

Archive of high-resolution barometric pressure records for the UK and Ireland, 15-18 January 2022

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Background

At 0415 UTC on 15 January 2022, the large subterranean volcano Hunga Tonga–Hunga Ha‘apai in the south Pacific Ocean exploded violently, sending an eruption cloud 40 km into the atmosphere (US Geological Survey, 2022; NASA Earth Observatory, 2022). The volcano is located at 20.546°S, 175.390°W and lies about 68 km north-north-west of Nuku‘alofa, the capital city of the Kingdom of Tonga. Satellite images caught the dramatic growth of the volcanic plume, and the subsequent pressure wave which radiated outward from the volcano at close to the speed of sound. The pressure wave, and its subsequent reverberations, were detected across the entire globe, reaching the British and Irish Isles some 14 hours after the eruption.

This dataset preserves high-resolution records of barometric pressure (1 minute frequency, precision 0.1 hPa or better) from about 50 sites across the United Kingdom and Ireland used in the analysis of the multiple airwaves, and their reverberations across the globe which could still be detected up to 127 hours after the eruption. In all, over 160,000 records are included. The amplitude of the airwaves reaching the British Isles appears to be without precedent since the very similar events following the similarly violent eruption of Krakatoa in August 1883.

There are two datafiles, CSV and Excel xlsx format; both contain identical information.

Details of the dataset follow. This dataset is made available under **Creative Commons Attribution 4.0 licence** <https://creativecommons.org/licenses/by/4.0/>. If you use the data, please include a citation as follows:

Burt, Stephen (2022): Multiple airwaves crossing Britain and Ireland following the eruption of Hunga Tonga–Hunga Ha‘apai on 15 January 2022. *Weather*, In press

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Dataset. <https://doi.org/10.17864/1947.000359>

Key words: Hunga Tonga–Hunga Ha‘apai eruption, volcano, airwaves, barometric pressure, UK, Ireland, Krakatoa

References

NASA Earth Observatory, 2022: Hunga Tonga-Hunga Ha‘apai Erupts, <https://earthobservatory.nasa.gov/images/149347/hunga-tonga-hunga-haapai-erupts>: Dramatic Changes at Hunga Tonga-Hunga Ha‘apai. <https://earthobservatory.nasa.gov/images/149367/dramatic-changes-at-hunga-tonga-hunga-haapai>. Accessed 10 February 2022

US Geological Survey, 2022: M 5.8 Volcanic Eruption - 68 km NNW of Nuku‘alofa, Tonga 15 January 2022. <https://earthquake.usgs.gov/earthquakes/eventpage/pt22015050/executive>, accessed 10 February 2022

The digital pressure archive

The dataset consists of high resolution barometric pressure records (1 minute, 0.1 hPa or better) from about 50 sites across the United Kingdom and Ireland, from a variety of sources including the UK Met Office, Met Eireann, the University of Reading and amateur observers from the Climatological Observers Link (COL). All data are open access and freely available to researchers provided the source is quoted.

Each entry consists of records from one site. The period of record varies within 15-18 January 2022, but all sites are complete for the 36 hour core period 1200 UTC 15 January to 2359 UTC on 16 January 2022. Temporal resolution is 1 minute; some records are ‘spot’ values and others are averaged over a period (the WMO guideline is that barometric pressure records should be sampled at between 1-0.1 Hz and averaged over a period of 60 seconds). Some are mean sea level (MSL), some are QFF and some are station level – the level is immaterial as relative changes were used to track the arrival and passage of the eruption airwaves.

For each site the following details are included:

Site name

Latitude °N, Longitude °W

No of records in this dataset

Station authority

Pressure level (MSL, QFF or station level)

Notes including frequency of sampling and averaging time, where known

Date/Time UTC

Pressure values, in hPa

Missing data are shown blank (empty cell).

Dataset details

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