Climate Change and Water Extremes

An International Meeting of The Water Tribune

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Water is being used up

- More than half of all accessible fresh-water resources are now currently used

- Underground water resources are being depleted at a rate the much greater than they can be replenished

Water and human development

- Millions of people do not have access to safe drinking water
- Securing safe-water for all is closely coupled to human development
- Goal 10 of the Millenium Development Goals

  Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation

Some Key Messages from the IV AR of the IPCC

Warming of the climate system is unequivocal, as evidenced by observations of increased global air temperatures, as well as of the oceans, widespread snow and ice melt and sea level rise

IV AR IPCC 2007

Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases.

There is *high confidence* that natural systems related to snow, ice and frozen ground (including permafrost) are affected.

IV AR IPCC 2007

Based on growing evidence, there is *high confidence* that effects on hydrological systems are occurring in many regions

IV AR IPCC 2007

Most of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic GHG concentrations

IV AR IPCC 2007

Continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century

IV AR IPCC 2007

Anthropogenic warming and sea level rise would continue for centuries, even if GHG concentrations were to be stabilised.

IV AR IPCC 2007

More specific information is now available across a wide range of systems and sectors concerning the nature of future impacts.

IV AR IPCC 2007

Among other, climate change is expected to exacerbate current stresses on water resources from population growth and economic and land-use change.

IV AR IPCC 2007

Runoff is projected to increase at higher latitudes and in some wet tropical areas, and decrease over some dry regions at mid-latitudes and dry tropics.

Many semi-arid areas (e.g. the Mediterranean Basin) will suffer a decrease in water resources due to climate change.

IV AR IPCC 2007

Projections and model consistency of relative changes in runoff by the end of the 21st century

