# 9th NOAA Ensemble Users Workshop

NCWCP, College Park, 20740 MD

August 22-24 2023

Draft Agenda

**Day 1 (August 22): - NCWCP Auditorium**

Join with Google Meet

Join by phone:   (US) +1 612-440-4498 PIN: 456 684 012#

**8:00 - 8:30 am Refreshments/Registration**

**Session 1: 8:30 - 10:10 am** (chair: Ivanka Stajner / Brian Gross - NCEP/EMC)

Introduction/logistics; Opening remarks, invited (ECMWF)

(10 minutes for each opening remark; 30 minutes for ECMWF invited talk)

- Logistics - Geoff Manikin (NCEP/EMC)
- Mike Farrar (NCEP director)
- Brian Gross (NCEP/EMC Director)
- Russell Schneider (NCEP/SPC Director)
- David Novak (NCEP/WPC Director)
- AJ Reiss (NCEP/OPC Director)
- Michael Brennan (NCEP/NHC Director)
- Kevin Garrett (OSTI Modeling Program Director)
- Gianpaolo Balsamo (ECMWF Principal Scientist) - **remote**

Morning break: 10:10 - 10:30 am

**Session 2: 10:30 - 12:00 pm** (Chair: Vijay Tallapragada - NCEP/EMC)

Review and development of the ensemble forecast systems (15 minutes each):

- Normand Gagnon (ECCC/MSC)
    - ECCC's ensemble system development and plan
- Bing Fu (NCEP/EMC)
    - *NOAA's Global Ensemble Forecast System (GEFS): operational GEFSv12 and development of GEFSv13*
- William Crawford (NRL) - **remote**
    - *Updates on the Navy Global Ensemble System*

- Burkely Gallo (USAF)
  - *Modeling updates at the US Air Force's 16th Weather Squadron*
- Jacob Carley (NCEP/EMC)
  - *Development of the Rapid Refresh Forecast System Ensemble*
- Curtis Alexander (NOAA GSL)
  - *Evaluation of Rapid Refresh Forecast System Ensemble Designs*

Lunch break: 12:00 - 1:30 pm

**Session 3: 1:30 - 3:00 pm** (Chair: Kathryn Gilbert - NCEP/WPC)

Ensemble-based probabilistic products

- Rosa Barciela (Met Office)  (30 minutes)
  - Exploiting Ensembles NWP Forecasts at the Met Office: From Science to Products and Services
- David Rudack  (NOAA MDL) (15 minutes)
  - Leveraging Ensembles for The National Blend of Models
- Kathryn Gilbert (NCEP/WPC), Jeff Waldstreicher (NWS ERH SSD), Matt Jeglum (NWS WRH SSD) (15 minutes, followed by 30 minutes of discussion)
  - Toward probabilistic IDSS

Afternoon break: 3:00 - 3:30 pm

**Session 4: 3:30 - 5:00 pm** (Chair: Geoff Manikin - NCEP/EMC)

Stakeholder reviews (15 minutes for each reviewer)

- NCEP Center reviews
  - *SPC - Israel Jirak -* **remote**
  - *AWC - Rob Hepper*
  - *NHC - Wallace Hogsett*
  - *WPC - Mark Klein*
  - *OPC - Joe Sienkiewicz*
- JTWC - Matthew Kucas - remote
  - *Applications of ensembles for tropical cyclone forecasting at JTWC*

**Optional Group Dinner:  6:00pm**

Workshop will organize a group dinner (pay your own) at "Franklins" (5123 Baltimore Ave, Hyattsville, Maryland)  Gather in the NCWCP lobby at 5:30 if you need a ride. Please reserve your seat from

https://docs.google.com/forms/d/e/1FAIpQLSfkyJRGPI_CheZQTU0g1FyF_mrPaLiW26Jl7L_lq_-sPYa_dw/viewform?usp=sf_link


