

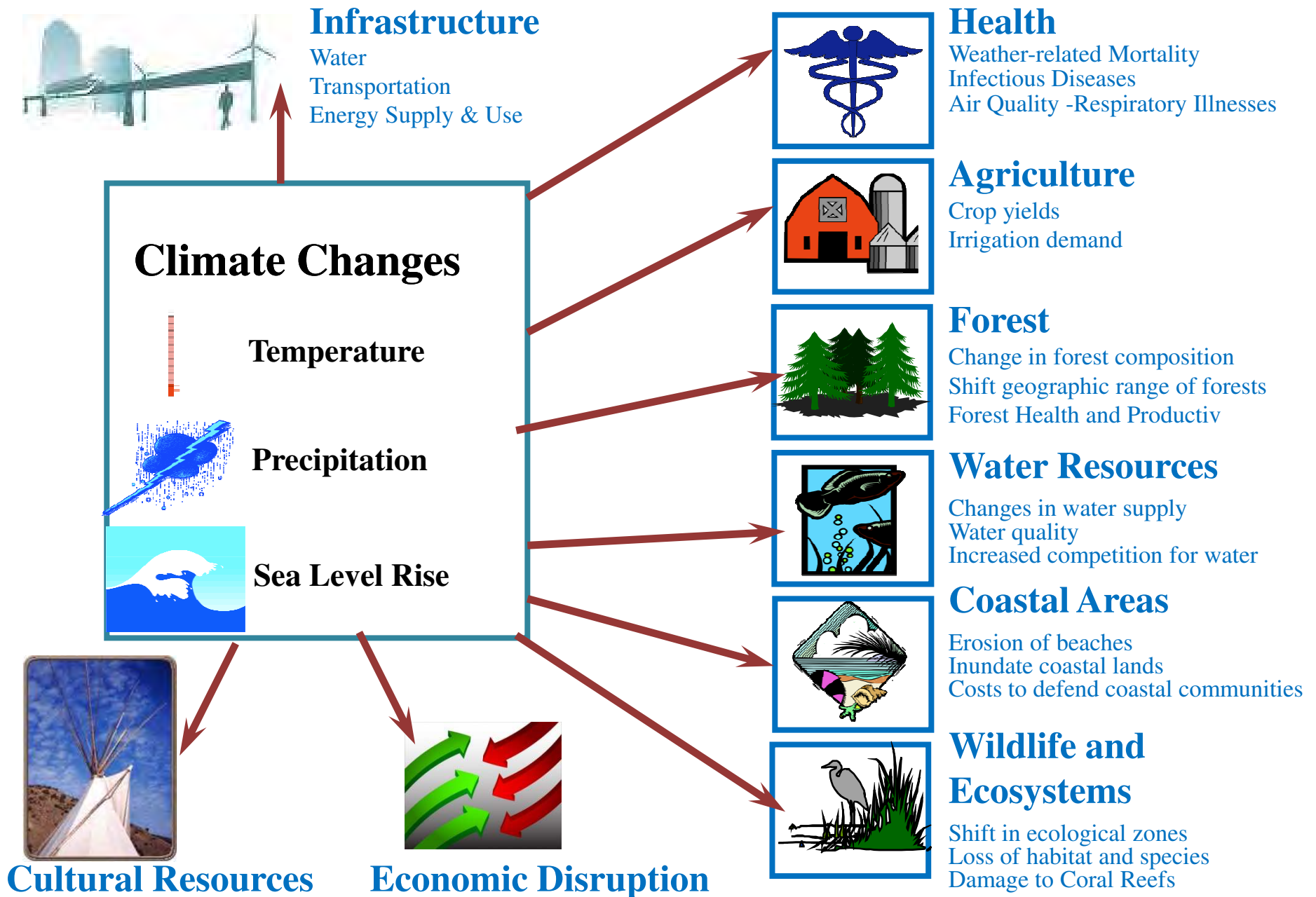


Asking the Climate Question: Why ask? Who should ask? What then?

