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Seventy four Scottish snow patches survive until winter 2015/16

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Here we present our twentieth annual report on the survival of Scottish snow patches, following the account for 2014 in Cameron *et al.* (2015).

Methods

The compilation of this year's paper was aided by the extraordinary contributions from people – far too many to name individually – using social media, and from www.winterhighland.info as usual. Unattributed observations are by authors IC, AW and DD, information from others being personal communications. Measurements of patches give greatest length, breadth and depth in that order.

Weather in winter through to autumn

The trend of the last few years, where winter was dominated by westerly winds, continued. December 2014 through to March 2015 was broadly in line with the 1981-2010 mean in terms of precipitation and daily maximum temperatures. Large amounts of snow were put down on east-facing aspects by the Atlantic-dominated winter weather, and the freeze/thaw cycles associated with these systems meant that deep consolidated snow was to be found on hills all over the country through the season.

April was milder than normal, but May, June and July were all unusually cool. In Lochaber, temperatures during May were more than 2.5 degrees C below the 1981-2010 mean, with precipitation around 175% of the average. Much of this fell as snow above 914 metres (3000 feet). So much fell in this month that avalanche forecaster B. Fyffe and us estimate Ben Nevis's deepest snow of the season was encountered during the first week in June. Fresh snow was observed on 8 days in June: a remarkable total. Though July was not as cool, relatively, as the previous two months, fresh snow was witnessed on Ben Nevis on the 25th. For the first time since 2010 there was no fresh snow in August, and September had only one day where it fell and lay (24th), on Ben Nevis and Ben Macdui.

Patches in late spring, summer and autumn 2015

April–July

Southern Scotland

On Goat Fell in Arran, E. Renshaw visited the north east side of the hill on 16 May and saw some small wreaths, estimating final melt a few days thereafter. In Galloway, Cairnsmore of Carsphairn and Corserine were inspected in early May, with big patches observed on both. Snow on the latter of these lasted longest, persisting to mid June. The last patch in the Southern Uplands to melt was on Cramalt Craig, where R. Dolder saw a wreath over 50 metres long on 10 June. We judge this lasted till the final week in the month.

West and Central Highlands

In Perthshire, IC visited Sròn a' Chaoinidh and Meall nan Eanchainn of Glen Almond, finding huge wreaths in the north facing corries on 29 May, larger than were seen on 31 May 2015. At Beinn Ime on 17 July a large patch of 42 x 25 x 2.5 metres was observed near the summit. The patch known locally as Cuidhe Chrom (crooked wreath) on Ben More near Crianlarich was observed on 30 July, and found to be large, finally succumbing in the middle of the next month.

On the most southerly Munro, Ben Lomond, IC went to the south-facing flank and found a 39 metre long patch on 20 May. This lasted till the first week in June, which was the latest since at least 1983. Farther west, on Ben Cruachan, small wreaths were seen on the very late date of 25 July, and which melted some 10 days later. Above Glen Lyon, a huge patch (307 metres long) was measured on 19 July at Carn Mairg's Coire Cruach Sneachda (corrie of the heap of snow).

East Highlands

The 41st annual survey of the north-east Highlands was undertaken on 1 July by AW and IC at Meall Odhar, near Glenshee ski centre, and on 29 June by DD on Ben Macdui. The numbers and total lengths of patches exceeded those in recent years significantly, and were again especially conspicuous on the hills of central Perthshire around Glen Almond, despite the considerable distance. Far larger wreaths than usual were seen on Beinn Bhrotain, Mullach Clach a' Bhlaire and Beinn a' Bhuid of the Cairngorms, as well as on the Ben Lawers range.

At Garbh Choire Mòr of Braeriach massive accumulations were observed on 15 June, more akin to an average April or May's deposits.

On 5 July, photographs taken from the summit of Ben Macdui (and shown to AW) revealed far more snow than usual on An Sgarsoch, Carn an Fhìdhleir, Meall Tionail, and Beinn Bhrotain. Carn Ban Mor's Ciste Mhearad, above Glen Feshie, was viewed by DD on 6 July and had three patches, the largest of which persisted until the 21st of that month.

