Webinar on Climate Services and Health

Extreme climate in the 21st century

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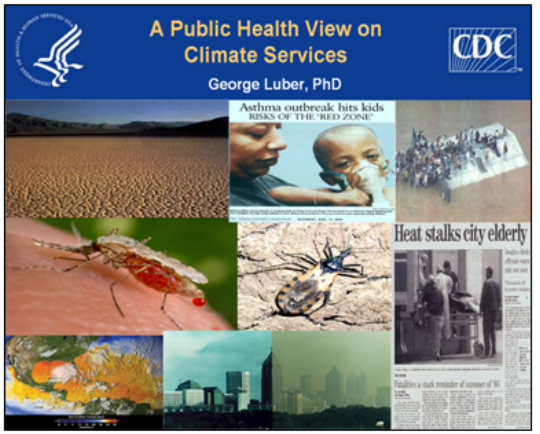
AMS Committee on Climate Services (CCS) November 6, 2009



Members: R. Boyles, R. Cohen, J. Dutton, C. Hakkarinen, H. Hartmann, K. Hubbard, P. Lanso, E. O'Lenic (Chair), K. Redmond, E. Shea. C. Simpson

Discussion questions for the panelists
(Questions and answers/comments are paraphrased for brevity and focus)
Following Dr George Luber's (GL) presentation:

Do you use any weather/climate data in addition to standard historic data (daily, weekly, monthly, seasonal temperature, precipitation, relative humidity, highs and lows, etc.)?

[GL] It is very important for public health investigators – especially in non-US settings– to understand the weather and climate parameters linked to a particular disease outbreak such as plague, hanta virus and monkey pox. Remote sensing data such as soil moisture and thermal band data are helpful in areas with little spatial and temporal coverage. But, in many instances the data are unavailable, especially for applications in developing countries.

Do you obtain climate information – observational data, analyses, predictions – from commercial weather and climate providers?

[GL] Yes, CDC and the public health community often have to look to other sources, especially for international data, and numerous commercial sources are used.

Following Dr Noah Diffenbaugh's (ND) presentation:

What climate information (observational data, prediction data) do you currently use and what additional climate information do you need?

[ND] In order to evaluate the performance of the climate models we use gridded observational data and point measurements. Reanalysis data are used to understand how well climate models represent the 3-dimensional structure of the atmosphere and for severe weather environments.
Better observations are needed, both from a climate model evaluation perspective and from a short term prediction, early warning system perspective. It is often difficult to obtain even basic observations in South Asia and Africa. [With regard to non-standard observational data that are needed,] a lot of work is underway to understand feedbacks from soil moisture to the atmosphere in creating short but severe heat waves.

What is the greatest difficulty you face when you utilize climate data in your research or application?

[ND] There is a gap between the original measurements and the processed data that tends to get used in the modeling community. A number of papers have addressed the errors that are created during the processing of the observational data, especially in addressing all the nuances of direct measurements such as the time dimension changes [across a region]. A lot of expertise is needed to create a synthesized dataset so we rely on the expertise of others.

Panel Discussion: Science and Scientific Process issues:

What type of climate information would be most useful for incorporation in your health model simulations/forecasts/surveillance/monitoring efforts?

[GL] There is a critical need for downscaled climate models. Public health tries to match the disease occurrence with the environmental parameters surrounding the event. Since data is not always available at that resolution, there is a need to interpolate the weather/climate parameters. The public health community needs information about appropriate ways to interpolate between stations [and gridpoints]. There is also a need to understand the limitations of the data (i.e., when a station has moved) and understand the historical record of a station. What are reasonable assumptions that can be made? Public health often uses weather data at face value without understanding its limitations (i.e. matching up date/time of a case with the available data). Sometimes only monthly data is available on cases, so we need to understand how we should determine, for example, an average temperature for the period. It can also be difficult to know where to go to obtain weather/climate data, even within a large organization like NOAA (i.e. NCDC, CPC, RCCs).

[It was noted that] the CPC has many global data sets such as daily precipitation, monthly soil moisture, evaporation, runoff, and temperature.

[GL] We are aware of that, and we are trying to develop a better relationship with CPC and other groups in NOAA.

Comment from a participant: Climate scientists use data across large time periods, so our time span generally runs out to a century or so. Stakeholders are focused on the next season, next several years – out to about a decade ahead. So there is a disconnect [between what climate scientists can provide and what is desired].

George, we often see that disease and health effects stemming from weather and climate events can depend quite strongly on the sequence of events [a precipitation event, then a temperature event, with possibly wind or humidity over a period], and the frequency with which climate models get the sequencing correct is not very well understood right now. Any comments?

