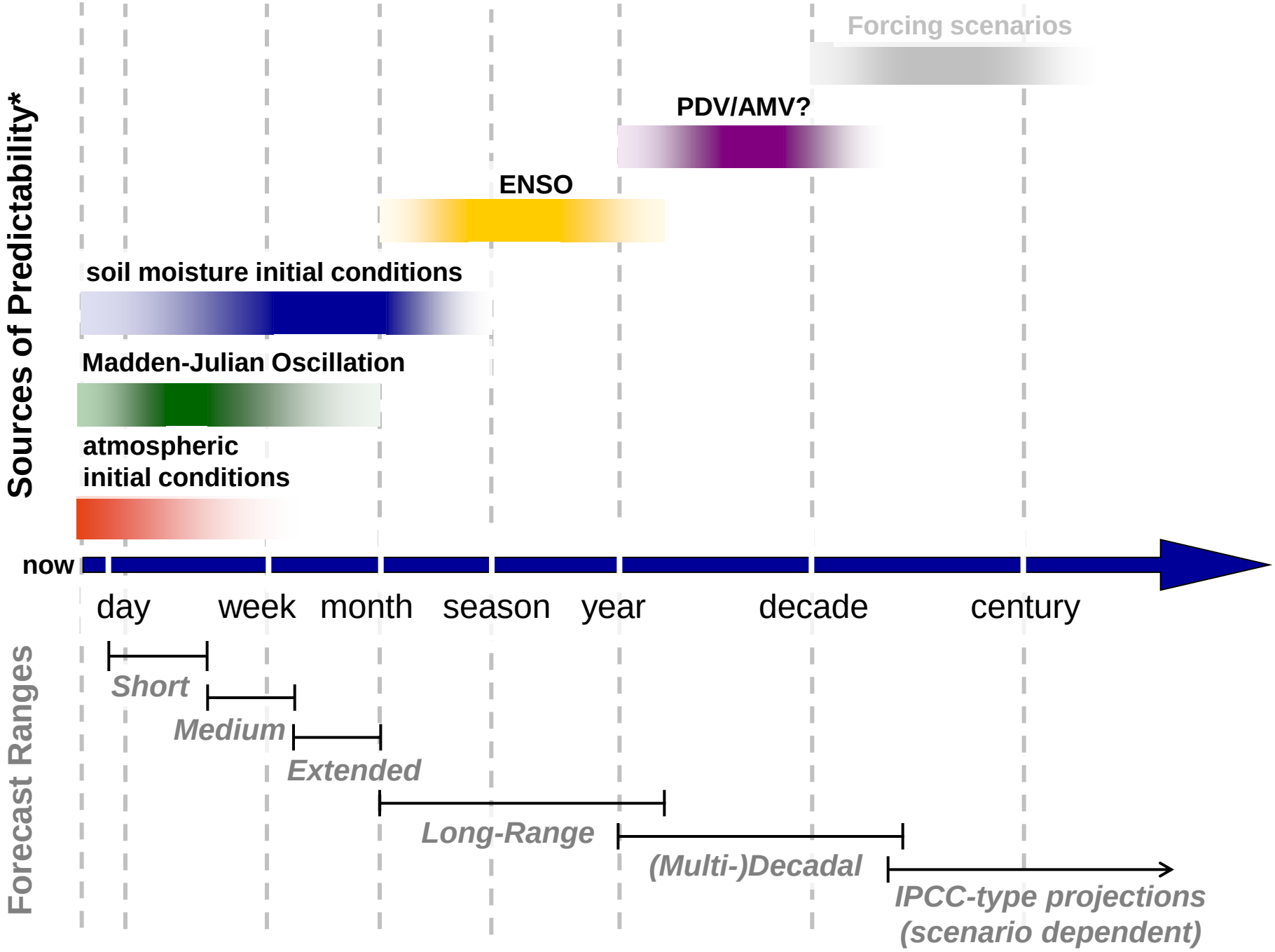
OUTLINE

- Background
- Description of the new system
- Forecast skill improvements
- El Nino / La Nina predictions
- Future works