August and September

All-Scotland survey in late August

The eighth all-Scotland survey since 2008 took place on 21 and 22 August. A colossal total of 678 patches was observed across the country. Their numbers and location were as follows: Southern Highlands, 17; West Highlands and Lochaber, 198; Central Highlands and Drumochter (including Ben Alder), 40; North-East Highlands (including Cairngorms and Lochnagar), 207; North-West and Northern Highlands, 216. In the six previous years (2008–2014) the number of patches had been 77, 35, 34, 36, 72, 81 and 281. We caution that this year's total is likely to be an under-estimate, given that not every location was observed.

West and Central Highlands

N. Morrison saw the tiny remains of the formerly massive patch at Sròn Chaoinidh, Glen Almond on 8 August: a remarkably late date. Beinn Mhanach's Coir an-t Sneachda (corrie of the snow) held a large wreath on 15 August, also highly unusual for the time of year. Farther east, above Glen Lyon, an outlier of Carn Mairg (Meall Liath) had a large patch on 16 August, and which we judge persisted till late that month.

On 15 August, A. O'Dowd was in Glen Ogle near Lochearnhead and viewed several large wreaths on Beinn Heasgarnich. We estimate that the largest of these survived into early September. On the same day, IC walked to the summit of Beinn a' Chreachain near Bridge of Orchy and saw several large patches on the Black Mount above Rannoch Moor, and a tiny remnant on Beinn an Dothaidh.

At Aònach Mòr in Lochaber, far more snow persisted on 16 August than at any equivalent time since 1994. During a trip on this date, IC also saw much snow on Bidean nam Bian. Next

day he visited the Ardverikie hills and saw large amounts on Geal-Charn's Aisre Cham, as well as sizeable drifts on the Grey Corries near Fort William. M. Atkinson, B. Fyffe and A. Todd went to Ben Nevis's Observatory Gully on 23 August and saw huge volumes of snow persisting, up to 15 metres deep, at the foot of Point 5 Gully.

In the NW Highlands on 26 and 27 September, IC climbed numerous hills around Glen Affric and Glen Cannich, finding many patches. The largest of these were the remnants of a June avalanche, semi-buried by mud and rock, on Sgurr na Lapaich (see Fig.1).

East Highlands

On the south-east side of Cairn Gorm on 5 August, H. Rennie skied on old snow, later than at any time she has experienced. On nearby Ben Macdui on 31 August, IC and A. Kish went to the Feith Buidhe slabs, where the latter skied over 100 metres to the foot of the 150 x 100 x 8 metres patch (see Fig.2).

S. Grant as usual monitored the snow patches on the north and west side of the Cairngorms from his house in Inverdrue. In Coire Ruadh of Braeriach the last patch disappeared on 23 August, and on the same day he went to Ciste Mhearad of Cairn Gorm and found it to be 63 x 60 x 5 metres, roughly oval in shape. Also at Braeriach, Garbh Choire Mor was visited by IC (with A. Todd, M. McKie and B. Findlay), who saw the largest amount of snow present for the time of year since 1994. The wreath at the foot of the cliffs stretched unbroken from Great Gully northwards for over 150 metres, with a 100 metre patch of former avalanche debris on the corrie floor.

On Lochnagar above Deeside, G. Jones went to the hill on 7 September and reported that no snow was left on Cairn Bannoch where he had seen it previously. C. Miller informed us that this was the last snow on that hill. G. Jones also saw the last remnants of the Laird's Tablecloth patch on Beinn a' Bhuid on 29 September, but this would have vanished a few days thereafter in warm weather.

October and November

West and Central Highlands

The Glencoe ski centre at Meall a' Bhuidh had its longest-lasting snow since 1956 (A. Meldrum), when a minute patch melted on 6 October. On nearby Bidean nam Bian a tiny wreath was observed on 24 October, melting a day or so later. At Stob Coire an Laoigh in the Grey Corries, H. Rennie saw a big patch from adjacent Aonach Mòr on 16 October. We judge that this snow survived through to lasting winter snow.

