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Land and Water Science
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12 June 2018

Dear Stephen

RE: Weekly NH₃ Monitoring Report 1 May – 28 May 2018 (Weeks 26 – 29)

In April 2018 Gore District Council (GDC) engaged Land and Water Science to conduct continuous monitoring of ammonia (NH₃) gas emissions from the Mataura Mill dross storage site (121 Kana Street, Mataura). GDC require emission values to comply with consent conditions that specify a limit of 5 ppm NH₃ discharged to air. In November 2017, Photonic Innovations (PI) installed two NH₃ Sensors for comparison of the indoor and outdoor ammonia levels. The outdoor sensor has been out of service since 18 March 2018. PI are currently in the process of rectifying connectivity issues and re-building the sensor for installation in June.

Weekly summaries of the indoor emission results from weeks 26 – 29 of monitoring are presented in this report. During May, the maximum NH₃ concentrations detected by the indoor sensor was 5.9 ppm, with a mean concentration of 2.8 ppm, and a median concentration of 2.7 ppm (Figure 1; Table 1). Air temperatures have decreased during May, which has been reflected in the diurnal variation of indoor NH₃ concentrations being more subdued.

Since the outdoor sensor has been disconnected, the indoor sensor will be used as a proxy for maximum outdoor NH₃ concentrations. Typically, indoor concentrations have exceeded outdoor, especially during warm days when the diurnal emission pattern is evident (Figure 1). During May it is likely that outdoor concentrations were acceptable as the average indoor concentration was 2.8 ppm.

Table 1. Summary statistics for the indoor NH₃ sensor, weeks 26 - 29 (1 May – 28 May 2018). NH₃ measured in parts per million (ppm).

Week	26	27	28	29	26-29
Date	1-7 May	8-14 May	15-21 May	22-28 May	1-28 May
Mean	3.5	3.1	2.5	2.0	2.8
Standard Deviation	0.9	0.7	0.5	0.5	0.8
Median	3.5	3.0	2.5	2.0	2.7
Minimum	0.2	0.2	0.6	0.6	0.2
Maximum	5.9	4.9	4.0	3.5	5.9
Confidence Level (95.0%)	0.06	0.05	0.04	0.03	0.03

Week 26: 1st – 7th May 2018

For week 26 of monitoring, indoor NH₃ concentration showed consistent diurnal variation for most of the week. Maximum indoor concentration was 5.9 ppm for this period. Mean and median values were both 3.5 ppm. Although the outdoor sensor wasn't working, it is likely that outdoor concentrations were acceptable during this week, as historically indoor concentrations have exceeded outdoor concentrations.

Week 27: 8th – 14th May 2018

For week 27 of monitoring, indoor NH₃ concentration showed consistent diurnal variation for most of the week. Maximum indoor concentration was 4.9 ppm for this period. Mean and median values were 3.1 ppm and 3.0 ppm, respectively. As the indoor concentration was below the outdoor limit of 5 ppm, it is likely the outdoor emissions during this monitoring period were also acceptable.

Week 28: 15th – 21st May 2018

The diurnal variation pattern was present during weeks 26 and 27 but was more subdued in week 28, coinciding with a reduction in daily temperature variation. Maximum indoor concentration was 4.0 ppm for this period. Mean and median values were both 2.5 ppm. As the indoor concentration was significantly below the outdoor limit of 5 ppm, it is likely the outdoor emissions during this monitoring period were also acceptable.

Week 29: 22nd – 28th May 2018

For week 29 of monitoring, indoor NH₃ concentrations showed consistent diurnal variation for most of the week. Maximum indoor concentration was 3.5 ppm for this period. Mean and median values were both 2.0 ppm. As the indoor concentration was significantly below the outdoor limit of 5 ppm, it is likely the outdoor emissions during this monitoring period were also acceptable.

Summary

The outdoor sensor has been disconnected for maintenance since 18 March 2018. Installation is planned by PI for mid-June 2018. During the four-week monitoring period (1 May – 28 May) indoor NH₃ concentrations were a maximum of 5.9 ppm, mean concentration was 2.8 ppm, and median concentration was 2.7 ppm. These values are consistent with that expected in the current cool weather conditions, and no signs of increased NH₃ gas activity have been detected during this period. From the observed datasets, it appears temperature continues to be the most dominant control over NH₃ concentrations on site.