NALMS 19th Annual Southeastern Lakes Management Conference May, 2010

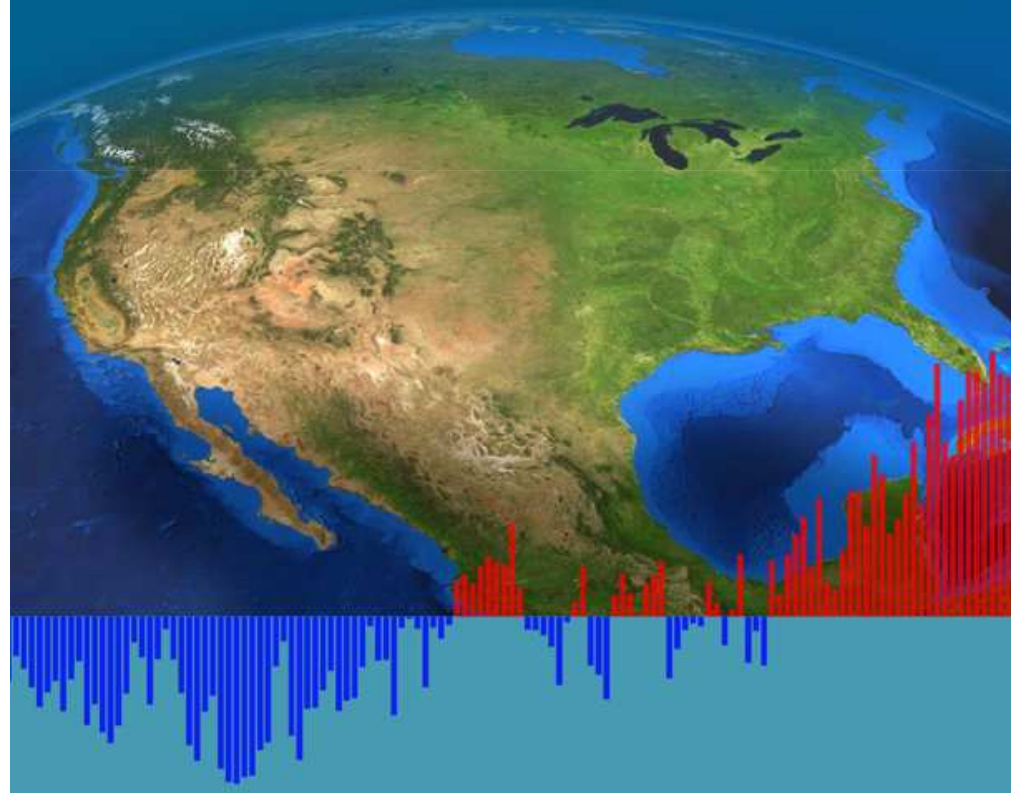
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Potential Impacts of Climate Change



