Workshop

Indicators for climate extremes and socio-economic impacts under different emission targets

Dates: 4 – 6 October 2017

Venue: Joint Research Centre (JRC) of the European Commission, Ispra, Italy. Bld 36 (amphitheatre), Via Enrico Fermi 2749, 21027 Ispra, Italy

Organizers:

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Summary

To better guide policy decision-making on mitigating the risk of climate change, novel and interdisciplinary approaches are required, which involve a dialogue between scientists from different communities (e.g., climate and impact modelling) and stakeholders to share data and knowledge. Credible and meaningful metrics need to be developed that can help quantifying risks related to physical climate change.

Building on a Future Earth workshop on “Extreme Events and Environments” and a WCRP workshop on “Addressing the Challenge of Compound Events”, this workshop aims at providing practical discussion on climate-related impacts to be expected for different emission scenarios, knowledge gaps and indicators that can facilitate decision-making on climate risk mitigation and adaptation planning across various sectors.

Negotiations during the 21st UNFCCC Conference of Parties (COP21) meeting in Paris 2015 have led to a historical agreement to reduce greenhouse gas emissions to limit the average rise in global mean temperature to well below 2 °C with respect to pre-industrial climate. ‘Pre-industrial’ is a relative term and not defined, thus might as well be translated into changes above a present-day baseline[1]. However, we lack sufficient knowledge about the socio-economic implications of limiting global warming to a certain temperature or the consequences of exceeding this, particularly if we talk about half a degree. Physical

1Hawkins, E. et al. (2017) Estimating changes in global temperatures since the pre-industrial period, Bulletin of the American Meteorological Society, doi:10.1175/BAMS-D-16-0007.1 or see https://www.carbonbrief.org/challenge-defining-pre-industrial-era

climate impacts are already observed in many regions of the world and increasingly challenge decision-makers.

Today and in the near future, the most severe impacts are caused by rare events manifesting themselves in extreme weather or the combination of physical processes leading to a severe impact, also referred to as a “compound events". Currently it is very difficult to translate changes in global temperatures or frequency of these rare events into actual risks in specific sectors or locations and express these in monetary terms. Focused research on the sources of physical climate risk exists, however climate projections come usually without risk information, while most studies on socio-economic consequences have only vague references to specific climate projections.

Objectives

The main objective of this workshop is to bring together scientists and stakeholders from different disciplines and sectors in order to discuss how to use or develop new metrics for climate change risk assessment for different warming levels. Our aim is to

- discuss how climate-related hazards are related to socio-economic impacts for different emission scenarios
- add value to decision-making via improved indicators and tools for providing and communicating climate change information
- Design of useful compound indices supporting decision-making

The findings of the workshop will be summarized in a short report, which will be the basis for a peer-reviewed publication (e.g., commentary or perspective paper) on the workshop topic.

Agenda

Day 1 October 4th, starting at 12 pm

12:00 pm Welcome Lunch

1:00 pm **Introduction:** Giovanni De Santi, Director, Directorate-General Joint Research Centre

1:10 pm **Composite Indicators, Impact evaluation and Climate:** Sven Langedijk, Head of Modelling Indicators and Impact evaluation Unit, Directorate-General Joint Research Centre.

1:20 pm **Workshop Purpose and Challenges:** Simone Russo and Jana Sillmann

2:00 pm **Session 1: Changes in Climate Extremes and COP21**
(Moderator: Jana Sillmann, CICERO)
(20 min talks + 10min discussion)

- The Paris Agreement and EU action to reduce greenhouse gas emissions (Tom van Ireland, HoU, DG CLIMA, Bruxelles)
- The COP21 agreement and relevant scenarios for simulating changes in climate extremes (Claudia Tebaldi, NCAR, USA)
- 1.5 versus 2 degree targets: Where to start? (Ed Hawkins, University of Reading, UK)

3:30 pm Coffee Break

4:00 pm **(Moderator: Simone Russo, JRC)**

- Anthropogenic contribution to global occurrence of heavy-precipitation and high-temperature extremes (Erich Fischer, ETH Zurich, Switzerland)
- Metrics used to measure climate extremes, caveats and uncertainties (Sebastian Sippel, Max Planck Institute for Biogeochemistry, Jena, Germany)
- The challenge of compound events (Jakob Zscheischler, ETH Zurich, Switzerland)

5:30 pm **General Discussion** (1 hour)
(Moderators: Jana Sillmann and Simone Russo)
6:30 pm End of the first day

Day 2 October 5th, 9:00 am

9:00 am Welcome Coffee

9:30 am **Session 2: Climate Change and Human Health**
(Moderator: Jakob Zscheischler, ETH)
(20 min talks + 10min discussion)

- Humid heatwaves and their socio-economic implications at different warming targets (Jana Sillmann, CICERO, Oslo, Norway)
- A global assessment on temperature, climate and health: results from the MCC Project: (Antonio Gasparrini, London School of Hygiene and Tropical Medicine, London, UK)

- Climate Multi-hazard and human mortality (Alessandro Cescatti, European Commission, Joint Research Centre, Ispra (VA), Italy)

11:00 am Coffee Break

11:30 am **Focus Group Discussions**
(Moderators: Jana Sillmann and Sebastian Sippel)

1:00 pm Lunch Break

2:00 am **Session 3: Climate Change and Agriculture**
(Moderator: Van Der Velde Marijn, JRC)
(20 min talks + 10min discussion)

- Crop calorie supply under climate change and vulnerability to drought events at +2°C of global warming threshold in Europe (BALKOVIC Juraj, International Institute for Applied Systems Analysis, Laxenburg, Austria)
- Climate, Agriculture And Food Security: A closer look at the connections (Morales Opazo Cristian,Food and Agriculture Organization of the United Nations FAO, Rome, Italy)
- Crop yield anomaly predictions by the Combined Stress Index at the global and regional scales (Matteo Zampieri, European Commission, Joint Research Centre, Ispra (VA), Italy)

3:30 pm Coffee Break

4:00 pm **Focus Group Discussions**
(Moderators: Sebastian Sippel and Simone Russo)

5:30 pm End of the second day

Day 3 October 6th, 9:00am ending at 3pm

9:00 am Welcome Coffee

9:15 am **Session 4: Climate Change, Economic and Finance**
(Moderator: Leandro Elia, JRC)
(20 min talks + 10min discussion)

- Climate risks to investors (Kristina Alnes, CICERO Climate Finance Centre, Oslo, Norway)
- The cost of adapting to climate change: evidence from the US residential sector (Matthieu Glachant, MINES Paristech, PSL Research University)

- Escalating economic impacts of weather-related extremes on critical infrastructures in Europe under climate change (Giovanni Forzieri, European Commission, Joint Research Centre, Ispra (VA), Italy)
- Economic assessment of climate change impacts and the role of autonomus adaptation mechanisms (Francesco Bosello, Fondazione Eni Enrico Mattei, Venice, Italy).

11:15 am Coffee Break

11:45 am **Focus Group Discussions**
(Moderators: Simone Russo and Jana Sillmann)

1:00 pm Lunch Break

2:00 pm **Summary and Ways Forward**
(Moderators: Simone Russo and Jana Sillmann)

3:00 pm End of meeting