



Comparisons of Ambient Air Quality Data at MMF9 Galingale View, Silverdale

1 June 2022

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Comparisons of ambient air quality data at MMF9 Galingale View, Silverdale between the 6 March 2021 – 30 April 2021 and 6 March 2022 – 30 April 2022

1. The Environment Agency's Ambient Air Monitoring Team (AAM team) has carried out three ambient air monitoring studies at various locations in Silverdale. The monitoring periods cover:
 - Study 1:** 6 July 2017 – 14 February 2018
 - Study 2:** 15 January 2019 – 25 June 2019
 - Study 3:** From 4 March 2021 – Ongoing
2. This document provides commentary on data collected at Galingale View (MMF9) between 6 March 2021 – 30 April 2021 and 6 March 2022 – 30 April 2022 (latest available data).
3. Caution should be exercised when comparing such a small data set of only two months as there are several variables that will have influenced the data, including activities in the local area, operational improvements on the site and meteorological conditions. Comparison of the data over a longer period would be more appropriate and reliable but this was not carried out as only the period of interest was considered.
4. We have considered hydrogen sulphide (H₂S) concentrations, wind direction, wind speed, temperature and pressure measurements and the number of odour reports. We did not have complete datasets for wind direction and wind speed for the period 06 – 16 March 2021 at MMF9.
5. Walleys Quarry Landfill Site (WQLS) is at a bearing of approximately 225° – 320° from the MMF, at 0.4km distance. This monitoring location has provided the highest H₂S concentrations during the 2021/22 monitoring study (see Figure 1 & 2).
6. In the period March-April 2021, dominant winds were from the northwest. For the same period in 2022 the dominant wind direction was from the northwest and southeast, with wind patterns following the topography of Silverdale valley. The wind was blowing from the direction of WQLS towards the MMF9 monitor (from wind sector 320° – 330°) for 44% of the time in March - April 2021 and 34% of the time in March - April 2022. Under conditions of low wind speed and temperature, higher H₂S concentrations have been observed for a wider range of wind directions. Consideration of the wind speed data shows that there was a higher frequency of low wind speeds <1m/s in March - April 2022 (see Figure 3 & 4).
7. Consideration of H₂S concentrations over the two monitoring periods shows a lower mean average concentration for March-April 2022 (27.2 µg/m³ for March-April 2021 and 12.4 µg/m³ for March- April 2022) (see Table 1 and Figure 5).
8. The data showed that the H₂S 30-minute mean concentrations were above the World Health Organisation (WHO) odour guideline of 7µg/m³ for 36.4% of the time in March - April 2021 compared to the 20.1% recorded for March - April 2022. This demonstrates a reduction in the amount of time H₂S concentrations were above the

odour guideline in March - April 2022, however we recognise that 20% is still a significant proportion of the time. The 24-hour mean H₂S concentrations were above the daily WHO health guideline of 150µg/m³ during March - April 2021 on two occasions. There were no days in March - April 2022 where H₂S concentrations were above the WHO health guideline level (see Table 1 and Figure 6).

9. The number of odour reports received by the Environment Agency was greater in March – April 2021 (12,986) compared to March – April 2022 (7,849). This represents a reduction of around 39%. The trend in the number of odour reports received often closely follows the trend in the number of daily mean H₂S concentrations (see Table 1, Figure 7 & 8).
10. Meteorological conditions have a strong influence on the H₂S concentrations measured at Silverdale. The data shows that lower temperatures with a strong undulation between daytime and night-time temperatures, accompanied by low wind speeds, resulted in elevated H₂S concentrations in late March and April 2021. These meteorological conditions occurred earlier in 2022, in late February and March of, resulting in an elevation in H₂S concentrations in March 2022 (see Figures 9 – 11).
11. The H₂S data measured at Galingale View (MMF9) shows lower H₂S concentrations between 6 March 2022 – 30 April 2022 compared to those measured between 6 March 2021 – 30 April 2021.
12. It is not possible to quantify how much the differences in H₂S concentrations between the two years is influenced by the operational improvements implemented at WQLS and other variables such as meteorology, which also have a strong influence on the concentrations measured.

Data Warning -

It is important to note that all this data, is rectified data. This means it has been subjected to some quality assurance checking and calibrations, but it is not final data.

The rectified data should not be relied solely upon to make regulatory or health decisions or public statements as it may change significantly once it goes through the final quality assurance checking and calibration process.

We strongly recommend that this document is considered in conjunction with all previously published Environment Agency air quality data and UKHSA's monthly health risk assessment data to give a more complete picture of the environmental and health issues in the local area.