[GL] It is the job of public health professionals to understand how weather elements in the sequence increase the vulnerability of a population (i.e. What if a power outage occurs due to increased use of air conditioning during a heat wave?). Climate models don't address this but it is a key component of a vulnerability assessment. Items to think about include: How long is the heat wave? When in the year does it occur? What is the susceptible/adaptive state of the population at that time? It would be very useful if we understood the variability and timing of extreme events with respect to other cycles (i.e., aflatoxin poisoning in Kenya, which resulted from mold induced by rains late in the corn harvest period).

[ND] Sub-daily data is available for evaluation of how the models handle that sequencing. For temperature variables, the climate models do pretty well. If you are looking at sequencing of precipitation, winds, and temperature (i.e. air stagnation), some parts of the world are better understood than others.

Some of the disease responses appear to respond more to "daily weather" rather than to a long-term "climate signal". So the need appears in these cases to be an improved ability to forecast daily weather parameters in a future, climate-changed world. I am not aware of much research underway on this approach. Are there groups in NOAA or elsewhere working on this research issue?

[ND] The climate community is well aware of this, and the large chunk of research is oriented toward daily weather events. There are many research programs (including the vast majority of my program) working on this issue including NCAR, in the university community, and internationally as well.

Climate/Health Systems Management, and Policy issues:

One of the most important issues involves the general awareness of the population to heat/health problems (and other weather-related health problems as well). The question is twofold…how do we increase public awareness on this issue, which is clearly quite low at this point? And…if we're concentrating on U.S. problems, how do we standardize public health response and coordination between weather service/public health officials across large U.S. cities?

[GL] Few know that heat waves are the number one killer in the U.S.. It is difficult to get the message across to the public and to the health community as well, so we need to convince local governments to develop and adopt heat health warning plans. The biggest challenge in generating a good response to a heat wave is community awareness. In too many fatal cases air conditioning was available but the individual was afraid to use it due to a higher electric bill but did not realize the threat they were under. Understanding the response curves for heat, and communicating that and getting people to take action is very important. Standardizing can be difficult – a local approach is needed. In heat waves, the same metrics can't be used for Phoenix and Philadelphia. There is a need to understand what data are available as well as the sensitivity of the population. CDC is working on developing standard practices for the development of climate change and health response strategies that will bring together critical weather and climate data into a portal that will allow for the examination of relationships between weather/climate events and mortality/morbidity.

With regard to health, how will the various actions to research, mitigate, and adapt be prioritized across the needs of various agencies, special interests and the general public?

[GL] There is an effort underway through the US Global Change Research Program and the Office of Science Technology and Policy to understand what the federal framework for climate adaptation should be. During the past 8-9 months, the group has been taking stock of the priorities of the different agencies and will begin to develop a framework that accommodates the various approaches.

[ND] Prioritizing is tough as groups have different interests and priorities. The need for reliable local scale, near term climate projections is a tough scientific problem that is being worked on. To address decisions needing climate/health guidance now, it would be useful to identify the gaps where we are not going to have reliable information and figure out a way to make decisions under those conditions.

Is there a central message about climate and health that could be a key argument in building consensus in climate change legislation in the U.S.? If so, should that message also inform the U.S position at Copenhagen?

[GL] A focus on two aspects would move the dialogue in a positive direction: 1) a shift to an emphasis on societal impacts with health being critical among them and 2) an understanding of the co-benefits of climate mitigation strategies – ways that society could benefit, i.e., clean the air, promote active transportation, reduce obesity, reduce motor vehicle injuries and reduce global warming at the same time – as well as the unintended consequences [example: linkage of extreme malnutrition in Guatemalan highlands with U.S. conversion of agricultural production into ethanol fuel production].

[ND] We have uncertainty about what the future climate state will be but there are areas where we have a sense of where things are headed. A measure can be taken where, if there is a benefit regardless of the climate outcome then that is a way of dealing with the uncertainty about future climate change in a constructive way that will also have benefits even if we are wrong about the future climate change.

What can certified consulting meteorologist (CCMs) do to assist in the education of groups such as local governments?

