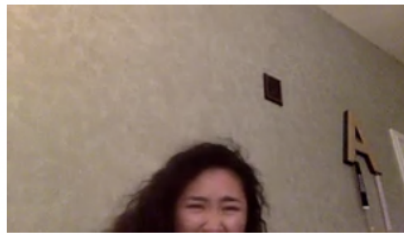

City of Boulder

Exploratory Data Analysis



Justin Nichols



Arlyn Alcidi



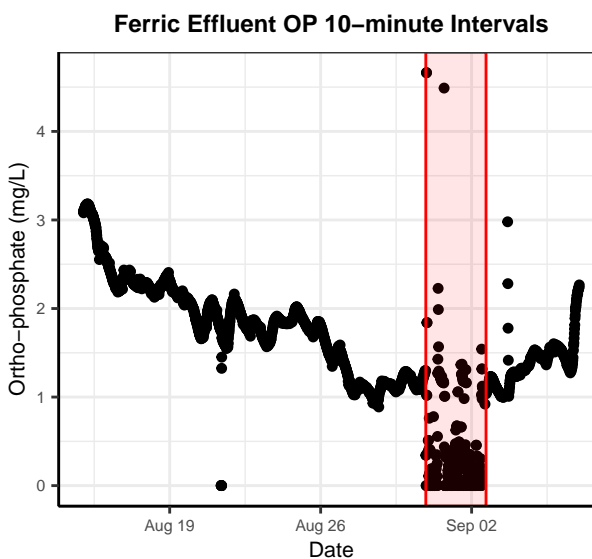
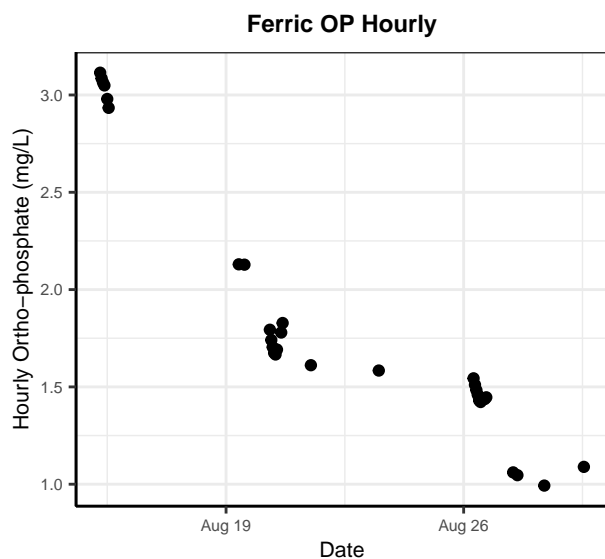
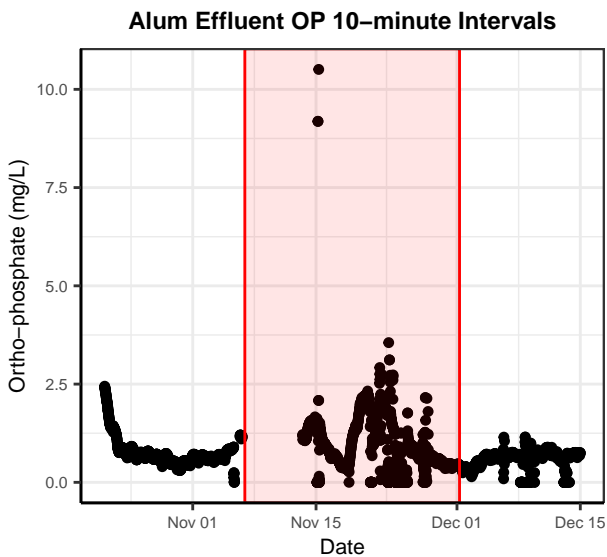
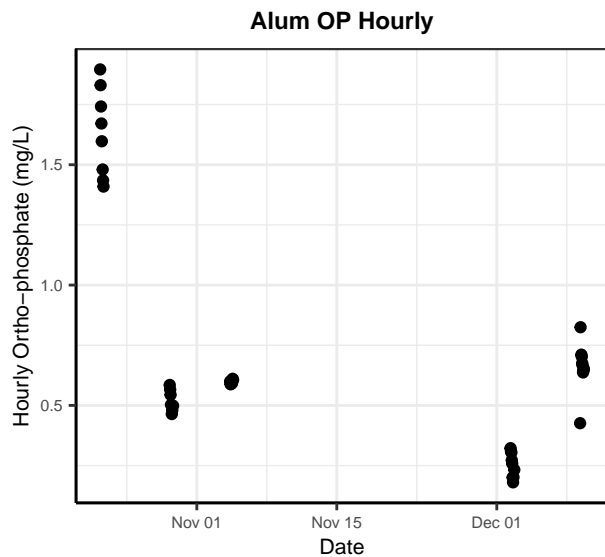
Ocean Wave

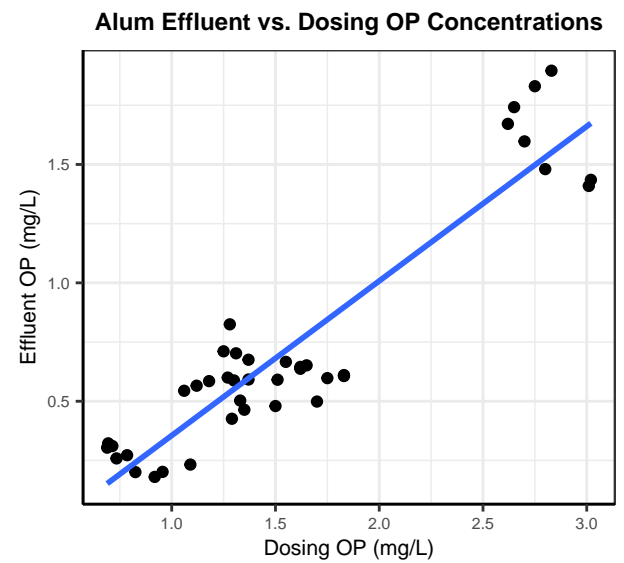
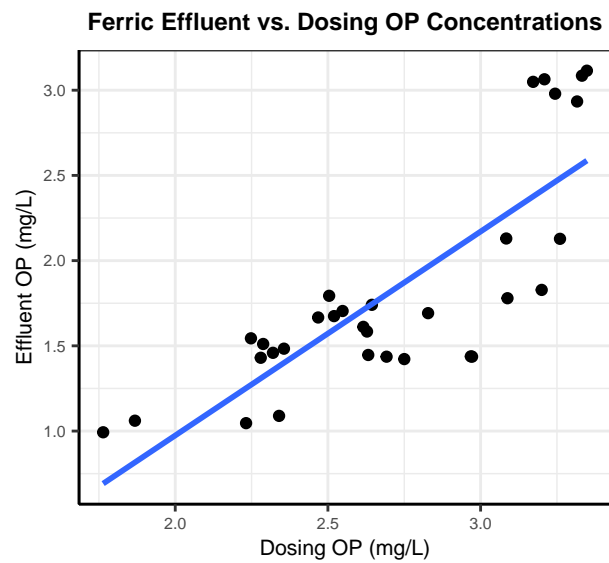
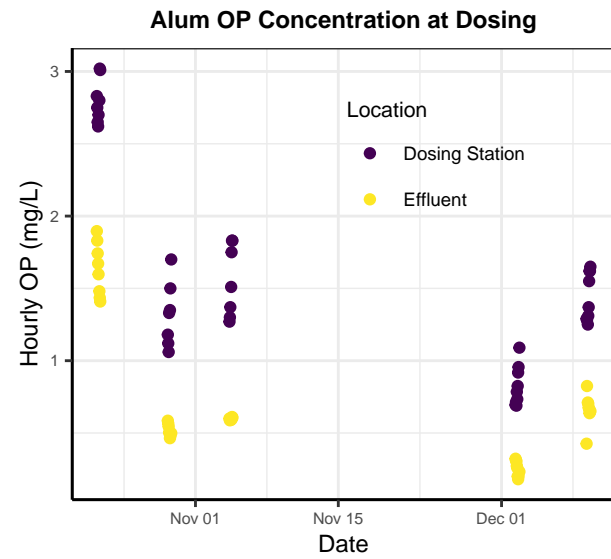
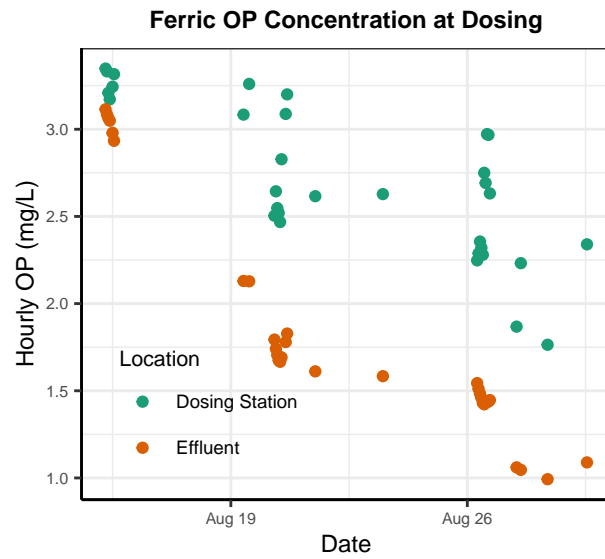