*Not complete



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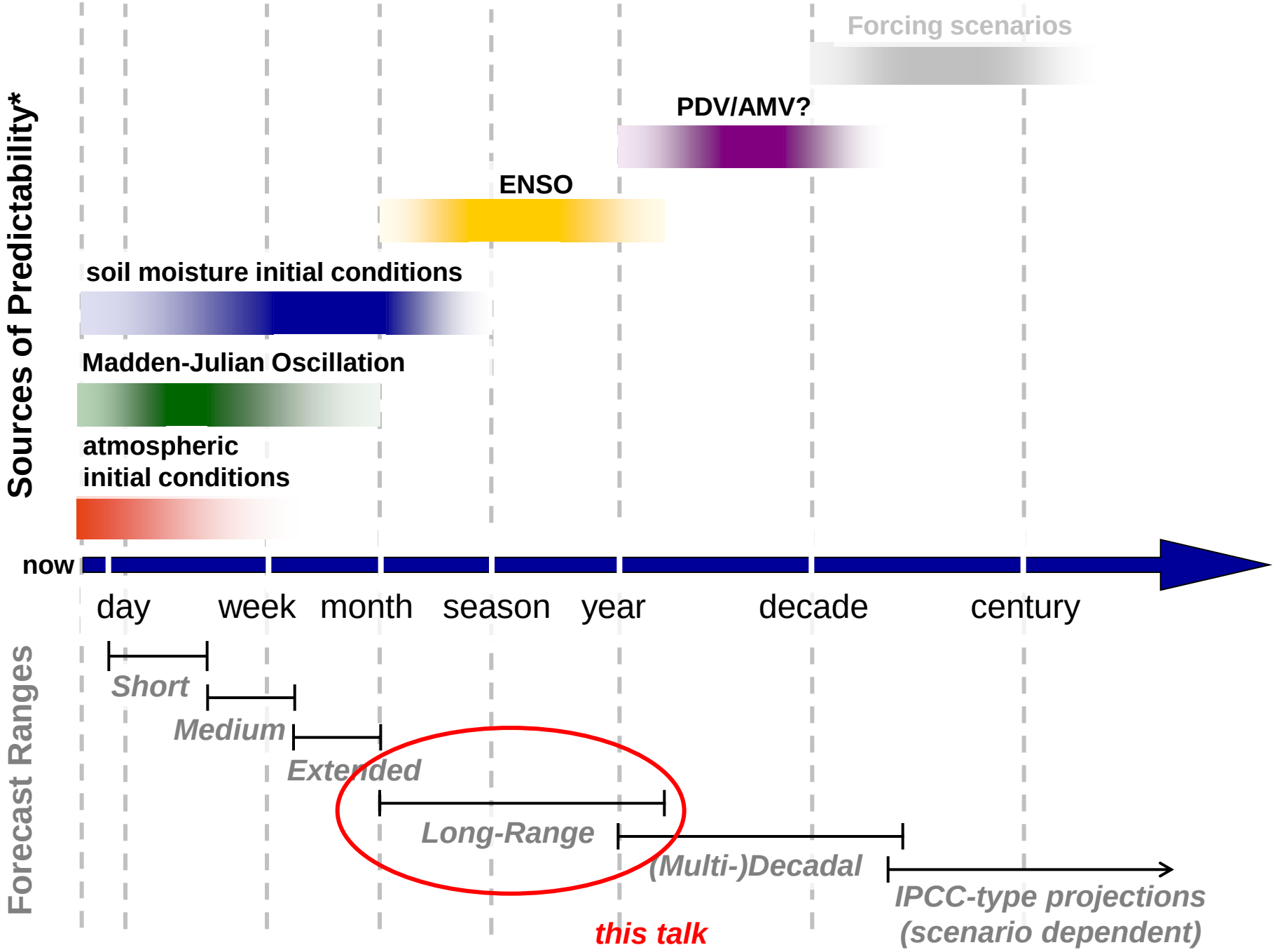
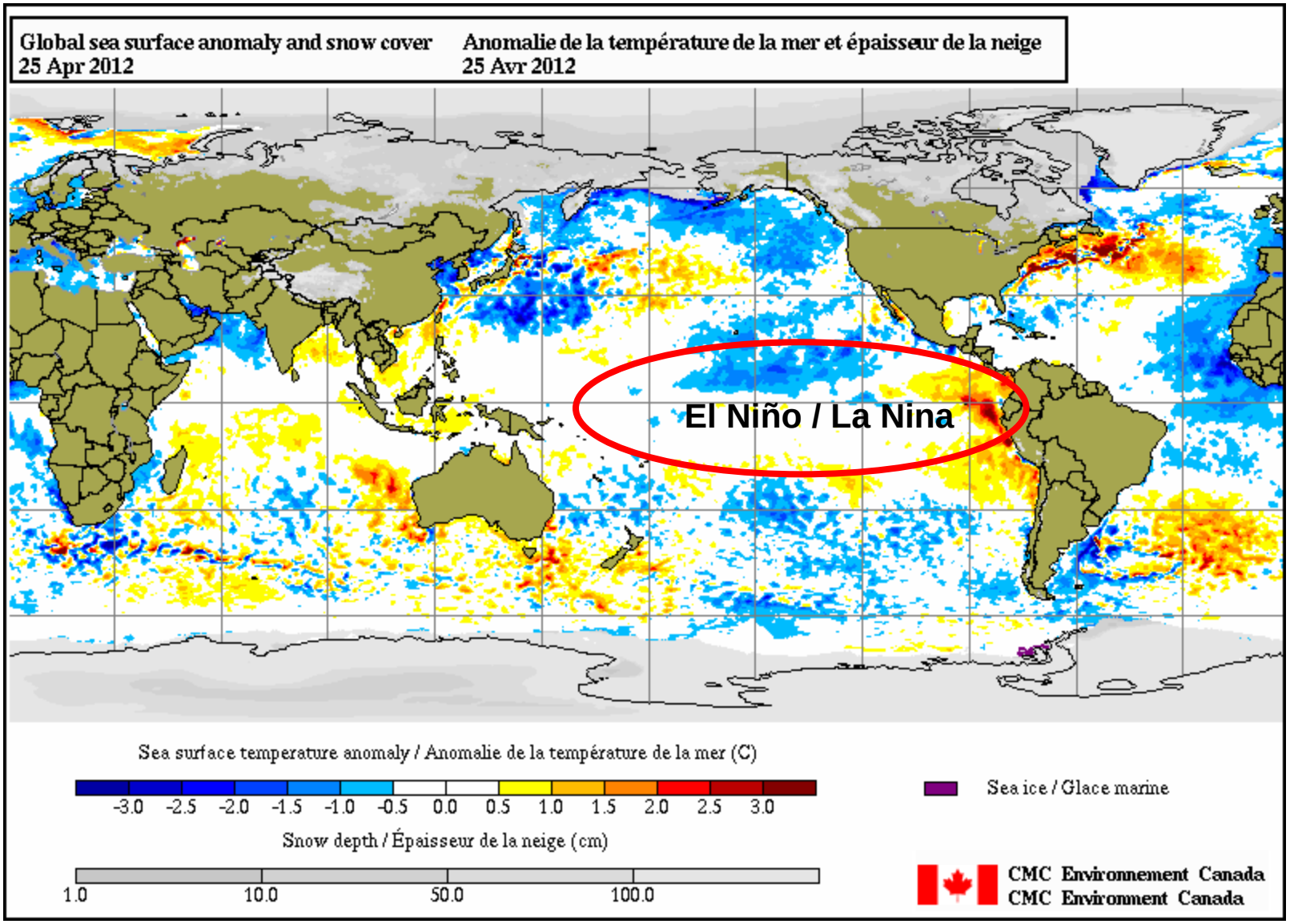
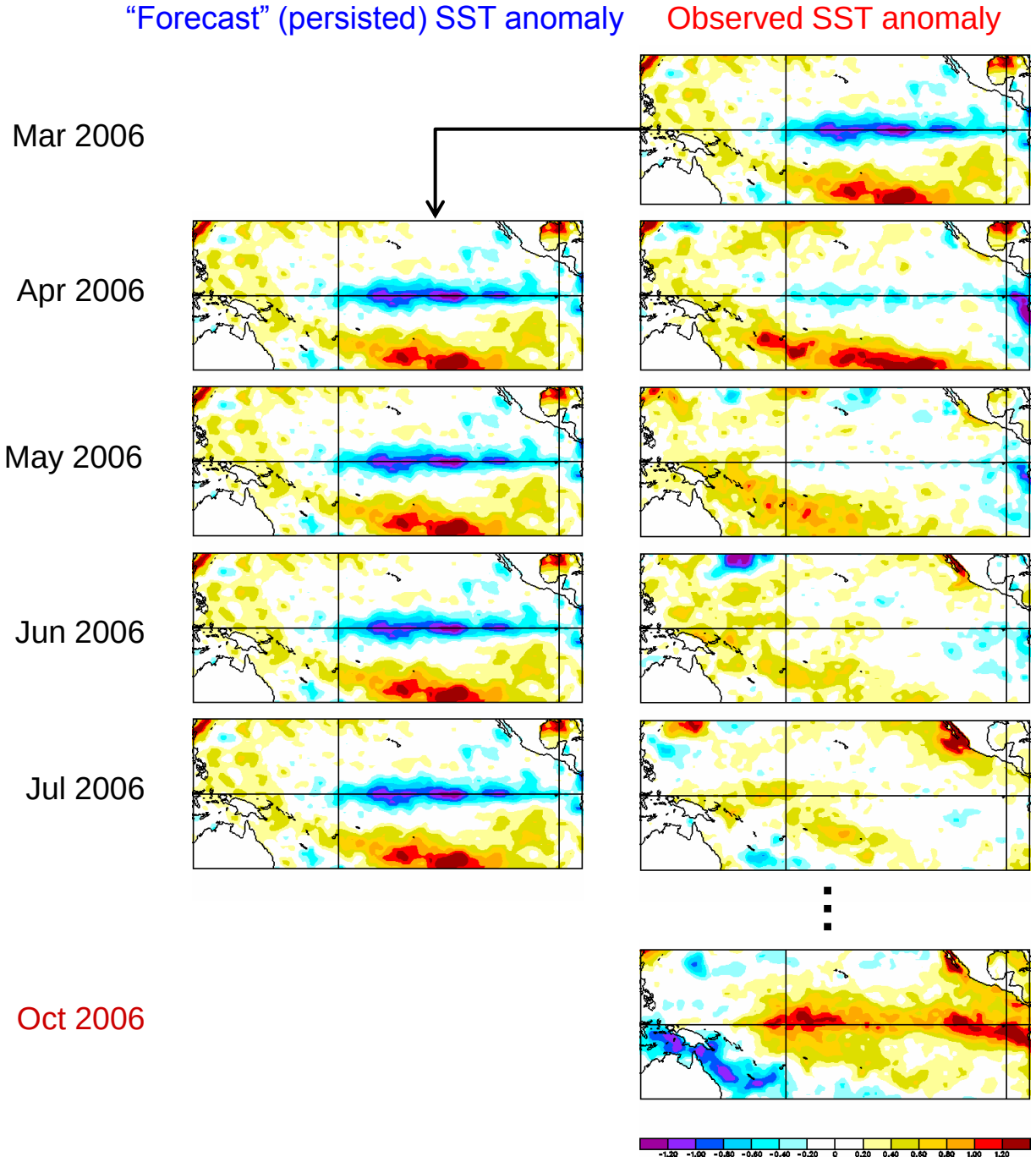