Copies of these documents can be obtained from the Citizen Space website here -

<https://consult.environment-agency.gov.uk/west-midlands/walleys-quarry-landfill-silverdale>

Figure 1: Map of MMF9 Monitoring Location

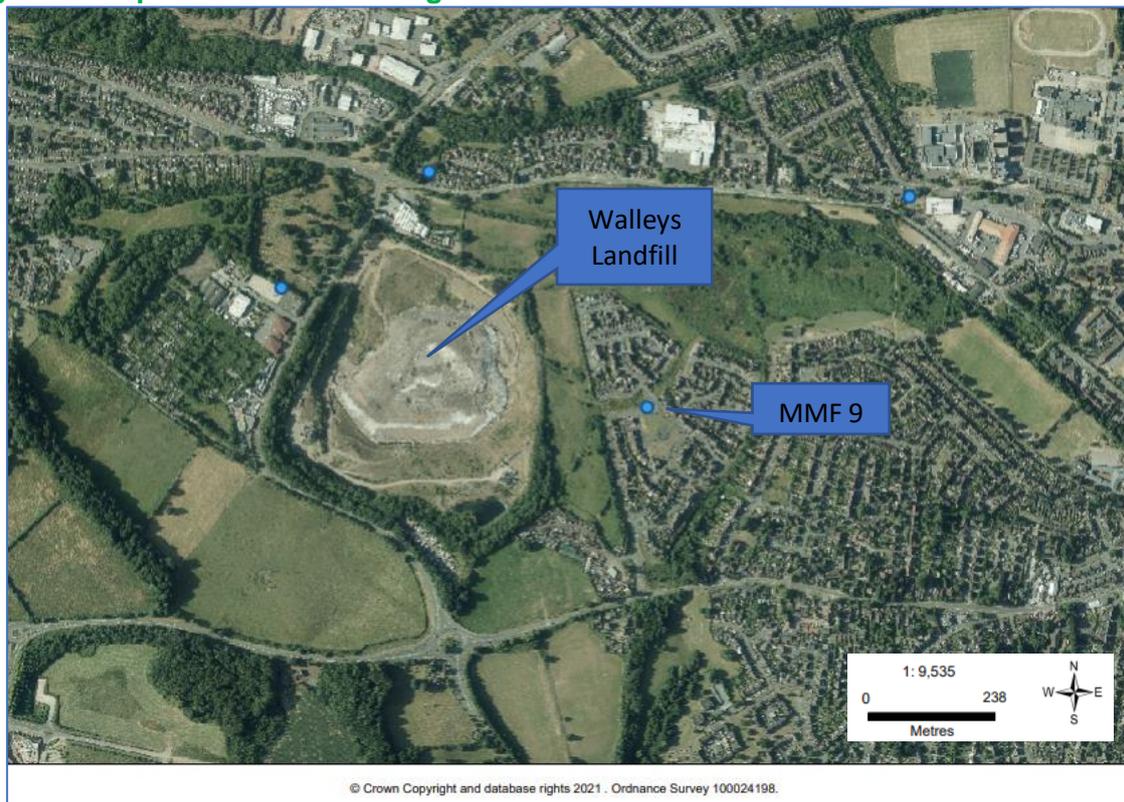


Figure 2: Picture of MMF9 Monitoring Location



Figure 3: MMF9 Wind Frequency Roses (from 5-minute values)

