Breakout 6B

Essential Principle: Through measurement and the application of physical principles, humans can understand and predict the behavior of the atmosphere.

Welcome bloggers~! This session will discuss FC's for the above EP. You can add your comments to a blog once you have logged in using the username and password emailed to you on the 26th.

As before, remember to refresh your browser by pushing the F5 key every 30 to 60 seconds

Facilitator: Becca Hatheway;   Online Participant Liaison: Rob Payo;   Recorders: Cindy Hamen

Participants in Attendance: Ted Williams, Miriam Lund, Ann Colen, Deke Arndt, Peter Schultz, Janelle Albarez, Ola Peterson, Jack Williams, Mary Beth , Joe Moran, Carol Landis, Daniel Barstow, Cynthia Hamen, Bob Henson, David Smith, Julie Winkler, Susan Foster

Session begins: 10:42 am

Ola: Predixn models are complex sets of mathematical relationshipos based on phys principles

Accuracy of predictions are limited by non-linearity of weather/climate processes

Certain scenarios and other time scales, dynamics, are more predictable than others....How far out can you predict weather

Instruments in classrooms

Math and weather relationships imp to stress

Obs are fundamental not only for predicting but understanding the atm

prediction: describing based on math principles

Dan: Concern of the use of the word "complex" ..overemphasizing the complexity vs what is accessible for us.

Mary: What's the obs suite available to them to understand the atm

Carol: From K12 perspective, I don't neccessarily need measurements to obs weather.

Jack: Can we change wording to "observation and measurement"

Janelle: Inquiry is in issue, how to teach it. Using inquiry type words help them to incorporate this content in the classroom.

Peter: 4 reasons why we do observations. if you think about why you are doing it, help

- Allow current understanding of the existing state

- Viewing based on a number of obs, patterns emerge

- Recognizing patterns: develop and test theory, hypotheses   (Patterns as a broad term, general workings of a process of the system)
- (High level) Use of obs to initialize models

Revise #3: Interpret obs and use phy principles to dev theories/models
Discussion of process using these 4 ideas:

From the theory, have the models themselves using the obs given

mary: tie it back to picture you see,

Jack: Prediction of weather and climate begins with collecting as much data as possible, then using computer models programmed with t eh basic math of phys principles

Deke: Purposeful obs, we have a plan: this needs to be incl

Peter: Uncertainty assoc with the variabilty of the system, anal over time

Ann: Accuracy and capability of the instruments used (engineering, math)

Susan: Uncertainty as a characteristic of the scientific process, general public understand that vs building a mistrust in scientific endeavors

Deke: Our understanding of the atm and climate system comes from accurate and purposeful observations of conditions at the earth's surface, throughout its astm and its oceans. Obs may be later by an instrument at the stie or from a distance.

Jack: All prediction is inherently uncertain.

Rob: Inclusion of Sharon Cooper's and Lois Ongley's comments in the list

Carol: Reword the EP statement:

Through observation, measurement and the appl of scientific principles, humans can understand the past, present and future behav of the atm.

Laws of physics, application of basic principles of physics, conservation laws

Joe: Models are an approximation of phenomena.

Ann: Should that be left to the teacher?

Carol: I don't think we should make that assumption

Jack: Variety of technologies are utilized to measure and obs the weather. Do we need to get into active and passive obs? Probably not at this level.

Peter: Models used in making climate projections are similar to those used in weather forecasting. The guts of these models are identical

Joe: But outputs are different. One looks at actual conditions, another looks at anamolies

Peter: We build an understanding of weather and then move from prediction

Janelle: Dealing with anamolies: teachers have trouble with this

Carol: Example of evolution: do you reject or accept the evidence? The evidence is compelling, turning the conversation away from "belief" terminology

Jack: Goes back to the uncertainty notion,

Ann: Comfort with uncertainty should be noted.

Ted: I think we're going to far deep. Something general that encompasses this should be used: Scientist used math models and data from a variety of obs to make predictions about weather and climate

Ted: Does the public need to know the details of how this is done?

Deke: But understanding these obs requires use of math, physics and an organized method of observation

jack: Yes, this isn't done by happenstance. Having the gen public understand that there is a process of knowing

Peter: The formal education piece is not about belief, but based on scientific inquiry

Understanding and quantifying the predicatability of the forecast

Climate predictions: how they differ from the projected local forecast

Dan: NSES statements on uncertainty:As students learn more sci processes, their explanations should become more sophisticated and reflect a greater tolerance for uncertainty.

Ann: Is it time to start grouping things? Are there emerging themes?

Janelle: Prediction models are based on scientific principles of sciences incluiding physics, and chemistry.

Peter: But not all prediction models are mathematical.

- Our understanding of the atm and climate system comes from accurate and purposeful observations of conditions at the earth's surface, throughout its atm and its oceans. Obs may be later by an instrument at the stie or from a distance.

Deke: Forecasts incorporate conceptual understandign, obs data, mathematics,

Jack: Models are an approximation of reality. Models range from simple concepts to complex mathematical relationships.

- Models and observations are used to make predictions about weather and climate. Forecasters use their knowledge, judgment, and models
- The atm is understandable and predictions can be made about its future behavior. There is, however, a limit to the accuracy of the predictions and instruments. Understanding these limitations is an essential part of forecasting.
- Accuracy and precision of models limits the accuracy of predictions, but improve with technological advancements.
- Observationally based understanding is used to construct models that can be used to make predictions
- Data about the atm involves measurements of temp, precip, wind, pressure, as well as remote sensing using radar and satellite imagery.
- Our understanding also comes from the applicatoin of scientific principles which include chemistry and physics.
- Models and new observations can be used to test and improve understanding.

4 reasons why we do observations. if you think about why you are doing it, help

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Rewording EP:

Through observations, measurements and the applications of scientific principles, humans can understand the past, present as well as predict the future behavior of the atm.

Session ends 12:05pm MT. Will resume with a quick plenary to go review before next round begins at 1pm MT. Thank you Sharon, Lois, and Linda for attending as well!