Summary of *Adapting to Oklahoma's Climate: Continuing the Conversation* Breakout Sessions
May 10th, 2011

Compiled by Charlotte Lunday

Important Points:

- Local
- Short-term and Long-term Models
- Wider Range of Information
- Impacts-Based
- Geared towards non-scientist audience
- Maps communicate effectively, but other formats are necessary for other projects.

Breakout Session 1: Communicating with Climate Visuals

Participants were arranged according to the sector they work with for the breakout session and were given examples of different ways climate information could be illustrated (see Appendix A). Participants were then asked a series of questions about the examples. The purpose of this exercise was to identify the kind of visual formats that effectively communicate climate projection information to decision-makers.

Agriculture

Response to the images from the agricultural sector was largely critical. Concerns largely focused on data confidence and locality of information provided. Participants overwhelmingly expressed concern in the accuracy of climate change projections, doubting the effectiveness of data extrapolation. Most seemed to advise that emphasis should be placed on data that has been collected rather than on what is expected. They also stressed that people in their field are typically concerned with shorter time periods; they are not concerned with 50 years from now. Generally, participants agreed that anything beyond 20 years is completely irrelevant, and projections for larger time periods are easy to doubt. Ten years, they seemed to agree, is a stretch.

Locality of information is also important to the agricultural sector. Region specific information is good, but the more local, the better. Although, it is good to have some global perspective, what really is needed for people in agriculture, according to the participants, is local information. Those who work in agriculture need to know if a crop is going to survive that season where it is being planted. If it would not survive in another country, or even in another state, is not important and will not affect any decisions. However, past climate for a specific locality, extremely short-term projections with confidence indicators, and area-specific information

such as common agricultural practices and products used are more helpful. Perhaps after the ultra-specific, agriculture-centric information is provided, broader climate information can be introduced.

On a final note, definitions of "low-emission scenario" and "high-emission scenario" need to be made with notes of relevance to the sector that will be viewing the information.

Cross Sector (Transportation & Non-Profit)

According to participants in the cross sector group, maps are the most easily relatable visual aids. Time series representations, they said, are hard to comprehend if the person viewing them is not a scientist. More specific land areas are helpful, but larger geographic areas also serve a purpose and put local events and information into a larger perspective. The broad time scale, nevertheless, was agreed to be appropriate.

Climate information that denotes probable consequences and impacts are extremely useful. Some participants also noted that focusing on extremes is more valuable than averages, since parts of their jobs center on extremes.

Noting confidence and including observations on all trend depictions is a must. Although uncertainty is expected, participants wanted to know what uncertainty exists and where. Including observations is also necessary because it adds confidence to datasets. Along with confidence information also needs better use of and descriptions of terms. If participants don't know what something means, how can they use the information effectively?

Water

A major point made in the water sector group was that climate visuals and projections need to be formatted in a sense that the layperson would understand. Funding for water projects often has to be approved by city councils and people without much background in climate and water science. Thus, information must be formatted in a way to make that it can be easily understood by someone outside the field and in a way that clearly depicts urgency.

Furthermore, impacts must be clear. Little confidence seems to exist among this group in how much they would be funded if city council members saw a mere degree temperature increase over the period of four decades. Nevertheless, if that degree temperature increase was communicated in terms of impacts, projects based off of that information would more likely be funded.

Water sector participants liked the large time scale of information and appreciated national maps, but also would like to see local information and watershed specific information. They also expressed the desire to combine temperature and precipitation on one visual. Observations give perspective to model data, so representing observations is a must, but offsetting from model-data in images would bring more clarity.

Cities and Tribes

Participants in the cities and tribes sector expressed differences between what they understand and what their constituents would understand. Making information available to the public requires the use of visuals with well-defined terms and more localized information. It also requires visuals to quantify uncertainty of climate change projection in terms of impacts. In fact, climate change information, in general, should have a large impacts focus.

