

An earthquake or a snow avalanche has its own shape

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Predicting earthquakes or snow avalanches is difficult, but to for instance reduce the related risks it is of high importance to know if an avalanche event is big or small. Researchers from Aalto University in Finland have, together with colleagues from Oslo and ENS, Lyon, found that such events or say the acoustic sound bursts coming from the tearing of paper have a typical form independent of whether they are big or small.

However, it is crucial what one observes – paper fracture or the avalanching of [snow](#). The results were just published in the *Nature Communications* journal.

Avalanches of snow or earthquakes can be described in other ways than the well-known Gutenberg-Richter scale, which gives a prediction of how likely a big avalanche or event is. Each avalanche or burst has its own typical shape or form, which tells for instance when most snow is sliding after the avalanche has started. The shape of can be predicted based on mathematical models, or one can find the right model by looking at the measured shape.

"We studied results from computer simulations, and found different kinds of forms of events. We then analyzed them with pen and paper, and together with our experimental collaborators, and concluded that our predictions for the avalanche shapes were correct," Mikko Alava explains.

The results can be applied to comparing experiments with simplified model systems, to a much greater depth. The whole [shape](#) of an [avalanche](#) holds much more information than say the Gutenberg-Richter index, even with a few other so-called critical exponents.

More information: Lasse Laurson, Xavier Illa, Stéphane Santucci, Ken Tore Tallakstad, Knut Jørgen Måløy, Mikko J Alava. "Evolution of the average avalanche shape with the universality class." *Nature Communications* 4, Article number: 2927, [DOI: 10.1038/ncomms3927](https://doi.org/10.1038/ncomms3927)

Provided by Aalto University

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