Topic: Probabilistic Tropical Cyclone (TC) Forecast Products Project
Virtual Meeting Summary: January 20, 2021, 0800 ET/1300 UTC

Attendees:

- Raghu Ashrit (National Centre for Medium Range Weather Forecasting, Noida, India)
- Estelle Coning (WMO, World Weather Research Programme)
- Chris Davis (NCAR Mesoscale and Microscale Meteorology Laboratory)
- Jason Dunion (University of Miami – NOAA/AOML/Hurricane Research Division
- Anne-Claire Fontan (WMO, Tropical Cyclone Programme (TCP)
- Helen Greatex (Pennsylvania State University)
- John Methven (University of Reading)
- Helen Titley (UK Met Office)
- Zhuo Wang (University of Illinois at Urbana-Champaign)
- Munehiko Yamaguchi (Japan Meteorological Agency)
- Hui Yu (Shanghai Typhoon Institute, CMA)

Not in Attendance:

- Julia Chasco (NMS Argentina)
- Jane Rovins (Massey University, New Zealand)

Agenda:

1. Brief Introductions

2. Project background (see page 3 of this document)
    - Chris D.: this task team effort is mainly driven by recommendations 19, 20, 21, & 35 from the December 2018 IWTC
    - Connection between this project to GDPFS is still being pursued and we are awaiting clarification (GDPFS does have an upcoming meeting in March). From Estelle: we cannot declare a GDPFS pilot project, but in the meantime, this effort is a good bridge.
    - ACTION ITEM 1: confirm the March 2021 date for the next GDPFS meeting

3. Task Team Charter (2021-2022)
    - The task team will coordinate across RSMCs and other forecast centers to identify best practice guidance for probabilistic tropical cyclone forecasts. This effort will be implemented in 3 phases:
        - Phase 1 (2021-2022): work with forecast enters to identify best practices of a value-cycle approach to probabilistic tropical cyclone forecasts of **TC position**.
        - Phase 2 (2023-2024): work with forecast centers to identify best practices of a value-cycle approach to probabilistic tropical cyclone related to forecasts of **TC intensity and structure**.
        - Phase 3 (2025-2026): work with forecast centers to identify best practices of a value-cycle approach to probabilistic tropical cyclone related to forecasts of **TC-related rainfall**.
    - ACTION ITEM 2: Define the following: 1) What is the name of this team (e.g., "task team" vs "implementation team" 2) What are the team's tasks (e.g., 4-6 specific tasks)
    - ACTION ITEM3: consider clarifying the wording of the Phase descriptions- specifically "TC impacts forecasts of position, TC intensity and structure, and TC-related rainfall".

4. Phase 1 Tasks:
    i. Identify RSMCs and forecast centers for inclusion in this effort.
    ii. ACTION ITEM 4: Identify forecasts centers for inclusion in this effort. ACTION ITEM 5: identify task team members to contact those forecast centers to determine the following information:
        a) What probabilistic TC forecast products are being produced currently?
        b) What probabilistic TC forecast products are planned in the near-future
        c) Who is their constituency? What are their needs? If not fully known, how can we help identify those needs? How should the forecast products be designed to meet their needs?
        d) Forecast challenges specific to that center
        e) If the forecast center is interested in participating in this project
    iii. Forecast center workshop: *Probabilistic tropical cyclone forecasts of TC position*
        a) Determine workshop main objectives (e.g., integrate scientific and social aspects of ensemble based forecasts to develop best practice guidance)
        b) Determine workshop format (e.g., 2-3 day workshop, 2 hr each day)
        c) Determine dates based on forecast center availability (e.g., late April through June 2021)
        d) ACTION ITEM 6: Identify task team members interested in organizing a late spring/early summer workshop on probabilistic TC impact forecasts
    iv. Develop a plan/mechanism for forecast centers to periodically stay engaged with this project after the spring/summer 2021 workshop
    v. 2022 IWTC (December 2022)
        a) Integrate results from this effort into one of the task team write-ups that are composed before the IWTC (Aug-Nov 2022 timeframe)
            - Suggestion: we need to reach out to the IWTC 2022 co-chairs early in the process to ensure that our material is integrated into the write-ups (e.g., July-Aug 2022)
        b) Present a succinct report summarizing our Phase 1 effort, including overviews of the following:
            - Probabilistic tropical cyclone forecasts of TC position being utilized at various forecast centers
            - Forecast challenges at different forecast centers
            - Best practice guidance / recommendations
            - Plans re: Phase 2 and 3 of this project
    vi. How might our task team interact/collaborate with implementation teams in the Typhoon Landfall Forecast Demonstration Project (TLFDP)?
    vii. Other Items
        a) Comment: multi model ensembles are not mentioned here, but that was one of the future values of TIGGE which is one of the motivations for all of this. So that data side is not reflected here. In the timing, in order to address phases 2 and 3, we need the data to be shared already. So could we keep data sharing high on our list? e.g. augmentation of what goes into the TIGGE database, or it will be too late to use it by 2023?