Global Climate Change Impacts in the United States

U.S. GLOBAL CHANGE RESEARCH PROGRAM



Global Climate Change Impacts in the United States



1. Global warming is unequivocal and primarily human-induced



2. Climate changes are underway in the United States and are projected to grow

3. Widespread climate-related impacts are occurring now and are expected to increase

Energy Supply and Use

Society

Ecosystems

Transportation



4. Climate change will stress water resources

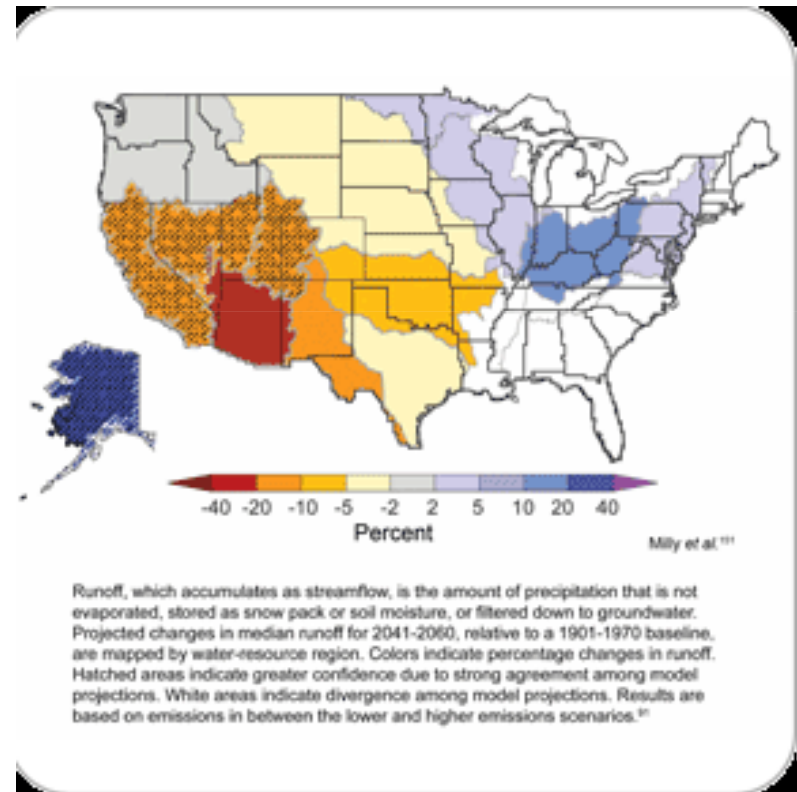
Water cycle is altered, affecting where, when, and how much water is available

Floods and droughts become more common and intense

Less snow, more rain

Wet areas get wetter, dry areas get drier

Increased competition for water supplies



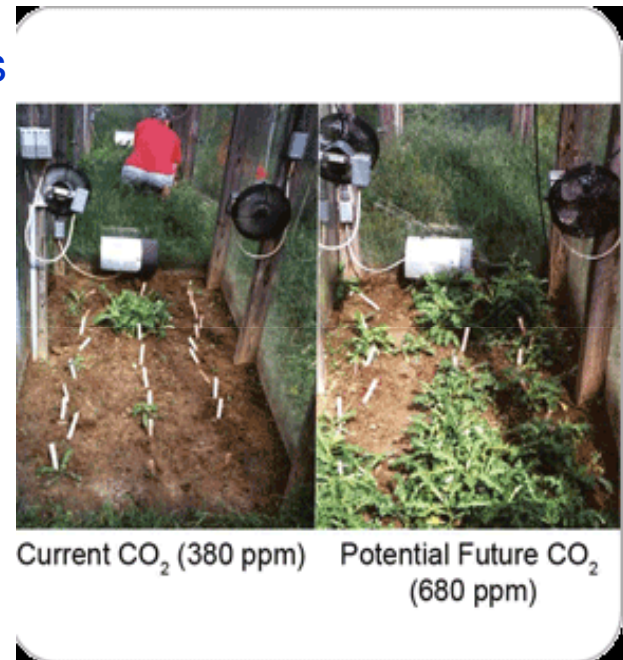
5. Crop and livestock production will be increasingly challenged

Positive response to elevated CO₂ and low level warming; negative impacts at higher levels

Extreme events (heavy downpours, droughts) are likely to reduce crop yields

Weeds, diseases and insect pests benefit from warming

Increased heat, disease, and weather extremes are likely to reduce livestock productivity



6. Coastal areas are at increasing risk from sea-level rise and storm surge

Erosion and loss of land; flooding; increased pollution; ocean acidification

7. Threats to human health will increase

Heat stress; waterborne diseases; poor air quality; extreme weather events; diseases caused by insects and rodents; pollen increases; children, the elderly, and the poor are most vulnerable to climate-related health effects