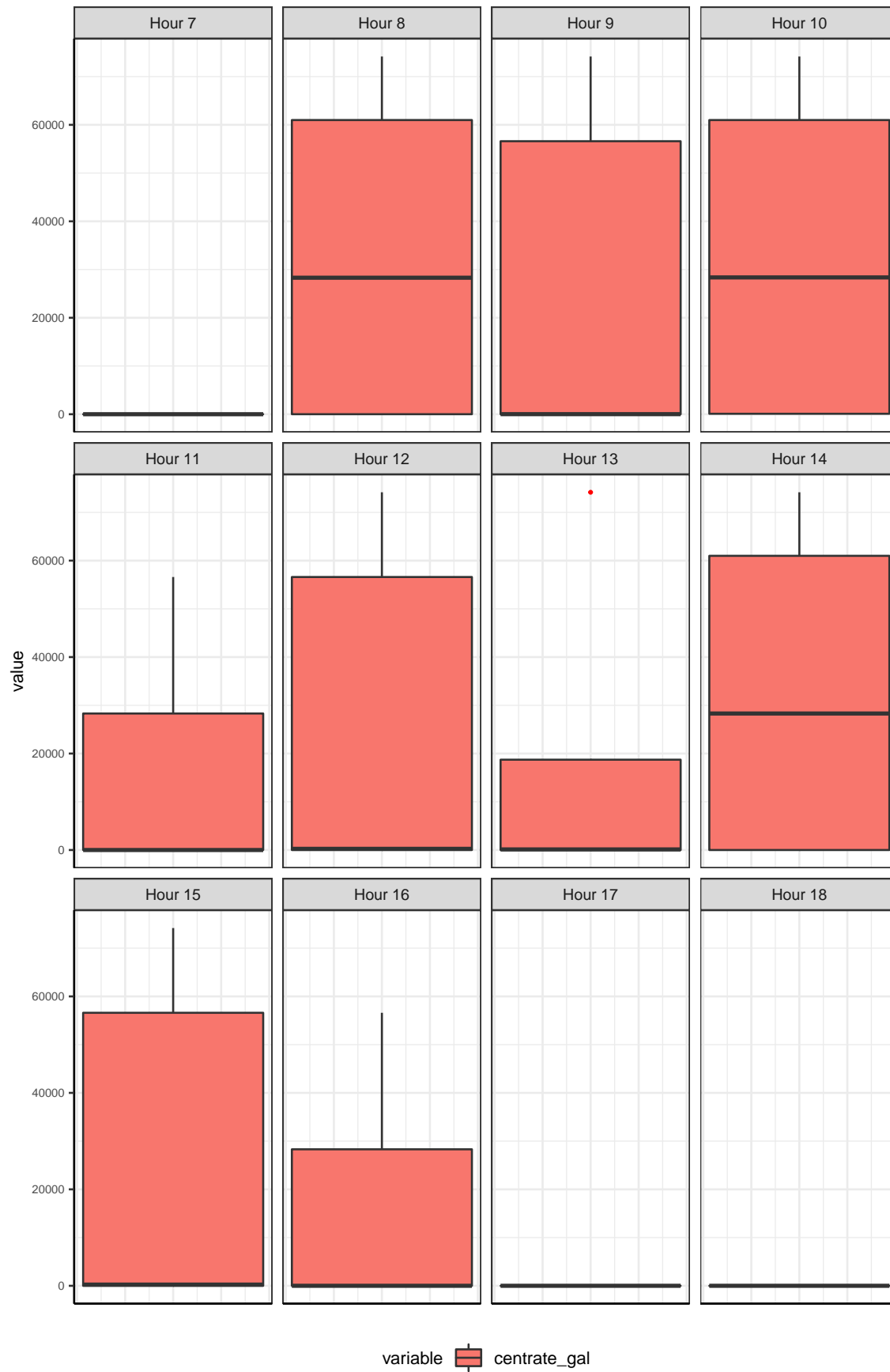
We begin by looking at how many observations we have based on the coagulant:

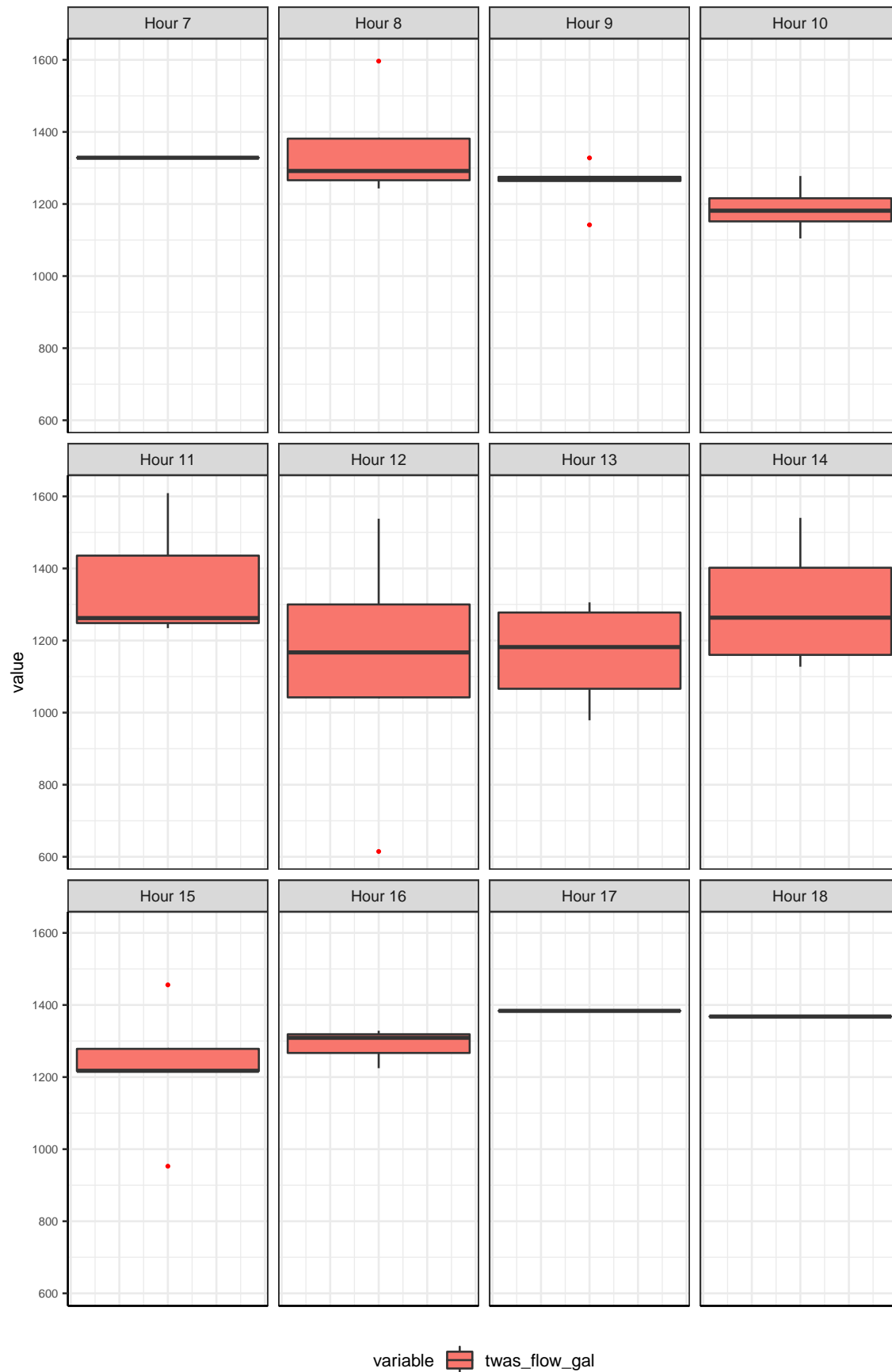
	Alum	Ferric	None
0	40	32	4

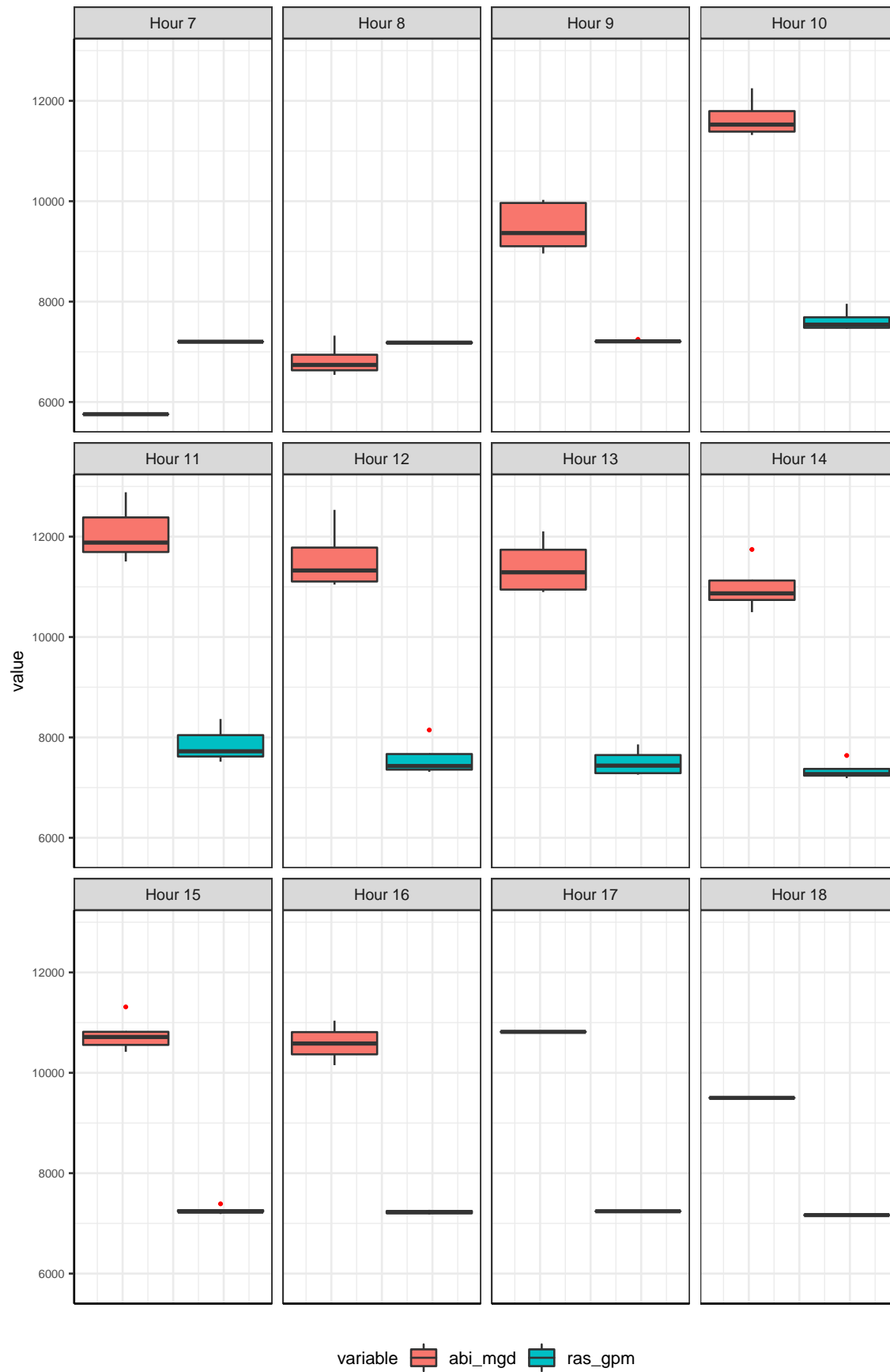
The following plots provide visuals for the effluent OP. They are split up by ferric or alum, as well as a comparison of the hourly data after removal with the original 10-minute intervals.

