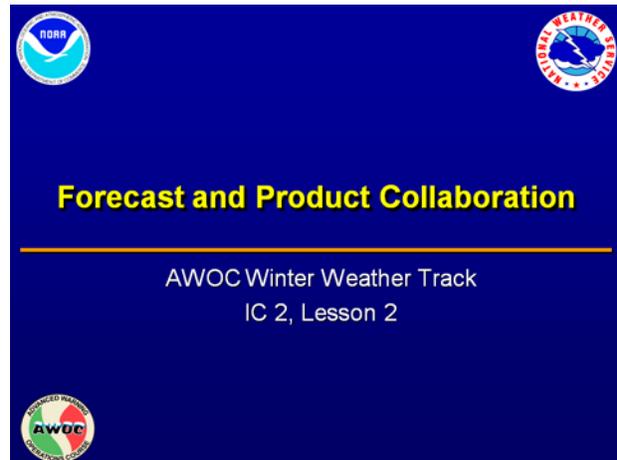

1. Forecast and Product Collaboration

Instructor Notes: Welcome to the AWOC Winter Track Instructional Component 2, Lesson 2. This presentation, Forecast and Product Collaboration, should last approximately 15 minutes. Original material for this lesson was initially provided by Brian Motta, instructor for the Forecast Decision Training Branch in Boulder, and Dr. Michael Brennan, formally of the HPC. Subsequent updates were provided by David Novak, current SOO of the HPC, and Jon Racy of the SPC. My name is Brad Grant, Team Leader with the Warning Decision Training Branch.

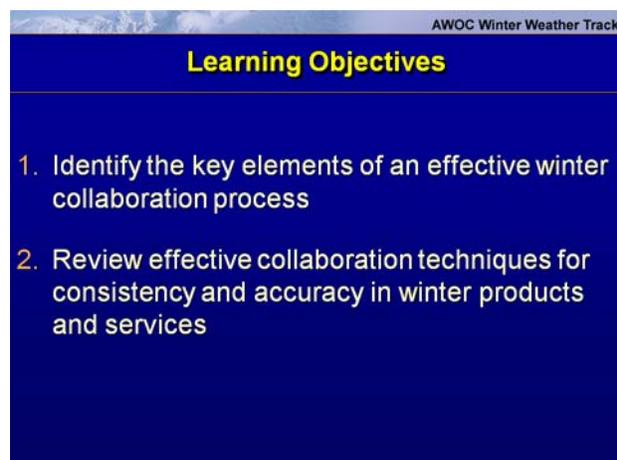
Student Notes:



2. Learning Objectives

Instructor Notes: There are two main objectives with this lesson. The first objective is to identify the key elements of an effective winter collaboration process. The second objective is to review effective techniques which preserve and create consistency and accuracy in products and services.

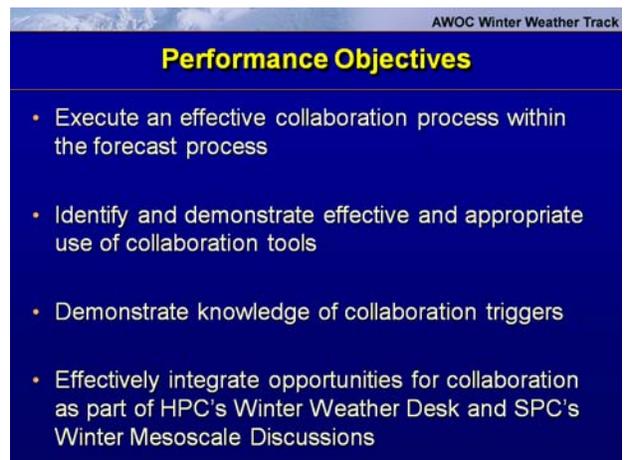
Student Notes:



3. Performance Objectives

Instructor Notes: Execution of an effective collaboration process within the forecast process requires every forecast shift and those additional situationally-dependent expectations, including initiation of collaboration with other NWS forecasters at local, regional, and national levels. The identification, effective demonstration, and appropriate use of collaboration tools is important because each tool has advantages which assist other forecasters in key activities such as shift change briefings, intentions to modify grids, and effective/coordinated timing of publishing changes to the National Digital Forecast Database (NDFD). The importance of collaboration triggers can be realized up-front in high-impact weather situations. A key part of a successful collaboration process is anticipating your role in collaboration events and allocating the time necessary to participate before, during and after grid editing tasks. In-depth knowledge of schedules, guidance products, and available assistance from HPC and SPC in the winter weather forecast process is important. Local product users may also be using national center guidance and products too. Note that particular aspects and threats of winter weather may cover large areas and have significant timing and intensity uncertainties. Strategies for handling such events and providing a common base for collaboration are important outcomes of national center collaborations such as the Winter Weather Desk at HPC.