Sea Surface Temperature Anomaly



Motivation for coupled vs 2-tier system

<u>Example</u>: consider 2-tier forecast (persisted SSTA) from 1 April 2006 →



→ **2-tier system with persisted SSTA *<u>cannot predict the onset of an El Niño or La Niña</u>***

Coupled Historical Forecasting Project II (CHFP2)

- *1-tier system -> two atmos-ocean-ice coupled systems*

  - CanCM3 = AGCM3 (T63/L31) + OGCM4 → 10 members

  +

  - CanCM4 = AGCM4(T63/L35) + OGCM4 → 10 members

- *20 Assimilation & forecast streams*

- *"Burst" initialization*

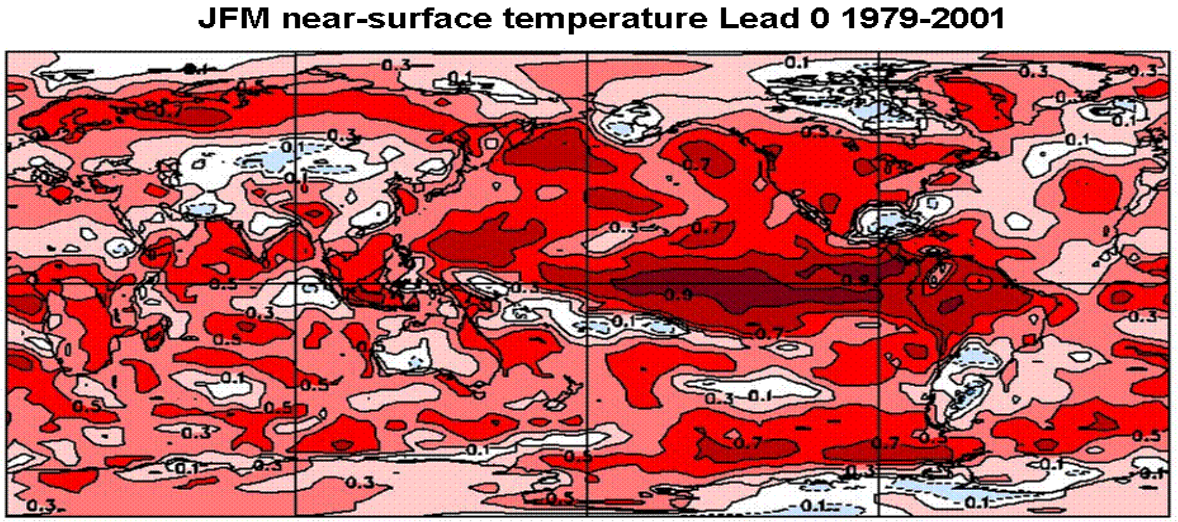
  - Initial conditions valid just before forecast starts – no time lags

