

Learning from the past to prepare for future extreme weather events

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Understanding which extreme weather events may have caused problems in the past leads to assess the potential impact of future such events on infrastructures.

In Central or Northern Europe, extreme snowfall, snow storms or freezing rain during winter can damage forests and infrastructures, such as [power lines](#). This may, in turn, disrupt power supply and cause considerable economic loss. Researchers are now analysing data and [weather forecasts](#) related to such [extreme weather events](#) from the past. Here, Hilppa Gregow, head of the Climate Service Centre at the Finnish

Meteorological Institute in Helsinki talks to youris.com about how learning from past cases helps researchers define what is meant by [extreme weather](#) event, as part of the EU-funded [RAIN project](#).

What is meant by extreme weather event?

In a meteorological sense, an event is called extreme when it causes large damage or consequences to society. Typically, it refers to events that are very intense or very unlikely to occur. We classify past events based on measurements such as wind speed, precipitation amount and snow depth. In general terms, an extreme event has an all-time maximum value and/or exceeds a previously measured high, or low, threshold. This does not exclude that there could not be a new record next year. This is because climate is changing and this can affect how often extremes occur.

A harmful event may happen once in ten to 50 years on the same spot in a country. Or it may happen every year but not in the same area. The impacts may vary from one location to another depending on the preparedness of the society.

How do you assess the impact of extreme weather events?

We interview stakeholders—who are typically people in charge of energy, telecommunication and transport infrastructure—using surveys. We ask them about cases that were especially harmful for their business. We search data and model files and ask: How did the weather develop? What caused the event? This gives us examples for the types of weather that affected the infrastructure in the past. In addition, we investigate and identify a number of extreme [weather events](#) and their impacts based on media reports and previous studies.

We can then analyse the values of relevant weather parameters against the impacts and consequences. It is even better, if we know the monetary losses in these cases. We might be able to update or find new impact thresholds for different weather parameters. The surveys will hopefully increase our understanding on how the end users perceive extreme weather events. Some of the interviews have already been successful. The persons interviewed provided valuable information about past cases.

What is the focus of your research?

We focus on weather events that are related to winter season extremes. These are excessive snowfall, snowstorms, snow loading and freezing rain. We also study forest fires. We work on weather forecasting models and warnings. Moreover, we look at past and future climate with the help of meteorological re-analyses and climate models.

We want to find out how climate change will influence the weather conditions that are critical for infrastructures such as roads, railways, communication systems and power lines. Moreover, thanks to our research, we can predict whether these [extreme events](#) will occur more often or will be more severe in the future.

What kind of challenges did you encounter when identifying extreme events?

The problem is that we do not get enough cases or data for a thorough statistical analysis. So it is about lessons learnt from these few cases. The amount of total monetary losses may also be difficult to estimate. Because of the regional character of hazardous weather phenomena, we need to define and apply different thresholds for severity and for rarity for different parts of Europe.

In addition, another issue is obtaining comprehensive results on the basis of case studies has proven difficult. We have realised that a survey that is well-structured, informative—but not too demanding—is required for a successful approach. We also noticed that using an English-language survey raised difficulties for some of the operators. Indeed, their understanding of meteorological terms and definitions in English was problematic. This is an important lesson for other EU-projects based on such stakeholders' surveys.

Provided by Youris.com

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