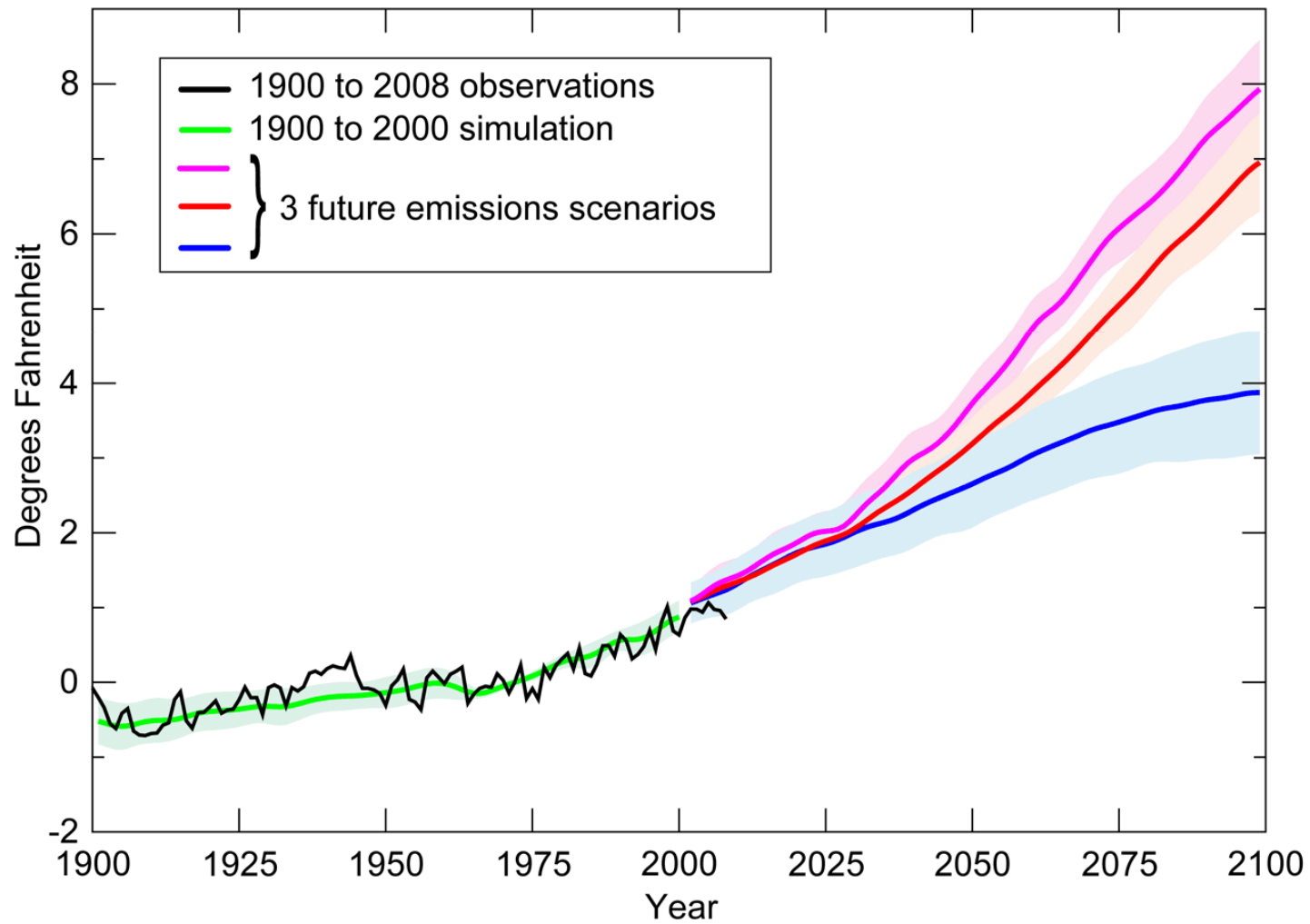
8. Climate change will interact with many social and environmental stresses

9. Thresholds will be crossed, leading to large changes in climate and ecosystems

10. *Future climate change and its impacts depend on choices made today*



Global Average Temperature, 1900 to 2100



Projected Impacts in the Southeast

- Decreased water availability is very likely to affect the region's economy as well as its natural systems.
- Projected increases in air and water temperatures will cause heat-related stresses for people, plants, and animals.
- Sea-level rise and the likely increase in hurricane intensity and associated storm surge will be among the most serious consequences of climate change.
- Ecological thresholds are likely to be crossed throughout the region, causing major disruptions to ecosystems and to the benefits they provide to people.
- Quality of life will be affected by increasing heat stress, water scarcity, severe weather events, and reduced availability of insurance for at-risk properties.