- *System climatology based on CanCM3 + CanCM4 Hindcasts*

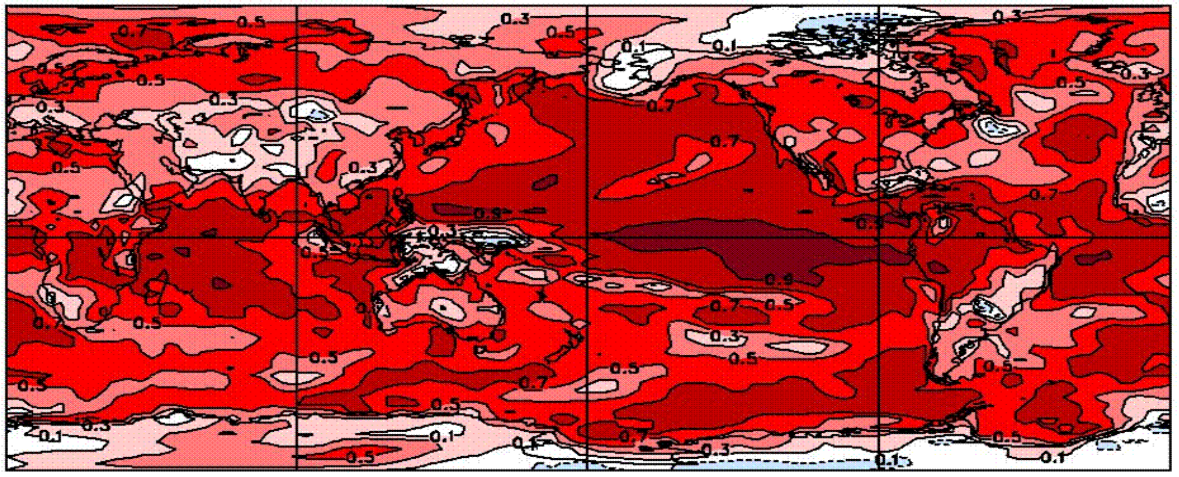
  - Initialized every month 1981-2010 (30 years)