Student Notes:

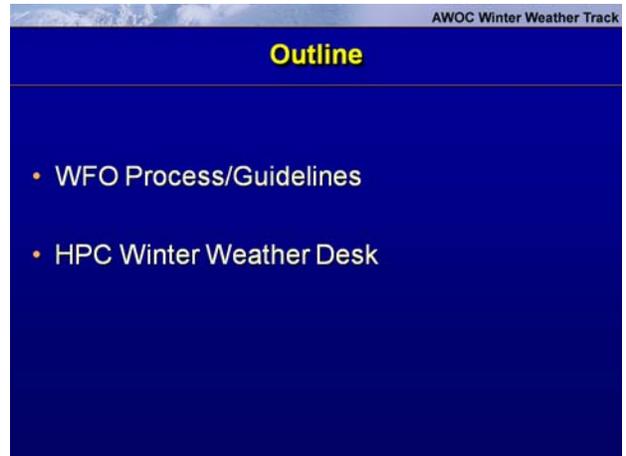


The slide is titled "AWOC Winter Weather Track" in the top right corner. Below the title, the main heading "Performance Objectives" is displayed in yellow text on a dark blue background. The slide lists four bullet points in white text:

- Execute an effective collaboration process within the forecast process
- Identify and demonstrate effective and appropriate use of collaboration tools
- Demonstrate knowledge of collaboration triggers
- Effectively integrate opportunities for collaboration as part of HPC's Winter Weather Desk and SPC's Winter Mesoscale Discussions

4. Outline

Instructor Notes: The collaborative process is a necessary and ongoing part of the forecast process. Key aspects and best practices for WFOs will be presented along with the lessons learned. Of particular note are the high impact events which may demand modifying workload assignments and monitoring SPC and HPC products and guidance more intensively than usual.

Student Notes:


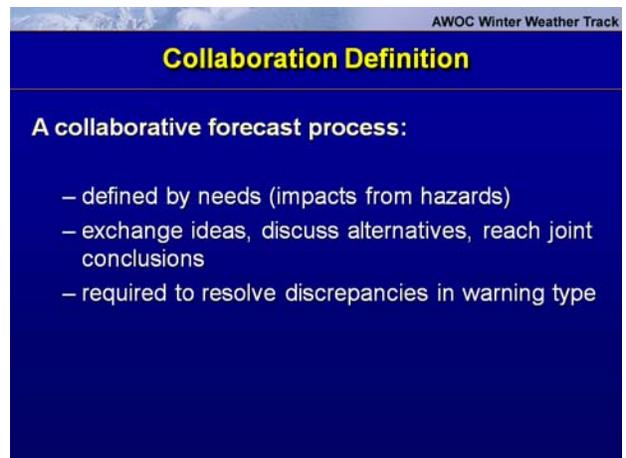
AWOC Winter Weather Track

Outline

- WFO Process/Guidelines
- HPC Winter Weather Desk

5. Collaboration Definition

Instructor Notes: An effective collaboration process is defined as an exchange of information at key decisional times which include the inheritance of the forecast grids from the previous shift, the consideration of new guidance, and proposed changes to the National Digital Forecast Database (NDFD). Often, the needed changes to the grids are greater than those which are required to be collaborated. NWSI 10-513 (Revised Winter 2008) says WFOs will coordinate with each other on warning product type.

Student Notes:


AWOC Winter Weather Track

Collaboration Definition

A collaborative forecast process:

- defined by needs (impacts from hazards)
- exchange ideas, discuss alternatives, reach joint conclusions
- required to resolve discrepancies in warning type

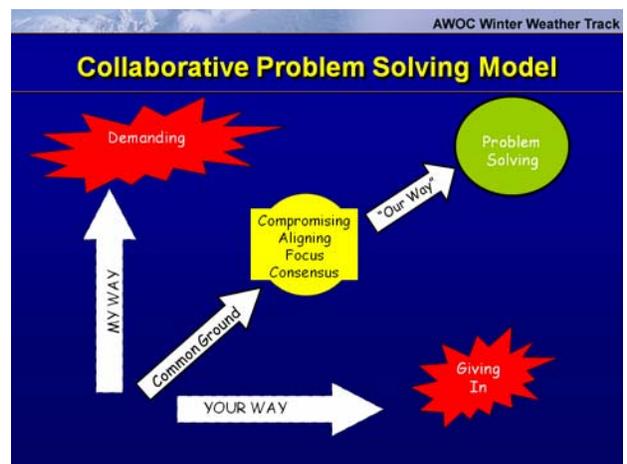
6. Collaborative Problem Solving Model

Instructor Notes: It is important to consider that several tools are in widespread use for collaboration. While office schedules and duty priorities can cause offices to become asynchronous in their communications, there are opportunities for different kinds of interactions. As an example, it is important to make initial and final contacts for collaboration. These are key points in the collaboration process and the previous and next shift's assessment and awareness. Recognizing the responsibilities of your neighboring offices is a key to timing your exchanges whether they be by chat, phone, Intersite Coordination

