Climate and WATER

Roy Rasmussen (NCAR)
David Yates (NCAR)
Kathy Miller (NCAR)
Brad Udall (U Colorado)
Jonathan Overpeck (U Arizona)

Ca. 40 participants in breakout
What can the UCAR community could be doing to help local and regional decision makers deal with the climate change adaptation and mitigation challenge?

How are these projects working and what lessons have we learned?

• There are quite a few science-stakeholder partnerships developing, and there are lessons learned.…
  - For example, an end-to-end approach at NCAR to connect the science to decision-making in water
  - NOAA RISAs - 9 total in US; Western Water Assessment; Climate Assessment of the Southwest
  - Decision-support tools being created on limited basis
  - Some utilities get it and they are powerful
    *E.g., Water Utility Climate Alliance and AwwaRF* – with big political (Congressional) connections
Lessons learned...

• Climate not incorporated in many stakeholder contexts; climate is still stationary in many operational plans, but awareness is growing; 
  *conversely*, climate will never be the entire decision-driver, so we have to understand decision-making contexts - e.g., need climate in mix of water, laws, regulations, ecosystems, culture, recreation, health, energy, etc. etc.

• Have to get the science out to society better (IPCC isn’t enough), but also need to reduce “Climate change public whiplash”

• Obviously - need for more communication and science “translation” that is focused on specific stakeholders.

• Uncertainty, and planning under uncertainty, nothing new to some (e.g., water) stakeholders - they are relatively sophisticated; e.g., so already developing risk-based decision analysis
Lessons learned…

• We need more focus on “use-inspired” or “stakeholder-driven” science, in addition to “basic” science

• Sustained stakeholder partnerships are needed to build understanding, co-generate knowledge and generate trust

• Need to focus on show-stoppers - megadrought, thresholds - can we see them coming, and plan
Lessons learned...

• There is key science still to be done! Many key processes - e.g., within the hydrologic cycle need to be understood and represented in state-of-the-art models; getting regional climates right
  Convection
  Representation of planetary boundary layer
  Cloud macro-physics
  Model resolution – what you can simulate vs parameterize
  Groundwater
Lessons learned…

- Global matters, but regional is what decision-makers really need

  Great quote -

  “if the large scale is rubbish, then the detail is rubbish, too”
  Sir Brian Hoskins

  Bottom-line…need the resources to do both
What can the UCAR community could be doing to help local and regional decision makers deal with the climate change adaptation and mitigation challenge?

What can our community can do to assist these partnerships (e.g., models and other tools, better information, training opportunities, outreach, sharing ideas, etc.)?

• Can we speed up the discovery cycle?
  - Right now, natural discovery cycle is just slow
  - for example, the IPCC mandate means certain priorities get priority

• meeting nation’s modeling requirement needs both NCAR (and GFDL) and a more distributed university network of innovators. Is there a way to get the centers and universities to work better/faster together? Universities especially needed to meet regional need!
More on what we can do…

Big (BIG) needs

• Regional climate projections and predictions

• Regional observations – e.g., soil moisture, snow pack from mid-elevations

• Comprehensive and interdisciplinary decision-support knowledge and tools.

• Training the next generation to make it all work and be useful
More on what we can do…

• Can we use UCAR facilities (e.g., aircraft) be used to support stakeholder needs more than just basic research? -E.g., use aircraft to use facilities to test regional-science hypotheses; use new UCAR computing facilities is to get down to the scale needed for regional climates.

• One-stop shopping/clearing house - need to collaborate w/ regions/stakeholder groups/other agencies etc. Can UCAR help here? E.g., for what is going on at state/regional levels.

• Also, working with other agencies, e.g., in meeting their needs, and anticipating their needs - for example for future disaster management.

• More generally, need to focus on interagency coordination, e.g., with emerging climate services.
More on what we can do...

• The job is huge - global to regional - and needs a major advance.

• It was suggested that the distributed Center - University effort needs to be expanded and made more effective.
  - UCAR/NCAR needs resources to support models for greater university use, and
  - universities need to coordinate more to improve the community modeling resources in ways that meet both global and regional needs
  - including, more outreach seminars, on-line resources.

States and stakeholder should be part of the strengthened partnership too
Bottom-line?

Unless we improve the effectiveness of the Center-University-State-Stakeholder-etc partnership, progress might remain too slow to meet the climate change adaptation and mitigation challenge that is likely coming faster and faster.