Appendix 1:

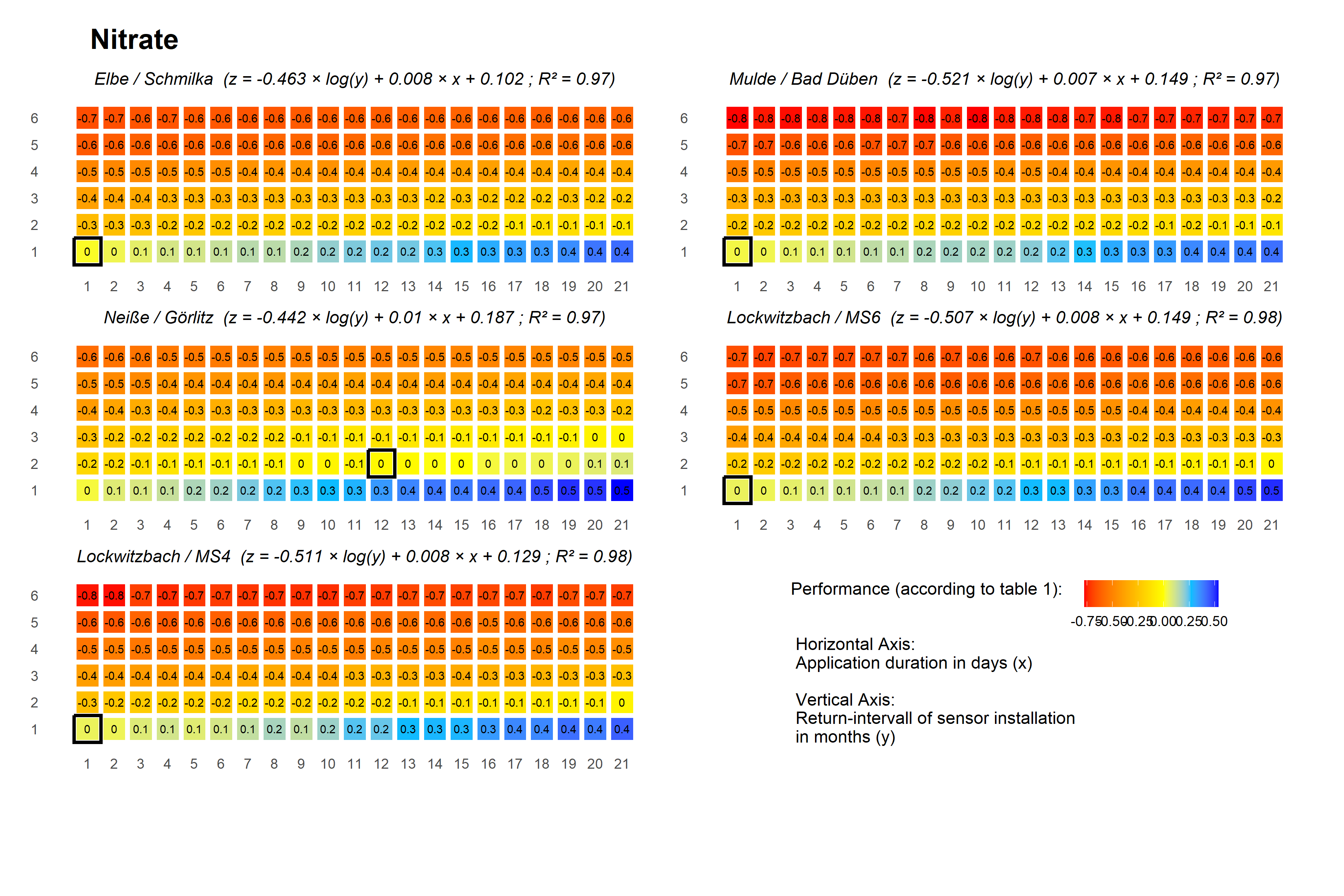


Figure 1: Performance between STOM and grab sampling at weekend and 9 am to 5 pm for nitrogen-nitrate