Warning Decision Training Branch

Grids, AFDs, etc. It's important to consider the "big picture" differences early and discuss the regional timing and placement of features exceeding collaboration thresholds. This early "heads up" can save significant time when including local effects later in the forecast process. Recall that the gridded forecasts are used to generate a number of forecast products both at the national and local levels. In addition, particularly for high-profile events, users may be referencing national products from the Storm Prediction Center (SPC) and the Hydro-meteorological Prediction Center (HPC). This presents an added level of collaboration above that needed for bordering CWAs. One common challenge is to avoid simple half-way compromises when time gets short as deadlines approach. In order to have the best result, collaborate significant changes early and confirm grid edit intentions with your neighboring office(s) as far in advance as possible or agree to make the changes by a later time.

Student Notes:

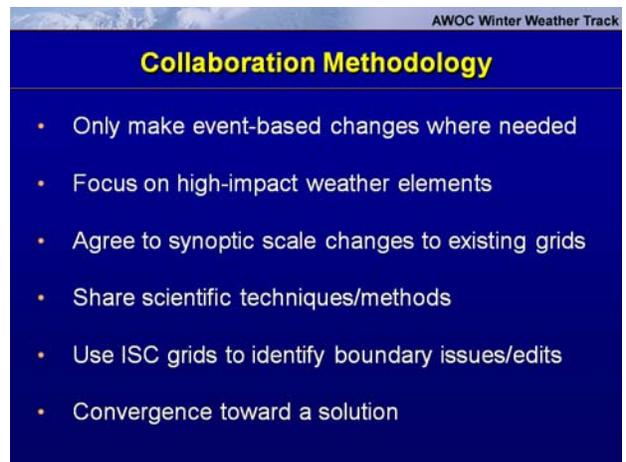


7. Collaboration Methodology

Instructor Notes: A key time saver and workload reducer is a good forecast process collaboration methodology. When possible, use the existing grid forecast as the basis for changes. Express your initial thoughts in chat so that others can be aware. Identify grids that will need little if any change and those needing major changes. Consider the following factors in deciding when and where event-based changes are needed: New model guidance (beware of model flip flops) Dropping the first period Adding new Day 7 Local customer needs/deadlines (eg. DOT, media, etc.) Observed weather doesn't match the forecast Be sure to address major points and significant changes as early as possible in the process. The best forecast collaborators do so in a focused and conservative way. For instance, you have an impending winter storm with several precipitation types. One decision to make is what aspects of the forecast you need to resolve first and which may cause you to collaborate. If there is agreement on the amount, timing and location of the heavy snow, then it makes sense to consider aspects related to possible ice accumulation and collaborate those in areas expected to be hard hit. You may be less concerned about the dewpoint or windspeed until the most important aspects of the storm are in-hand. Also consider that additional forecasters may be needed to complete the edits. Synoptic scale changes to the current forecast database can help focus you early in the

forecast process and will help to avoid potential problems and wasted time later. Typically, there are both early and late NCEP collaboration opportunities which you may trigger or participate in by collaborating with NCEP. Using the chat, ISC, and grid discrepancy tools, your ever-present goal as a forecaster should be to converge toward a solution based on sound reasoning from the most likely solution presented by the available guidance. Any introduction of discrepancies between CWAs should be raised at or before sending ISC grids. You may not need to collaborate to resolve discrepancies. Use collaboration to inform others of your progress and to agree on publishing times. Be as predictable in completing your grids as possible and up-front with any necessary delays. In cases where the uncertainty is particularly high, collaborators may want to establish regular or key times to reassess the situation. It's important to publish updates as soon as possible allowing for the needed editing time and upgrades/downgrades of relevant watch/warning/and advisory products.

Student Notes:



The slide is titled "AWOC Winter Weather Track" in the top right corner. Below the title, the main heading "Collaboration Methodology" is written in yellow text on a dark blue background. A list of six bullet points follows, each starting with a white dot. The text is white on the dark blue background.

- Only make event-based changes where needed
- Focus on high-impact weather elements
- Agree to synoptic scale changes to existing grids
- Share scientific techniques/methods
- Use ISC grids to identify boundary issues/edits
- Convergence toward a solution

8. NCEP Winter Weather Support for WFOs

Instructor Notes: NCEP provides winter weather support to the WFOs through two of its service centers. SPC provides products for the very short range or NOWcast time period out through 9 hours. HPC provides support that cover the period from 12 hours out through day 3.