Anomaly correlation skill
2-tier vs CanSIPS

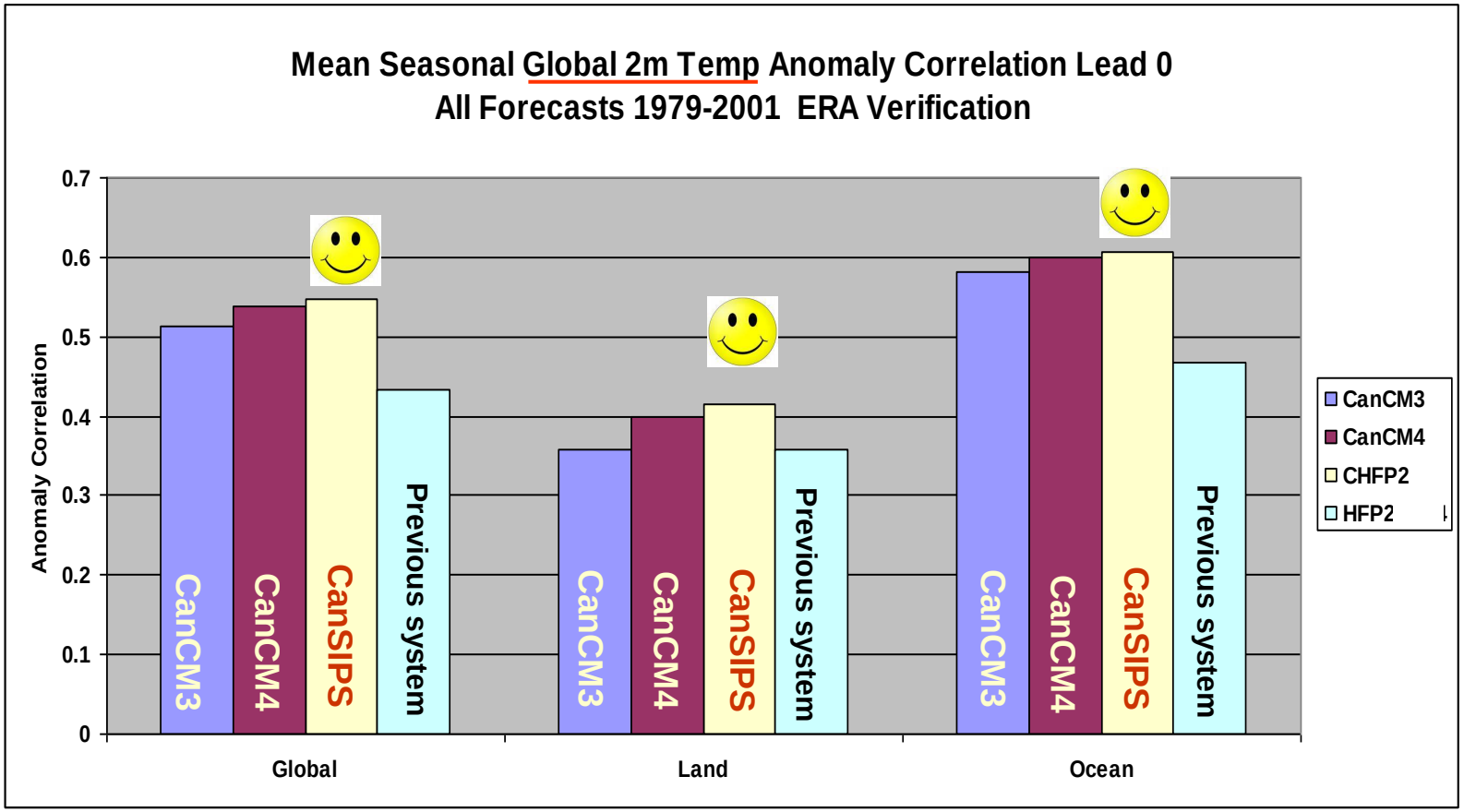
2-tier



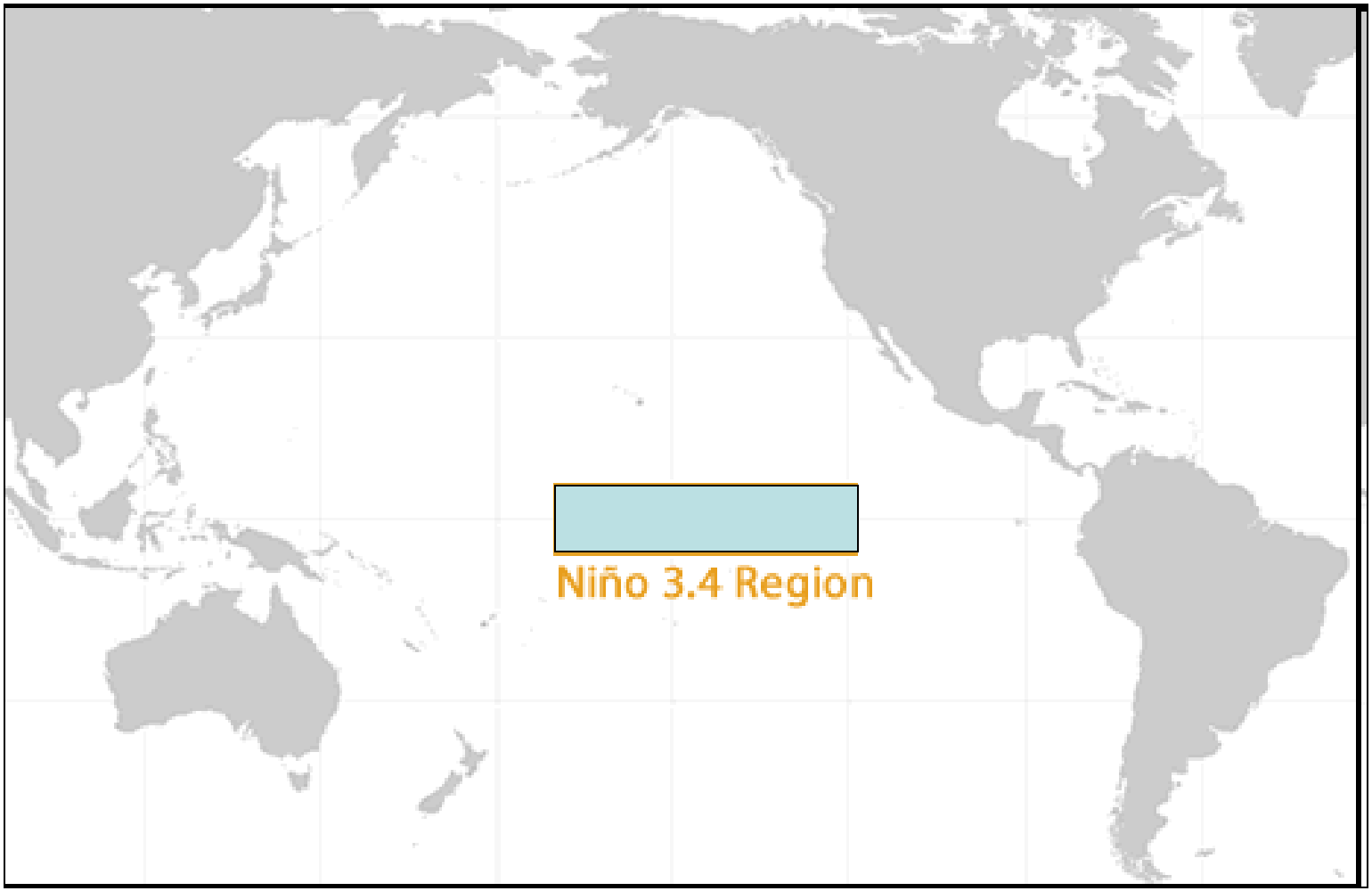
CanSIPS



First season (Lead 0 months) Global 2m temperature

