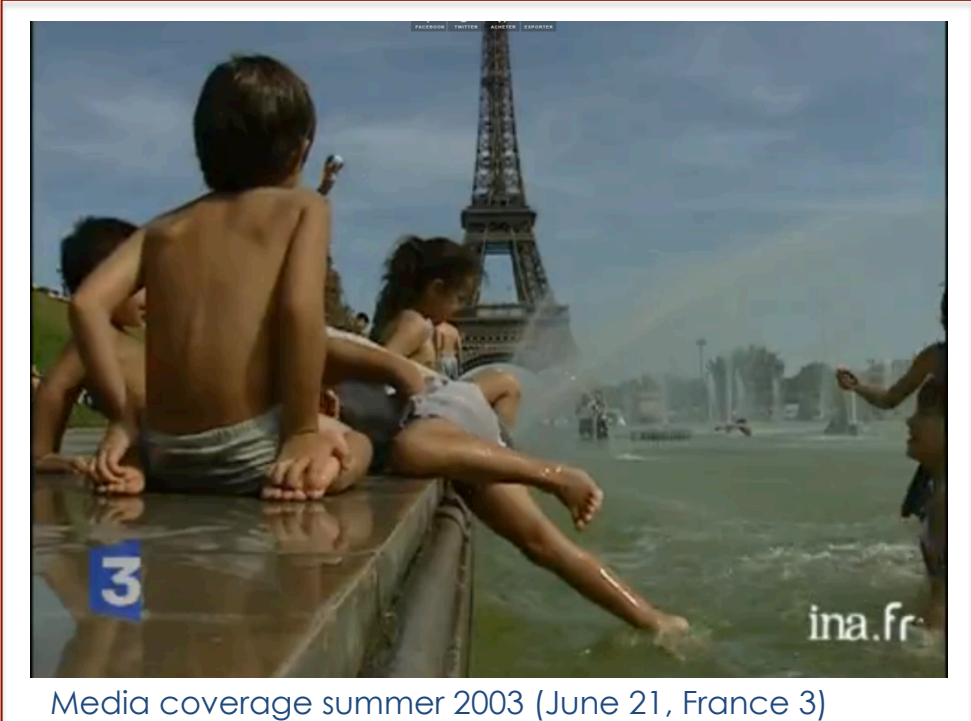


# Framing Extreme Event Attribution from the Bottom up

## an Enquiry into the Social representations of Stakeholders, of the Press and of Climate Scientists.

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### Abstract

Attribution of extreme weather events has recently generated a lot of interest simultaneously within the general public, the scientific community, and stakeholders affected by meteorological shocks. This interest calls for the need to explore the potential for the development of climate services aiming at quantifying the human responsibility for particular events.

Through interviews with climate scientists, through the analysis of the press coverage of extreme meteorological events, and through stakeholder focus groups, we analyze how social representations of the concepts associated with extreme event attribution are theorized. From these, we build up a grounded, bottom-up, theorization of extreme weather event attribution. This bottom-up theorization allows for a framing of the envisioned climate services in a way that is attuned to the needs and expectations of the stakeholders.

From apparently simple formulations: "what is an extreme event?", "what makes it extreme?", "what is meant by attribution of extreme weather events?", "what do we want to attribute?", "what is a climate service?", we demonstrate the polysemy of these terms and propose ways to address the challenges associated with the juxtaposition of four highly loaded concepts: extreme – event – attribution – climate services.