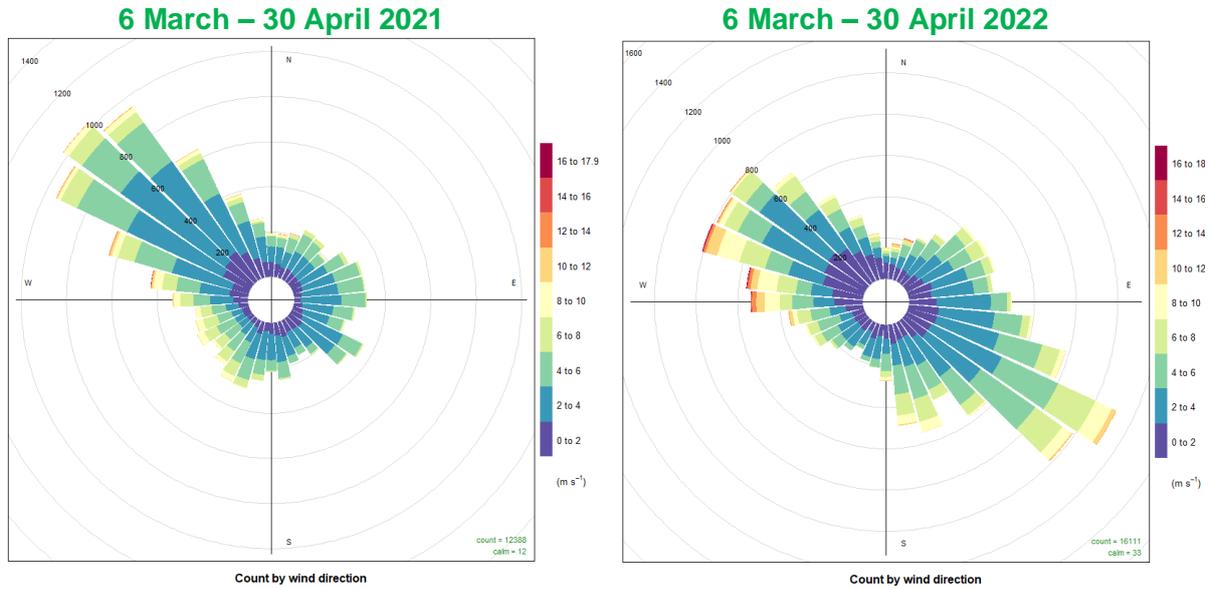


Figure 4: MMF9 Polar plots of wind frequency and speed for 10° sectors (from 5-minute values)

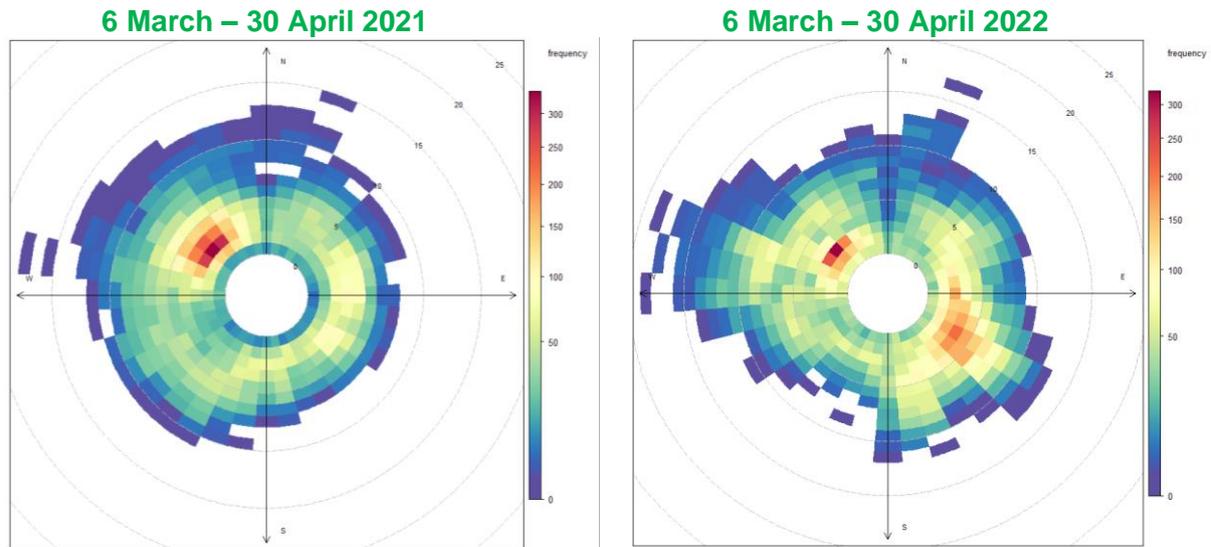


Table 1: Consideration of H₂S concentrations for 6 March 2021 – 30 April 2021 and 6 March 2022 – 30 April 2022.

H ₂ S concentrations		
	6 March – 30 April 2021	6 March – 30 April 2022
Mean	27.2	12.4
Maximum	1350.9	1197.5
99th%ile	383.5	213.0
95th%ile	136.8	67.8
75th%ile	15.7	2.9
50th%ile	2.4	0.9
25th%ile	1.4	0.6
Minimum	0.08	0.02
24-hour maximum	199.0	54.7
Number of 30-minute H ₂ S mean values > WHO odour guideline (7µg/m ³)	36.4%	20.1%
Number of days above the WHO H ₂ S health guideline value (150 µg/m ³)	2	0
Number of odour reports	12986	7849