Figure 2: Performance between STOM and grab sampling at weekend and 9 am to 5 pm for cholride

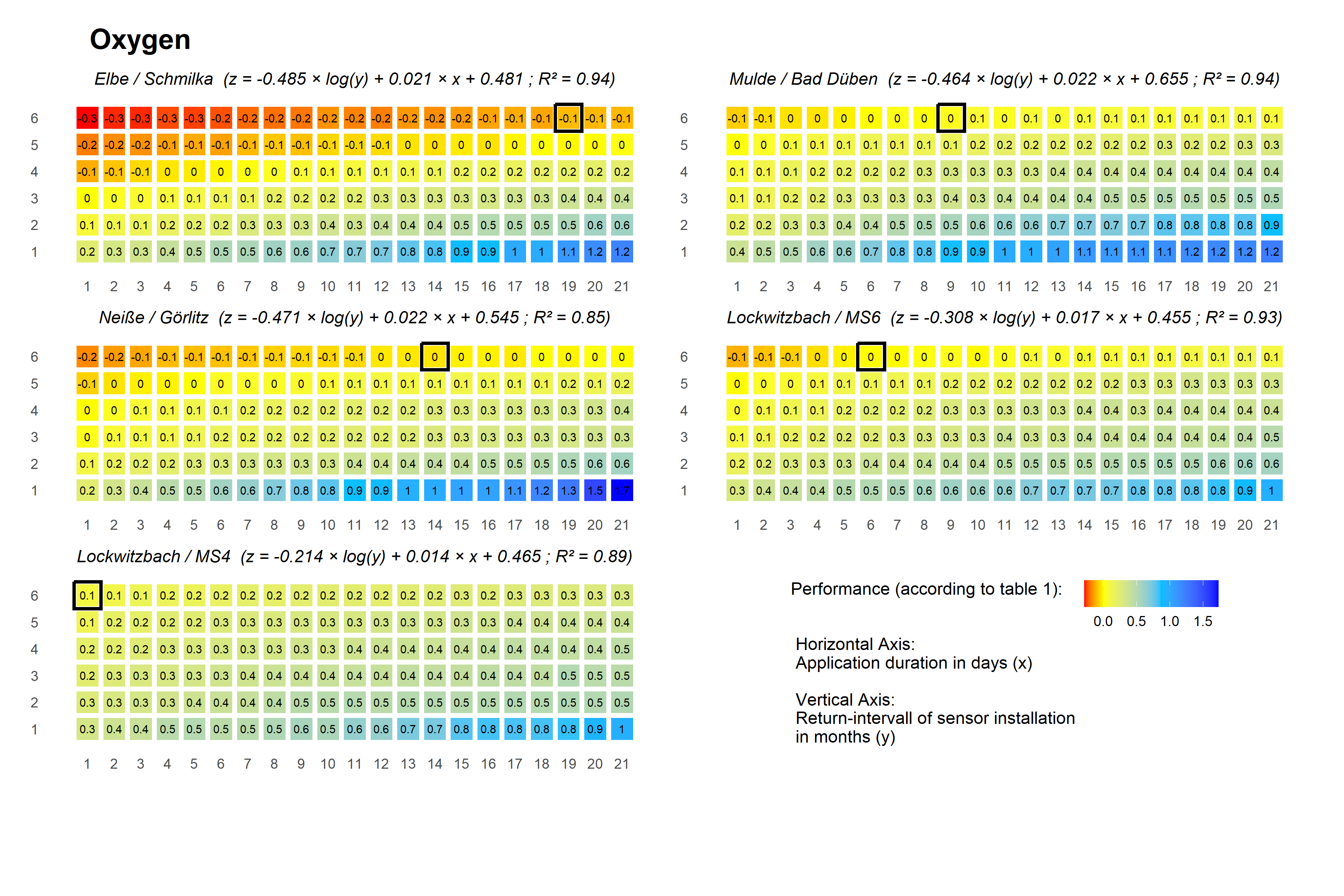
