THE UNIVERSITY of EDINBURGH

# *News Release*

Issued: Thursday 12 January 2017

## When the snow is deep and crisp … here's why it may not be even

Stepping in deep snow can have a distinctive feel compared with walking in other terrain – now engineers and scientists have shed light on why this is.

Their findings explain why sometimes when we step into deep snow, it compacts to feel firm underfoot then, with just a little more weight, we may quickly sink in further still.

Experiments with real and artificial snow have examined how, when snow is compressed, the snowflakes – particles of ice – move closer together. These particles may stick to their new neighbours, strengthening the snow, or the movement may break connections between particles, weakening it.

Once an area of weakness develops it spreads through the snow, causing sudden movement without any extra weight. How much the snow compacts can vary even within the same type of snow, depending on the shape and movement of the particles involved.

The discovery affirms a technique used by experienced mountaineers on steeper snow – gently increasing pressure through their foot until the snow collapses or takes their weight.

Researchers hope their discovery will help inform the development of equipment used in snowy terrain, such as vehicle tyres or treads.

Engineers and scientists at the Universities of Edinburgh and Erlangen-Nuremberg, Germany, used a high resolution camera to study snow as it was crushed in a glass-walled box. Researchers created a computer model of the process and reproduced it in a digital simulation.

The study was published in *Nature Physics.*

Dr Jane Blackford, of the University of Edinburgh's School of Engineering, who led the testing, said: "Experienced mountaineers instinctively understand how snow behaves under pressure – now we have a scientific understanding of the processes involved. We hope that with further investigation, our findings can translate into real benefits in developing equipment for use in snowy conditions."

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