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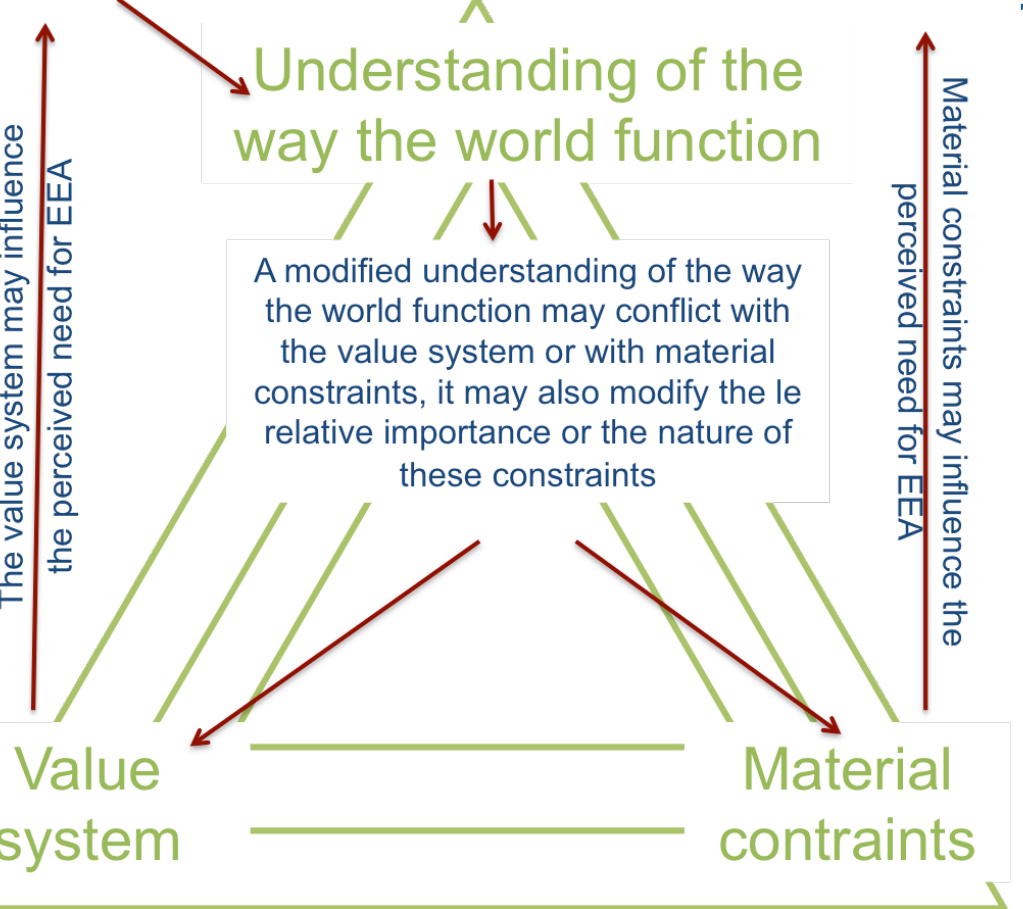
## 1. Risk theories

### Risk Governance:

If we treat extreme event attribution as a new tool within a climate risk governance framework it can, in theory modify all dimensions of the risk governance cycle.



EEA influences the « Understanding of the way the world function »



### Risk Perception:

Risk perception are voiced through the expression of evidence, normative and relevance claims.

Extreme event attribution may influence these expressions of stakeholders' positioning on climate risks

## 3. Results:

The development of an "extreme event attribution climate service" mobilizes concepts that have autonomy. These concepts are: "extreme event", "attribution", "attribution as knowledge generation", "climate service." This autonomy leads to intertwined theoretical streams

"what is an extreme event?", "what makes it extreme?" **This according to the corpuses that we analyzed**

Within the context of climate risk the adjective "extreme" may take several meaning: is it the meteorological event that is extreme or is it the consequences?

The judgement made on the "extremeness" depends on the stakeholders' interests, this may change through time.