As for the participants themselves, they reported being familiar with climate change concepts and terms, although they were not confident in the layperson's understanding, and they were curious to see more scientific information. Observations are helpful, but participants expressed an interest to seeing more observations and information from geologic history. They express concern over the certainty of climate information when the visuals do not include a broader time span that shows cyclical climate patterns. The biggest emphasis from the cities and tribes participants was that their constituents should be able to clearly understand all the information a visual portrays and be familiar with the impacts so that they find the information compelling enough to take action.

Summary

Common themes from all groups about the visuals were that the participants stressed the need for more localized information, well-defined legends, and quantifiable impacts and uncertainty. All participants expressed concern that their colleagues and patrons have geographically-centered viewpoints, and would not care about information that does not affect them immediately, or that doesn't appear to be of immediate concern. Because funding is limited in most of these sectors, it is imperative that visuals appeal to funders and taxpayers. Thus, all information must be in clear terms. Definitions of key terms, such as high-emission scenario and low-emission scenario, must accompany visuals and must be worded in clear terms so that non-scientists clearly understand the meaning. Parameters used in image-development should be clearly stated. Likewise, uncertainty must be quantified to show exactly what is known and where the questions are. Finally, everything, uncertainty included, must be put in terms of impacts. This may mean that many images must be used to communicate one idea, but the participants overwhelmingly expressed concern that most people would not be moved by a degree or two temperature increase over several decades would not motivate many people to care or take mitigation or adaptation measures. However, if that temperature change was translated into impacts, then it would communicate immediacy more and perhaps convince people that mitigation and adaptation is necessary.

Breakout Session 2: Climate Tools and Models

Participants were asked during the second breakout session to consider climate models and tools, the specific information they need to make decisions, and the point at which information becomes useful.

Agriculture

Agricultural demands for climate models, the participants recognize, might be well beyond the ability of models at the moment. Nevertheless, participants in the agriculture sector stress that what they need and what growers need is hyper-localized information. What is happening in that grower's area specifically? And what will be happening during the duration of growing a crop and seeing the return on that investment? Thus, agriculture sectors need small and seasonal time scales to work with.

Uncertainty, participants said, is also an important piece of information. Because growers make largely personal decisions with their money, they want to know the uncertainty of certain ventures so that they can accurately measure the riskiness of certain ventures and make decisions based off of that.

Although averages are the types of information usually show in climate models, extreme information is more pertinent to participants in the agriculture sector. Many of their decisions, and many impacts to their field are related to extreme events. Modeling those would be much more useful than averages.

Cross Sector (Transportation & Non-Profit)

The cross sector participants appreciated a wide scale of information. Participants expressed a desire to see time scales as short as five years and local spatial scales, as well as long periods of time and wide ranges of space. This is because projects vary in size and in length of time, and their needs depend on budgets and long-term strategic planning.

Cross sector participants also discussed the need for information about major weather events. Although temperature and precipitation are the variables commonly modeled, floods, ice storms, and droughts are what make sense to people and communicates risk to them. Thus, having data and models about them would be more helpful. Also, one participant made a note that the modeling needs are location specific, not just sector specific.

When uncertainty is concerned, keep the public in mind. Cross sector participants often work with non-scientists and need information presented in a way that motivates people and is easily understood. They mentioned that if their bosses and policy makers are persuaded to do something because they found the information exact and logical, then they would probably want to know every bit of uncertainty that exists in the data presented to them. However, if people are motivated by something that has shock-value like an extreme trend, then not discussing uncertainty may be a better option.

Participants in the cross sector group noted that maps are the best format in which to present information but that raw data may also be helpful in certain instances. All assumptions and definitions should be written out at middle-school reading levels.

Water

Water participants have various data and modeling needs depending on the project. In terms of budget cycles and organizational plans, information is needed as short as five years out. However, watershed data and groundwater information require longer-term data. Seasonal and monthly intervals should be used as well. Spatial scales vary according to projects. Some projects may require information over as little as 1 sq. mile, but others require much larger areas. Thus, grid-based spatial distribution in a resolution like that of the Mesonet is preferred.

Precipitation, evaporation, soil moisture, and sediment rates are all variables that water participants expressed wanting climate information on. In particular, precipitation and evaporation. Having models that account for climate change for precipitation and evaporation help make long-term plans better than assuming stationarity. Likewise, data that represents averages, extremes, and seasonal changes are all useful. Water participants would also like models for (consecutive) days where the temperature is around freezing or below and for days that are really warm.

