Probabilistic Event Attribution in the context of Loss and Damage

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Attribution of slow-onset phenomena is comparably straightforward
High-impact, extreme events are more likely to cause loss and damage, at least in the short term.
Common assumptions:

a) All extreme weather events are made worse by climate change.

b) We cannot attribute a single event to anthropogenic climate change.

#everydayclimatechange+
Generally impossible to say “this event would not have occurred without human influence” …
…but we can ask how the risk of such an extreme event occurring has changed due to external factors

![Graph showing climate variable distribution in Actual World and Counterfactual World](image)
Possible outcomes of an event attribution study:

1. The event was made more likely due to anthropogenic climate change
2. The event was made less likely due to anthropogenic climate change
3. Anthropogenic climate change did not play a detectable role in the frequency of occurrence of the event
4. With our current understanding and tools we cannot assess whether and how the event was influenced by anthropogenic climate change
Reconciling two approaches for attributing the Russian heat wave

Not "impossible without warming"

Otto et al., 2012

Probability framing: mainly externally driven

Magnitude framing: mainly internally generated

Image: nasa.gov
Thesis: Probabilistic Event Attribution (PEA) can provide scientific evidence on loss and damage and has implications for pending policy decisions concerning the Warsaw International Mechanism for Loss and Damage.

Thompson and Otto, *Climatic Change* forthcoming
Extreme Events 2011-2013

Detected human influence on likelihood of event occurring:

- Red: Heat
- Blue: Precipitation
- Grey: Storms
- Orange: Drought
- White: Cold
- Black: Sea ice

Small coloured circles indicate that an event attribution study has taken place, but that human influence on the likelihood of that event occurring was not found or is uncertain.
There is a science to back up the “Loss and Damage” agenda.
Building inventories of impacts of climate change

- PEA allows to identify impacts of anthropogenic climate change today, linking WG2 & WG1. Arguably harm from bad weather independent from climate change is morally different from loss and damage.
- Identification and recognition of loss and damage could lead to improved risk assessment and preclude any blame game.
- PEA needs to be further developed:
  - PEA to date is ad hoc and biased to events close to the home of the scientists.
  - Attribution of impacts needs to be developed – e.g. what is the counterfactual world in impact modelling?
  - Regular attribution while the world is listening could move recognition and identification forward.
- What is loss and damage?