

Breakout 7D

Essential Principle: The atmosphere changes over time and space giving rise to weather and climate. (Second Chance)

Hi. My name is Teri Eastburn and I will be the blogger/OPL for this session. Our goal is to refine the fundamental concepts under the essential principle: The atmosphere changes over time and space giving rise to weather and climate. Please feel free to comment and I will be your voice within the session. The procedure will be as follows:

1. Review what was decided by the session 6 (please see 5d Powerpoint)
2. Individually reflect and refine the fundamental concepts.
3. Post stickies with these comments.
4. Review comments collectively.

Participating in this session are: Lucy Warner (Facilitator - UCAR Communications); Roberta Johnson (UCAR EO); Cindy Hamen (The College Board); Deke Arndt (Oklahoma Climatological Survey); Susan Avery (Univ. of Colorado); Julie Gustafson (NATIONAL WILDLIFE FEDERATION); Parker Pennington IV (National Earth Science Teachers Assoc.); Steve Ackerman (University of Wisconsin-Madison)

Review and comment on Weather and climate:

1. Weather changes over time periods of seconds to weeks; and climate changes from months to millennia. These changes can be gradual or abrupt relative to forcings.
2. "Weather" is the state of the atmosphere at a particular place and time and is influenced by climate.
3. Weather and climate are related and linked, but distinctly different subjects
 - a. o Weather is short-term, localized conditions in the atmosphere
 - b. o Climate is long-term, large-scale statistical average conditions

Here are the comments from the statements above:

- wx. and climate are linked but distinctly different different concepts.
- Sense of group is to replace first item, "Wx changes over time...." and use the third above instead.
- Let's say "Wx changes over time and space" and then break out the climate piece and space wx. piece.
- Roberta Johnson: Maybe what we need to address is why it changes over time and space in terms of the energy exchanges.
- Susan Avery: A lot of these statements are just statements of change with no explanation of why - external and internal forcings.
- Deke: climate is sensitive to the other spheres acting upon it as compared to wx (i.e. land use changes effects climate)
- Steve: actually, wx can be sensitive to other spheres too (e.g. lake effect in terms of snow fall...)
- **Let's say: the atmosphere exchanges energy and momentum in time and space in response to internal and external forcings that produce changes in wx, climate and space weather. (needs wordsmithing) This will be a restatement of a fundamental concept previously stated.**
- Comment: what does the word "forcing" mean here?
- Comment by Cindy Hamen: There are terms that are not commonly known in the statement above. There's a lot of "unpacking" that will need to be done.
- Deke: It would be nice to define wx and then climate because in my work it is a common question of people of all ages.

Review of concept "Many physical and chemical processes affect the atmosphere...."

- This belongs with the Earth System standards, not in under this principle.

Review of concept: Wx and climate vary by region based on latitude, physical features such as oceans and mountains and variations in the circulation of air.

This concept can be coupled with "The atmosphere exchanges energy and momentum in response to internal forcings that produces wxs., climate and space weather.

Comment: We like these but we need bullets underneath to "unpack."

Review: "Interactions between the atmosphere, ocean and land surface can shape weather features such as hurricanes and climate features such as ENSO."

Comment: Let's move this one out from under this principle.

Review: Many chemical and physical processes affect the atmosphere. Feedbacks can amplify or dampen atmospheric changes

Comment: Reword to: **Energy and imbalances and the response to those imbalances cause movements in the atmosphere.** We need to add a sub-bullet to space wx.

Review: Human activities contribute to weather and climate variability and change. Some changes can not be explained without taking human activity into account

Comment: Some suggest that we should eliminate this as there is a fundamental principle on this.

Comment of Julie Gustafson: I disagree that we should remove it.

Comment Deke: I have a compromise. We include the human impacts under one of the concepts under climate. (Many disagreed.)

Comment: Let's just drop the first half and say: **Some atmospheric changes can not be explained without taking human activity into account.**

Here are the concepts we've flushed out here. We do not feel we are finished and that there is more work needed.

- The atmosphere exchanges energy and momentum in time and space in response to internal and external forcings that produce changes in wx, climate and space weather. (Agreed that this needs wordsmithing)
 - Space weather bullet needs to be added.
 - Wx and climate vary by region based on latitude, physical features such as oceans and mountains and variations in the circulation of air.
- Energy and imbalances and the response to those imbalances cause movements in the atmosphere.
- Some atmospheric changes can not be explained without taking human activity into account.
- Do we define weather, climate, space weather here?

This session is now over. Thank you.

Online Viewers: Please use the "Add Comments" button below to add your comments and suggestions.