Student Notes:

AWOC Winter Weather Track

NCEP Winter Weather Support for WFOs

- SPC provides products tailored for the 0-9h time frame
- HPC provides products tailored for the 12-84h time frame

9. HPC Winter Weather Desk Strategy

Instructor Notes: The HPC winter weather desk forecast strategy is based off of feedback collected from WFOs feedback in later years. The HPC winter weather desk issues a set of preliminary guidance products on a password protected webpage for internal use within the NWS. These products are based on model and ensemble guidance available at HPC, including models and ensembles run at NCEP at other modeling centers, HPC forecaster input and internal HPC collaboration. These internal guidance products provide the basis for collaboration between HPC and the WFOs. Based on this collaboration, HPC and the WFOs will finalize their public suite of products. HPC's public winter weather products are probabilistic in nature and intended to compliment the deterministic snow and ice accumulations forecasts published to the NDFD by the WFOs. Therefore, collaboration is vital to ensure that HPC and WFO products are consistent. This combined produce suite provides the public with both the most likely scenario from WFO grids as well as a information on forecast uncertainty and alternative outcomes from the HPC probabilities.

Student Notes:

AWOC Winter Weather Track

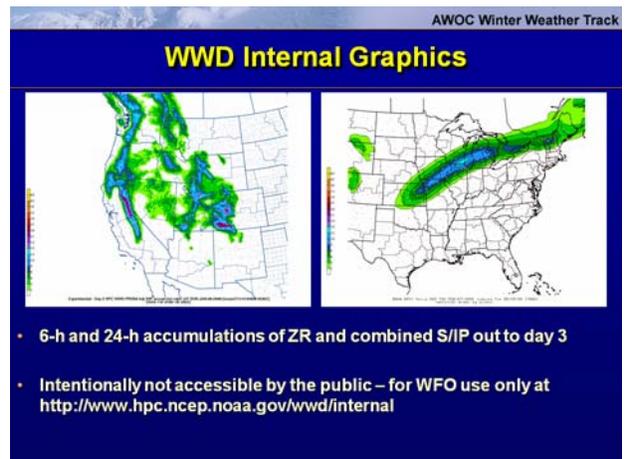
HPC Winter Weather Desk Strategy

- HPC WWD issues preliminary (internal) guidance for use at WFOs
- Guidance serves as basis for collaboration
- HPC and WFOs finalize public (external) product suite

10. WWD Internal Graphics

Instructor Notes: HPC's preliminary internal winter weather products consist of both 6-h and 24-h accumulation graphics of snow/sleet and freezing rain for days 1 through 3. Images showing 2 and 3-day accumulations are also available. The HPC provides the accumulation graphics in gridded format for ingest and display in AWIPS D2D/GFE. These products are available only through a password-protected website since they are not official NWS forecasts. The HPC winter weather accumulations are depicted on a 20-km grid (note the right panel). Over the Intermountain West, PRISM data are used to downscale the accumulations to a 5-km grid as shown in the left panel.

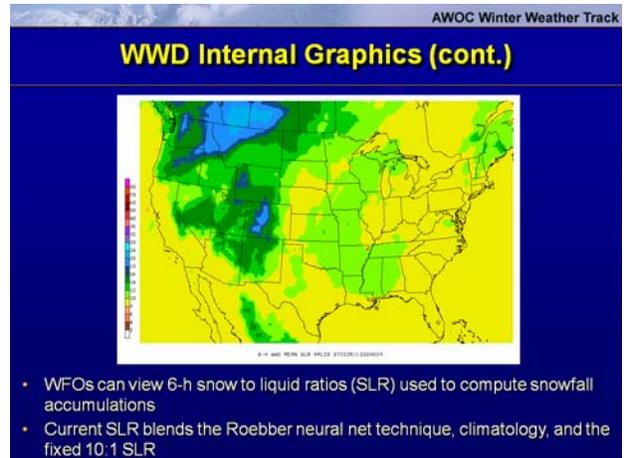
Student Notes:



11. WWD Internal Graphics (cont.)

Instructor Notes: HPC also provides images of the snow to liquid ratio used to produce the snowfall accumulation graphics. These SLRs are computed every 6 hours through the 3-day forecast period. Images of the SLR are available from a link in the bottom right corner of the internal WWD collaboration page. These graphics are also available for display in AWIPS D2D/GFE. The SLR is computed from an equal blend of the following: The Roebber neural network technique run on GFS and NAM output, the climatological SLR, and a fixed 10:1 SLR. See lesson IC6.5 for more on SLRs and details on forecasting SLR.