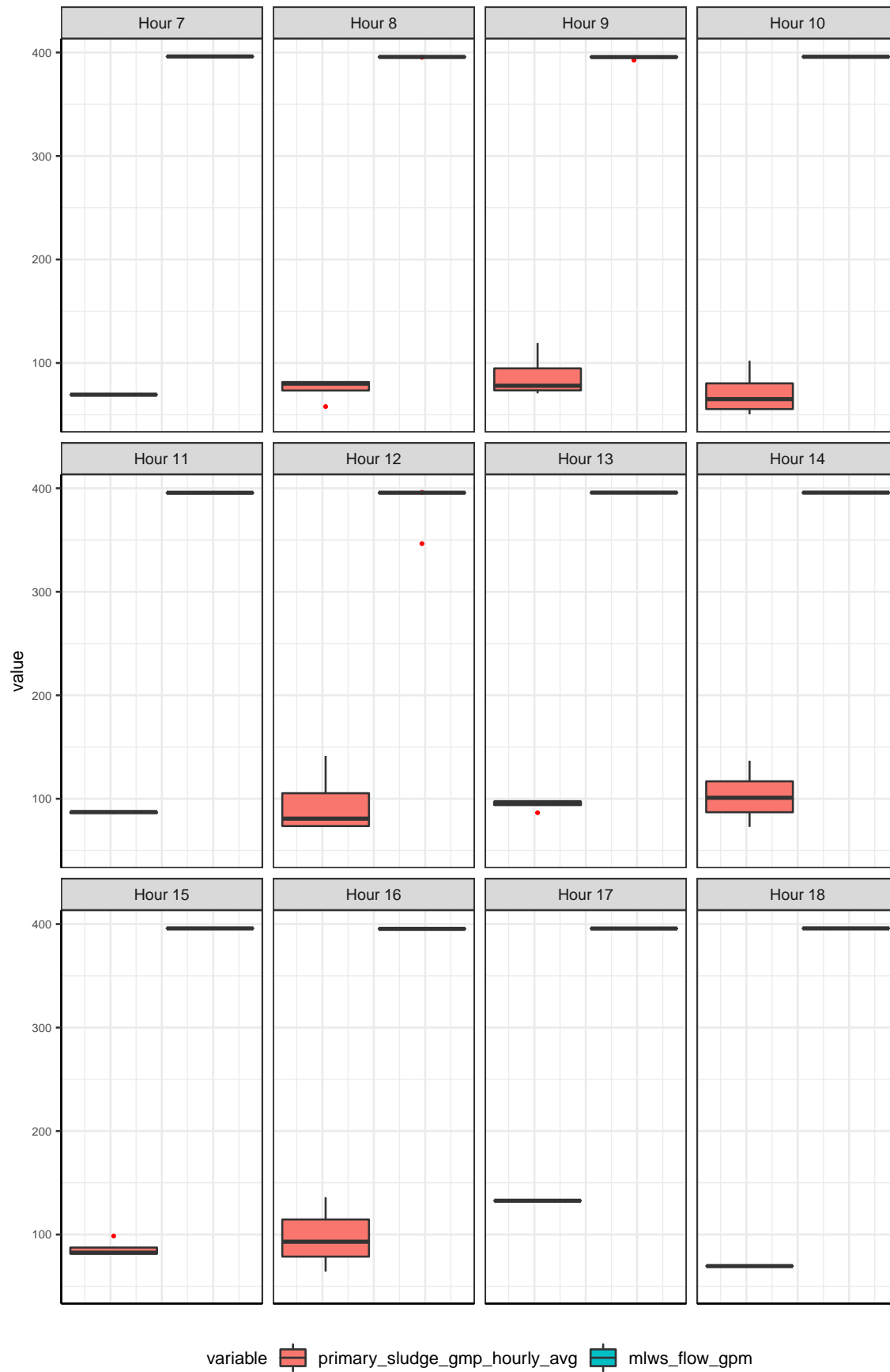


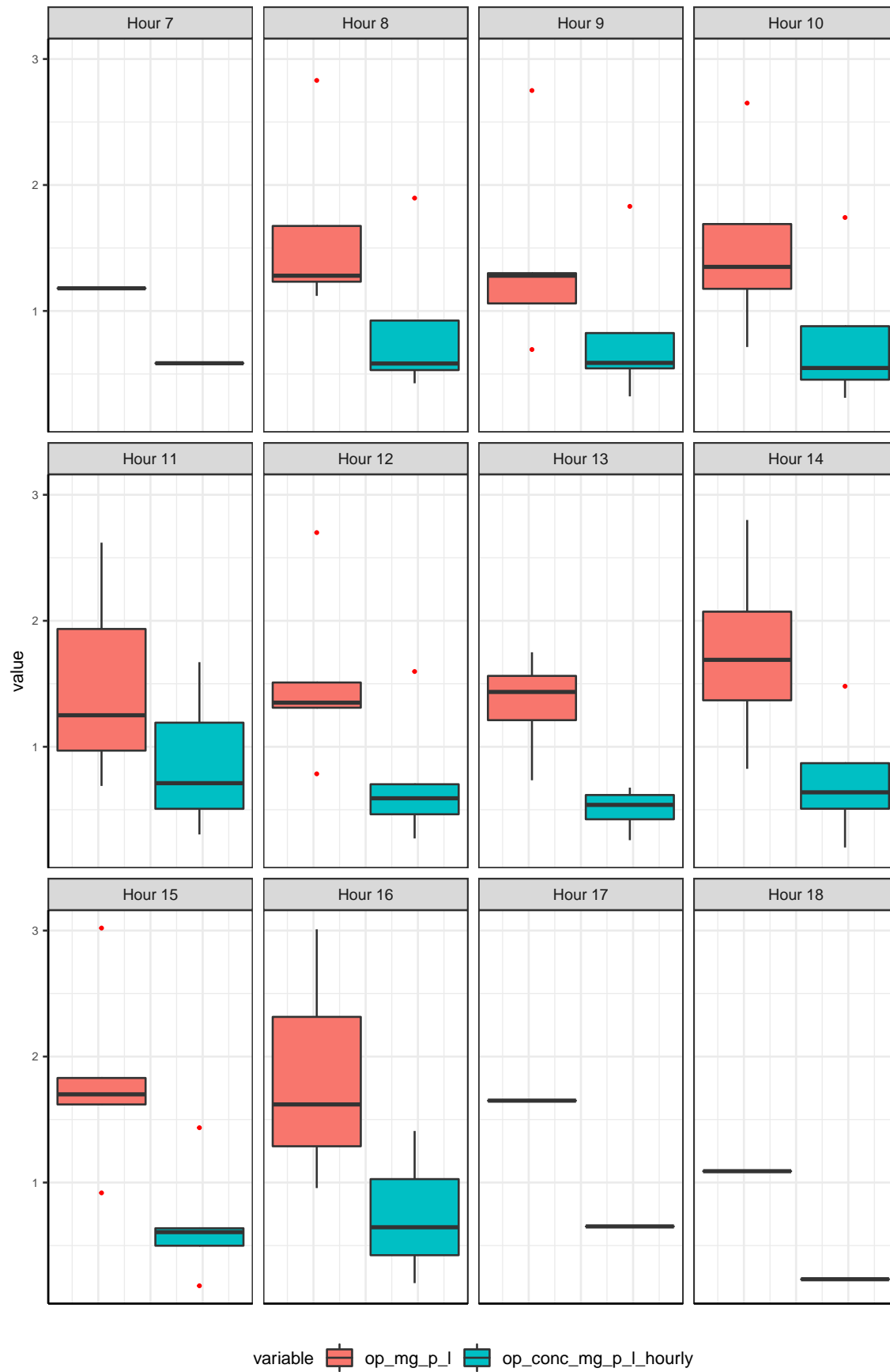


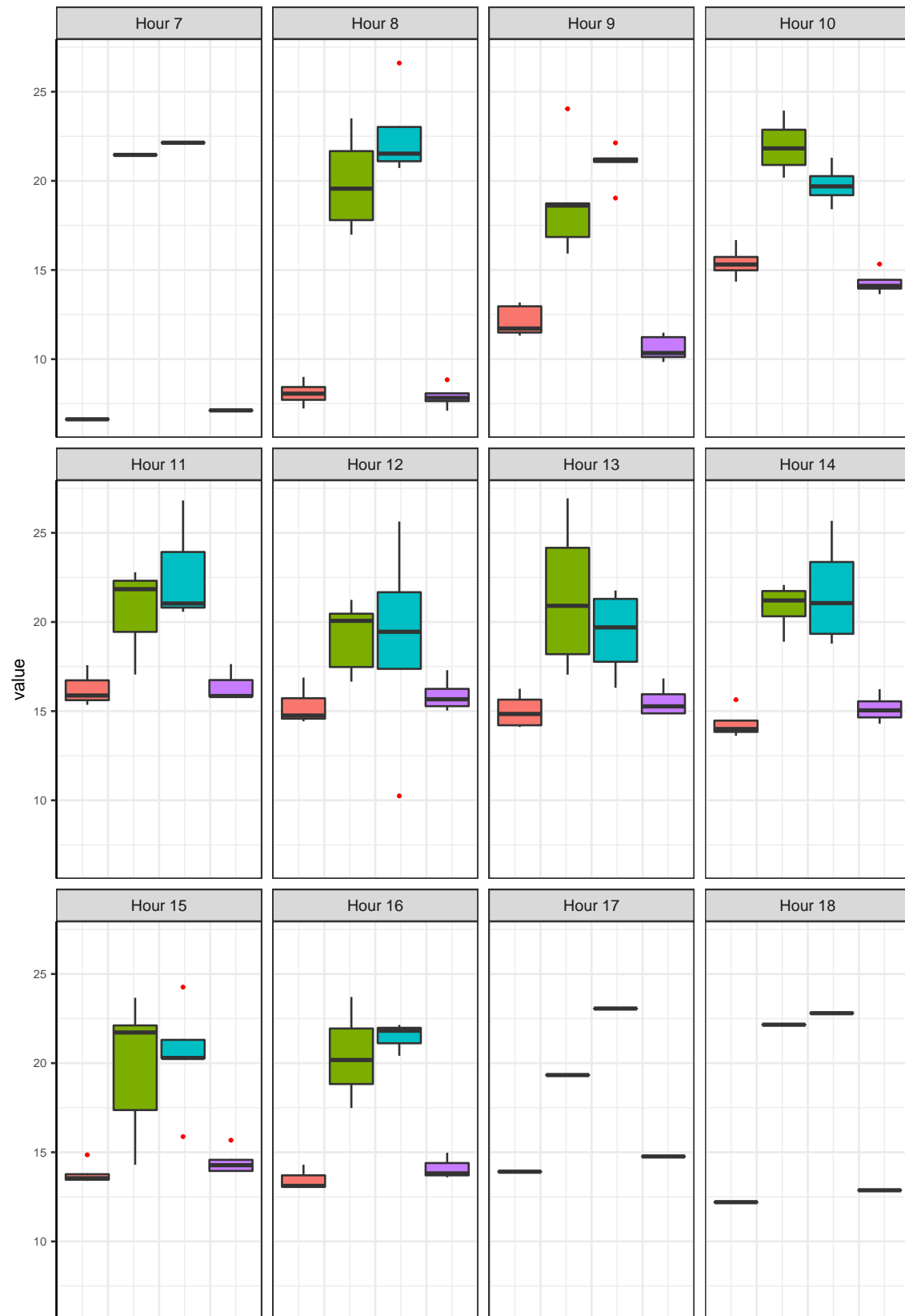