Figure 5: Time series of 24-hour (midnight-midnight) mean H₂S concentrations

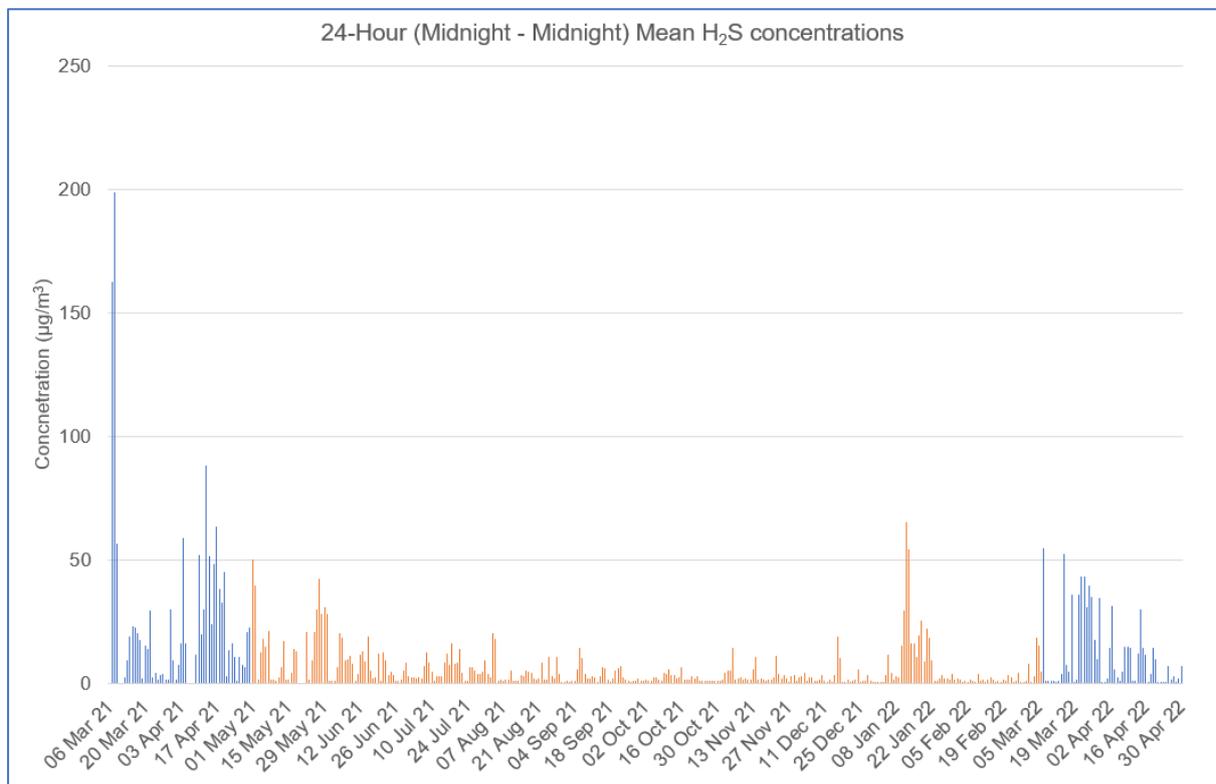


Figure 6: Percentage of time each day that H₂S concentrations were above the 30-minute mean WHO odour guideline (7 µg/m³).