Uncertainty needs to be shown so comparisons of risk vs. uncertainty leads to better decision-making. Confidence thresholds such as 50 and 70 percent would also be good to include with the data. All participants agreed that ranges and averages are helpful formats when communicating uncertainty.

Climate information can then be modeled spatially, and raw data should be made available to viewers in a format that they can upload the data into their own tools.

Cities and Tribes

In terms of time and space, needs are fairly short-term and local. Although some things like water plans need data out to 50 years, many of the projects that cities and tribes undertake are relatively short. Likewise, although national and global information provide useful contextual information, regional scales are better, and municipal-specific information helps justify funding.

Cities and tribes expressed a greater range of data needs than the aforementioned groups. Apart from projecting precipitation and temperature (in Fahrenheit and Celsius), trends in humidity, pollutants, greenhouse gases, storm severity, degree days, and soil temperature and moisture were also cited to be important. Extremes and seasonal swings should be noted along with averages.

Specific events make city and tribal participants pay attention to what is going on. For example, city and tribal participants would be interested in storm and air quality alert trends. These events are important to them.

Information presented should be presented in maps, graphs, and raw data should be made available.

Summary

Once again, the needs that came up across each group were needs for local and short-term and long-term information. Variables other than just precipitation and temperature need to be modeled. Participants in each sector work on a wide range of projects, and knowing temperature and precipitation information along is not typically useful as it does not help very much when lobbying for budgets.