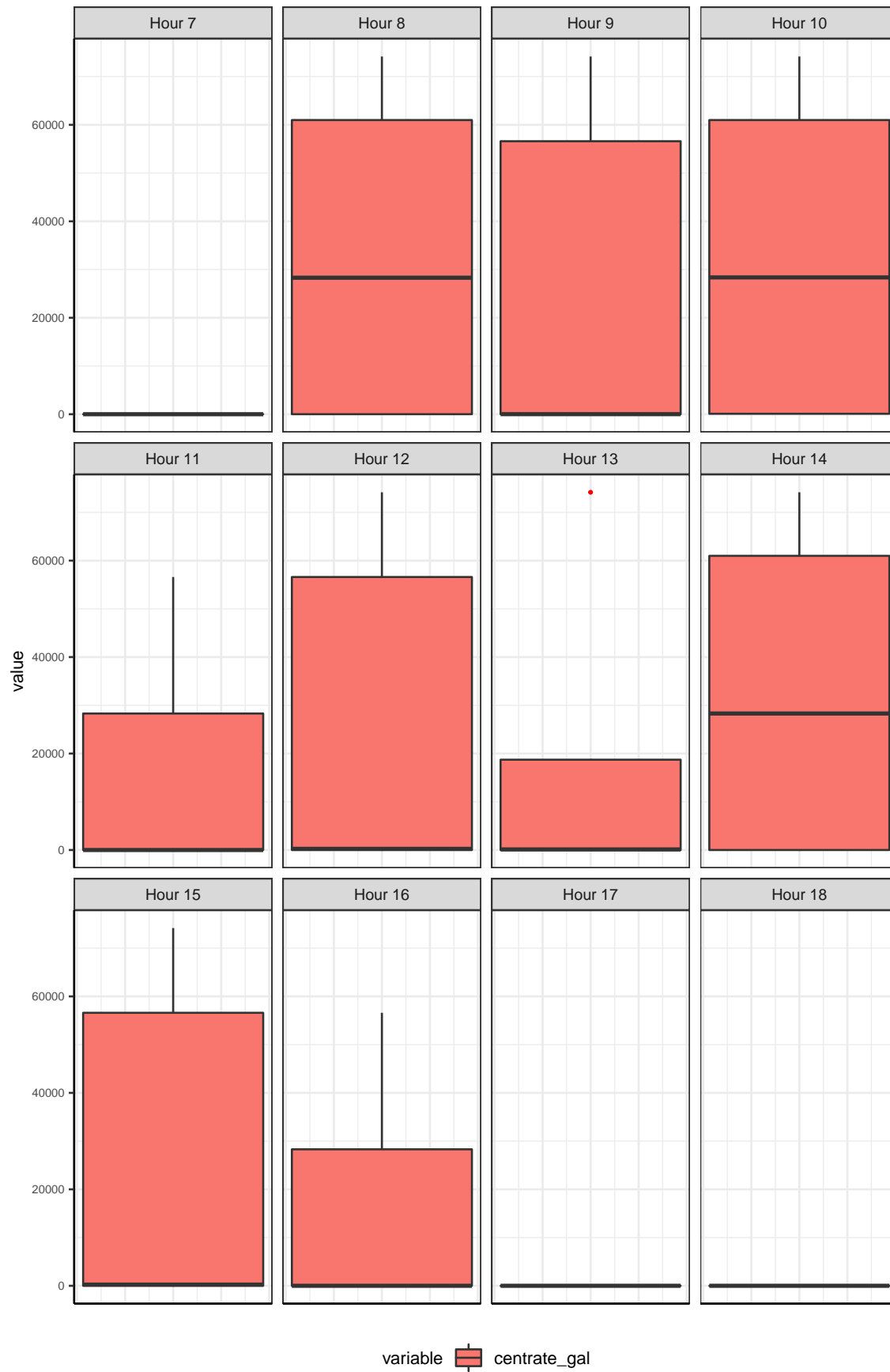


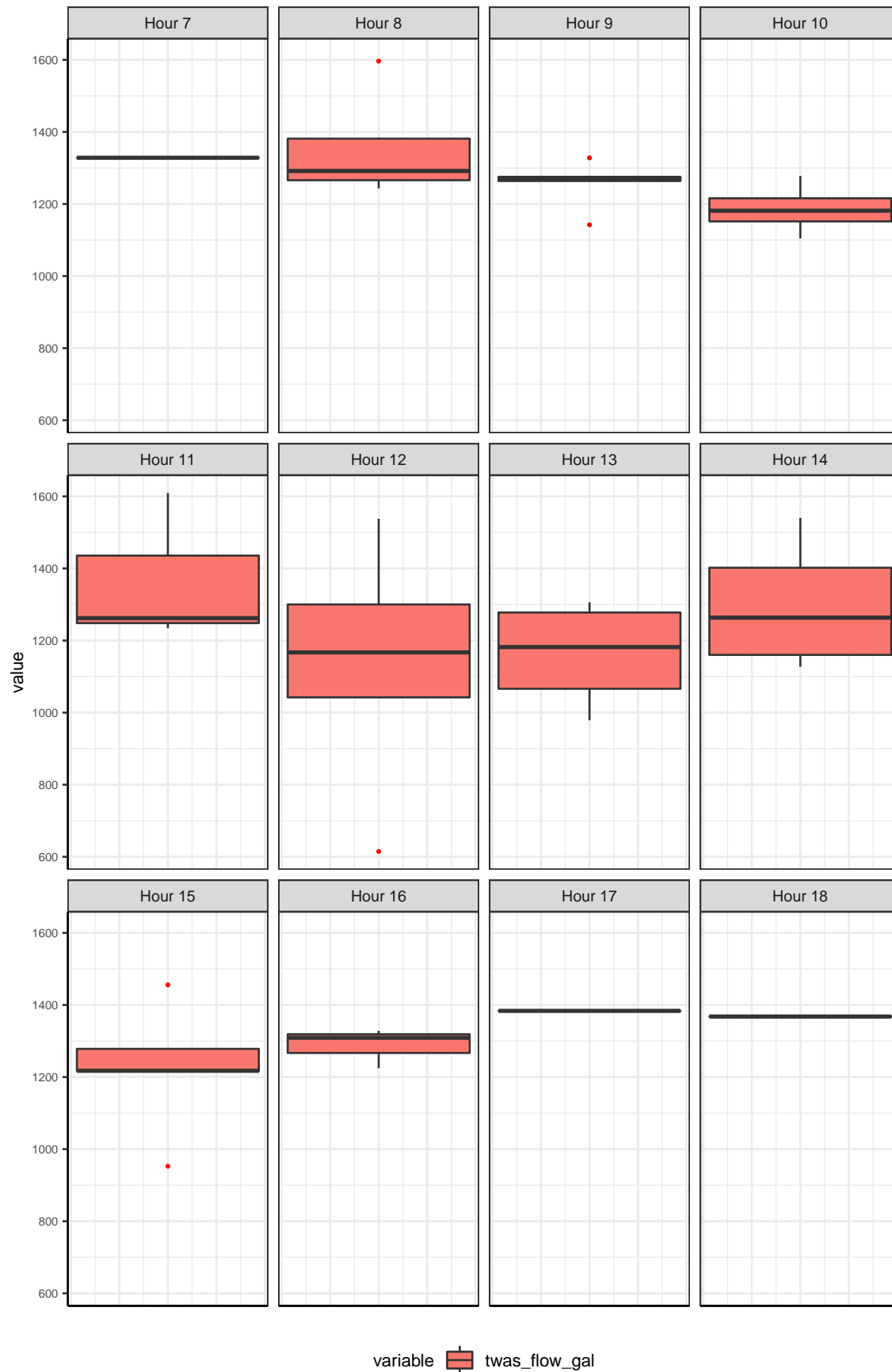