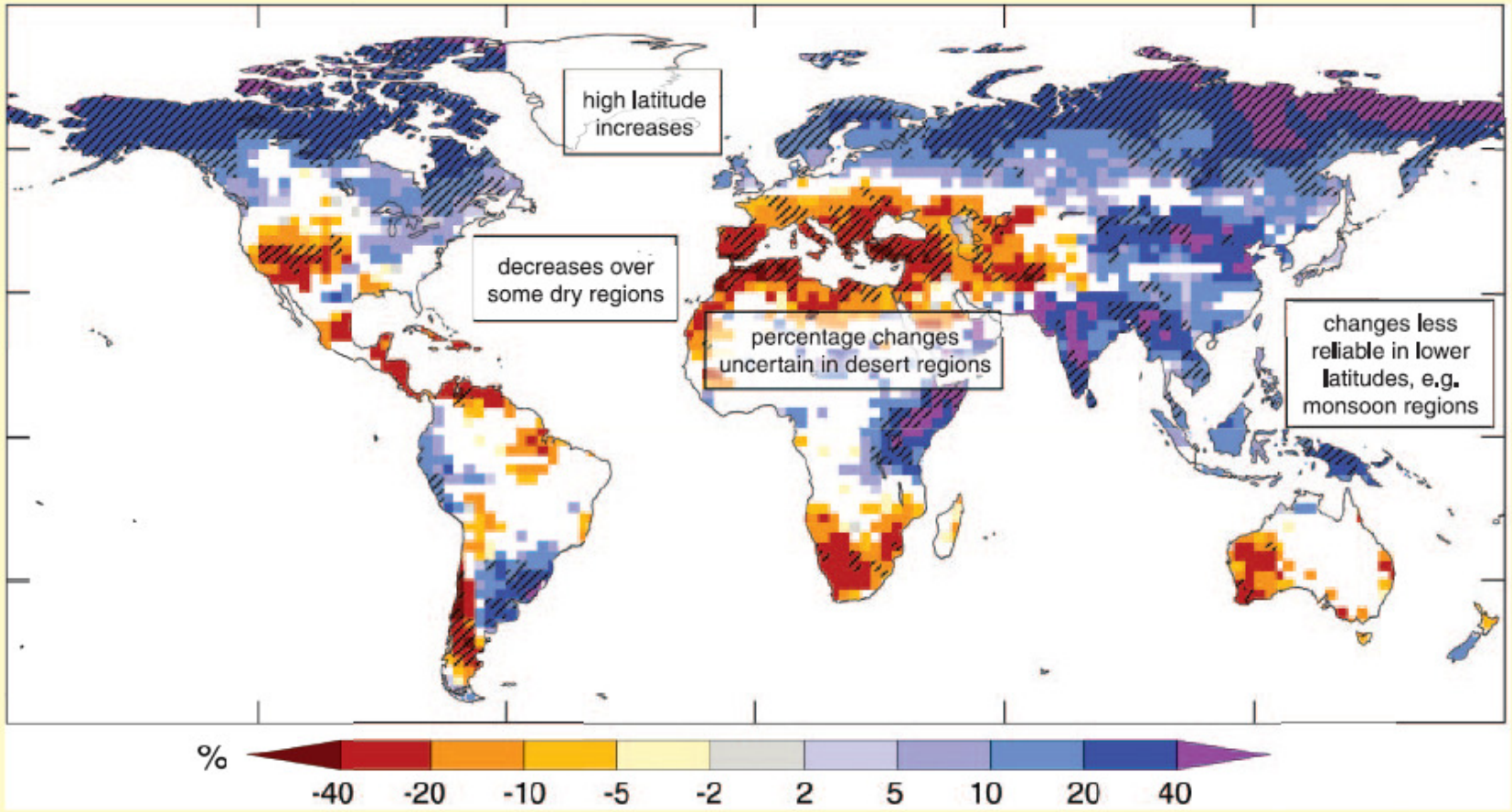

Figure 3.5. *Large-scale relative changes in annual runoff (water availability, in percent) for the period 2090-2099, relative to 1980-1999. Values represent the median of 12 climate models using the SRES A1B scenario. White areas are where less than 66% of the 12 models agree on the sign of change and hatched areas are where more than 90% of models agree on the sign of change. The quality of the simulation of the observed large-scale 20th century runoff is used as a basis for selecting the 12 models from the multi-model ensemble. The global map of annual runoff illustrates a large scale and is not intended to refer to smaller temporal and spatial scales. In areas where rainfall and runoff is very low (e.g. desert areas), small changes in runoff can lead to large percentage changes. In some regions, the sign of projected changes in runoff differs from recently observed trends. In some areas with projected increases in runoff, different seasonal effects are expected, such as increased wet season runoff and decreased dry season runoff. Studies using results from few climate models can be considerably different from the results presented here. {WGII Figure 3.4, adjusted to match the assumptions of Figure SYR 3.3; WGII 3.3.1, 3.4.1, 3.5.1}*

Objectives

- To know how climate has changed in the recent past and what changes we can expect in the near future in relation to the water cycle, water extremes and water bodies
- To understand how climate change will affect water resources, and the changes in water availability on food production and on the economy and society
- To learn how we can adapt to a future world of water scarcity and uncertainty

Opening address

Teresa Ribera
Secretary of State for Climate Change

The Challenge of the Future Climate Change Regime. Adaptation and Water Resources as a Crucial Issue for Spain

Day 1: Climate, Extremes and Water Bodies

Sesssion 1: Climate Change and Water

Moderator: Ernesto Rodríguez Camino

Jean Palutikof: Water Resources in the IPCC Fourth Assessment Report

Ulrich Cubasch: Future Rainfall Projections

Robert L. Wilby: Dealing with Uncertainties of Future Climate: The Special Challenge of Semi-arid Regions

Session 2: Climate Extremes

Moderator: Juan Satrústegui

Juan B. Valdés: Risk of Droughts: Characterization, Challenges and Opportunities

Zbigniew W. Kundzewicz: Heavy Precipitation and Floods

Jesús Yagüe Cordova: Mappping Flood Risks: Spain as a Case Study

Session 3: Impacts on Water Bodies

Moderator: Ricardo Anadón Álvarez

Gino Casassa: Snow and Ice on Planet Earth: Present State, Impacts and Projections

José Lucas Pérez Llorens: Impacts of Climate Change on Wetland Ecosystems

Day 2. Water Availability and Impacts

Sesssion 4: Water Resources

Moderator: Jean Palutikof

Joseph M. Alcamo: Climate Change and the Transformation of World Water System

Henk van Schaik: Climate Changes Water Demand Management

Session 5: Water and Food Production

Moderator: Francisco García Novo

Marco Bindi: Food Crops under Global Warming and Changing Water Availability

Alan K. Knapp: Climate Change and Grasslands: Unexpected Consequences of Extreme Rainfall Patterns

Session 6: Climate, Water, Economy and Society

Moderator: Luis Jiménez Herrero

Diego J. Rodríguez: The Economic Implications of Changes in Water Availability

Karen L. O'Brien: Climate Change, Globalization and Water Scarcity

Claudia Pahl-Wostl: Climate change – A Global Challenge for Water Governance

Day 3. Adapting to Water Scarcity and Climate Changes

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Abel Mejía: Water Resources and the World Bank Experience

Session 7: Adapting to Water Scarcity: General Approaches

Moderator: Joseph M. Alcamo

Luis Mata: Implication of Climate Change on Droughts and Water Scarcity

Stewart J. Cohen: Climate Change and Water: Adaptation

Session 8: Adapting to Water Scarcity in Less Favored Countries

Moderator: Luis J. Mata

Nick van de Giesen: Adapting to Climate Change in West Africa

N. Vijay Jagannathan: Water in the Middle East and North Africa

Laura Tlaiye: Managing Water Scarcity in Latin American Countries

Session 9: Adapting to Change: A Regional Focus

Moderator: José M.Moreno

Wolfram Mauser: Adapting to Water Scarcity in Europe

Ron N. Hoffer: Becoming a Member of the EU and Adapting to Change: the Case of Southeastern Europe

Juan Manuel Ruiz García: Projected Impacts of Climate Change on Water Resources in Spain

Teodoro Estrela Monreal: Adaptation in Spain to the Effects of Climate Change on Water Resources

Organization

- Speakers are allowed a maximum of 25 min.
- After each talk a couple of burning questions can be taken. The main discussion will follow at the end of the session
- The moderator assisted by the team of rapporterus will take notes of the main conclusions emerging from the discussions
- These will be entered into the frame-work document prepared by the organizing team
- Hot and important issues will be fed on to the Zaragoza Chart

Thanks and enjoy the meeting!

The organizing team

José M. Moreno
Joseph Alcamo
Luis J. Mata
Jean Palutikof