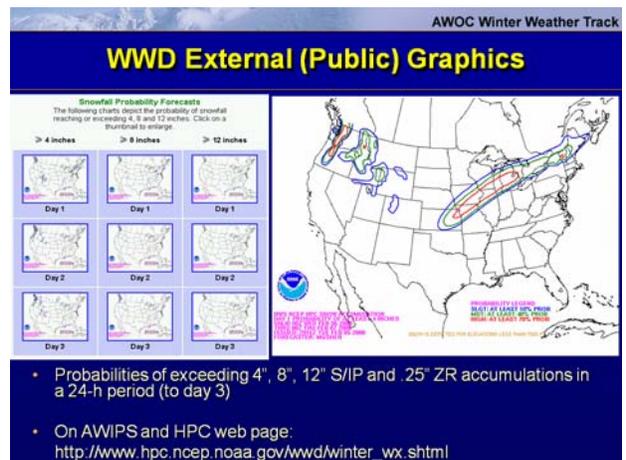
Student Notes:



12. WWD External (Public) Graphics

Instructor Notes: HPC's public winter weather products consist of probabilities graphics that depict the probability exceeding combined snow/sleet and freezing rain thresholds for a 24-h period for days 1 through 3. For example, the contours on the graphic to the right show the probability of exceeding 8 inches of combined snow and sleet on day 1. These graphics are available both in AWIPS and on the HPC website.

Student Notes:

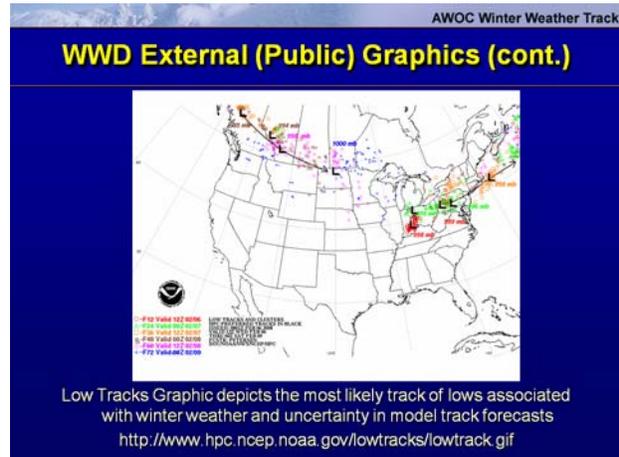


13. WWD External (Public) Graphics (cont.)

Instructor Notes: Another public winter weather desk product is this low tracks graphic. This graphic depicts the HPC forecast track of surface lows associated with significant winter weather as well as forecast tracks of those lows from deterministic and ensemble numerical model guidance. This provides a measure of forecast uncertainty, showing the spread of model solutions for a particular low along with the deterministic HPC forecast. The black low and line is the HPC forecast track in 12-h increments. Model predicted locations of the low are depicted by the colored symbols and are grouped by forecast hour as shown in the legend in the lower left corner. In this example, you can see that the

HPC forecast position of the low in North Dakota at forecast hour 72 is on the western edge of the envelope of model solutions, which are indicated by the blue crosses.

Student Notes:



14. WWD Collaboration

Instructor Notes: Collaboration with the WWD occurs primarily through 12Planet. The WFOs prefer to have HPC available as a resource early in the forecast process to discuss large-scale pattern evolution. It is not HPC's role to make watch/warning decisions, but HPC will provide comments on watches and warnings if asked to by WFOs. HPC's winter weather desk 12Planet id is "hpc_wwd". All HPC 12Planet sessions will sound an alarm if you include HPC, NCEP, or WWD in upper or lowercase. However, it is preferred that when addressing the winter weather desk, you include "wwd" in your message so the HPC forecasters can quickly determine who your comment or question is directed to.

Student Notes:

AWOC Winter Weather Track

WWD Collaboration

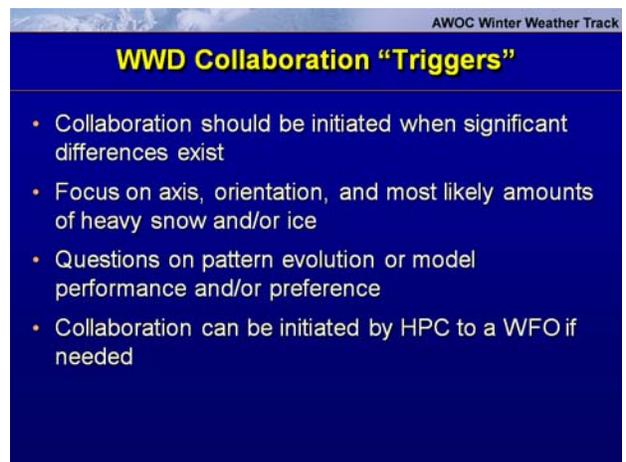
- 12Planet
 - Resource early
 - No Watch/Warning Decisions
- ID is "hpc_wwd"

The figure is a slide titled "WWD Collaboration" from the "AWOC Winter Weather Track" series. It contains two bullet points: "• 12Planet" with sub-points "– Resource early" and "– No Watch/Warning Decisions", and "• ID is 'hpc_wwd'". To the right of the text is a photograph of a person sitting at a desk with multiple computer monitors displaying weather maps. The person is seen from the back, looking at the screens.