Appendix A: Example climate projection visuals

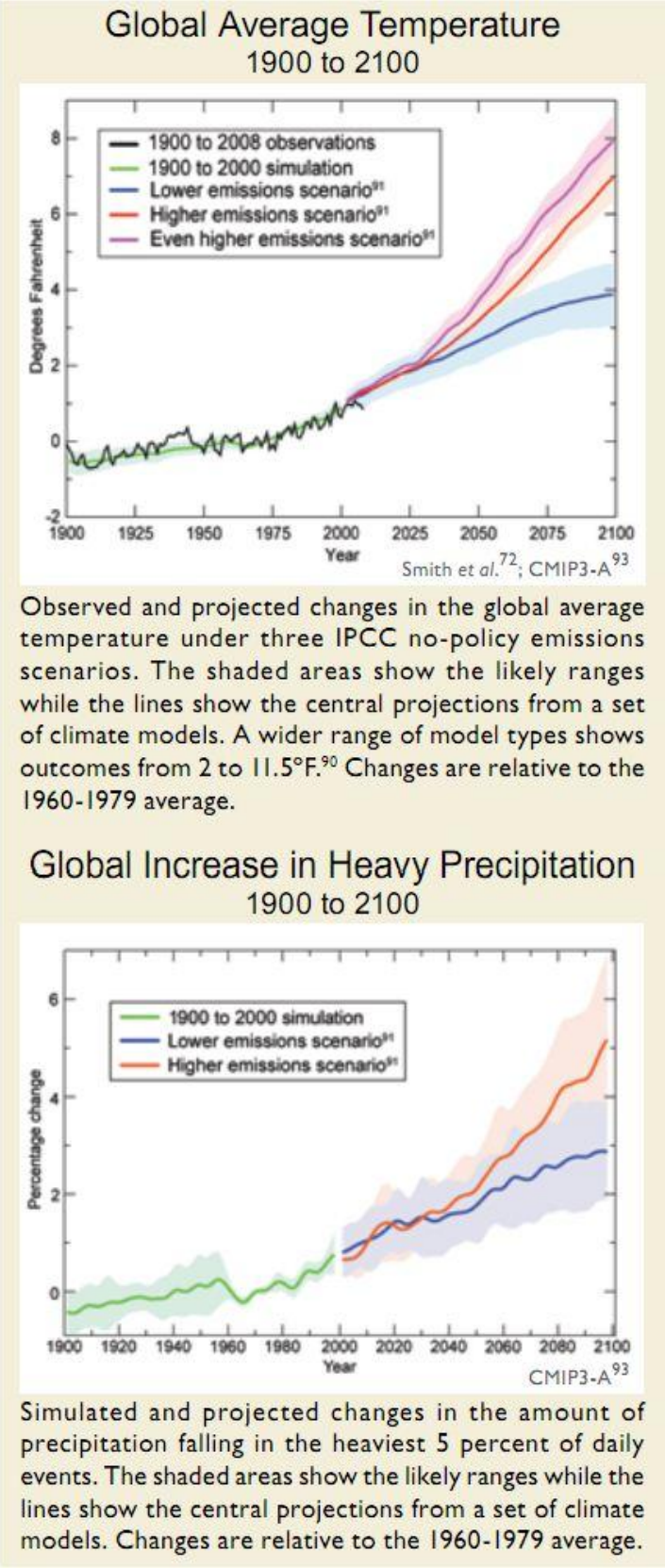


Figure 1: Temperature & Precipitation Time Series (USGCRP 2009)

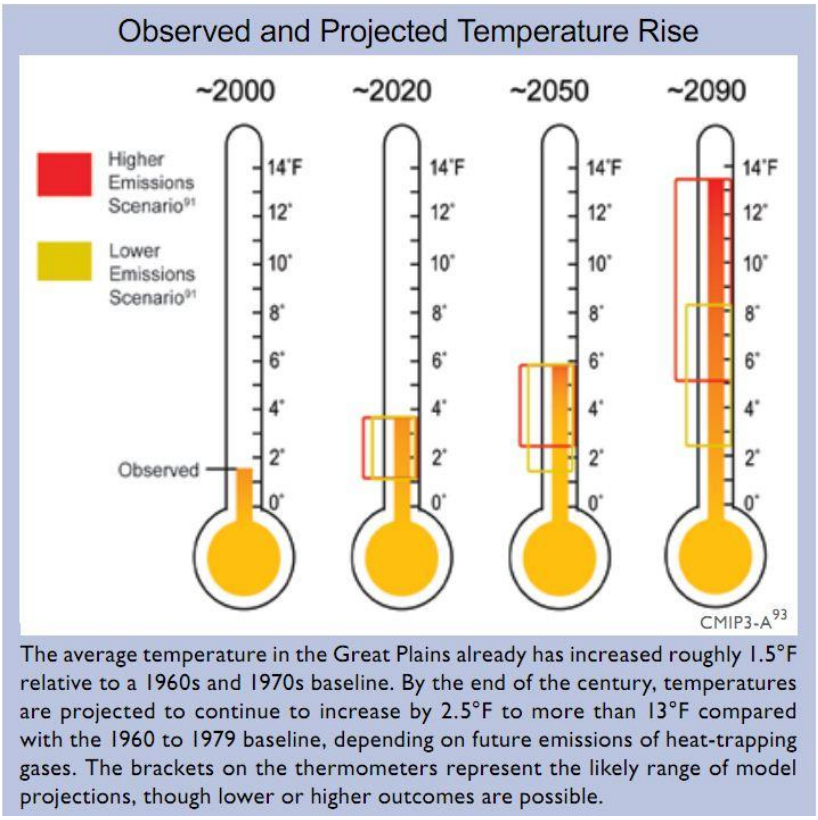


Figure 2: Temperature Change Thermometer (USGCRP 2009)