At Aisre Cham on Geal-Charn, IC went with A. Kish and M. Atkinson on 1 October and observed two big patches, the largest of which was 97 x 45 x 2.5 metres. In a subsequent visit on 2 November A. Kish saw that these had broken up into four, three of which survived to lasting winter snow. A few miles north-west, Creag Meagaidh carried two massive wreaths in Coire Ardair's Easy Gully when visited on 31 October. Another patch was seen below the summit cliffs, as well as at the top of Raeburn's Gully. Unusually, a large patch was spotted on the adjacent hill of Carn Liath, at Coire nan Gall. All of these patches survived to the following winter.

On Ben Nevis various accounts by multiple contributors were given to the authors throughout October. To check exact numbers A. Kish summited Carn Mòr Dearg on 3 November in perfect conditions and counted 33 patches, of which he estimated 18-20 'could easily survive'. In fact, we judge that 21 patches survived to lasting winter snow.

Aonach Beag and Aonach Mor had far more snow than usual for the time of year. Photographs and reports relayed to the authors showed that just before lasting snow came, five patches at the latter's Coire an Lochain endured, and eight at the former's An Agaidh Gharbh, as well as two in An Cuil Choire.

North-West Highlands

On a clear day on 23 October, C. Anton and J. Pottie ventured into the Glen Affric hills to observe remaining snow. Tom a' Choinich and Toll Creagach both had large patches visible, as did An Riabhachan in the distance. Though Sgurr na Lapaich and its neighbour Sgurr nan Clachan Geala were not visible, we estimate that the snow present on them on 26 September was of sufficient size to endure to the new winter snows in November.

Beinn Dearg near Ullapool had 3 large patches on 23 October, and – again – though we did not visit for two weeks prior to lasting snow arriving, we estimate that these also survived.

At Ben Wyvis, N. Lamb went to Coire na Feòla on 13 October and saw a patch 20 x 4 x 1 metres. We judge that this disappeared very late in the month, or in the first week of November.

East Highlands

A large 40 x 50 x 3 metre wreath persisted at Beinn Bhrotain's Coire an t-Sneachda in the Cairngorms on 24 October (see Fig.3). During his visit IC saw a wide snow tunnel which would have split the patch into two sections. However, both segments would have been large enough to endure to lasting winter snows. Multiple visits to Ciste Mhearad on Cairn Gorm by H. Rennie during October and November produced good observations and notes. By the time lasting winter snow came the patch was much reduced and had split into three pieces, but still survived: the first time since 2000.

E. Boyle went to Ben Macdui on 18 October and managed to see all remaining snow, the extent of which exceeded any comparable time since 1994. He saw seven patches at Braeriach's Garbh Choire Mòr, five of which lasted until winter, and several more on Ben Macdui's eastern flank. A. Kish also visited this location on 1 November and saw six patches that subsequently persisted to lasting winter snows. Two were at Garbh Uisge Beag, one at the Feith Buidhe slabs and the other three in the Snowy Corrie.

Conclusions

Seventy four patches survived until the following winter's snows. Twenty one were on Ben Nevis, eight on Aònach Beag, five on Aònach Mòr, one on Stob Coire an Laoigh, five on Creag Meagaidh, two on Carn Liath, nine on Ben MacDui/Cairn Gorm, six on Braeriach, two on Beinn Bhrotain, three on Geal-Charn, two on An Riabhachan, three on Sgurr na Lapaich, one on Sgurr nan Clachan Geala, two on Tom a' Choinich, one on Toll Creagach and three on Beinn Dearg. Lasting snow came to all locations on 13 November, except for Garbh Choire Mòr, which arrived on 11 November.

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Figure 1. The remnants of previous winter's snow on Sgurr na Lapaich lie buried on 26 September by debris from a massive avalanche and mud slide. (© Iain Cameron)

Figure 2. Attila Kish is dwarfed by eight metre deep snow at the Feith Buidhe slabs on Ben Macdui, 31 August. (© Iain Cameron)

Figure 3. Author Iain Cameron underneath a water and wind-carved tunnel at Beinn Bhrotain in the Cairngorms, 24 October. (© Iain Cameron)

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