**Day 2 (August 23): Parallel sessions**

Google link for Sessions 5a - 7a:
 Join with Google Meet  Join by phone:  (US) +1 612-440-4498 PIN: 456 684 012#
Google Link for Sessions 5b - 7b:
 Join with Google Meet  Join by phone:  (US) +1 662-441-3155 PIN: 754 700 108#

**Session 5a: 8:30 - 10:00 am** (Chair: Mark Klein - NCEP/WPC)

   Ensemble-based products and verifications (15 minutes each)

- Bo Cui (NCEP/EMC)
  - *NAEFS Version 7 Upgrade at NCEP*
- Bruce Veenhuis (NCEP/WPC)
  - *Overview of Ensemble-based Probabilistic Winter Precipitation Forecasting at the Weather Prediction Center*
- Binbin Zhou (NCEP/EMC)
  - *Novel Ensemble Verification and Validation Efforts at EMC*
- A.N. Rohith (Penn State University)
  - *Verification of medium-range ensemble flow forecasts for drought prediction applications in the Potomac River Basin*
- Austin Coleman (NCEP/WPC)
  - *R2O2R in Action: Ensemble Clustering and Sensitivity Analysis*
- Eric Engle  (NOAA MDL) - **remote**
  - *GRIB2IO Utility*

**Session 5b: 8:30 - 10:00 am** (Chair: Stephane Gagnon - ECCC)

   Ensemble systems and applications from other international centers (15 minutes each)

- Ashu Mamgain (NCMRWF, India) - **remote**
  - *Ensemble Prediction System in NCMRWF: its performance and future goals*
- Jing Chen (China Meteorological Administration)

- - *A Review of the 10 Years' Development of the CMA Global/Regional Ensemble Prediction System*
- Shih Chun Chou - (Central Weather Bureau, Taiwan) - **remote**
  - *Evaluation of Probabilistic Forecasts of Consecutive Days Without Measurable Rainfall Over Taiwan*
- Murali Malasala (UCAR and NCEP/EMC) - **remote**
  - *Post-Processing on GEFSv12 Reforecasts for Extreme Rainfall Events Prediction on Sub-Seasonal Scale at Regional Level*
- Mengying Yao  (Institute of Meteorological Research, China) - **Pre-recorded**
  - *A introduction of WMO RA II Research Development Project /19th Hangzhou Asian Games Research Development Project on Convective-scale Ensemble Prediction and Application (HangzhouRDP)*
- Hsiao-Chung Tsai - (Tamkang University, Taiwan) - **Pre-recorded**
  - *Subseasonal Tropical Cyclone Forecasts in the Western North Pacific using the NCEP and ECMWF Ensemble Models*

Morning break: 10:00 - 10:30 am

**Session 6a: 10:30 - 12:00 pm** (Chair: Avichal Mehra - NCEP/EMC)

Development of ensemble forecast systems (15 minutes each)

- Cathy Thomas (NCEP/EMC)
  - *Overview of the Next Global Forecast System GFSv17*
- Neil Barton (NCEP/EMC)
  - *Including Sea Ice and Ocean Models in GEFS*
- Jessica Meixner (NCEP/EMC)
  - *The Wave Component of the Global Ensemble Forecast System*
- Zhan Zhang (NCEP/EMC)
  - *Hurricane Analysis and Forecast System (HAFS) based Ensemble Prediction System:  Real time Experiments and Future Plan*
- Jason Jordan (NOAA FDTD)
  - *Ensemble Fluency - Diving Deeper into using Ensemble Output*
- Arthur Mizzi (NASA Ames Research Center)
  - *Regional Ensemble Atmospheric Composition Forecasting/Assimilation/Emissions Estimation with WRF-Chem/DART: Applications, Lessons Learned, and Future Projects*

**Session 6b: 10:30 am - 12:00 pm** (Chair: Curtis Alexander - NOAA GSL)

Ensemble applications (15 minutes each)