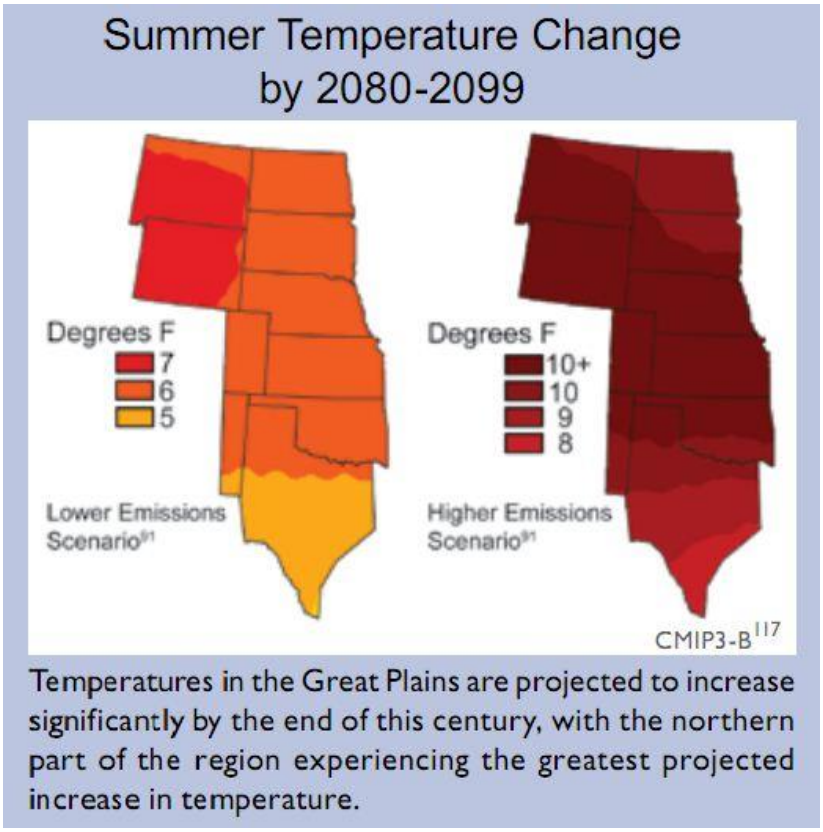
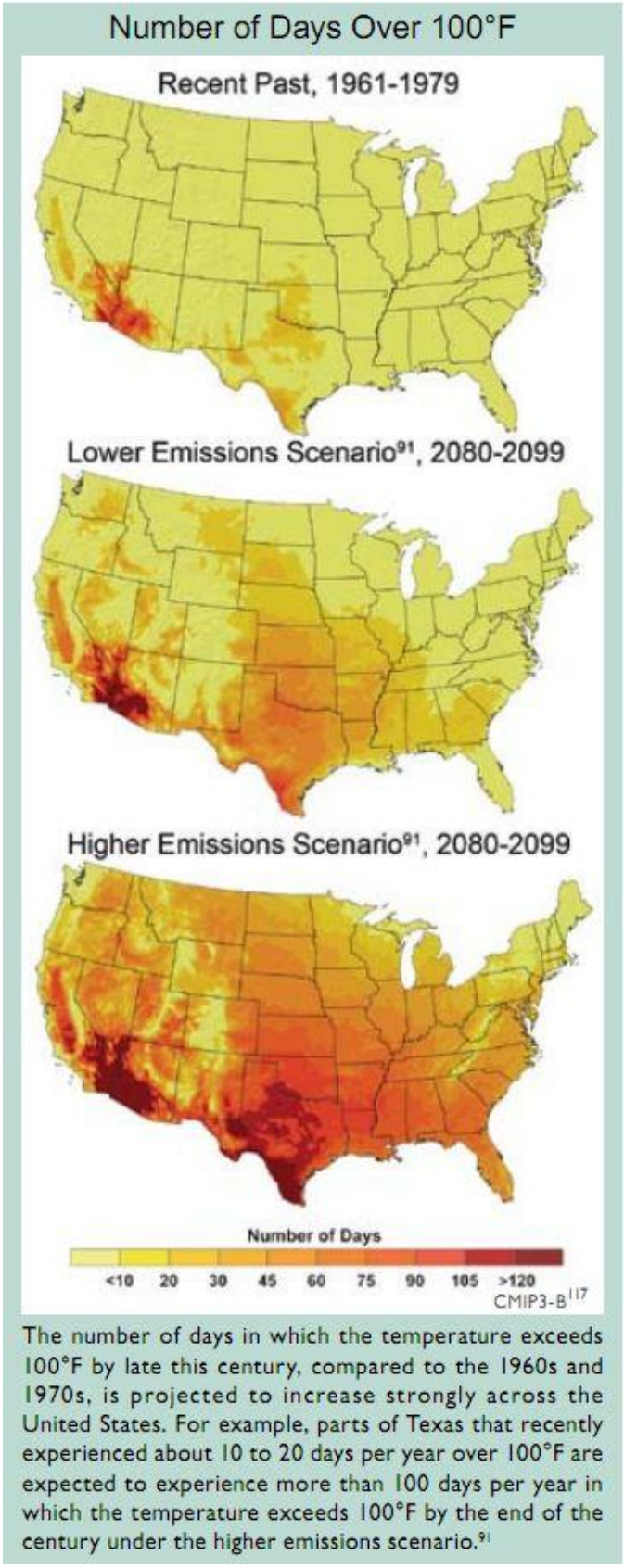


