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Glasgow and the western Lowlands in 1816

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Prof Graeme Morton, University of Dundee
Author of *Weather, Migration and the Scottish Diaspora: Leaving the Cold Country*
(London, 2021)

Tambora 1815, Scotland 1816 (Transcript)

Scotland remains the coldest part of the UK

Looking at data from the mid-1870s until recent years, the record coldest temperature each day in Britain has been logged in Scotland on 303 occasions and the warmest daily temperature has been observed on only 25 occasions. Studies that began in the twentieth century show that the people of Scotland experience excess winter mortality at a level higher than countries that regularly record more extreme winters. There is no agreement as to the cause—and in Ireland and Spain the level is even higher—yet the levels of excess winter mortality in Scotland have been regularly double that of Scandinavia and the countries of northern Europe.

Scotland's climate should never be ignored compared to the extremes found elsewhere in the world. Looking at data going back to 1884, the ten hottest years in Scotland have been since 2002 and five of the ten coldest years have been before 1900.

If we go back a little further and look specifically at Scotland's weather in the aftermath of the eruption of Mt Tambora in April 1815, the effects of volcanic action on this cold northern nation are profound. There evidence indicates that the year 1816 stands out in the data in any survey of the nation's weather over long term, and the effects of the volcanic ash would be felt over the next two years.

The winter of 1815/16 was one of the severest in Scotland. Local newspapers in Glasgow and Inverness complained of frost and snow from early November right through to April 1816. Across Scotland, the year 1816 was amongst the top five years for snowfall when compared with records from the late 18th century. There were 40 days of snow in 1816, compared with highs of 35 days in 1795 and 34 days in 1772. Annual rainfall in 1816 for Edinburgh stood at 25.24 inches, and just over 29 inches in 1817 (the top three of years for rainfall, 1733-1820).

Looking for the coldest years shows finds that 1816 and 1823 showed greatest distinction from the mean. 1816 was one of only two years when the average temperature was below the norm for each of the year's twelve months. And the decade 1811-20 was the coldest on record throughout the period 1700 to 1950,

And it was windy, and that wind was cold. Gale events above the norm - of 30 gales per year - were recorded in 1815 (57 gales), 1816 (67 gales), 1817 (56 gales) and in 1818 when 72 gales ripped through the country, the highest in the whole range surveyed. Much of that wind came from the east, again at near record levels, with 46% of the wind from that direction making it into the top three, just under 2% less that record for 1798

The research of Alasdair Dawson, Kieran Hickey and colleagues has shown that the frequency of gales has peaked following the volcanic eruptions of Tambora (1815) and Krakatoa (1883), and that periods of extreme windiness were found to follow relatively quickly after major episodes of volcanism. Over the 19th century, the first period of increased wind activity has been identified as that of 1813–43. And the link between increased storminess and the effects of global warming is, of course, of interest to climatologists.

The years around the eruption of Tambora was a period that Victorian meteorologist RC Mossman identifies as being particularly bad for agriculture, and the price of oats was dear (the second dearest year was 1816) in the period from the 1770s to 1850. The price of oats was high in these years, except for 1815, and the high would return and continue through to 1819

Scotland, the cold nation, would warm over the 19th century, and with greater rapidity during the first three decades of the century. It is notable that neither the 1830s nor 1840s—the decades when agricultural crisis hits the highlands of Scotland—stand out for their coolness. The 1840s began with storms and hurricane strength winds, with strong winds recorded in the south-west of the country in 1844, and the effects of a severe south westerly gale were disruptive to the citizens of Edinburgh in January 1845. It was instead the warmth of 1846 that provided the conditions conducive to the potato blight. The combination of high humidity and thunderstorms helped the blight to first spread more freely in Ireland than in the higher and cooler hills of northern Scotland. The cool of the 1845 summer in Scotland was however followed by a mild winter and warm months for the rest of 1846, achieving the warmest British summer that century, reaching 49.6 °F for the year in Scotland compared to an annual mean of 46.75 °F (over 1795–1859).

The cold, the frost and storm have particular impact on fragile agricultural environments. But they have impacts, it should not be forgotten, on the health of urban scots. The great killer is this period as associated with pulmonary tuberculosis and bronchitis, with the death rates consistently higher in the urban areas than the rural parts of the country. Mid century, Greenock was Scotland's unhealthiest town, with Glasgow second in that unwanted table. Contemporaries looked to the level of rainfall on the west coast to help explain this, along with the third most common cause of death that came from inflammation of the respiratory organs, exacerbated by smoke filled cities and dreadful factory conditions.

Meteorologists have maintained that the impact of global warming is not confined to any one-off incident but that the severity, frequency and impact of climate events are exacerbated as a consequence. The events of 1815/16 show how one climate event contribution to worsening the impact of Scotland's difficult climate on the health of its people.

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