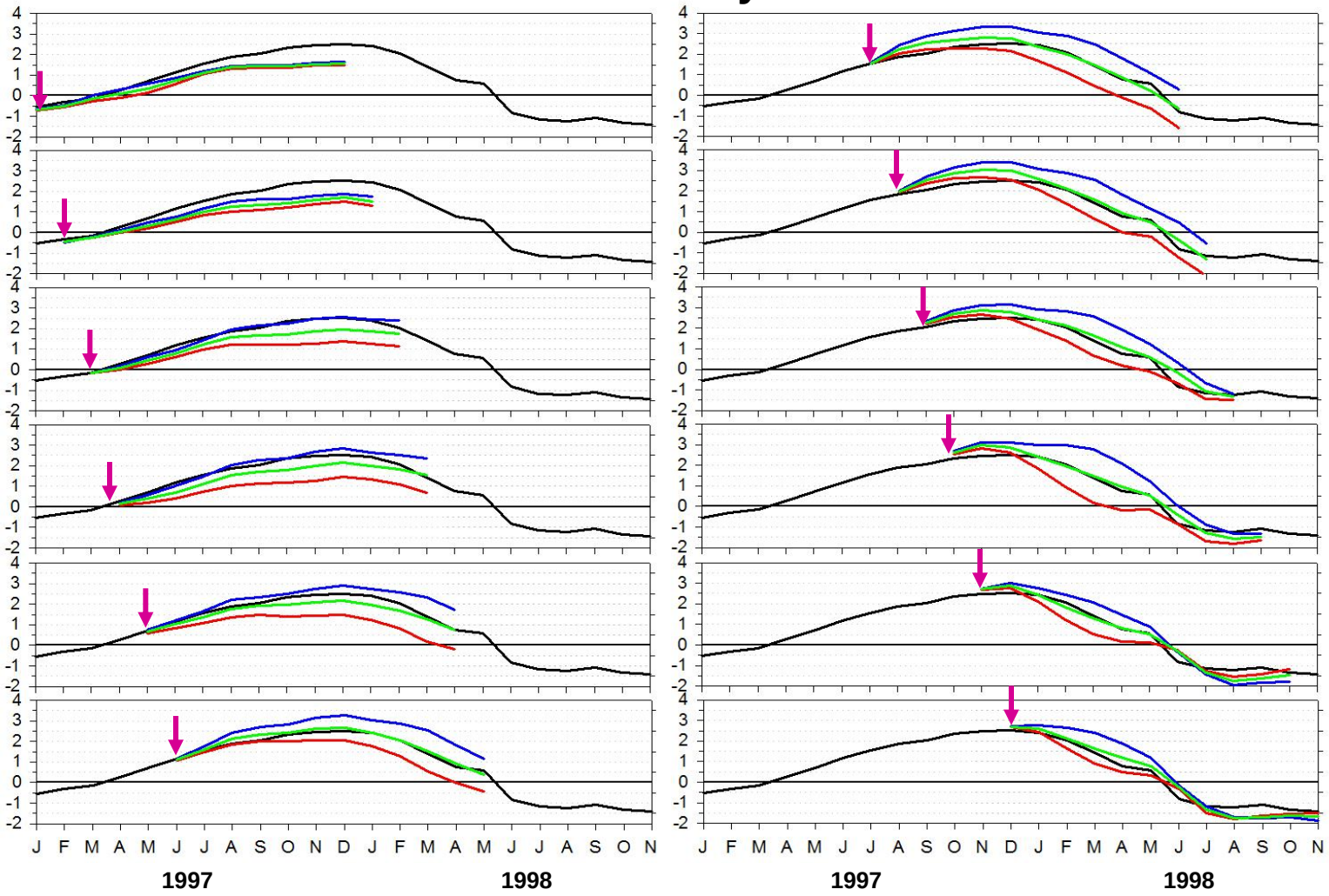


ENSO Skill
- Nino 3.4 region -



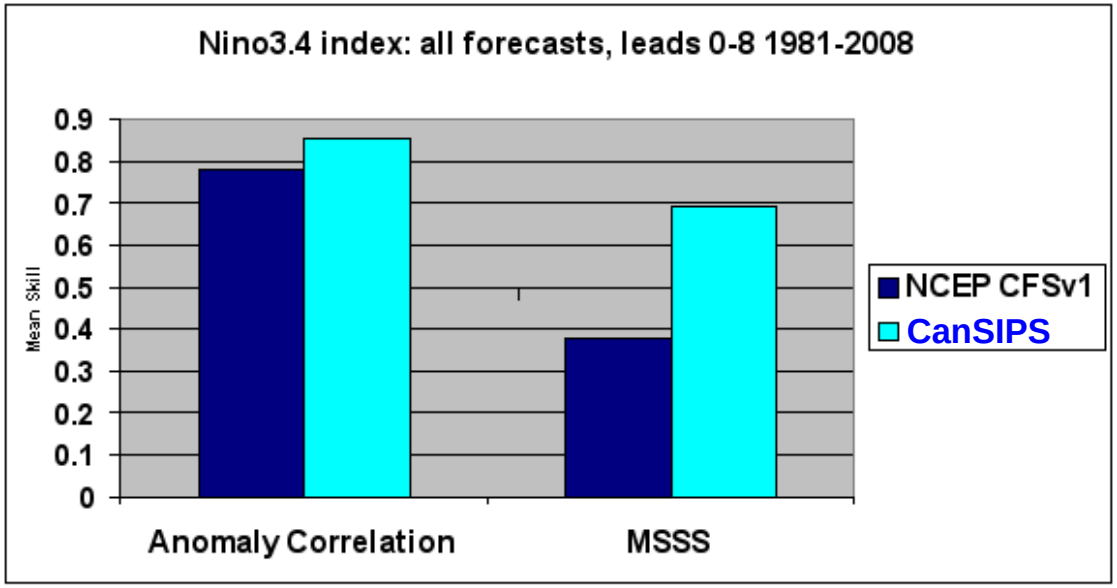
ENSO Prediction Skill
Case Study: 1997-98 El Niño

