

# Scotland's last glacier discovered

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Picture shows the corrie in the Cairngorms examined by Dr Kirkbride

(Phys.org) —A glacier was still in place in Scotland within the last 400 years - some 11,000 years less than previously thought - a scientist at the University of Dundee has discovered.

It had long been understood that Britain's last glaciers melted around 11,500 years ago. However, geographer Dr Martin Kirkbride, based in the School of Environment at the University of Dundee, has now established that a glacier was in place in the Cairngorms possibly as recently as the 18th century.

Using a technique called cosmogenic  $^{10}\text{Be}$  dating, Dr Kirkbride has shown that a small glacier in a Cairngorm corrie piled up granite boulders to form moraine ridges within the last few centuries, during the period of cool climate known as the Little Ice Age.

'Our laboratory dating indicates that the moraines were formed within the last couple of thousand years, which shows that a Scottish glacier existed more recently than we had previously thought,' said Dr Kirkbride.

'The climate of the last few millenia was at its most severe between 1650 and 1790. There are some anecdotal reports from that time of snow covering some of the mountain tops year-round. What we have now is the scientific evidence that there was indeed a glacier.'

Scientists had speculated that glaciers may have re-formed in the Highlands around the time of this Little Ice Age but hard evidence has proved to be elusive.

Dr Kirkbride teamed up with Dr Jez Everest at the British Geological Survey in Edinburgh, and the Cosmogenic Isotope Analysis Facility at the Scottish Universities Environmental Reactor Centre in East Kilbride, to carry out the research.

Dr Everest said, 'This is exciting news, as for the first time we have shown that climatic conditions in Scotland allowed glaciation within the last half millennium, at a time when other glaciated areas, such as Scandinavia, Iceland and the Alps saw their glaciers grow to some of their largest sizes since the end of the last Ice Age. This has great importance when we start to reconstruct climate change in Scotland and the wider region over the last few centuries.'

The dating technique estimates the time since quartz crystals in granite boulders were exposed at the Earth's surface, based on measuring the concentration of beryllium-10 isotopes which form when the rock surface is bombarded by cosmic rays from deep space.

Dr Kirkbride's discovery is backed up by a parallel study by Dr Stephan

Harrison (University of Exeter) and Dr Anne Rowan (University of Aberystwyth). They have developed a numerical climate model to simulate Little Ice Age climate in the Cairngorms, allowing them to calculate how much cooler and snowier the winter weather must have been to cause glaciers to form.

The models show that small glaciers would have been created in the corries by a cooling of air temperatures by 1.5degreesC and precipitation increasing by ten per cent.

Dr Harrison said, 'Our findings show that the Cairngorm mountains were probably home to a number of small glaciers during the last few hundred years - around 11,000 years later than previous evidence has suggested. It may be that such [glaciers](#) also existed in the Scottish Highlands and elsewhere during other cold periods after the main ice sheets had disappeared.

'Present [climate](#) warming means there is little chance of a return of glacier ice to the Highlands for the foreseeable future.'

Both studies are published in the latest issue of the journal *The Holocene*.

Provided by University of Dundee

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