b) Comment: In terms of the value team approach. I think it would be good to split out impact and the cone of uncertainty work as the value approach might be different
c) Question: What is the time frame that we are looking at for each phase. The forecast is produced for 10 days, so we're looking up to 3 days?C up to 5 days? >> TBD from the planned workshop
d) Suggestion (forecast center workshop invites): consider inviting all RSMCs; invite ECMWF and Meteo-France
e) Suggestion (workshop format): use a similar format to the AMS meetings, if people want to give a presentation, they record it in advance. During the workshop we focus on discussions.
f) Question: What is the expected deliverable of the task team? >> to deliver guidance at the IWTC 2022 that addresses IWTC 2018 recommendations 19, 20, 21, and 35
g) Comment: the 3 phases (TC position, TC intensity and structure & TC-related rainfall and best practice guidance influence impact modeling & forecasting, but the phases "drive the bus" (i.e., are the critical elements).
h) Question: How is the task team defined? Do we get a letter from WWRP or WMO confirming our membership on the team? >> need action item 2 completed before WMO can write a letter.
i) John M (operational center contacts and operational configurations): luence.ecmwf.int/display/TIGGE
    - Contacts: >> *support >> contacts*
    - Operational ensemble configurations: >> *descriptions*
    - TIGGE TC track data archive: https://rda.ucar.edu/datasets/ds330.3/index.html#!description
j) Ann-Claire: Past workshops aimed at facilitating dialogue between operational and end-users communities, identify the issues and gather their needs: Technical Meeting "Tropical Cyclone impact estimation for humanitarian preparedness and response: Joining the dots", 6 - 7 February 2020, Geneva, Switzerland, during the 6th Humanitarian Networks and Partnerships Week (HNPW 2020)).
    - workshop excerpt: "clear need to improve our knowledge and practice on e.g. communicating and interpreting uncertainties around TC forecasts and on each other's way of working": https://www.crews-initiative.org/en/news/caribbean-workshop-impact-based-forecasting-and-risk-scenario-planning
k) WMO >> promoting impact-based forecast (IBF) products (what the weather will do rather than what the weather will be); to help the NMHS in improving the communication, to meet end-users (e.g., humanitarian agencies, NDMOs) requirements (help in decision-making). WMO Guidelines on Multi-hazard Impact-based Forecast and Warning Services (2015). An updated version should be published this year.

5. ACTION ITEM 7: Set up the next task team meeting: late February/early March 2021 (Jason will coordinate)

Background:

The 2018 International Working Group on Tropical Cyclones (IWTC) recommended (among their 35 recommendations):

- 19. Consider working toward replacing static cones of uncertainty with dynamic types, which can be ensemble-based or hybrid statistical and dynamical techniques.
- 20. Include social science aspects and knowledge of ensemble and uncertainty as (mandatory/desirable) components of basic meteorological training under WMO.
- 21. Encourage access to forecast data (deterministic and ensemble; global/regional) and international data sets, particularly TIGGE, to facilitate research and operational use of ensemble forecasts.
- 35. Encourage the opportunity for major interdisciplinary research activity in the Asian Region aimed at improving the information available to typhoon forecasters and providing the research needed to enhance the communication and utility of typhoon warnings. This should be a pilot project for the seamless Global Data Processing and Forecasting System co-designed between WWRP and any interested regional body/ies in the Asian region to ensure a strong linkage between research and operational forecasting. The WWRP focal point of the activity would be its HIWeather project with significant contributions from all WWRP Working Groups and from WGNE.

The objectives of the current project arose from the above recommendations. The connection of this work to the GDPFS (Global Data-processing and Forecasting System) pilot project is still being pursued, awaiting clarification of the process primarily from the Infrastructure Commission of WMO. They are slated to meet in March to, among other things, develop clear guidelines.

The formation of the current team stems from the initiative of the TMR working group of WWRP, in response to the IWTC recommendations, to form a task team to address principally recommendation #19, but following an interdisciplinary and probabilistic approach as recommended in #20 and #21. The Science Steering Committee of WWRP did not approve the Task Team as a separate structure. Rather, the SSC proposed that the current team be formed as an extension of the Typhoon Landfall Forecast Demonstration project (TLFDP), which already includes work related to products representing TC position uncertainty. Under TMR, the Probabilistic TC Forecast Products Team will report their activities to the WWRP SSC twice per year.