15. WWD Collaboration “Triggers”

Instructor Notes: Collaboration with the WWD can be triggered by any question regarding an event. However, you should especially collaborate if you see that there are significant differences on a storm scale between what you intend to publish to the NDFD and what is depicted in the HPC preliminary accumulation graphics. This includes significant differences in maximum amounts from lake effect or topographically enhanced accumulations, or differences in areas where expected amounts straddle watch or warning criteria. Questions about pattern evolution and/or model performance or model preference for the winter weather event should also serve as a collaboration trigger. Note: If needed, HPC will initiate collaboration with a forecast office.

Student Notes:



AWOC Winter Weather Track

WWD Collaboration “Triggers”

- Collaboration should be initiated when significant differences exist
- Focus on axis, orientation, and most likely amounts of heavy snow and/or ice
- Questions on pattern evolution or model performance and/or preference
- Collaboration can be initiated by HPC to a WFO if needed

16. WWD Collaboration Call Criteria

Instructor Notes: Although primarily collaboration with the WWD occurs via 12Planet, there are instances where verbal communication is required or more efficient. A formal collaboration call is reserved for situations when two or more adjacent WFOs are potentially impacted by the same event and there is sufficient uncertainty in the pattern evolution. Verbal collaboration is especially needed when collaboration using 12Planet becomes inefficient or if technical problems with 12Planet arise. While either HPC or a WFO can initiate a call, if you would like to speak with WWD, you can just pick up the phone and call.

Student Notes:

AWOC Winter Weather Track

WWD Collaboration Call Criteria

- Two or more adjacent WFOs impacted by same event
- Pattern evolution in question (sufficient uncertainty)
- 12 Planet collaboration on pattern evolution becomes inefficient
- Either WFO or HPC can initiate and facilitate a call

17. What to Expect from HPC during call

Instructor Notes: During a collaboration call, HPC's contribution will focus on large-scale pattern evolution and how that pertains to forcing mechanisms generating winter precipitation. Also, HPC will provide information on model differences and preferences, and justification for those preferences. While collaborating watches and warnings is not HPC's primary role, HPC will comment on watch/warning decisions if asked by a WFO. However, the final watch/warning decision and watch/warning collaboration responsibility still resides with the WFOs.

Student Notes:

AWOC Winter Weather Track

What to Expect from HPC during call

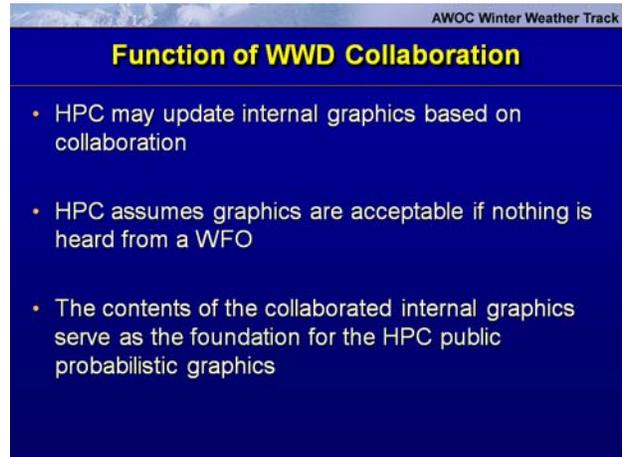
- Focus will be on pattern evolution and how that pertains to forcing mechanisms expected to produce winter precipitation
- Additional focus will be on model preference (including ensembles) and justification
- HPC will comment on watches/warnings if asked, but will not make watch/warning decisions

18. Function of WWD Collaboration

Instructor Notes: To reiterate, the major function of the WWD collaboration is to ensure consistency between HPC's probabilistic graphics and the deterministic products produced in the NDFD by the WFOs. Therefore, HPC's internal accumulation graphics may be updated based on collaboration with the WFOs. However, if HPC depicts accumulations over a given CWA and nothing is heard from that forecast office, HPC will assume the preliminary accumulations are acceptable to the WFO. This is critical, because the

preliminary accumulations serve as the foundation for the generation of the HPC public probabilistic graphics.