- Zoltan Toth (NOAA GSL) - remote
  - *A Review of Ensemble Forecasting*
- Snehlata Tirkey (Indian Institute of Tropical Meteorology) - **remote**
  - *High-resolution Global Ensemble Forecast System (GEFS T1534) for the Indian summer monsoon and extreme rainfall: Verification and forecast products*
- Xiaoyun Liang (China Meteorological Administration) - **Pre-recorded**
  - *Dynamical Seasonal Prediction of the Asian Summer Monsoon in CMA-CPSv3*
- Jack Lind (NCEP/AWC)
  - *Evaluating User-Understanding of Probabilistic Information at the 2023 AWT Experiment*
- Henry Santer (University of Maryland)
  - *Evaluating Contour Band Depth as a Method for Understanding Ensemble Uncertainty*
- Sanjib Sharma (Howard University)
  - *Advancing streamflow prediction using hydrological multimodel ensemble forecasting system*

Lunch Break: 12:00 - 1:30 pm

**Session 7a: 1:30 - 2:45 pm** (Chair: Daryl Kleist - NCEP/EMC)

The development of ensemble forecast system (15 minutes each)

- James Correia (NCEP/WPC)
  - *A larger convection allowing ensemble: How many members does it take to get to Meaning?*
- Kenta Kurosawa (University of Maryland)
  - *Convective-Scale Ensemble Prediction Using Adaptive Gaussian/Non-Gaussian Ensemble Filters*
- Frank Colby (University of Massachusetts - Lowell)
  - *Using Ensemble Forecast Track Spread to Predict Deterministic Model Track Errors*
- Kelly Ryan (NOAA AOML)
  - *Leveraging Ensemble Prediction Developments in HAFS to Evaluate Tropical Cyclone Hazards*
- Jonathan Poterjoy (University of Maryland)
  - *Non-Parametric Data Assimilation and Uncertainty Visualization for Ensemble Weather Prediction for UFS Applications*

**Session 7b: 1:30 - 2:45 pm** (Chair: Phil Pegion - PSL)

S2S products and verifications (15 minutes each)

- Jon Gottschalck (NCEP/CPC)
  - CPC's review
- Mingyue Chen (NCEP/CPC)
  - *A Week-Two Probabilistic Fire Danger Outlook Tool Based on NCEP Ensemble Forecast System*
- Cory Baggett (NCEP/CPC)
  - *Week 3-4 Multi-Model Ensemble Subsampling: A Real-time Verification*
- Melissa Ou (NCEP/CPC)
  - *CPC's post-processed ensemble probabilistic week-2 extremes tool (PET)*
- Dan Collins (NCEP/CPC)
  - *Separation of interanual signals into decadal and shorter time scales in dynamical ensembles for seasonal forecasting*

Afternoon break: 2:45 - 3:15 pm

**Session 8: 3:15 - 5:00 pm**

Breakout group discussion

Topics:

- High-resolution ensemble system development (leads: Curtis Alexander - GSL and Jacob Carley - EMC)
  - Join with Google Meet  Join by phone:  (US) +1 612-440-4498 PIN: 456 684 012#
- Ensemble system development for weather, S2S, including reanalysis and reforecast (Leads: Phil Pegion - PSL and Neil Barton / Bing Fu - EMC)
  - Join with Google Meet  Join by phone:  (US) +1 662-441-3155 PIN: 754 700 108#

- Ensemble based products, probabilistic IDSS, and post processing (leads: Hui-ya Chuang - EMC and Matt Rosencrans - CPC)
  - Join with Google Meet  Join by phone:  (US) +1 914-893-5722 PIN: 527 858 818#

**Day 3 (August 24): - NCWCP Auditorium**

Join with Google Meet

Join by phone:  (US) +1 612-440-4498 PIN: 456 684 012#

**Session 9: 8:30 - 10:00 am**

S2S plan and reanalysis/reforecast (15 minutes each)