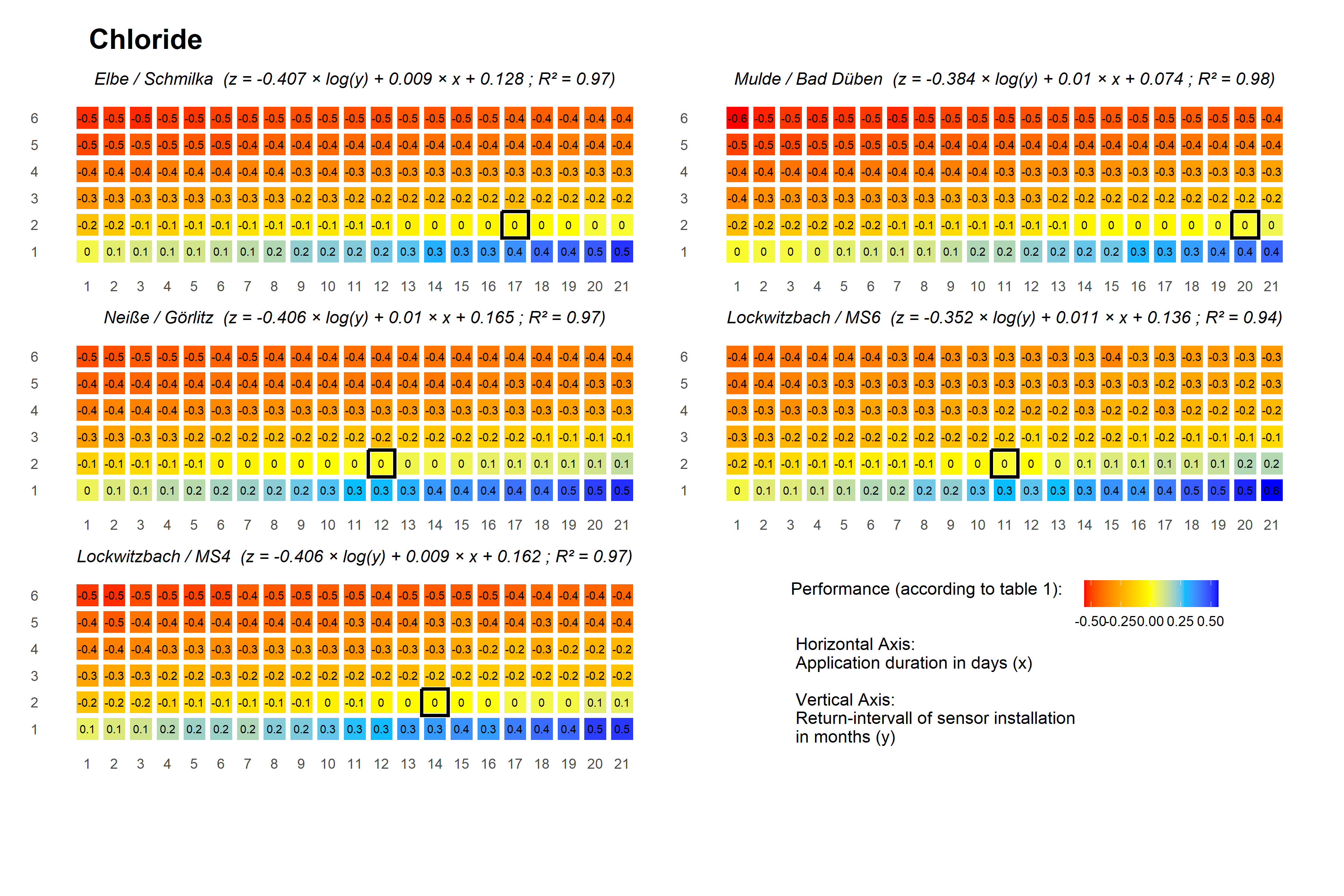


Figure 3: Performance between STOM and grab sampling at weekend and 9 am to 5 pm for dissolved oxygen