Kind regards,



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For public access to the real-time data go here: <http://35.189.3.224:3000/login>
Log in email: gcc@photoninnovations.com and use the password: Pa5%w0rd

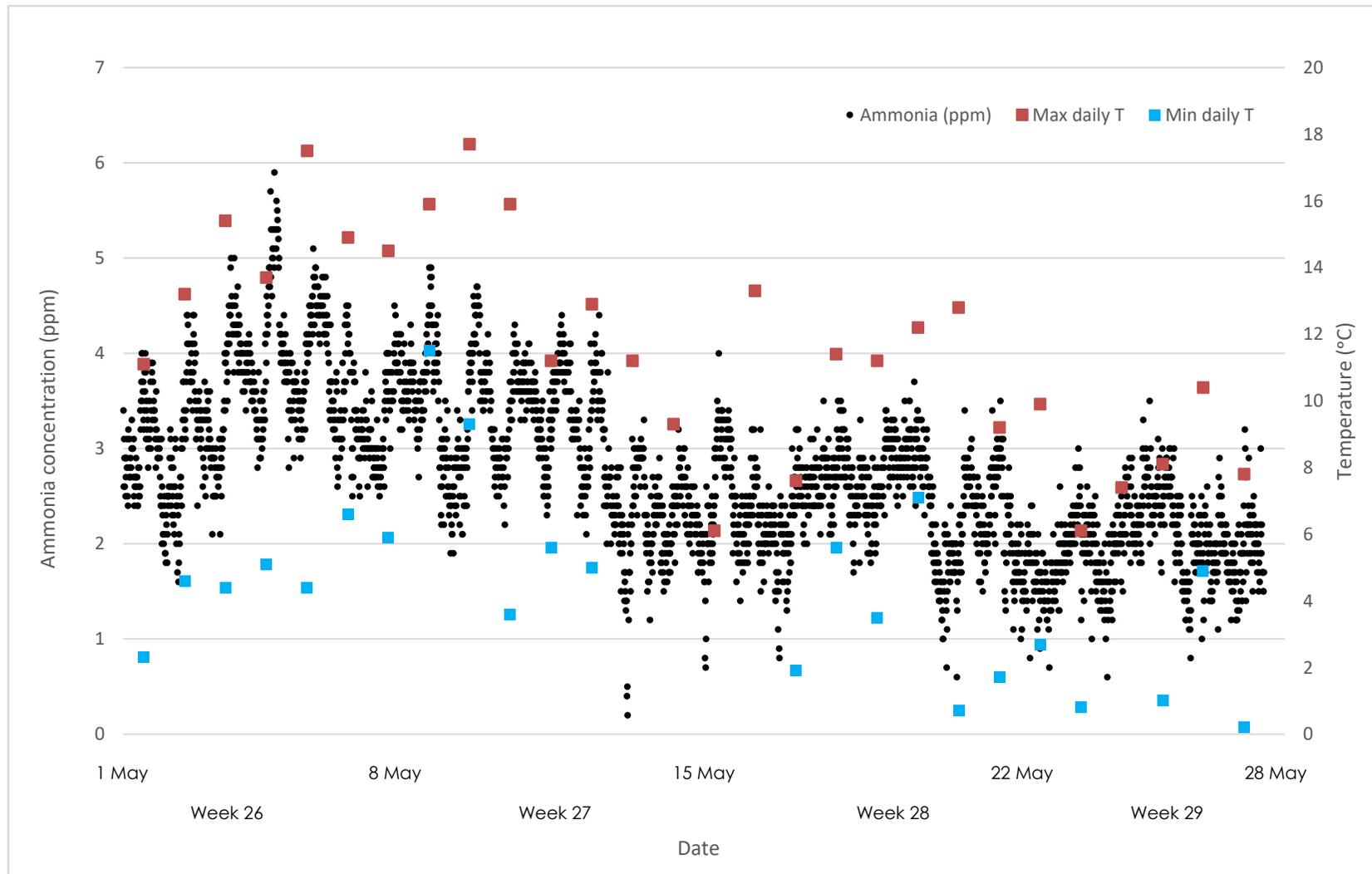


Figure 1: Continuous NH₃ Concentration at Matura for 1 May – 28 May 2018 (Weeks 26 - 29 of monitoring), maximum daily temperature and minimum daily temperature. Only the indoor sensor is currently connected.