# Changes and outages in Chilbolton broadband radiometer data

This document describes how I’ve produced amof-netCDF from the 4 Chilbolton broadband radiometers (CM21 downwelling total visible, CMP21 downwelling diffuse visible, CHP1 downwelling direct visible and CG4 downwelling longwave visible). The CNR4 net flux radiometer has operated stably over the same period, without being sent for calibration, so is not considered here.

This timeline is important both for understanding the dataflow from these instruments at a time when they were moved to a new datalogger at the same time as they were being sent for calibration and for knowing what data to archive at CEDA.

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| Date | Event |
| 18/12/2018 | Solar tracker fails. From this date, the CMP21 was unshaded, resulting in it producing very similar data to the CM21 and the CHP1 was not pointing at the sun so its data are useless. The solar tracker was out of action until autumn 2021 – see later.  At this point the “cfarr-radiometer…” data (i.e. original CFARR format) were being sent to CEDA. Any data from the CMP21 and CHP1 data which were sent contained fill values of -999.0. This continued until 31/03/2020 when we ceased sending data to CEDA in this format.  All radiometers were being logged using the Agilent datalogger and the data files recorded on Moe in the receive cabin. |
| 21/02/2019 | Solar tracker brought down from roof. Broadband radiometers remained on the same metal plate, now clamped to the railings. The CHP1 was brought indoors as there was nowhere to mount it. |
| 11/04/2019 | Testing of new Campbell Scientific CR1000X dataloggers had commenced and on this data the CMP21 was connected to one of the loggers as a test of the data quality. As it was recording the same solar radiation as the CM21 (with the solar tracker broken) it was useful for testing. This continued for many months, although sometimes other codes were run on the CR1000X so no CMP21 data were recorded. There is no need to send these data to CEDA.  These CR1000X tests showed that there was no reduction in data quality when the CMP21 was moved to the CR1000X dataloggers.  COVID-related lockdowns and restrictions on working in close proximity to other staff meant that nothing much changed for a long time for the broadband radiometers. |
| 01/04/2020 | Start to produce new “ncas-radiometer…” netCDF data (i.e. new NCAS format). In this format we don’t send files to CEDA which have all missing data. |
| August 2021 | The CMP21 and CHP1 were sent to Kipp and Zonen for calibration. |
| 26/08/2021 | The solar tracker was put back on the roof and the plate holding the CM21 and CG4 mounted on it. The data from them are still recorded using the Agilent dataloggers. The shadow arm was left off as the CMP21 and CHP1 were still away for calibration. |
| 20/09/2021 | Shadow arm reinstalled. |
| 06/10/2021 | CMP21 and CHP1 reinstalled. Not yet correctly shaded so don’t release data. CMP21 logged using CR1000X number 2, CHP1 logged using Agilent.  CM21 and CG4 still logged using Agilent datalogger. |
| 12/10/2021 | CM21 and CG4 taken down in preparation for sending for calibration. Hence no useful data being recorded by any radiometers except the CNR4 net flux radiometer. |
| 14/10/2021 | Move CHP1 to being logged using CR1000X number 2, alongside the CMP21. A new CR-Basic code was run to log both radiometers. |
| 22/11/2021 | First well-aligned data from CMP21 and CHP1 after further alignment work. Fan on CMP21 wasn’t working however. This was fixed on 08/12/2021. |
| 12/01/2022 | CM21 and CG4 reinstalled on the solar tracker after calibration. CM21 data dodgy until 14/01/2022 as its radiation shield was not fully located and was slightly shading the sensor. |

Run option 4 (broadband radiometers from Agilent datalogger) of generate\_days\_netcdf\_metsensors.py until 12/10/2021. Delete ncas\_radiometer\_2 and ncas\_radiometer\_4 from 01/04/2020 to 21/11/2021 inclusive as they are empty. Delete ncas\_radiometer\_1 and ncas\_radiometer\_3 from 13/10/2021 to 11/01/2022 inclusive as they are empty.

Run option 9 (broadband radiometers from Agilent datalogger) of generate\_days\_netcdf\_metsensors.py from 22/11/2021.