Grab sampling during the whole day (0-24h):

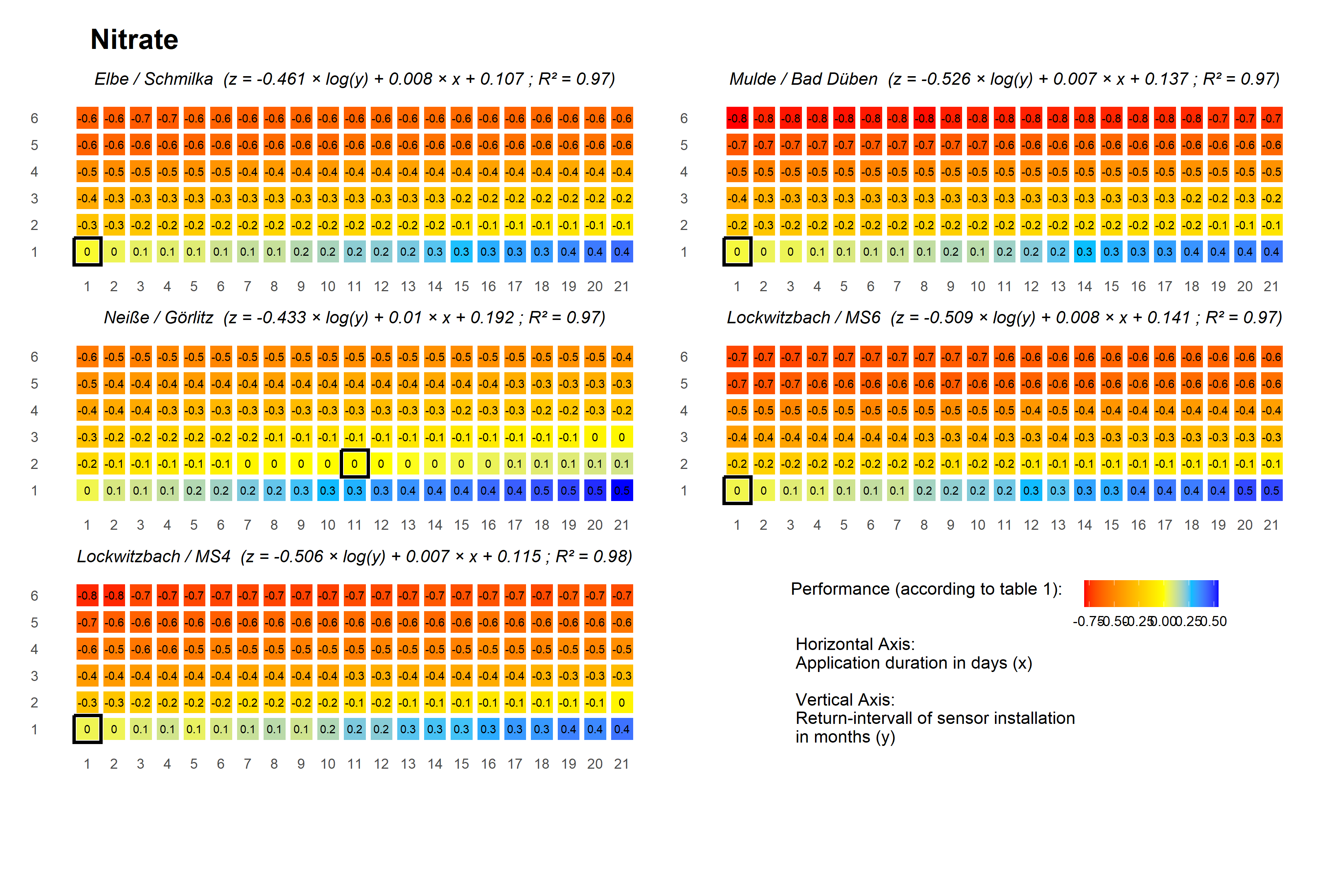


Figure 4: Performance between STOM and Grab sampling during the whole day (0-24h) for nitrate nitrogen