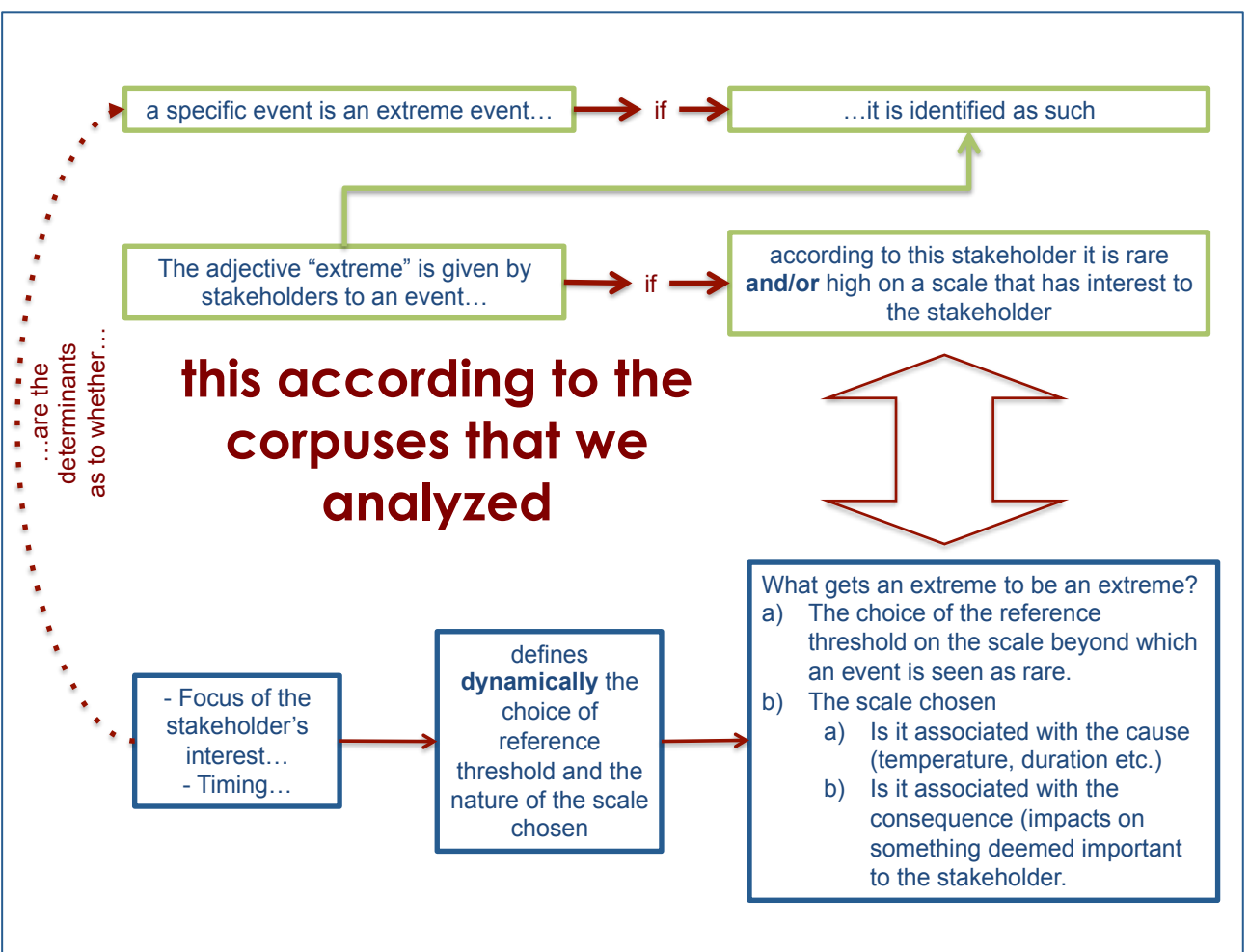


Figure 3: representation of a the concept "extreme" as it deploys itself in society

"what is meant by attribution of extreme weather events?", "what do we want to attribute?" **This according to the corpuses that we analyzed**

