

Fireballs over Iceland

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Late in the evening of 1976 August 1, a spectacular fireball appeared over Iceland. The sky happened to be clear over most of the country and the meteor was widely observed. The day was a Sunday and the following day was a holiday. Consequently, many people were travelling and camping in the countryside and reports came in from many areas. The time (22:40 UT) was after sunset for most observers except those in NW Iceland where the Sun was still above the horizon.

The meteor left a conspicuous trail which could be seen for hours as a noctilucent cloud, and was photographed from many directions. A thundering sound was heard in northern Iceland and registered at one seismic station. Unfortunately I did not witness the event myself, but I set about collecting all available data, including several photographs of the trail taken from different directions. These made it possible to deduce the approximate path of the meteor. The place of fall (or disappearance, rather) turned out to be 170km



Figure 1. This picture of the 1976 August event was taken at Kaldbaksvík, NW Iceland, 2–3 minutes after the disappearance of the fireball about 200km to the north. The trail is still fairly straight. (Photo: Gunnar Tómasson)



Figure 2. Taken at Höfn in SE Iceland, showing the trail approximately 450km away to the northwest. The exact time is unknown but the trail has clearly begun to dissipate. (Photo: Thorsteinn Gíslason)

north of Skagatá promontory in Northern Iceland. Judging from the observations, the meteoroid had been moving around the Sun in a direction similar to that of the Earth.

After this memorable event I began to gather data on fireballs reported by the Icelandic news media. There is no generally accepted definition of the term ‘fireball’. The IAU (1961) defines it as ‘a bright meteor with luminosity which equals or exceeds that of the brightest planets’. For the purposes of this note the term simply applies to meteors bright enough to make people report them. In Iceland, people who witness such phenomena often contact the Icelandic Meteorological Office and their staff have been helpful in alerting me to many cases.

A summary of the recorded events can be seen on the following web page: www.almanak.hi.is/fireballs.html. This page provides links to pictures of meteor trails, including those of the 1976 event given here.

The total number of events recorded to the end of 2010 stands at 182. The 1976 fireball is no. 9 on the list; the top items were added later.

A plot of the yearly number of fireball reports is given in Figure 4. The sharp increase after 1992 is probably due to the



Figure 3. Taken at Vadnes in S. Iceland, about 400km south of the point where the fireball disappeared. The time was close to 01:00 UT, more than two hours after the event. The trail has been scattered widely by high altitude winds. Because of its great altitude, the trail is still in sunlight while ordinary clouds, seen at the bottom of the picture, are dark. It should be noted that this photo covers a relatively narrow angle, only 10° horizontally. (Photo: Halldór Guðmundsson)

general adoption of e-mail, which made it easier for people to report sightings. Prevailing weather conditions also affect the numbers so it is difficult to say how much of the variation is real. The highest number reported in one year after 1992 is 17 and the lowest is 2.

It is not uncommon for two fireballs to be reported in a 24-hour period. There have been 14 such cases since 1976 and another 3 when three fireballs were seen on the same date. There is no evidence that these closely spaced meteors were in any way related. Their association might be the result of exceptionally good observing conditions (clear skies over an unusually large area) or a greater incentive to report a sighting when a fireball has been in the news.

However, this reasoning fails to explain the large number of fireballs observed on 2009 November 14–15, when several bright meteors were reported in only seven hours. The appearance and motion of these meteors were dissimilar, so it is not a question of a group travelling together in space. A possible exception is a fireball (or fireballs) observed at 17:34 UT on 2009 November 14. Descriptions of this event were obtained from 25 observers in southern and south-

western Iceland. It was initially assumed that the observations must all relate to the same object because no observer saw more than one fireball and all agreed that it had been travelling from east to west. There remains, however, a large and inexplicable difference in the direction where the fireball is said to have disappeared, and one is almost forced to conclude that two similar objects appeared within a minute or so of each other.

Counting the observations at 17:34 UT on 2009 November 14 as two events, the number of fireballs observed in Iceland in a seven hour period that day comes to an astonishing total of eight. As all but two of these meteors appear to have been unrelated, their exceptional confluence must be regarded as a rare coincidence.

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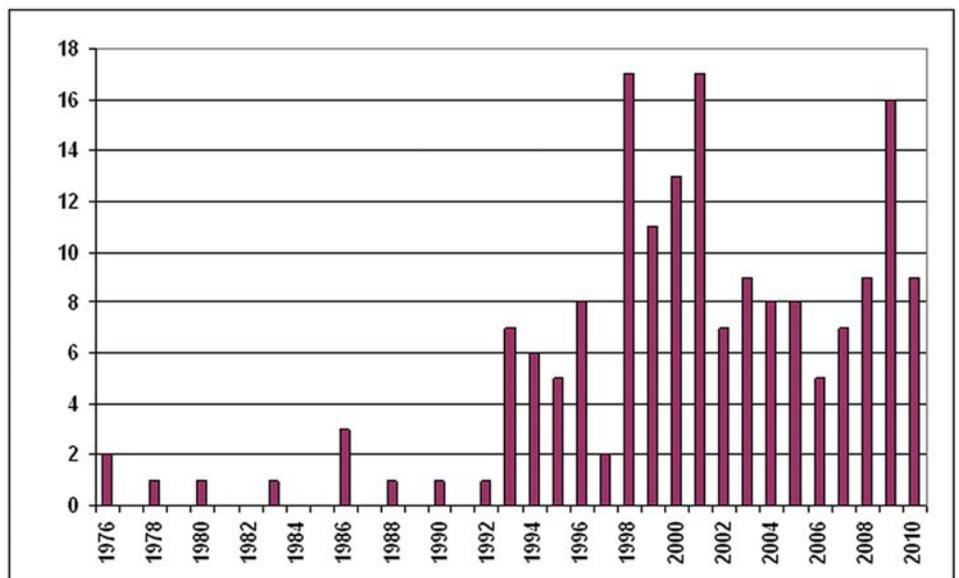


Figure 4. Yearly number of fireballs reported from 1976 to 2010.