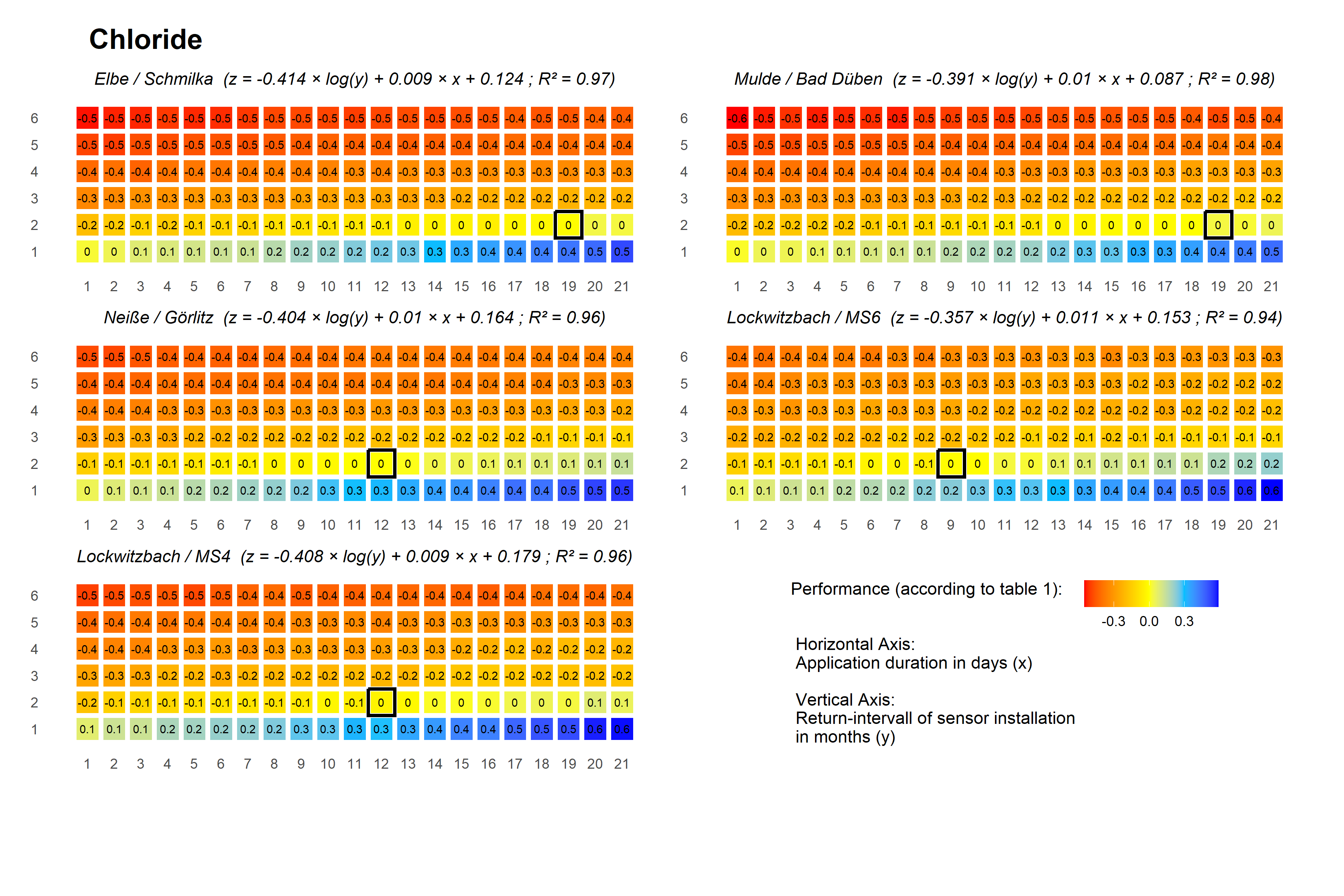


Figure 5: Performance between STOM and Grab sampling during the whole day (0-24h) for chloride

