

Scientists prepare for large-scale glacial floods (w/ Video)

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(PhysOrg.com) -- Surging floods as powerful as the Amazon could hit parts of Europe within decades, according to new research.

Dr Andy Russell, of Newcastle University, is publishing the first comprehensive review in *Developments in Quaternary Sciences* (hard copy published Monday 9 November) of the impacts of flooding at a large Icelandic volcano-clad glacier.

These geological events - which can dramatically alter the surrounding [landscape](#) - are relatively frequent in Iceland, where a large sub-glacial eruption is long overdue.

This latest research has focussed on Mýrdalsjökull - Iceland's southernmost glacier.

Melting glaciers and ice sheets are considered by many to be one of the greatest geological hazards associated with climate change.

Where glaciers are found on top of volcanoes enhanced glacier melting is likely to result in increased volcanic activity, enabling the sudden melt and release of large volumes of water as giant glacier outburst floods.

In Iceland enormous volumes of water and sediment suddenly entering the ocean during these floods have been known to generate tsunamis and extend the coastline by several kilometres within hours.

Volcanically triggered outburst floods are therefore a potent threat to surrounding communities and infrastructure.

Although subglacial volcanic eruptions are difficult to predict and impossible to prevent, Dr Russell and his research team have used evidence gathered within the routeways of former floods to gain a better understanding of what will happen during future outbursts.

“Knowledge of how outburst floods behaved previously enables us to better predict the impacts of future events and allows us to develop appropriate strategies to lessen their impact on the surrounding population,” explained Dr Russell. “We can’t predict or stop nature, but we can be prepared for it when she blows.”

Dr Russell has been working with academics and Earthwatch volunteers in Iceland for the last ten years. “There are still many gaps in our understanding and we are realising that meltwater can find its way out of [glaciers](#) much more quickly than previously thought,” he said. “We’re looking at the possibility of a flow the size of the Amazon being released within less than an hour and that doesn’t give people much time to get out of way.

“The potential impact of much of our work is in helping to inform both the local population and the civil defence authorities to ensure they are as prepared as possible.”

Case study: The Skeiðará river, Iceland

During this summer’s fieldwork, Dr Russell witnessed an event which made him realise just how quickly the environment can change in response to rapid glacier margin recession and ice surface lowering.

He watched the demise of Iceland's largest glacial river, the Skeiðará, which started flowing on a new drainage path, along the glacier margin into the Gígjukvísl River.

During July 2009, Gígjukvísl's flow rate increased steadily as the river 'capture' took hold. "The impacts of this event were spectacular," said Dr Russell. "The levels in two iceberg-infested lakes at the glacier margin rose and water levels in a further three lakes dropped.

"Newly-routed water sliced through the glacier margin like a hot knife through butter. River channels between the lake basins experienced major growth over just ten days.

"This spectacular event illustrates dramatically how climate change can lead to sudden environmental change."

Water no longer flows in the Skeiðará River system and, coupled with the nature of the whole outwash system, these changes so close to the glacier are likely to have significant impacts further down stream and within the coastal zone in the future.

Provided by Newcastle University

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