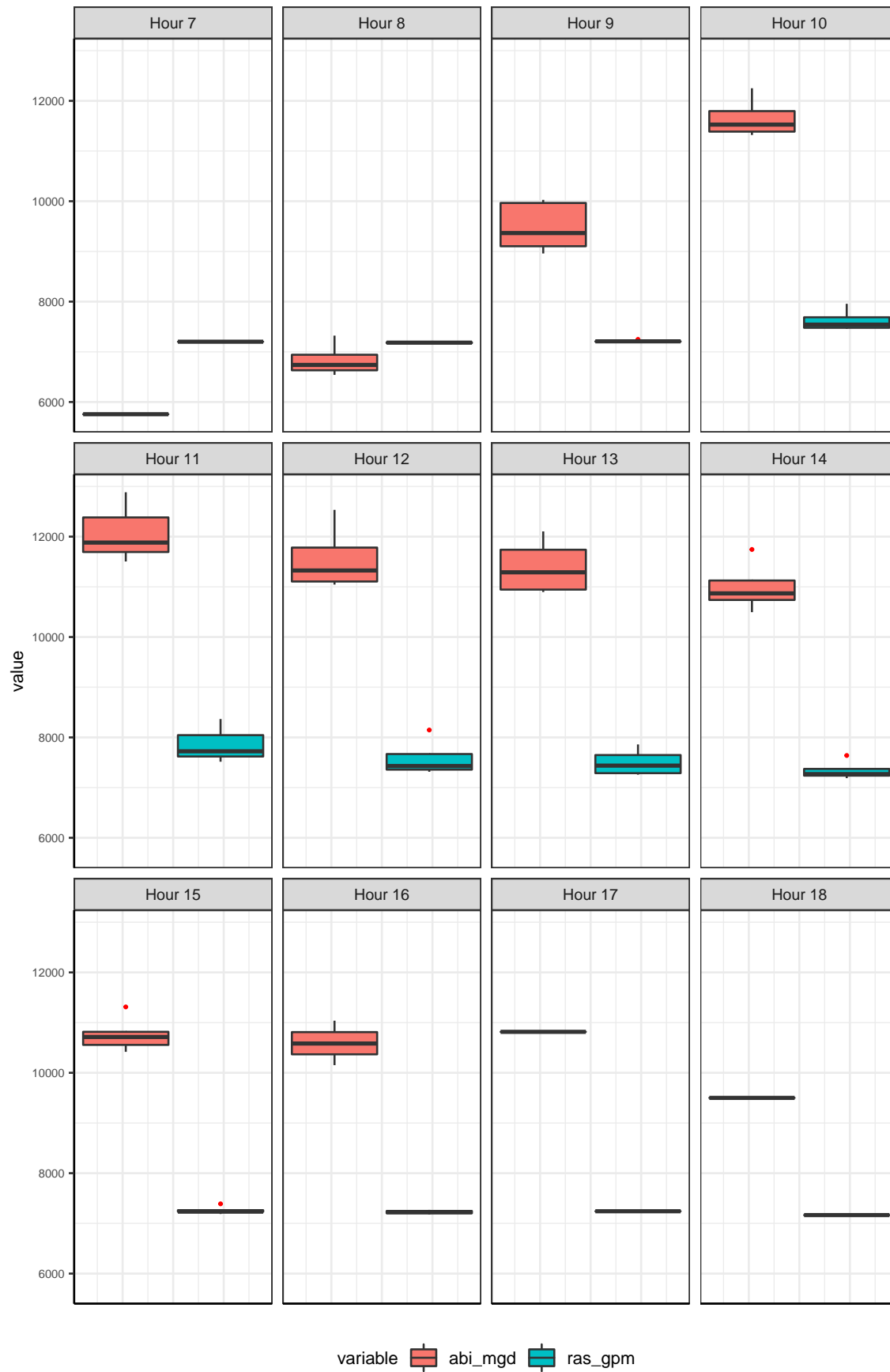


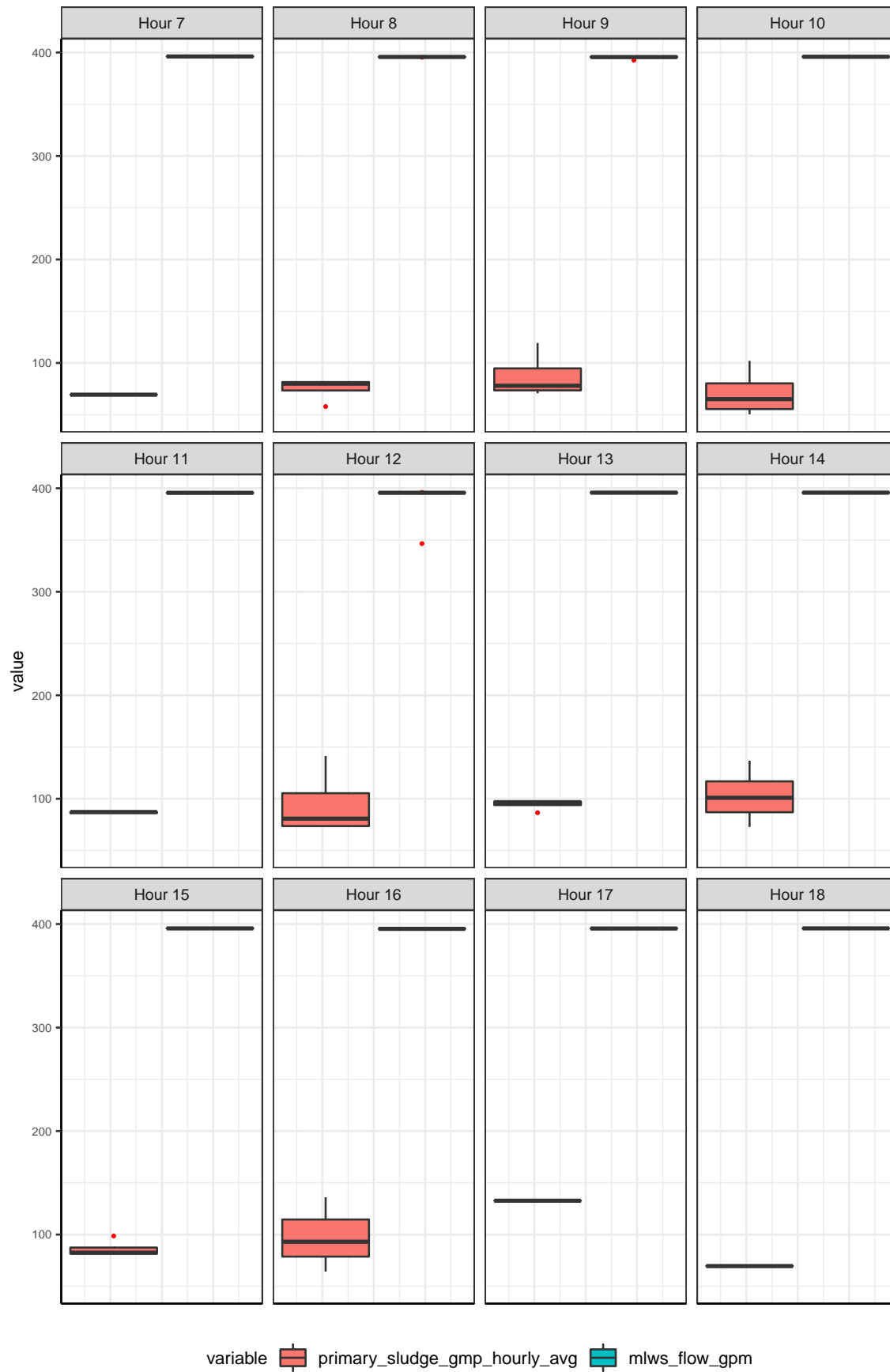


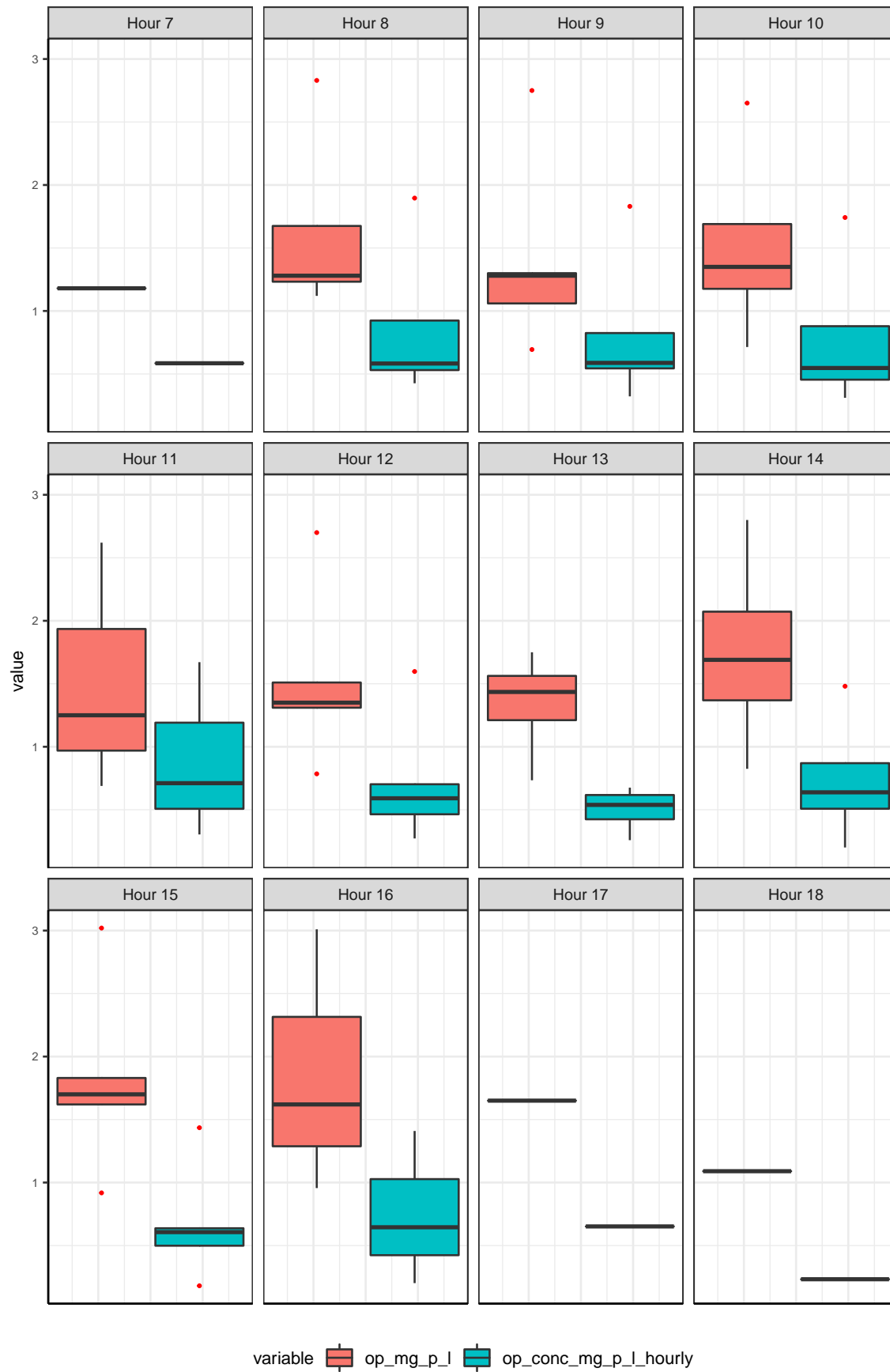
variable ■ influent_mgd_hourly_avg ■ thickened_sludge_gpm ■ twas_flow_gpm_hourly_avg ■ effluent