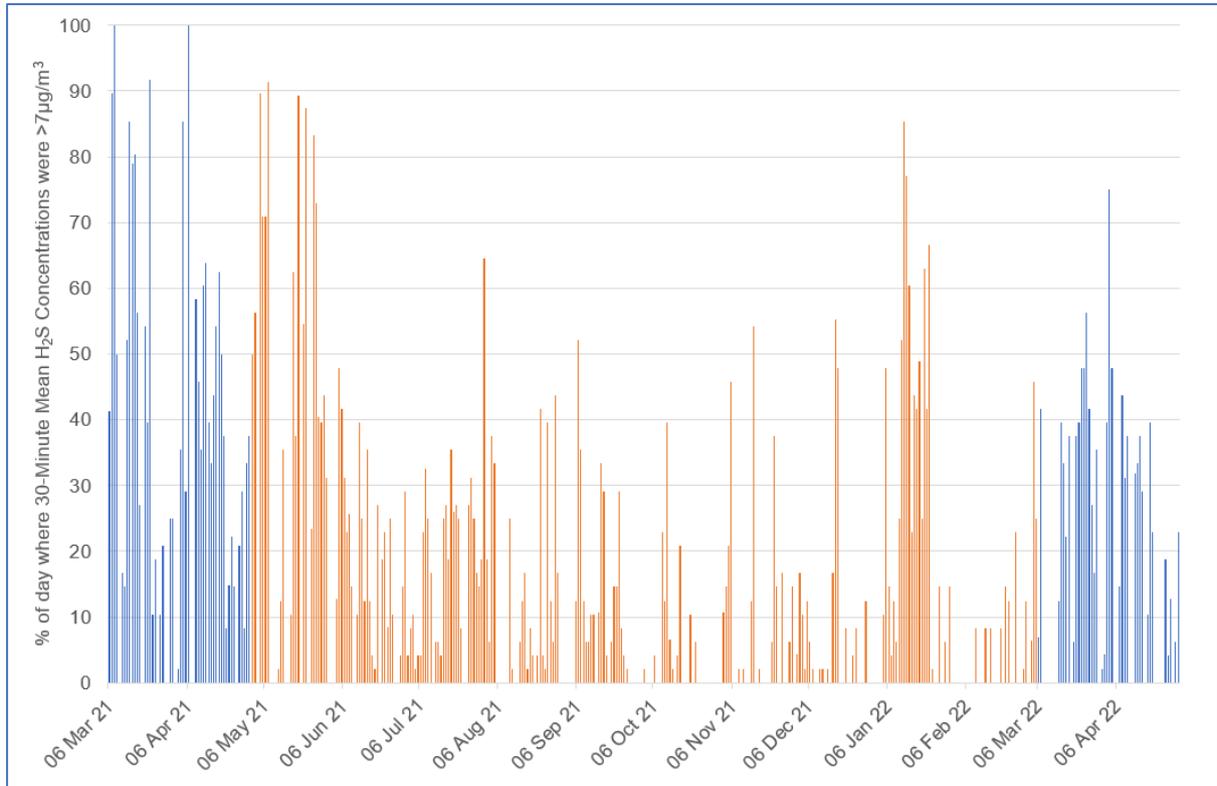


Figure 7: Daily number of odour reports for March – April 2021

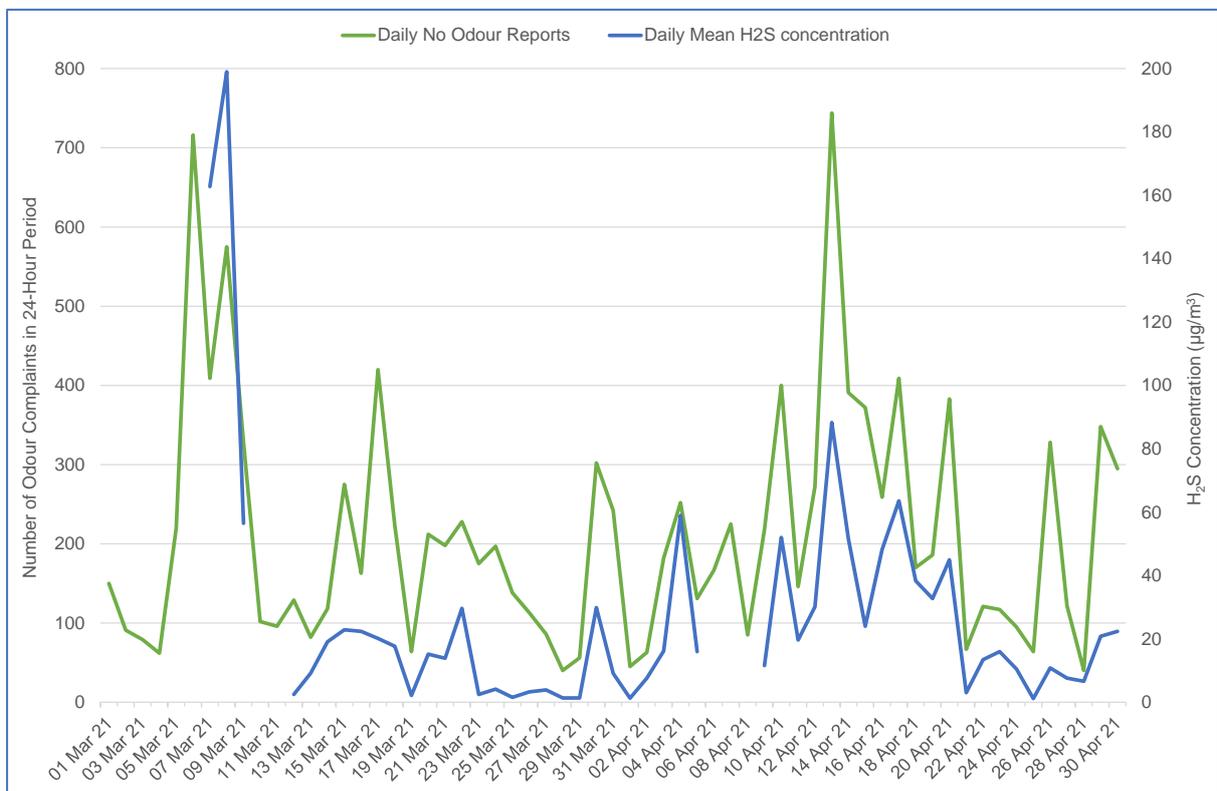


Figure 8: Daily number of odour reports for March – April 2022

