

A Thunderstorm and Subsequent Flash Flood at Alum Pot & Long Churn Caves

A record and educational resource,
detailing the events of Sunday, 11th May 2008.

Build up to the Storm

1. Clouds began building over Whernside and Cam Houses from 11am.
2. Within an hour the two cells had merged into one large cell.
3. Thunder started at 1:30pm and the anvil head of a large CuNimb began to move upwind towards Ingleborough.
4. No rain was visible at this time.
5. Smaller cells appeared over Pen-y-Ghent and the western flanks of Ingleborough.
6. The gust front from the CuNimb hit Selside and Simon Fell at approximately 2pm.
7. Rain started over Whernside and Ribbleshead at 2:15pm.

The Storm itself

1. The rain moved in from the North crossing Ribblehead and onto the spine of Ingleborough.
2. It hit the Park Fell area at 2:45pm and Simon Fell at 2:50pm.
3. The rain lasted no more than forty-five minutes.
4. It was torrential with at least 30mm, but probably closer to 40mm.
5. There was a large amount of hail up to 5mm in diameter.
6. The downpour tracked along to the summit and then dissipated.
7. It was extremely localised to the main ridge.

What was the Effect Underground?

1. At 3:30pm a large number of surface streams were visible on the back wall of the catchment above the Alum Pot system, 1km above the caves.
2. It was immediately apparent what was going to happen and an attempt was made to warn people at the cave
3. The noise of the approaching flood was audible at Dr Bannister's entrance.
4. Five minutes later, the downstream exit to Borrin's Moor Cave exploded and the pulse entered Dr. Bannister's.

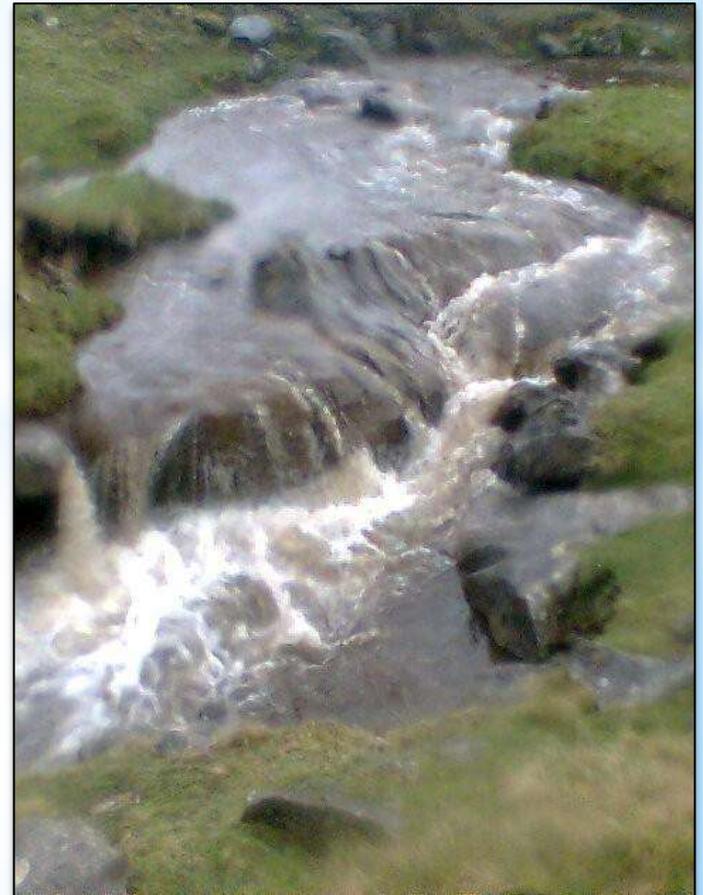


Photo: Water flooding from Borrin's Moor Cave at 3:45pm.

The Middle Entrance

1. The pulse was observed arriving at the Middle Entrance cascade at 3:50pm. It arrived as a massive surge and a loud, crashing noise which was very scary.
2. The cascades down to the low exit crawl before the fossil passage will have been impassable.
3. The low crawl out to Diccan will have sumped immediately and Diccan entrance also became virtually impassable.
4. There was no water in the stream entering Main Shaft at this time.

The Call-Out

1. No contact was made with anyone underground. It was not known if parties were still in the cave.
2. Several caving parties had been observed walking out from the cave.
3. Two minibuses were parked in the lane, both obviously groups.
4. On return to the lane, one empty bus remained. After a quick investigation it became apparent that a party was still underground and had been trapped.
5. Together with some remaining cavers, a return to the entrances confirmed this.

The following photographs were taken at 4:40pm.



1. With no signs of the group and flood levels impassable, the rescue call was made from the Middle Entrance at 4.42pm.
2. There is no reception at the car park on the lane. CRO, were already aware and arrived at approximately 5.05pm.