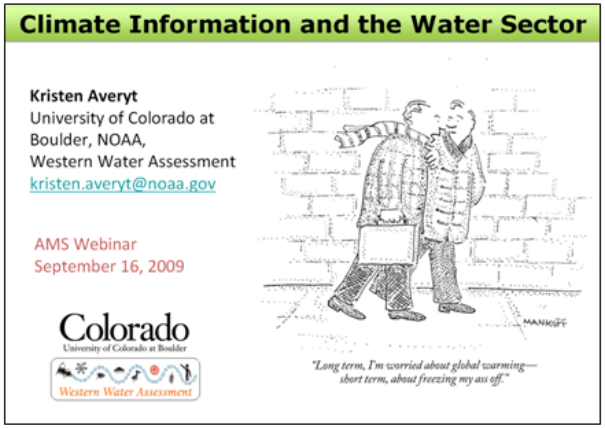
[GL] There is an important role that any scientist can have in the community by highlighting an empirical approach to local climate adaptation and to help with identifying priority impacts and priority interventions for the protection of human settlements. They can also engage in the climate adaptation process, as cities develop climate action plans: get a seat at the table for local public health to marry the environmental justice issue along with the climate change issue.

http://www.ametsoc.org/boardpges/cwce/docs/BEC/index.html

Joint CCM-CCS Webinar on Climate Services to the Water Sector

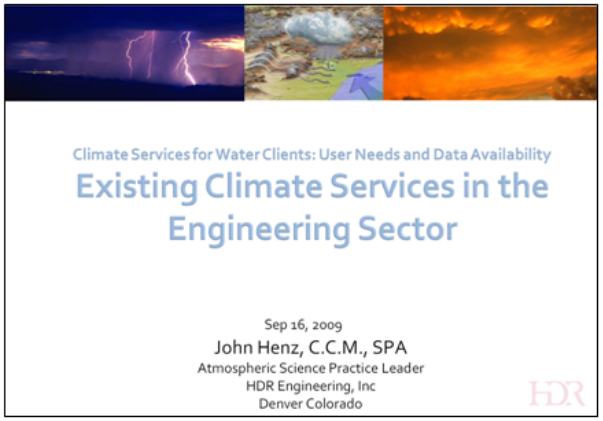
AMS Committee on Climate Services (CCS)
September 16, 2009

Members: R. Boyles, R. Cohen, J. Dutton, C. Hakkarinen, H. Hartmann, K. Hubbard, P. Llanso, E. O'Lenic (Chair), K. Redmond , E. Shea. C. Simpson



Kirsten Averyt's presentation, entitled "Climate Information and the Water Sector" addressed 1) cognitive challenges, 2) integrated frameworks, and 3) climate information needs. She noted that climate variability and change have disrupted the notion of stationarity of the precipitation record, which is one of the staple assumptions of the water community in making predictions. She noted that it is important to bring together tool developers and users in an iterative process. This takes time, because trust is also essential to the relationship, and that takes time to build.

Eileen Shea discussed "Climate Services for Water Clients: User Needs and Data Availability". Eileen described how the various government members of the climate community (PRODUCERS of climate information in the form of observations, monitoring, research, modeling, and assessments) might, through the National Climate Service, address the needs to the USER community, including resource risk management and adaption and mitigation. She narrowed her focus even more to discuss services to the water community, noting that CCMs and other service partners address key user needs, and are in a position to develop trusting relationships with users.



John Henz's presentation, entitled "Existing Climate Services in the Engineering Sector", provided insight into the climate services provided by the engineering company employing him. These services ranged from the development of drought management plans for reservoirs, predictions of climate impact on river water supplies, to assessing the climate change impacts on EIS/EIR studies. He offered ways the weather enterprise members can work together rather than compete in climate services. Eileen Shea of NOAA agreed and provided examples.

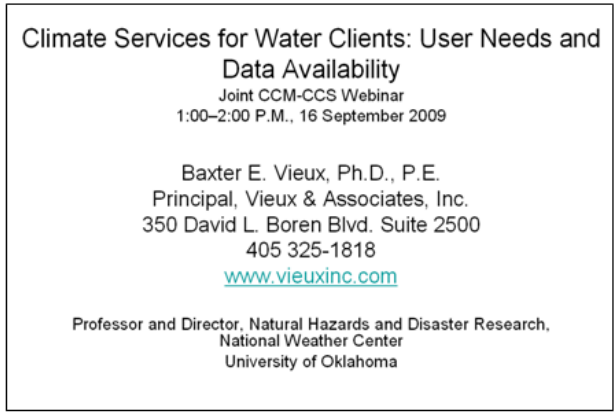
Baxter Vieux: Water availability is profoundly affected by many different factors at the same time. Among his conclusions are:

Understanding changes in precipitation and streamflow climatology is important in assessing future conditions, design of urban infrastructure, managing water quality, or forecasting the impacts of climate change.

Usefulness in climate and water services could be improved through access to data from multiple agencies with documented accuracy and metadata having a sufficient period of record to detect trends adequate geographic distribution of homogeneous sensor data continuity in sensor type (discontinued sensors or changes).

Metadata that describe sensor conditions often missing or inconsistent.

Forecasting water availability, flooding, or low flow characteristics relies on understanding the accuracy, and trends of long-term measurements.



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