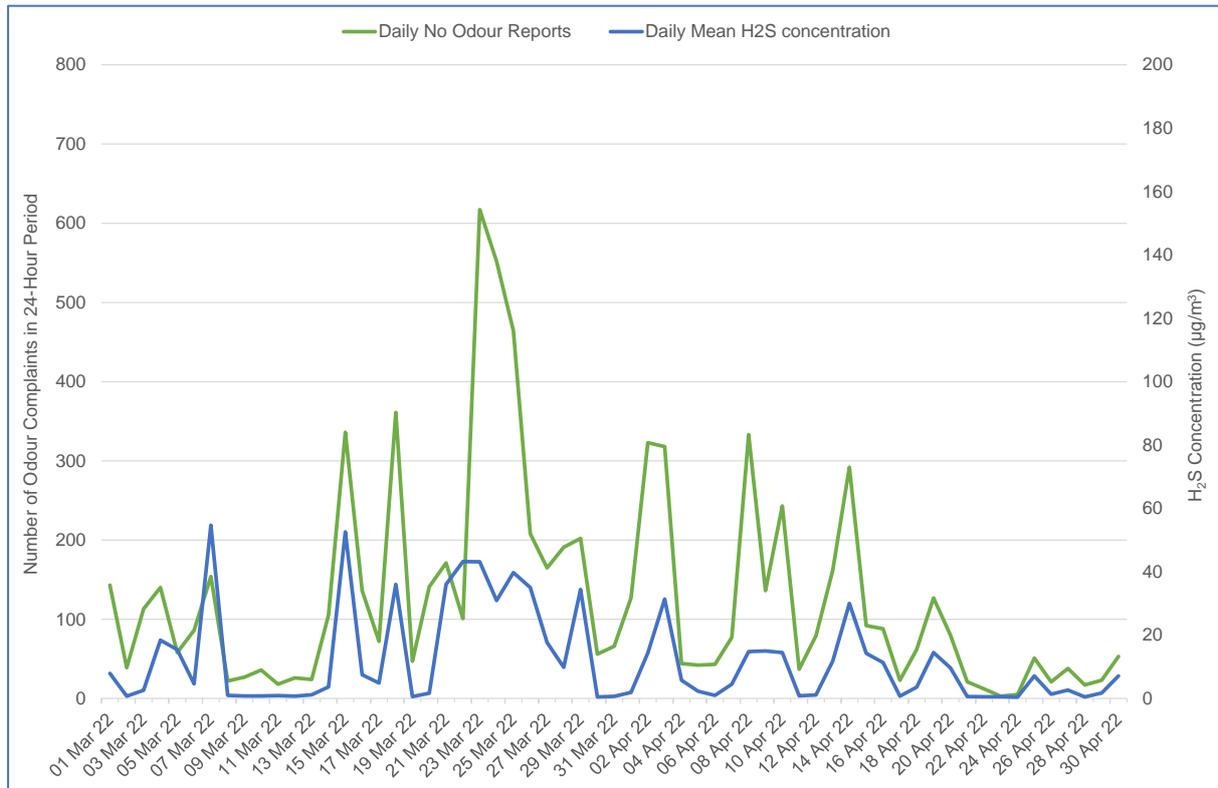


Figure 9: MMF9 scatter plots of 30-minute mean H₂S, wind speed and temperature values for week 9 - 17 of 2021 and 2022 (Monday – Sunday).