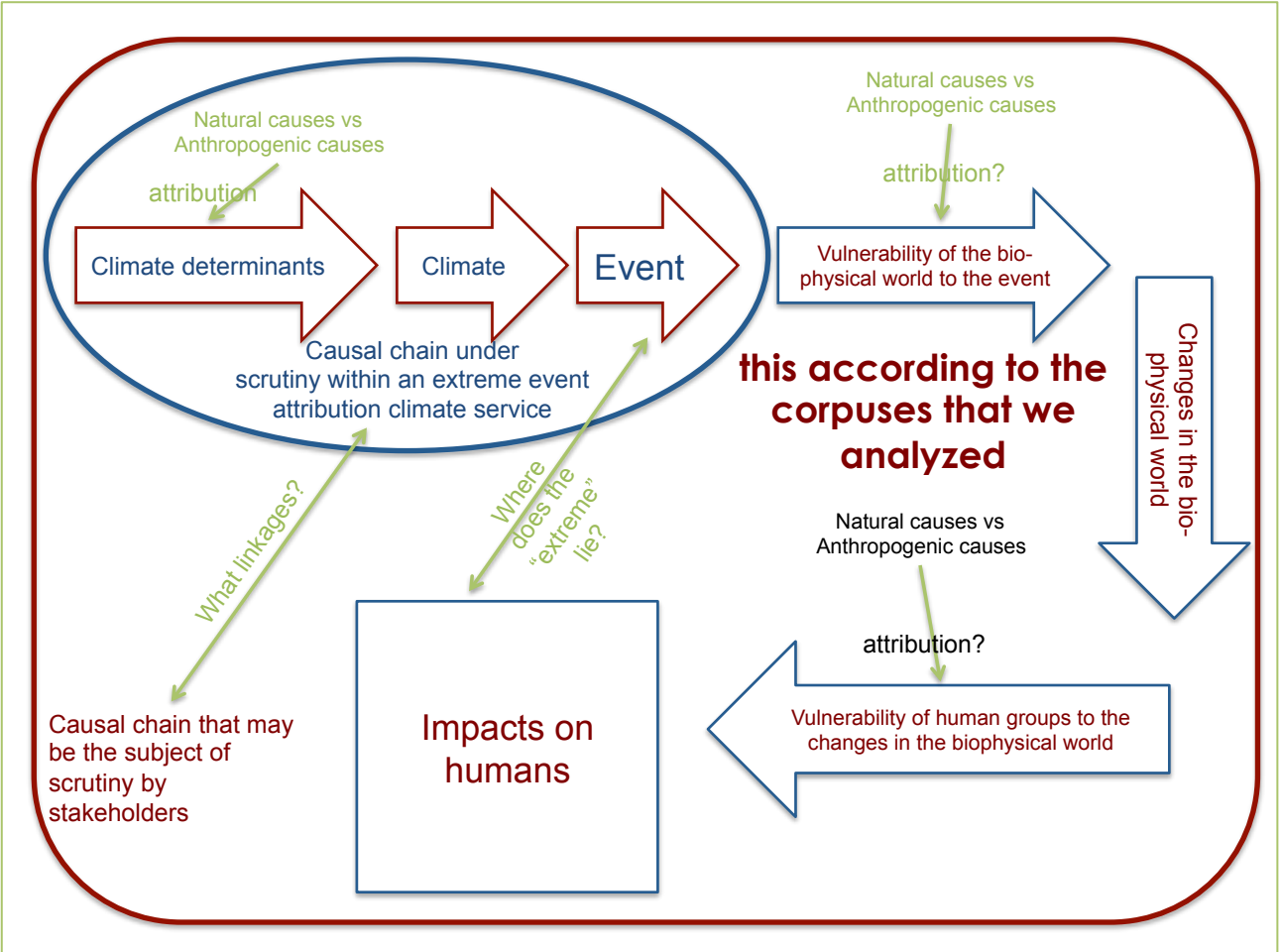


Figure 4: representation of a grounded theory of "attribution" in terms of causal chain and potential object to attribute.

