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News Release

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Mountain glacier slides could aid predictions of climate impacts

Scientists studying glacier movements in the world's highest mountains have gained valuable insights into how they are responding to changing climates.

A study has revealed how the changes have affected the speed at which glaciers slide downhill in the vast region known as High Mountain Asia.

The findings could lead to more accurate projections of how glacial melting might affect global sea levels and the region's supplies of fresh water.

Glaciers in the region – which contains the largest reserves of fresh water outside the polar regions – feed major rivers that provide water to more than 1.3 billion people.

Previous research has revealed that many glaciers worldwide have thinned in recent decades, but the effect on the speed of their movement has been poorly understood until now.

Researchers developed algorithms to analyse almost two million satellite images of glaciers in High Mountain Asia taken between 1985 and 2017. Scientists tracked distinctive features – such as crevasses or patches of dirt – to work out how far glaciers had moved over time.

The team, which included researchers from the University of Edinburgh, found that differences in glacier flow rates could be explained by changes in ice thickness. As glaciers lost ice and thinned over time, their gravitational pull weakened causing them to flow more slowly. In contrast, the few glaciers that gained ice moved faster.

Knowing this should make projections more accurate but, at this stage, the impact of this finding on global sea levels and regional water supplies are not known, the team says.

The research, published in the journal *Nature Geosciences*, was funded by the European Space Agency's Dragon programme, which is a joint undertaking with the National Remote Sensing Centre of China. The study also involved researchers from the NASA Jet Propulsion Laboratory in the US and four universities in France.

Lead author Amaury Dehecq, of NASA's Jet Propulsion Laboratory, who completed a post-doctorate at the University of Edinburgh, said: "For more than a decade, satellite data have documented that Asia's high-mountain glaciers are thinning owing to melting. However, it has not been entirely clear how their rate of flow is responding to ice loss."

Dr Noel Gourmelen, of the University of Edinburgh's School of GeoSciences, said: "These findings should help us better understand how glaciers behaved in the past and better project how glaciers will respond to climate change. What's surprising about this study is that the relationship between thinning and flow speed is so consistent."

For further information, please contact:
Corin Campbell, Press & PR Office, tel 0131 650 6382, email Corin.Campbell@ed.ac.uk