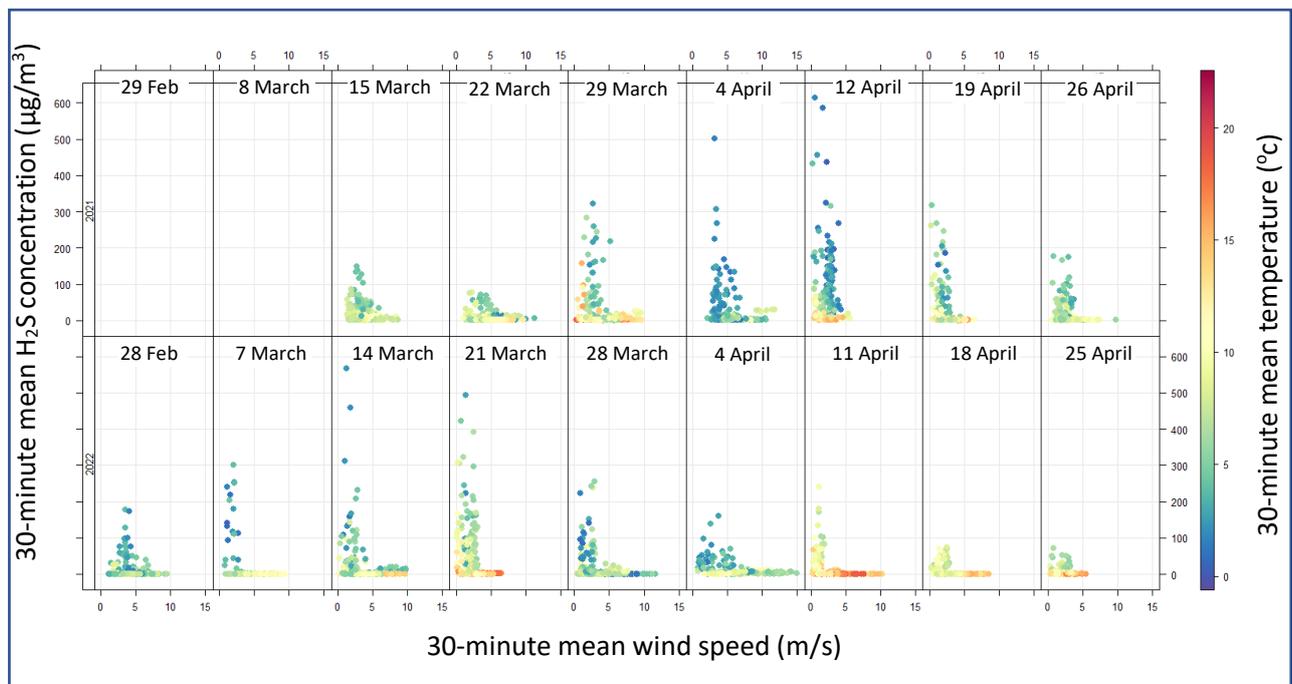


Figure 10: MMF9 30 – minute mean time series from 6 March – 30 April 2021

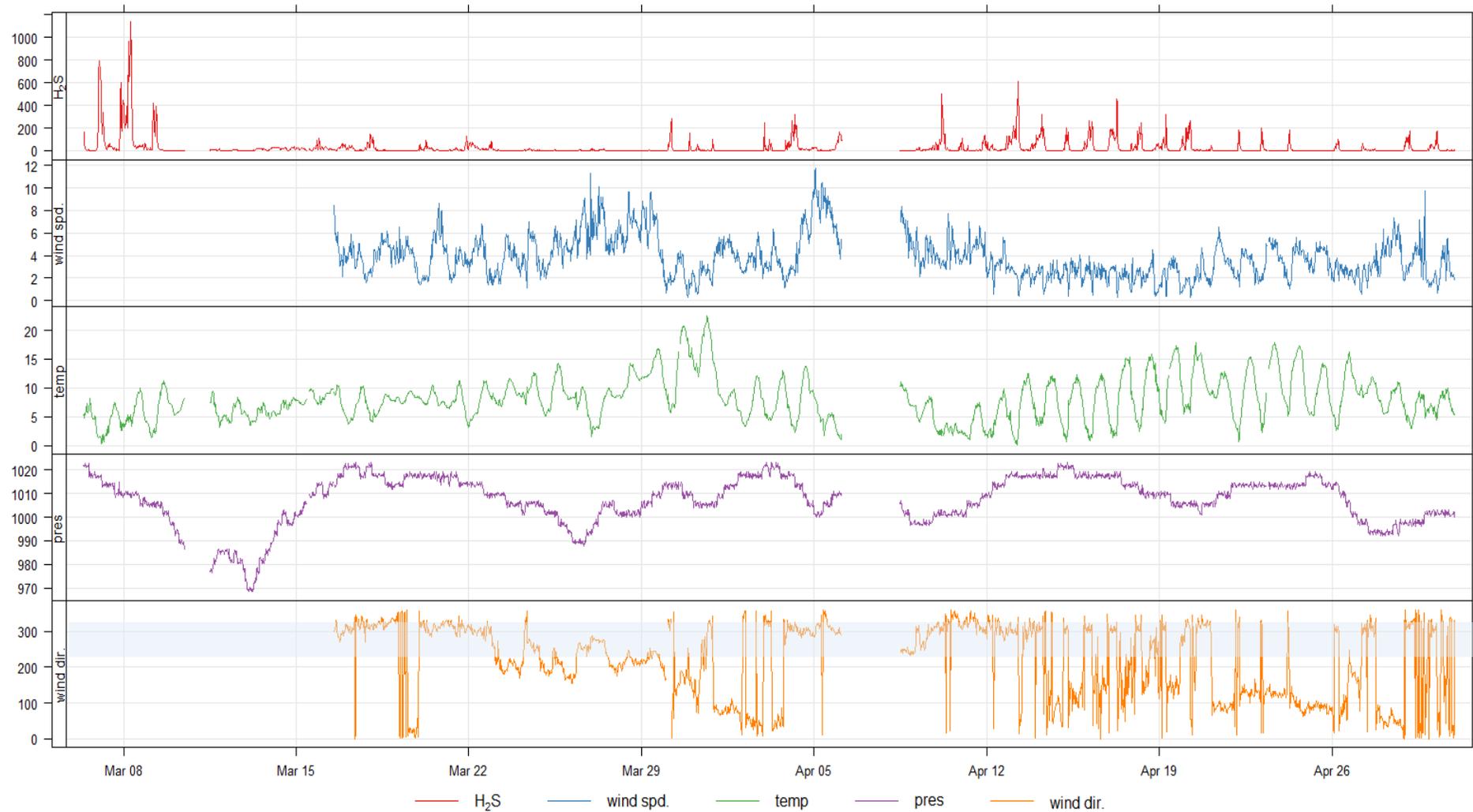
