



## COMPENDIUM OF CANADA'S ENGAGEMENT IN INTERNATIONAL ENVIRONMENTAL AGREEMENTS AND INSTRUMENTS

### *North American Ensemble Forecast System Collaborative Arrangement (NAEFS)*

**SUBJECT CATEGORY:**

Meteorology

**TYPE OF AGREEMENT / INSTRUMENT:**

Canada – United States

**FORM:**

Cooperative Arrangement

**STATUS:**

- Signed by Canada November 16, 2004
- In force in Canada November 16, 2004
- In force internationally November 16, 2004
- Ongoing

**LEAD & PARTNER DEPARTMENTS:**

**Lead:** Environment and Climate Change Canada

**Partners:** United States National Weather Service (NWS) and the National Meteorological Service of Mexico (NMSM)

**FOR FURTHER INFORMATION:**

**Web Links:**

- [Government of Canada's web site on the North American Ensemble Forecast System \(NAEFS\)](#)
- [NOAA NCEP Central Operations website](#)

**Contacts:**

[ECCC Inquiry Centre](#)

**COMPENDIUM EDITION:**

February 2022

#### PLAIN LANGUAGE SUMMARY

The NAEFS is the agreement that allows for the coordination of weather forecast products between Canada, the United States, and Mexico. This agreement is important because it generates higher quality guidance for forecasts, which ensures that weather forecasts across the three countries are as accurate as possible. Further, by coordinating among the three North American countries, meteorologists can be better aware of incoming hazardous weather and provide information to Canadians in a timely manner. With regular meetings between the countries involved in this agreement, Canada promotes the importance of open exchange of meteorological data between the signatories.

#### OBJECTIVE

The objective of this agreement is to combine state of the art ensemble forecasts, developed at Environment and Climate Change Canada (ECCC) and the U.S. National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS), to produce a superior ensemble forecast which can provide weather forecast guidance for the 1-14 day period that is of higher quality than the currently available operational guidance based on either set of ensembles alone.

The NAEFS generates a set of forecast products that are seamless across North America (i.e. Canada, the United States and Mexico.)

The research/development and operational costs of the NAEFS system are shared by the three organizations (ECCC, NWS, and NMSM), which make it more cost effective and result in higher quality and more extensive weather forecast products.

#### KEY ELEMENTS

The agreement requires that Canada and the U.S. exchange operational data twice daily of 20 member Global Prediction Ensembles

Partnering scientists meet on a regular basis to discuss technical issues and agree on a collaborative work plan.

## **EXPECTED RESULTS**

This agreement is expected to achieve: improved weather forecast guidance across North America, longer lead times (i.e. extend from 16 days to one month) and higher resolution, leading to better decision making in all three countries and more advanced warning of hazardous weather.

## **CANADA'S INVOLVEMENT**

The NAEFS cooperative partnership between Environment and Climate Change Canada and the U.S. NOAA/NWS is currently managed under the collaborative MOU with NOAA. The NAEFS is a cost effective way for both countries to leverage R&D investments as well as products development to improve weather and environmental forecasts and warnings. This agreement is important to Canada because by combining ensemble products with U.S. partners the end result performs better than the two datasets taken separately.

## **RESULTS / PROGRESS**

### ***Activities***

Canada shares and receives operational data from NOAA on a daily basis, and produces common products, such as maps of week-2 temperature anomaly and meteograms for a number of sites in Mexico, USA and Canada.

- Temperature Anomaly: Day 8 to 14 Outlooks
- EPSgrams for cities in Canada, Mexico and United States of America
- Ensemble means and standard deviation charts
- Maps of probabilities of occurrence of several weather events

Canada also hosts and participates in regular workshops to resolve technical issues and develop collaborative work plans.

### ***Reports***

Reports of the workshops are produced to track the discussions and status of action items

The overall progress and performance of NAEFS is also monitored by the ECCO-NOAA MOU Cooperation Steering Committee on a periodic basis

### ***Results***

The combination of the Canadian global forecast model ensemble and the NWS global forecast model ensemble into a joint ensemble results in higher quality weather forecast guidance for all of North America for the 1 – 14 day period than currently available guidance being produced by the individual countries. The NAEFS shares research, development and operational costs between Canada, the U.S. and Mexico. The resulting North American products lead to improved decision making by forecasters and ultimately users and clients across the continent.