The storyline approach as a scientific methodology for risk assessment of remote climate impacts on Europe

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Thanks to many RECEIPT colleagues including Ted S, Bart vdH, Jana S, et al

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Receipt

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Design steps for climate event storylines

Receipt



van den Hurk et al. 2023

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What Are Physical Climate Storylines

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"a self-consistent and possible unfolding of a physical trajectory of the climate system, or a weather or climate event, on timescales from hours to multiple decades" Shepherd et al. (2018)



Baldissera Pacchetti et al (under review) Varieties of approaches to constructing **Physical Climate** Storylines: a review. WIREs Climate Change

Receipt



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WPs: Sector	Historical events	Perturbations	Regions of remote hazard	Affected subsectors
WP3: Agriculture & food production	Drought impacts on crops (ENSO, events like 1997, 1983, 2012) Water scarcity	<u>Climate</u> : RCP2.6 vs. RCP8.5 <u>Society</u> : SSP1 vs. SSP3 vs. SSP5	 Brazil, USA West Africa (Ivory Coast, Ghana) Indonesia 	Soybeans Cocoa Palm oil
WP4: Financial impacts	13 Tropical cyclones in the Caribbean, North Atlantic, and Indian Ocean (2017 and 2018)	<u>Climate</u> : Temperature increase based on RCP2.6 vs. RCP4.5 vs. RCP6.0 vs. RCP8.5 <u>Society</u> : SSPs are not defined, but with stylized/arbitrary future projections of GDP per capita (except 3 rd storyline)	 Islands of EU countries: Caribbean, North Atlantic and Indian Ocean Caribbean island nations US Northeast 	 Public and private financial sector: 1. EU Solidarity Fund 2. Caribbean Catastrophe Risk Insurance Facility (CCRIF) 3. Trade and Private investments
WP5: International cooperation	 Cyclone Idai (2019) Locust infestations (2020) combined with multi-breadbasket failure (2007- 2008) 	<u>Climate:</u> no historical anthropogenic climate change <u>Society:</u> Not determined, only current socioeconomic conditions considered.	 Cyclone Idai: Mozambique Locusts: Horn of Africa 	 Human displacement Major crops: wheat, maize, rice, soybeans
WP6: Global manufacturing chains	Hurricane Harvey (2017)	<u>Climate</u> : Temperature increase based on RCP2.6, RCP7.0, RCP8.5 <u>Society</u> : Current socioeconomic conditions, but SSP1, SSP3.	Texas and Louisiana, USA	 Mining and quarrying Natural gas and oil production
WP7: Sea level rise and coastal infrastructure	 Storm Xaver (2013) Storm Xynthia (2010) Storm surge in Emilia-Romagna (2002) 	<u>Climate</u> : Sea level rise under RCP2.6 vs. RCP4.5 vs. RCP8.5 <u>Society</u> : SSP1 vs. SSP3 vs. SSP5.	 North Sea Atlantic coast of France Emilia-Romagna, Italy 	Coastal Infrastructure

External guidance on storyline development based on RECEIPT research and lessons learnt

Receipt

- Method
 - Document the effectiveness of the storyline approach as a scientific methodology for risk assessment;
 - Identify commonalities of the storyline development
 process
- Process:
 - 15 semi-structured interviews of consortium members
 - Published papers and deliverables
 - Participant observation

Lessons Learned



- Storylines can complement other methods of climate risk assessment:
 - incorporating perspectives from within the scientific community and other stakeholder groups
 - adding realism;
 - increasing the accessibility of climate risk information.
- Development depends on context, aim, and specific application
- The storyline approach is not necessarily seen as a novel approach, but it does bring some novelty to already developed methods.
- The subjectivity makes them easier to criticise/challenge





- Make the aim of developing storylines explicit at the outset.
- Be clear and open about what are the key concepts that underlie storylines.
- Involve stakeholders at the beginning and throughout the process.
- Ensure stakeholders share aims and goals with the developers.
- Appoint a storyline "director" to maintain the coherence and continuity.







- Recognise the necessary diversity of disciplines.
- Allocate adequate resources to non-scientific members.
- Be clear on how uncertainty is treated, if at all
- Limitations of the evidence should be acknowledged
- Where possible, draw on historical evidence of extreme events and their recorded impact(s)



Conclusion



- Overall it was seen that:
 - The study was able to provide several additions to the criteria of realism, relevance, and risk orientation identified by van den Hurk et al. (2023).
 - Storylines are seen as a promising approach to develop climate risk information, as complementary to probabilistic risk assessments
 - Due to their nature, storylines are able to uncover assumptions, include multiple perspectives, and provide understanding of complex processes in a way that other approaches to climate risk assessments cannot.