Projected impacts to water

- Climate change has already altered, and will continue to alter, the water cycle, affecting where, when, and how much water is available for all uses.
- Floods and droughts are likely to become more common and more intense as regional and seasonal precipitation patterns change, and rainfall becomes more concentrated into heavy events (with longer, hotter dry periods in between).
- Precipitation and runoff are likely to increase in the Northeast and Midwest in winter and spring, and decrease in the West, especially the Southwest, in spring and summer.

Projected impacts to water (cont.)

- In areas where snowpack dominates, the timing of runoff will continue to shift to earlier in the spring and flows will be lower in late summer.
- Surface water quality and groundwater quantity will be affected by a changing climate.
- Climate change will place additional burdens on already stressed water systems.
- *The past century is no longer a reasonable guide to the future for water management.*

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Climate change will affect many aspects of our lives as it alters the character of every region.



So who should ask the climate question?



All of us

What Then?

Response Strategies

“**Mitigation**” – reducing the amount of climate change, for example, by reducing heat-trapping emissions or increasing their removal from the atmosphere



“**Adaptation**” – improving our ability to cope with or avoid harmful impacts or taking advantage of newly favorable conditions



Both will be needed.

Basic Categories of Actions

Increase your climate literacy

Build partnerships

Think, learn and speak “risk management”

Identify and implement “no regrets” actions

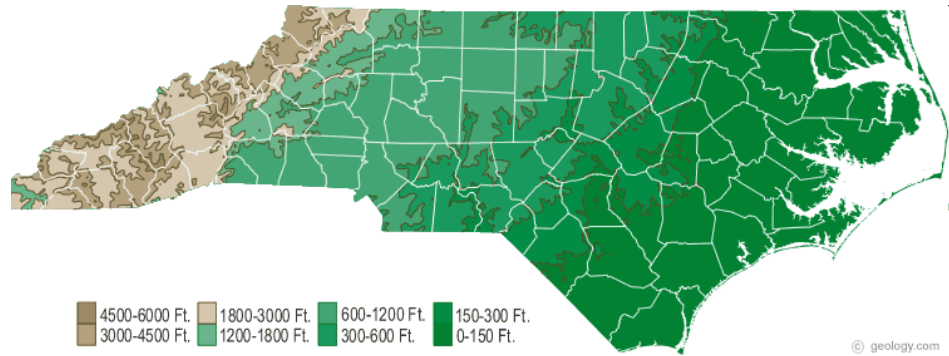
Learn to communicate on climate issues

Increase your climate literacy

- <http://www.noaa.gov/climate.html>
- <http://www.epa.gov/climatechange/>
- <http://www.climatechange.nc.gov/>
- <http://www.ipcc.ch/>
- <http://www.usgcrp.gov/usgcrp/default.php>
- <http://www.pewclimate.org/>

Build Partnerships

Dealing with the challenges of climate change, via both mitigation and adaptation strategies, will involve working across disciplines, across levels of government, across jurisdictional boundaries, and with all age groups, socioeconomic levels and economic sectors.



Think, learn and speak risk management

Adaptation to climate change involves mitigating risk, which has three main components:

- Reducing exposure
- Reducing vulnerability
- Increasing resilience

What will happen cannot be predicted; what might happen can be considered

Uncertainty and Climate Change

Currently two competing paradigms in the climate change science and impacts community. . .