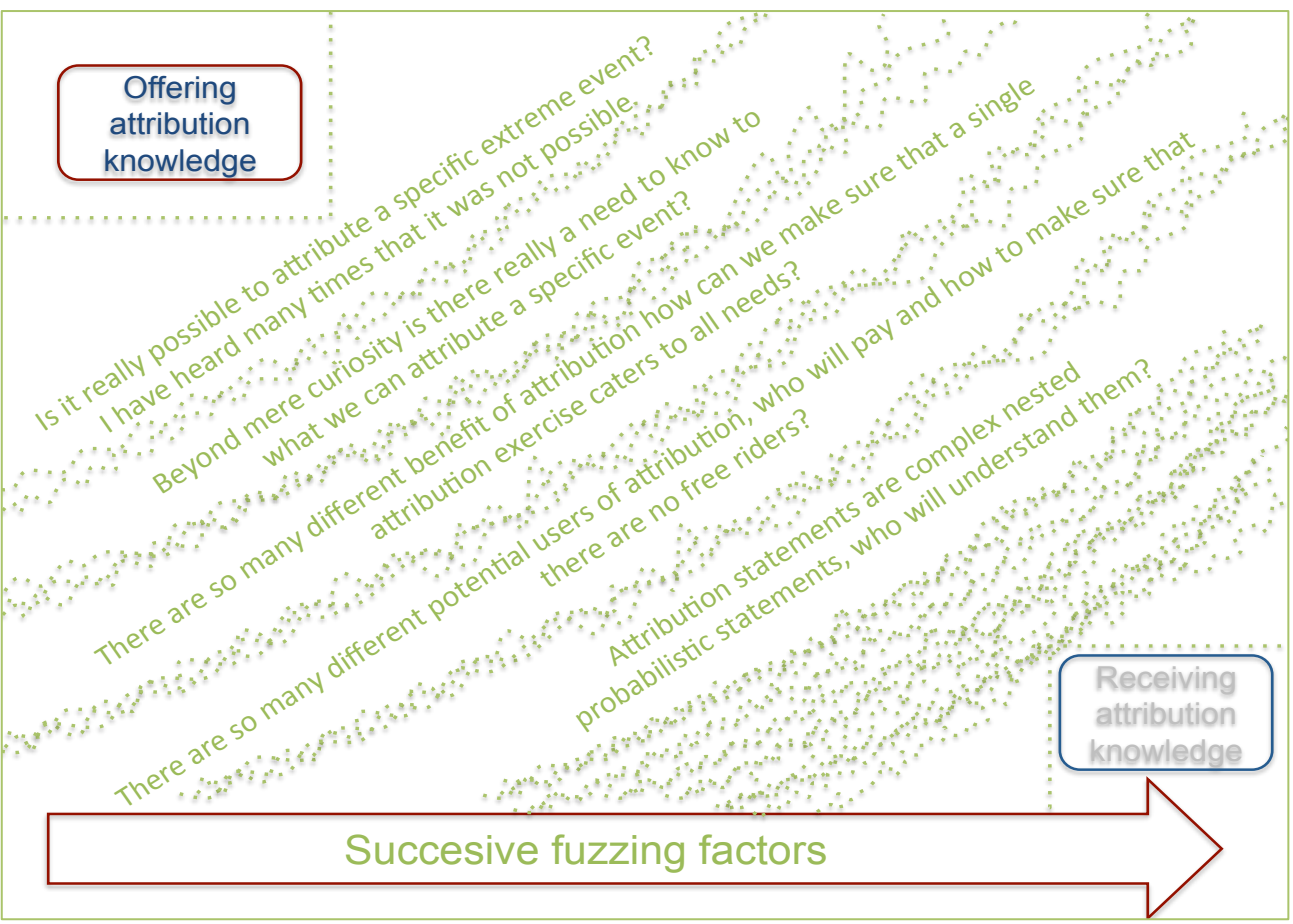


Figure 5: attribution as a potentially fuzzed knowledge production endeavour .

## The wider project Eucleia

### Aims:

To provide well verified assessments of the extent to which such weather-related risks have changed due to human influences on climate. To identify those types of weather events where the science is still too uncertain to make a robust assessment of attributable risk

### Approach:

EUCLEIA will work closely with stakeholders to establish their requirements for event attribution products, and to help develop climate attribution strategies. Stakeholder groups includes: insurance industry, regional managers, policy makers, general public, legal field

### Deliverables:

The attribution system developed by EUCLEIA will deliver reliable and user-relevant attribution assessments on a range of timescales: on a fast-track basis in the immediate aftermath of extreme events, on a seasonal basis to stakeholder groups, annually to the scientifically prestigious attribution supplement of the Bulletin of the American Meteorological Society

<http://eucleia.eu>

"what is a climate service?" **This according to the corpuses that we analyzed**

It is still an unfamiliar concept

It is seen has originating through a top down injunction

It is about mobilizing the best climate science in order to benefit stakeholders

It is seen as a process for which stakeholders should be in "the driver's seat."

### Approach: Grounded theory:

Grounded theory involves the construction of theory by engaging a constant dialogue between the scientist and the data.

Rather than interrogating the data within a particular theoretical framework, grounded theory seeks to build the theory as it emerges form the data (Strauss and Corbin, 1997).

This approach has shown to be quite effective in the analysis of social dynamics around emerging risks in general, and climate change induced risks in particular (Kane et al. 2014, Touli et al. 2014).

Five corpuses have been built in course of this research. Each of these corpuses had specific objectives in terms of data collection/proxy.

In order to conduct the iterative-grounded theory we moved along the following sequence:

1. Preliminary coding of press articles
2. Initial theoretical development
3. Design of scientists interview framework
4. Preliminary coding of scientists interview using the results of (2) as predefined code
5. Development of stakeholder workshop structure independently of (1), (2), (3) and (4)
6. Preliminary coding of stakeholder workshop
7. Identification of supplementary emerging categories
8. In depth coding of all corpuses, categorizing, grounded theory
9. Validation of results in a different field setting

## 4. Conclusion

### Need for a careful contextualization

What should be included in an attribution report?

Should attribution services encompass the issue of attributing?

When is the information needed?

How are these needs evolving through time as the event deploys itself and in its aftermath?

### Extreme event attribution has its own history

How to communicate the fact that extreme event attribution is now possible for single events?

How to communicate the benefits?

How to deal with the fairly complex probabilistic statements associated with extreme event attribution?

Extreme event attributions may cater to high diversity of needs

How to set up processes that allow for the production of attribution report that are attuned precisely to the need of specific stakeholders?

How to set up processes where all structures potentially benefiting from an attribution exercise have access to the results?

How to set up processes where all structures potentially benefiting from an attribution exercise contribute to the provision of the report?

### It seems urgent to put stakeholders on the drivers' seat

How to make a progressive transition form a concept driven by a narrow subset of stakeholders (meteorological services, large international organisations, climate scientists) to a concept driven by the potential users of the service?

#### Sources cited

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