- Dave DeWitt (NCEP/CPC Director)
  - Opening remarks
- Avichal Mehra (NCEP/EMC)
  - Introduction of the SFS plan
- Jassie Carman / Mark Olsen (NOAA WPO)
  - NOAA S2S program review
- Jeff Whitaker (NOAA PSL)
  - *A "replay" reanalysis dataset for initializing coupled reforecast ensembles with the UFS*
- Wesley Ebisuzaki (NCEP/CPC)
  - *A Large FV3GFS Ensemble in an Reanalysis System*
- Hong Guan (NCEP/EMC)
  - *The review of GEFSv12 reforecast and plan of GEFSv13*

Morning break: 10:00 - 10:30 am

**Session 10: 10:30 am - 12:00 pm**

Ensemble applications (15 minutes each, except ECCC's invited talk)

- Stephane Gagnon (ECCC MSC) (30 minutes)
  - ECCC's ensemble applications MSC transformation: include post-process, probabilistic products, multi-model for all time scales
- Mark Fresh (NOAA OWP)
  - *The National Weather Service (NWS) Hydrologic Ensemble Forecast Service (HEFS) use of the Global Ensemble Forecast System (GEFS)*
- Xingren Wu (NCEP/EMC)
  - *NCEP Ensemble Sensitivity Tool with GEFS and CMC products for Atmospheric River Reconnaissance*
- **Poster presentation (3 minutes each - 30 minutes)**
  - Murali Malasala: Predictability of Atmospheric Rivers and Associated Precipitation on Sub-Seasonal scale over U.S. West Coast using GEFSv12 Ensemble Reforecasts
  - Eric Sinsky: The Community Support of the GEFS Reforecast (GEFSv12/GEFSv13)
  - Qianqian Qi: An assessment of Subseasonal Forecast Capability from CMA-Global Ensemble Prediction System (CMA-GEPS) - **Pre-recorded**

- Justin Hicks: Assessment of Ensemble Regression and Time-Lagged Ensembles on Week 3-4 GEFS Forecasts of Temperature and Precipitation - **Withdraw**
- Fei Peng: The CMA-GEPS extreme forecast index for temperature and verification on the extreme high temperature forecasts for the summer of 2022 - **Pre-recorded**
- Alex Corner: Global, Probabilistic Guidance for Convection, Turbulence, and In-Flight Icing
- Jingzhuo Wang: The roles of chaos seeding and multiple perturbations in convection–permitting ensemble forecasting over southern China - **Pre-recorded**
- Aditya Kumar: Evaluation of operational CFSv2 ensemble seasonal forecasts and comparison with CWRF downscaling predictions for spring season over the United States

Lunch Break: 12:00 - 1:30 pm

**Session 11: 1:30 - 3:00 pm** (Chair: Shan Sun - NOAA GSL / Fanglin Yang - NCEP/EMC)

S2S development and applications (15 minutes each)

- Edmund Chang (Stony Brook University)
    - *Subseasonal Outlook for Extratropical Storminess using NCEP Dynamical Ensembles*
- Hailan Wang (NCEP/CPC)
    - *Application of Subseasonal and Seasonal Ensemble Forecasts for the Development of NOAA CPC Probabilistic Drought Outlooks*
- Ping Liu (Stony Brook University)
    - *GEFSv12 Ensemble Predictions of Heat Waves over CONUS associated with Persistent Highs in 2021–2022*
- Chidong Zhang (OAR/PMEL)
    - *Using Saildrone Observations to Validate Ensemble Forecasts in the Arctic*
- Jianwen Bao (OAR/PSL) - **remote**
    - *Applying the multidimensional Langevin process in stochastic physics parameterization for the GEFS*
- Clara Draper (OAR/PSL) - **remote**
    - *Accounting for land model uncertainty in numerical weather prediction ensemble systems: toward ensemble-based coupled land/atmosphere data assimilation*

Afternoon break: 3:00 - 3:30pm

**Session 12: 3:30 - 5:00 pm**

- Reports from each round table discussion (20 minutes each)

- Wrap up