Niño3.4 hindcasts initialized monthly from 1 Jan 1997 to 1 Dec 1997

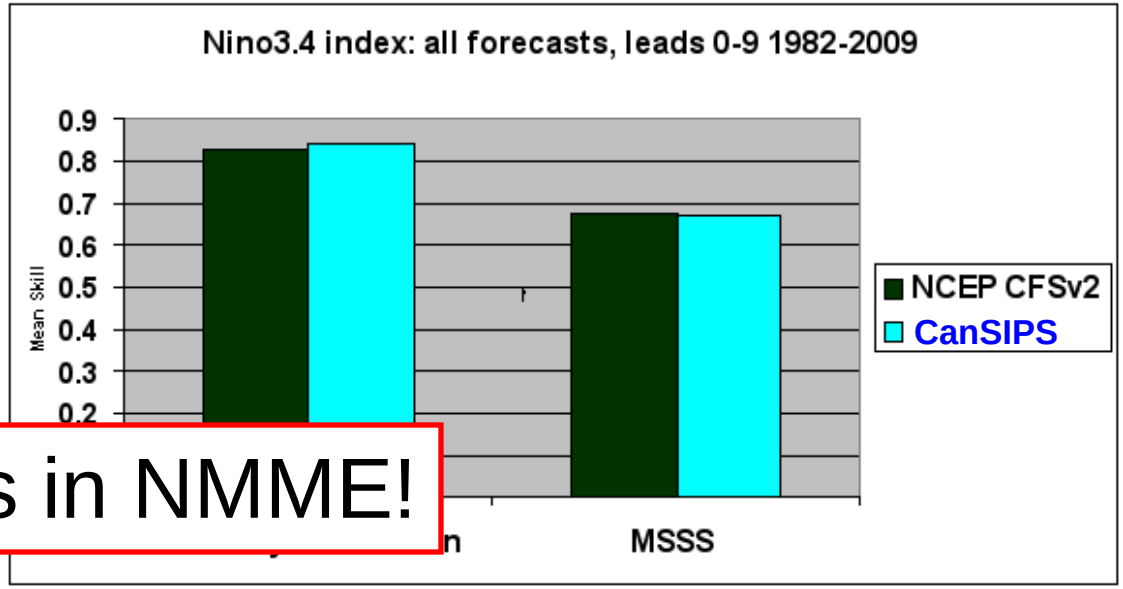


ENSO Skill Comparison with NCEP CFS

CanSIPS
vs
CFSv1

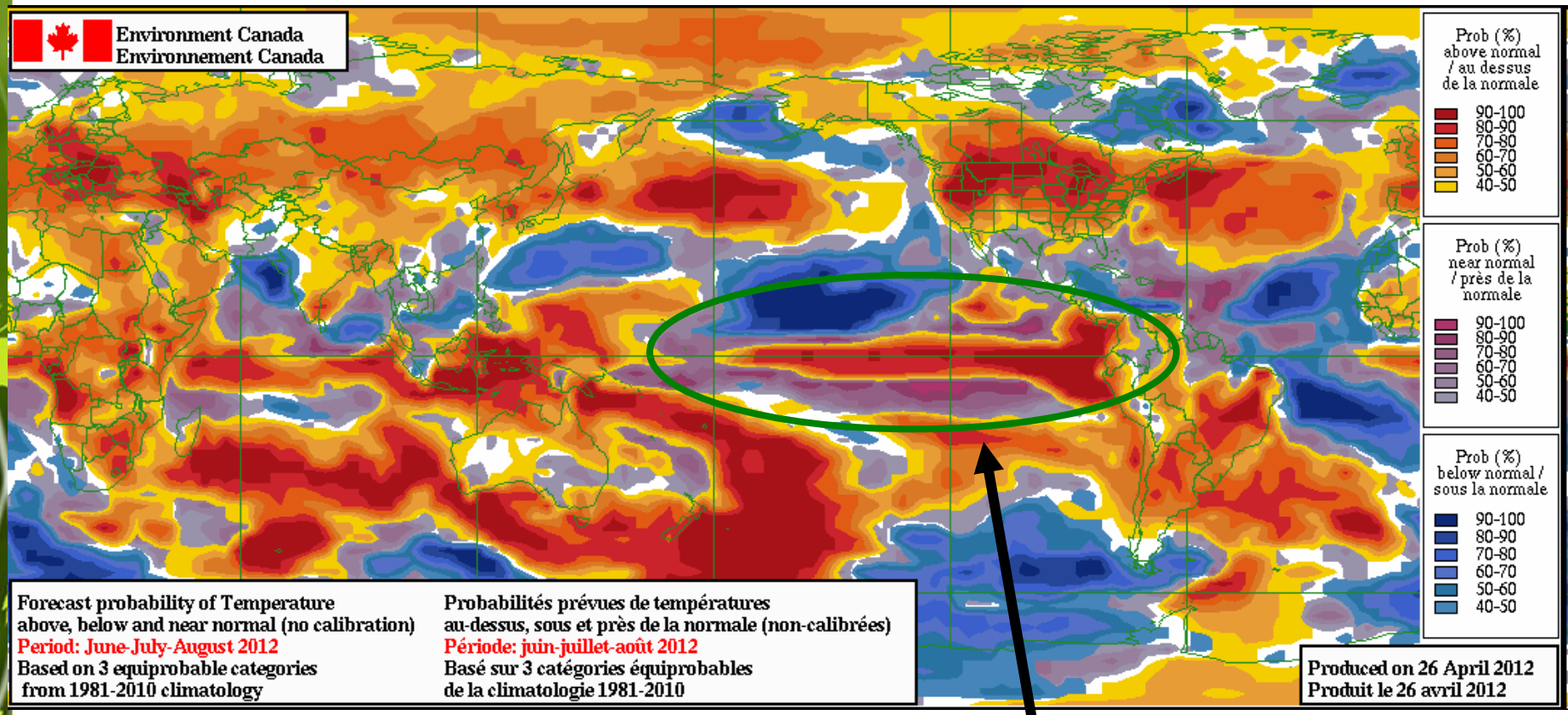


CanSIPS
vs
CFSv2



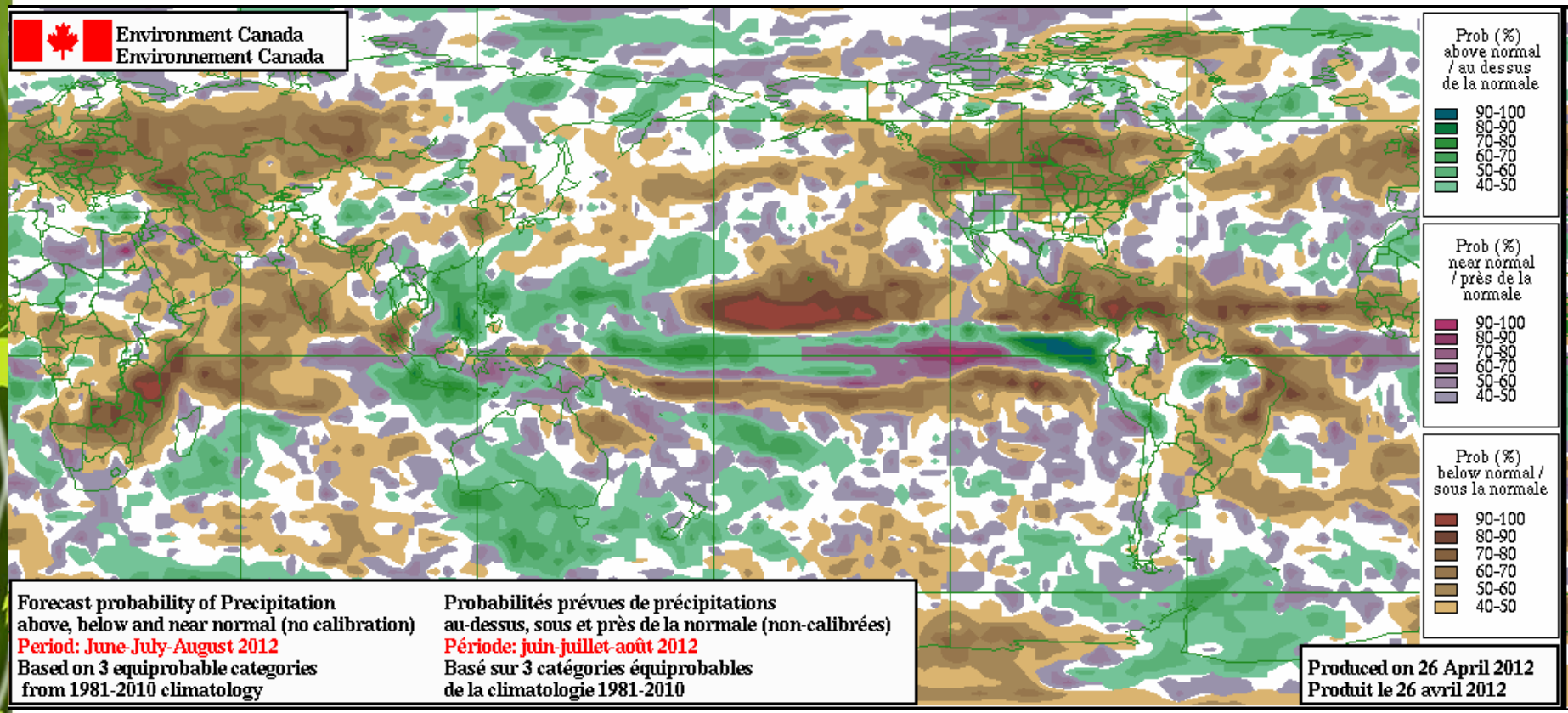
Now partners in NMME!