Student Notes:



AWOC Winter Weather Track

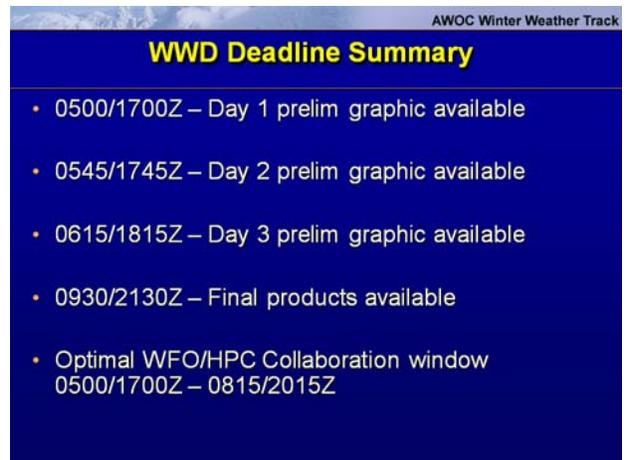
Function of WWD Collaboration

- HPC may update internal graphics based on collaboration
- HPC assumes graphics are acceptable if nothing is heard from a WFO
- The contents of the collaborated internal graphics serve as the foundation for the HPC public probabilistic graphics

19. WWD Deadline Summary

Instructor Notes: Here is a summary of the deadlines for when to expect the accumulation graphics from the WWD. Note, collaboration can occur anytime with the WWD, but the WWD deadlines lead to an optimal collaboration window several hours before the final public products are released.

Student Notes:



AWOC Winter Weather Track

WWD Deadline Summary

- 0500/1700Z – Day 1 prelim graphic available
- 0545/1745Z – Day 2 prelim graphic available
- 0615/1815Z – Day 3 prelim graphic available
- 0930/2130Z – Final products available
- Optimal WFO/HPC Collaboration window
0500/1700Z – 0815/2015Z

20. SPC Support

Instructor Notes: As mentioned earlier, SPC provides support for winter weather events to the WFOs in the short-term nowcasting time frame. Specifically, SPC issues mesoscale discussions on an as-needed basis based on issuance criteria. They also produce web based graphics as shown. SPC winter MDs emphasize observations and short-term, high-resolution model output. The SPC winter weather forecaster, which can be handled at multiple desks, can be contacted on 12 Planet at the ID “SPC”. Please

note that a WFO inquiring of HPC about an event in the nowcast time period will be forwarded to SPC and vice versa.

Student Notes:

AWOC Winter Weather Track

SPC Support

- Issuance of Mesoscale Discussions and web based graphics
- Issued on as-needed basis
- Focus on Short-term winter hazards of 0-9 hrs
- Planet ID is "SPC"



21. SPC Winter MD Issuance Guidelines

Instructor Notes: SPC Winter MDs are issued for the following events: 1) Heavy snow rates of 1 in. per hour at elevations below 4000 ft and for rates of 2 in. per hour at higher elevations and in lake effect areas. 2) Heavy snow MDs are also issued for rare mesoscale events or mesoscale snow events that are ending quickly. 3) Freezing rain events where .05 in. or more of freezing rain is produced in a 3 hour period and when precipitation type changes from liquid to freezing rain or vice versa, 4) The initiation of blizzard conditions that are expected to last at least 3 hours, and for 5) Winter precipitation trends.

Student Notes:

AWOC Winter Weather Track

SPC Winter MD Issuance Guidelines

- **Heavy Snow**
 - Rates 1 in/hr below 4000 ft MSL
 - Rates 2 in/hr between 4000-8000 ft MSL, higher mountainous terrain, or lake effect areas
 - Initiation of rare mesoscale event or rapid cessation of a heavy mesoscale snow event
- **Freezing Rain**
 - Producing 0.05 inches of freezing rain within a 3 hour period
 - Changeover from liquid to freezing rain or vice versa
- **Blizzard**
 - Initiation of mesoscale blizzard conditions expected to last at least 3 hours
- **Winter Precipitation Trends**

Mesoscale Discussion 2458
NWS Storm Prediction Center Norman OK
0600 AM CST WED NOV 24 2008

AREAS AFFECTED...NEAR MO...CENTRAL IL...AND NW IN IND
CONCERNING...PRECIPITATION TRENDS...WINTER PRECIPITATION
VALID 241200Z - 241745Z

RAIN WILL GRADUALLY MIX WITH AND CHANGE TO SNOW THROUGH
EARLY AFTERNOON FROM NEAR MO THROUGH NW IN IND. SEVERAL
BOUNDS OF WY MET SNOW WITH RATES EXCEEDING 1"/HR ARE
EXPECTED ALONG THIS AXIS AS STRONGEST FORCING MOVES NEAR
FROM CENTRAL MO TOWARD CENTRAL IL AND IN THROUGH LATE
MORNING/AFTERNOON.