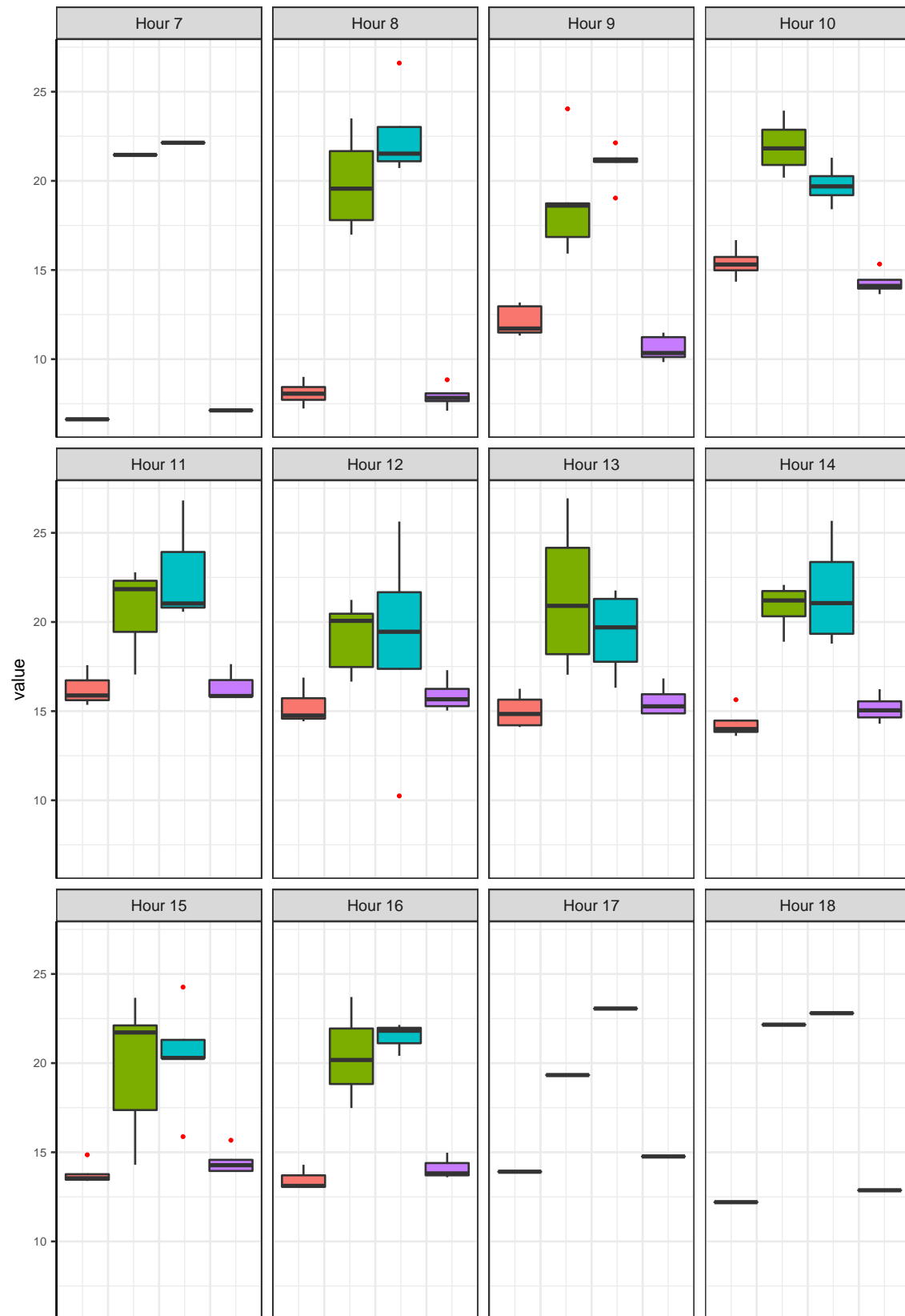












variable ■ influent_mgd_hourly_avg ■ thickened_sludge_gpm ■ twas_flow_gpm_hourly_avg ■ effluent

Percent Change in Alum OP:

```
[1] 33.00311 33.43780 34.26500 36.20696 40.83457 47.13253 52.47718 53.17811
[9] 50.42695 49.50094 48.65866 62.18977 65.61906 68.02027 70.66944 52.75772
[17] 54.78610 56.80516 60.86528 65.85033 66.63732 66.86018 53.56720 56.47498
[25] 55.87934 65.33614 64.77530 75.68154 80.34528 78.90321 78.66838 66.97313
[33] 35.55792 43.13317 46.38196 50.71036 57.01887 60.67348 60.18477 60.50797
```

Percent Change in Ferric OP:

```
[1] 6.974935 7.407288 4.515576 3.876140 8.157696 11.522592 30.938932
[8] 34.725112 28.370414 34.159254 33.107300 33.556065 32.477654 40.178866
[15] 42.377844 42.869229 38.402886 39.726303 31.313979 33.963210 37.040344
[22] 37.107716 37.277368 48.279045 46.643583 51.663055 51.545022 45.043066
[29] 43.218335 53.120027 43.714583 53.457158
```

We perform a t-test to determine if they're performing differently

Welch Two Sample t-test

```
data: alum_diff_pct and ferr_diff_pct
t = 6.8612, df = 61.462, p-value = 3.881e-09
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 15.98862 29.13849
sample estimates:
mean of x mean of y
 56.52389  33.96033
```