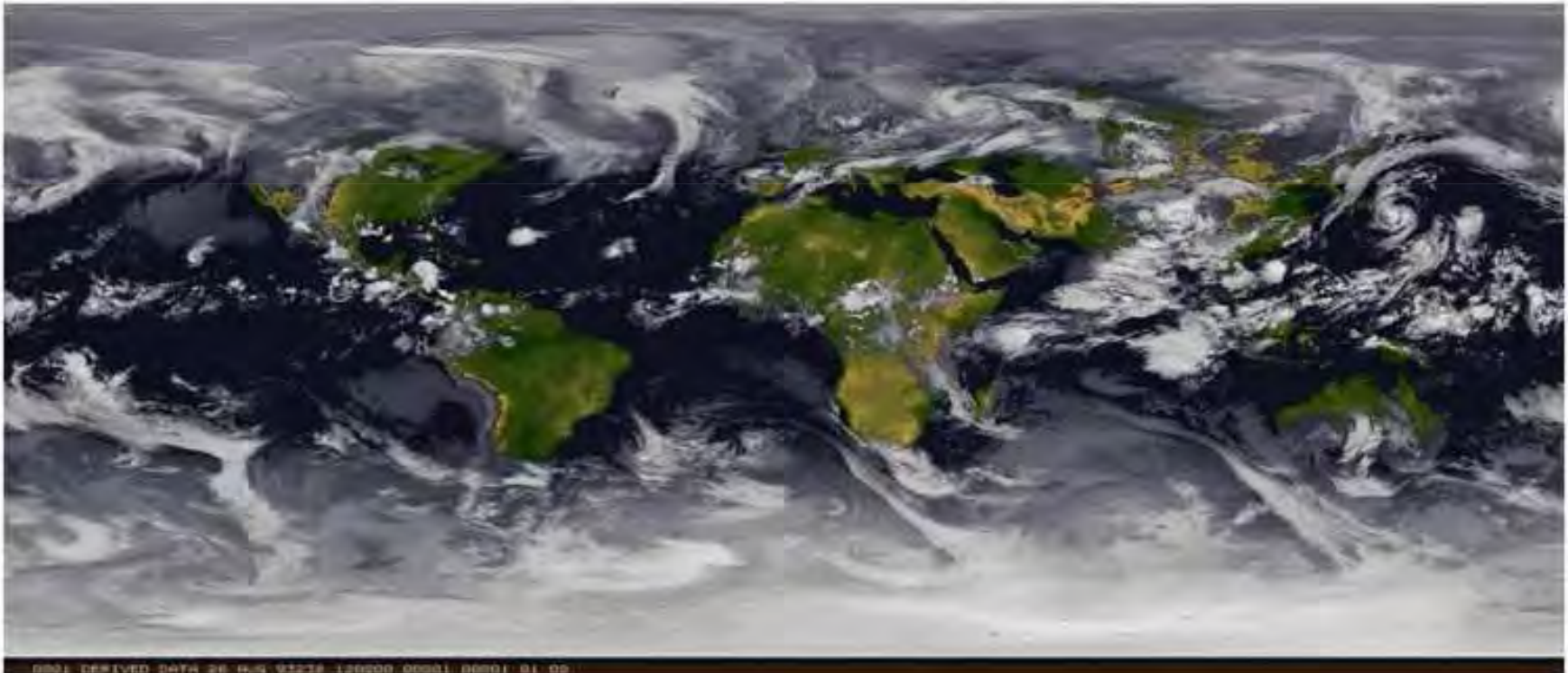
Paradigm 1: Development of effective adaptation strategies is contingent on improvements in modeling, leading to improvements in the accuracy and reliability of climate predictions. Such probabilistic forecasts will then support arriving at the “optimal” decision for a “most likely” future. (e.g. Shukla et al., 2009)

Paradigm 2: The climate-change problem is ill-suited to a reliance on predictions, and uncertainty should instead be managed by identifying the greatest vulnerabilities and policy trade-offs across the broadest possible range of plausible futures – for example, the use of scenario-based approaches to support decision-making that is “robust” across the “highest risk” futures (e.g. Dessai et al., 2009)

Identify and implement “no regrets” actions

- Energy efficiency and conservation
- Water conservation and reuse
- Green infrastructure
- Compact development and other “smart growth” strategies
- Open space preservation
- “Green building” design standards
- Plant trees

*Where in the World is
Global Warming?*



Learn to communicate on climate issues

- Integrate climate into areas like weather, energy, national security, and business.
- Apply climate locally.
- Communicate science and not politics. Use visualization
- Give weather events context.
- Recognize that climate literacy will vary by demographic group.
- Show long-term data and trends, but clarify that prediction of trends is different than predicting specific weather several decades into the future.

Ocean Acidification



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