AT 1245Z...BROAD MID-LEVEL DEFORMATION ZONE EXTENDED
FROM RABIAS CITY NEAR THE LOWER GREAT LAKES AREA IN
SNOW QUADRANT OF FREEZING SURFACE CYCLONE PRESENTLY
OVER NW IN. PRECIPITATION ZONE IS MARKED BY
POTENTIOMETRIC FORCING IN 700-600MB LAYER NEAR NW EDGE
OF WARM ADVECTION AREA. STRONGEST UPV CURRENTLY ACROSS
CENTRAL MO...WINDS COULDED SHOWING DEEPENING/OVER
DIVERGENCE IS ALSO CONTRIBUTING TO DEEP-LAYER UPV NORTH
OF LOW CENTER. STRONGEST UPPER TROPOSPHERIC DIVERGENCE
PROPAGATES NEAR CENTRAL IL BY 10Z AND SHOULD
ENHANCE ONGOING PRECIP PATHS. BOUNDARY LAYER
TEMPERATURES ARE PRESENTLY AS OR ABOVE FREEZING...
HOWEVER...DEEP LEFT SHOULD INDUCE SUFFICIENT DYNAMIC
COOLING TO CHANGE RAIN TO SNOW ACROSS THE DISCUSSION
AREA THROUGH THE REMAINDER OF THIS MORNING INTO
EARLY/VERY AFTERNOON. INCREASING MID BOUNDARY LAYER WINDS
AS LOW DEEPENS TO NORTH BY 01Z OPEN USE 250...WINDS
ALSO HELP WITH INCREASING CAH IN THE LOWER LAYERS
ACROSS CENTRAL IL/NW IN IND. THERMODYNAMIC PROFILES ALSO
BECOME FAVORABLE FOR DEBRITTE SNOW GROWTH AS STRONG
FORCING MOVES NEAR ACROSS THE REGION.

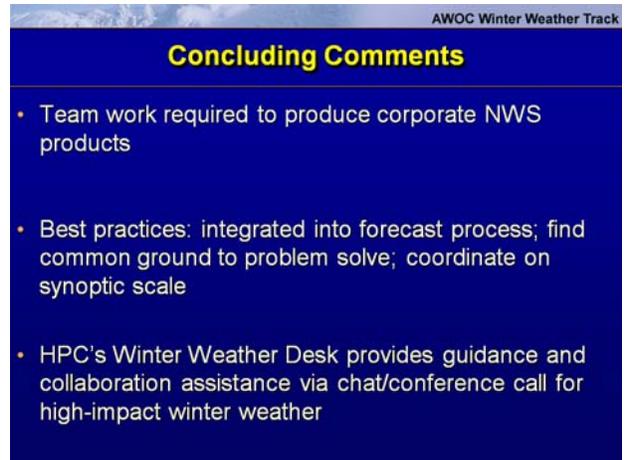
22. Concluding Comments

Instructor Notes: Good collaboration requires team work. It is the foundation of the current NDFD product generation. Collaboration works best when it is treated as a process

Warning Decision Training Branch

integrated within the forecast process. Collaboration should begin early in the forecast process and be appropriate to the forecast challenges in the time and effort expended. While collaboration time can be minimized, at least a small amount of time should be devoted to it. Collaboration should continue throughout the forecast process until the grids are published as agreed upon. Finally, there can be valuable insights into model performance and guidance from NCEP (HPC and SPC) during winter weather situations. Consider high-impact winter weather a collaboration trigger with HPC because customers and partners will likely get information from both sources.

Student Notes:



AWOC Winter Weather Track

Concluding Comments

- Team work required to produce corporate NWS products
- Best practices: integrated into forecast process; find common ground to problem solve; coordinate on synoptic scale
- HPC's Winter Weather Desk provides guidance and collaboration assistance via chat/conference call for high-impact winter weather

23. Learning Interaction

Instructor Notes:

Student Notes:

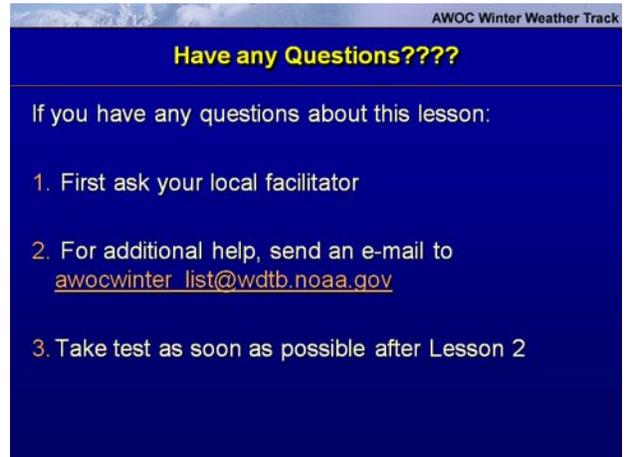
24. Have any Questions????

Instructor Notes: If you have any questions about this lesson, first ask your local AWOC facilitator. If you need additional help, send an e-mail to the address provided. When we answer, we will CC your local facilitator and may consider your question for our

AWOC Winter Track FY11

FAQ page. We strongly recommend that you take the exam as soon as possible after completing Lesson 2.

Student Notes:



AWOC Winter Weather Track

Have any Questions????

If you have any questions about this lesson:

1. First ask your local facilitator
2. For additional help, send an e-mail to awocwinter_list@wdtb.noaa.gov
3. Take test as soon as possible after Lesson 2