Water flowing into Upper Long Churn entrance



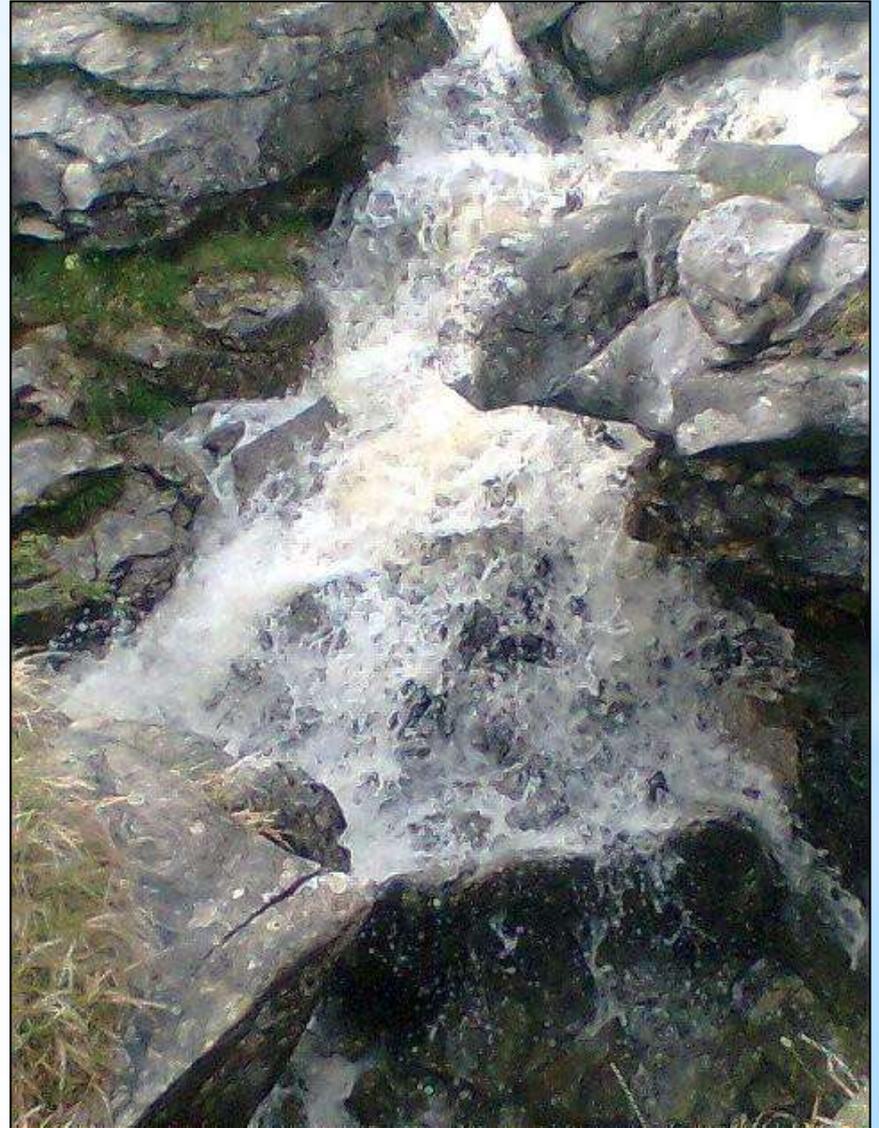
*Water at Middle Entrance flowing
from Upper Long Churn*



*Water flowing out of Long Churn at the
Diccan Entrance*



Alum Pot Stream



Water from Wilson's Cave

Effects on the People Underground

1. The group had been ascending Double Shuffle Pool when noise upstream alerted the leader.
2. They managed to retreat as far as Plank Pool and it was while crossing this that the water arrived.
3. A foot-high wall of water came down the fossil passage.
4. The flood was immediate.
5. The group was able to get to the link passage with Diccan, where they waited away from the flood.

Water Levels Observed

1. Water in St Paul's by the Cheese Press reached 40cms above the floor level.
2. Water had flowed down the Dolly Tubs and Cross Passage.
3. Plank Pool had washed out completely.
4. Water in Fossil Passage was 55cm deep.
5. In the link to Diccan, the water coming from Diccan was 45cm deep.
6. Upper Long Churn had been at least chest deep in places.
7. The Slot into St Paul's was impassable.
8. The passage out to Diccan, Borrin's Moor Cave and Wilson's Cave were all sumped.

Met Office Weather Forecast

Fine at first glance ...

Forecast For Yorkshire & the Humber
Issued by Met Office Exeter
at 0400 on Sunday 11 May 2008

Headline:
Warm sunshine developing for most.

Today:

Mostly dry with some warm sunshine developing again for most by afternoon. Parts of the coast may be cooler and cloudier at times and **isolated heavy thundery showers are likely, mainly in Pennine areas this afternoon.** Maximum temperature 24 deg C (75 deg F).

Tonight:

Some showers may linger through the evening but it will become mostly dry overnight with some mist or fog patches forming later. Minimum temperature 8 deg C (46 deg F).

...but the devil's in the detail.

The following photographs were taken on Wednesday, 14th May,
3 days after the flood.

On the back wall of the catchment area, large land slips had formed ...



... up to 10 metres across.





Drainage into the Alum Pot System



Evidence of the Surface Stream Depth –upstream



Evidence of the Surface Stream Depth –downstream

Timings

- 14:45 Rain started on Park Fell.
- 15:45 Pulse hit Dr. Bannister's.
- 15:50 Pulse hit Middle Entrance.
- 15:53 Pulse hit Diccan Entrance.
- 16:40 Approx. time of peak flood.



Please be aware that no two floods are the same.
The timings of any future floods could be very different.



Conclusions

1. The pulse took 60 mins from first rain to hit Dr. Bannister's.
2. Flooding was immediate leaving little choice of refuge.
3. The group was well led and managed to reach safety in the Diccan link with Lower Long Churn.
4. Water receded relatively quickly.
5. Entry to the system was only possible after levels had dropped somewhat.
6. It was an exceptionally heavy storm, but very short in duration.

with thanks to ...

- **BCA Training Committee** for their hard work in pulling together this presentation.
- The **Met Office** for their kind permission to include the weather forecast for the day.