Forecast for next summer…Temperature at 2m



El Nino will be back ?

Forecast for next summer…Precipitation



CanSIPS phase II implementation

- **New products**
  - Nino indices
  - Sea Ice
  - Tropical cyclone potential
  - ...
- **New web interface**
  - Menu driven
  - Interactive display of probability forecasts
  - Display all hindcasts, verifications

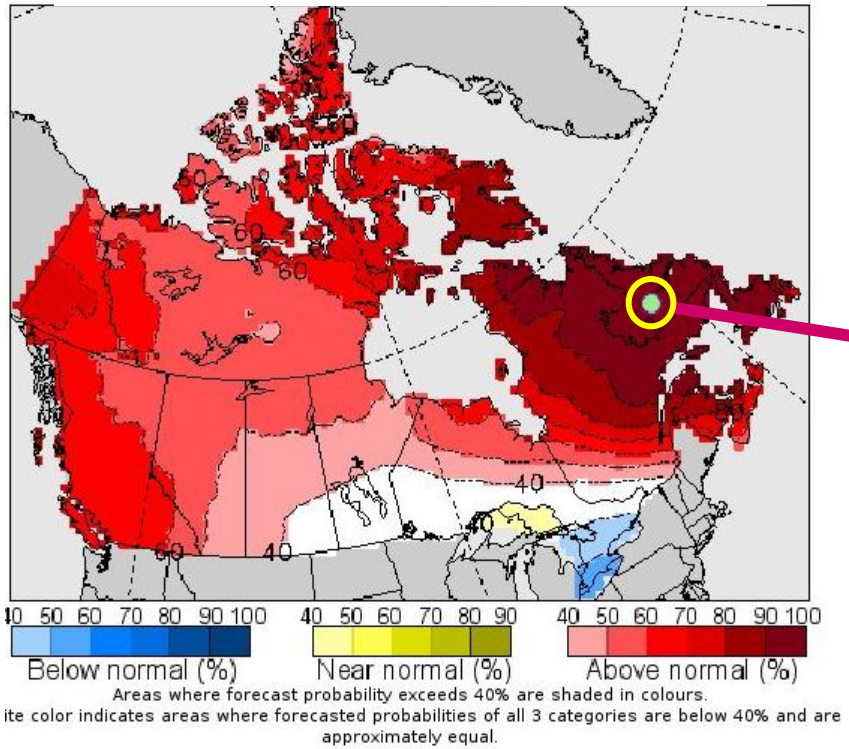
Probability forecast interface

CHFP2 EXPERIMENTAL PROBABILITY HINDCASTS/FORECASTS

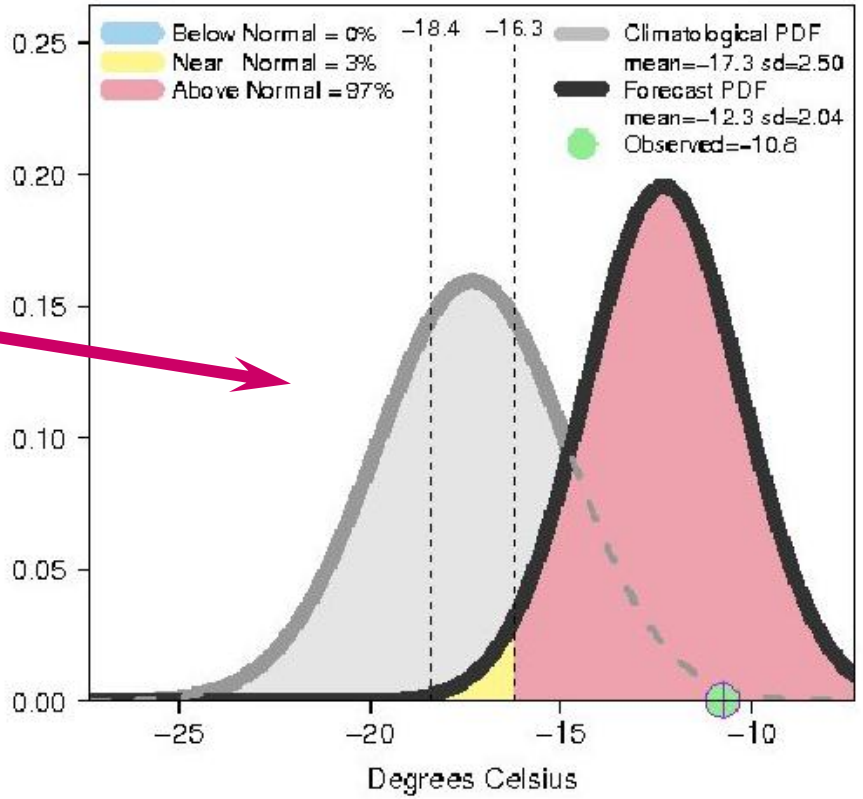
Variable	Type	Lead	Month(s)	Year	Region	Validation	Base period	Version	Thresh	Action
Temperature	Seasonal	0-month	JFM	2010	Canada	era40int	1981_2010	era	40	Go!

Reset | Deterministic Forecast | Observed Percentile | Observed Category | All 3 Forecast Categories | Calibrations | Home Page

3-category Probabilistic Forecast
year=2010 JFM 0-month lead



Local Probability Forecast
Lat=53.6N Lon=62.8W



Towards CanSIPSv2

We are considering:

- More ensemble members
- Higher resolution
- Improved ocean data assimilation in CanCM3/4
- Add coupled GEM-NEMO (GEM=NWP model)
- Land surface data assimilation

For more information

- Details of recent implementations at CMC
  - http://collaboration.cmc.ec.gc.ca/cmc/cmoi/product_guide/docs/changes_e.html

- Environment Canada's official seasonal forecast web pages
  - http://www.weatheroffice.gc.ca/saisons/index_e.html

- Description of Climate models developed at CCCma
  - http://www.ec.gc.ca/ccmac-cccma/default.asp?lang=En&n=4A642EDE-1