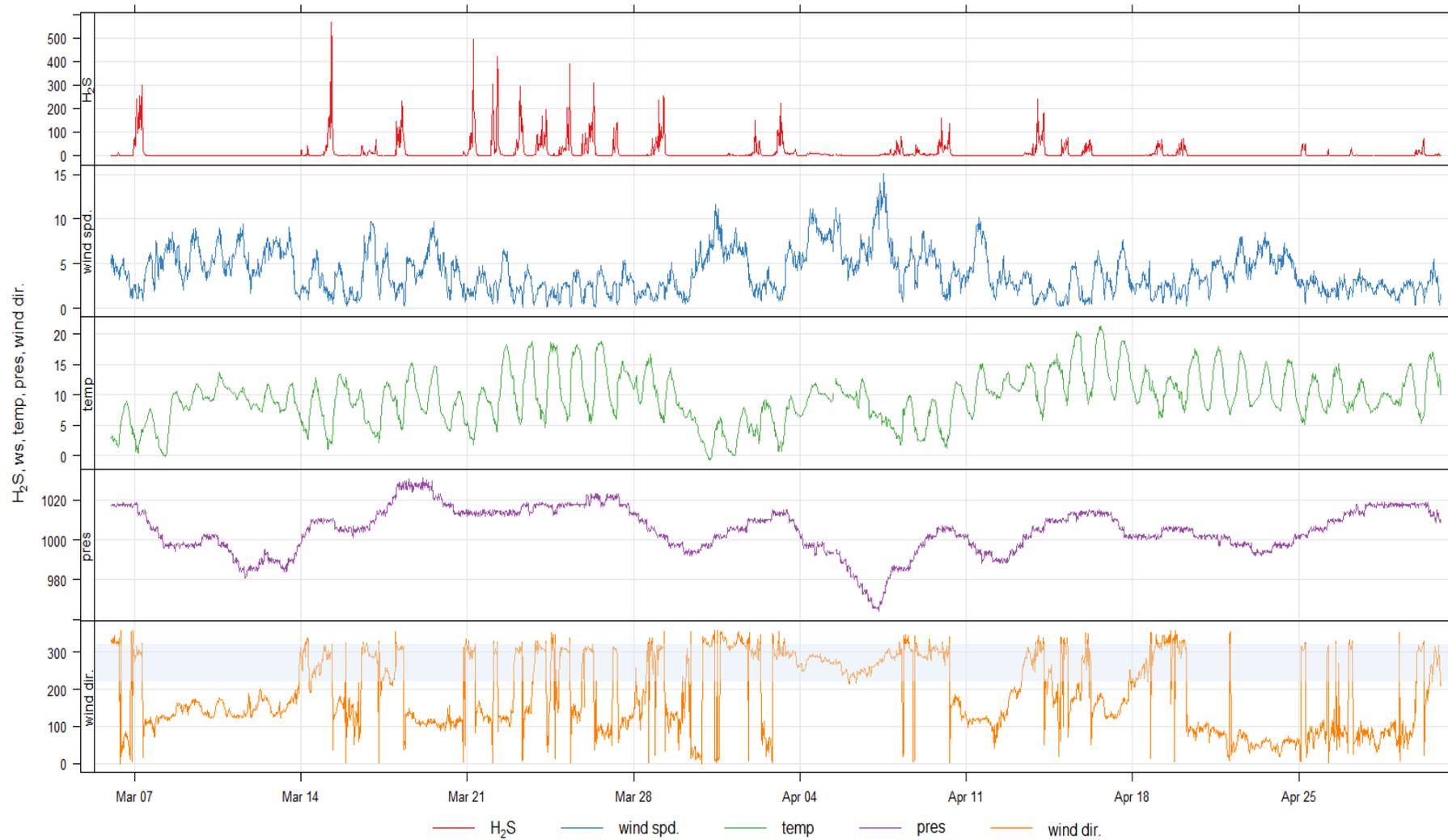


Figure 11: MMF9 30 – minute mean time series from 6 March – 30 April 2022



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