Figure 3: Temperature Change Map (USGCRP 2009)



The number of days in which the temperature exceeds 100°F by late this century, compared to the 1960s and 1970s, is projected to increase strongly across the United States. For example, parts of Texas that recently experienced about 10 to 20 days per year over 100°F are expected to experience more than 100 days per year in which the temperature exceeds 100°F by the end of the century under the higher emissions scenario.[91]

Figure 4: Temperature Threshold Map (USGCRP 2009)

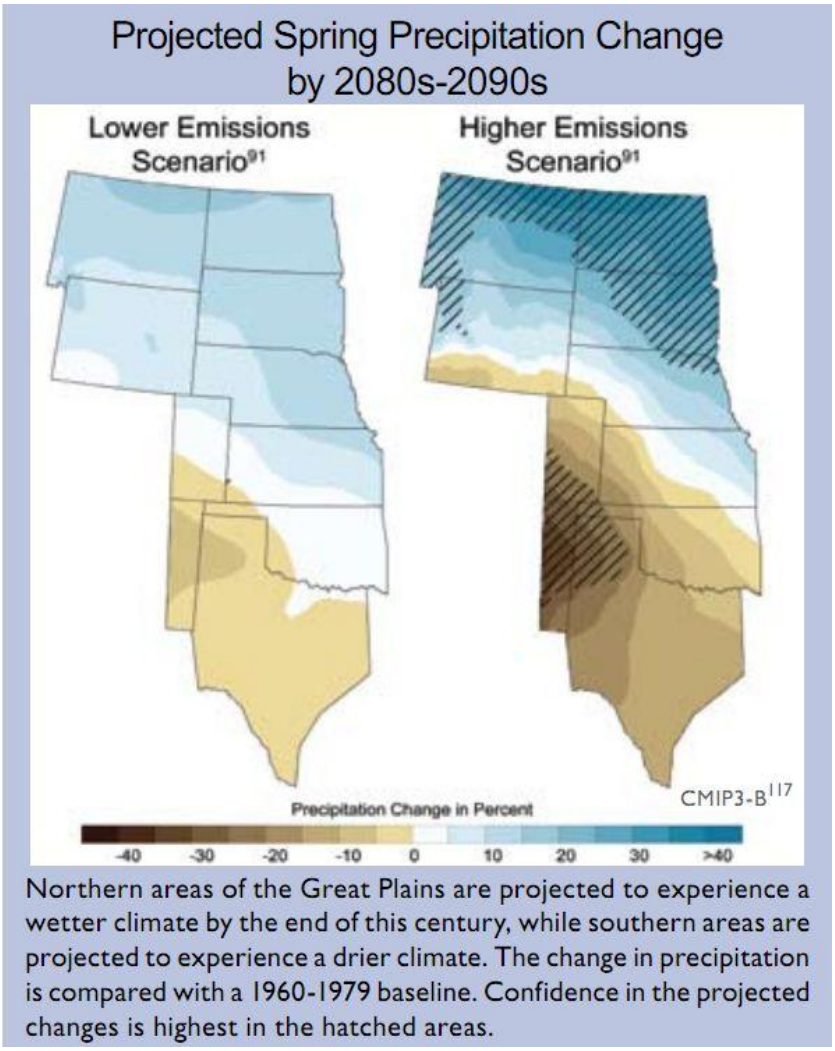


Figure 5: Precipitation Change Map (USGCRP 2009)

Reference:

United States Global Change Research Program (USGCRP). 2009. United States, Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press. 196pp.