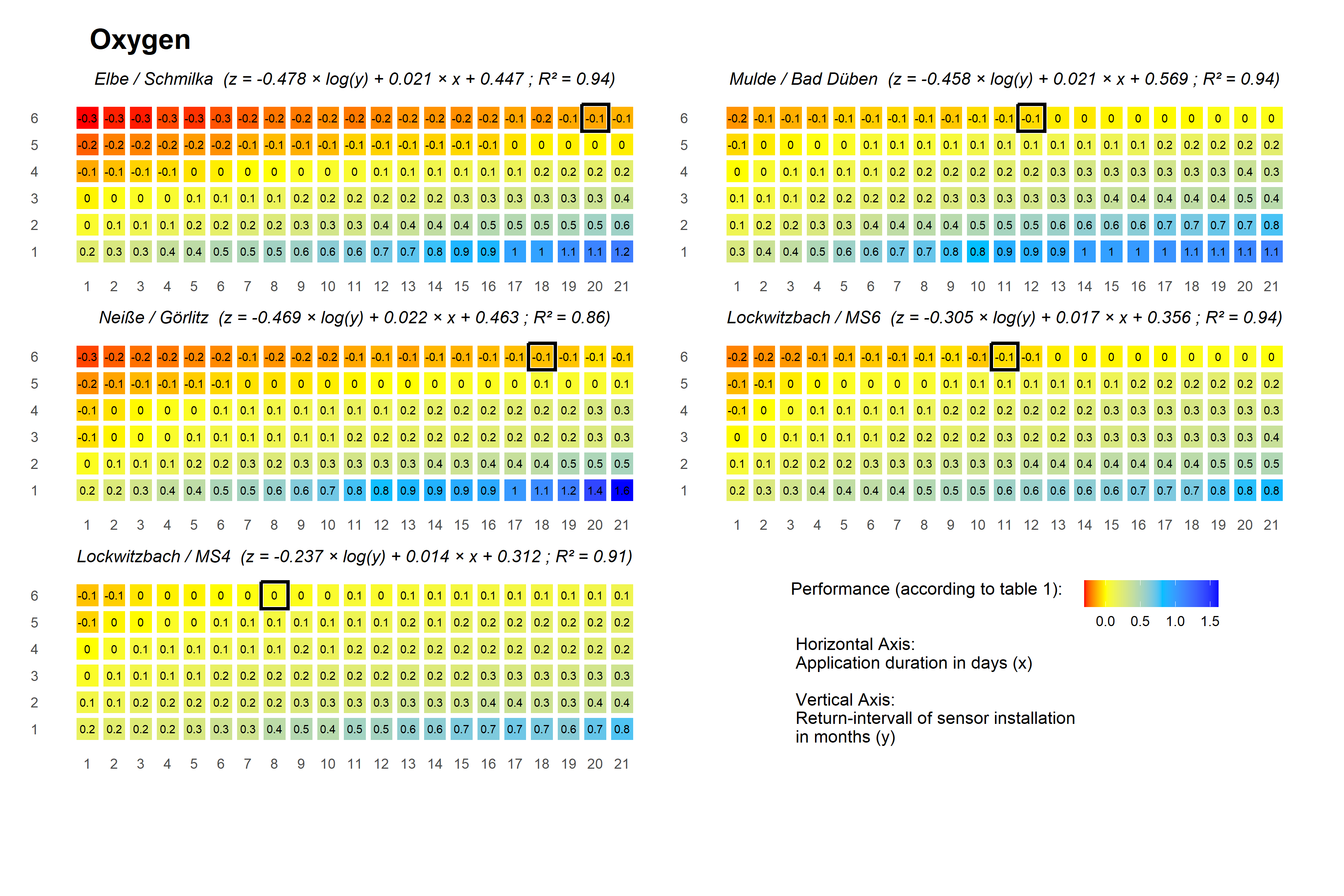


Figure 6: Performance between STOM and Grab sampling during the whole day (0-24h) for dissolved oxygen

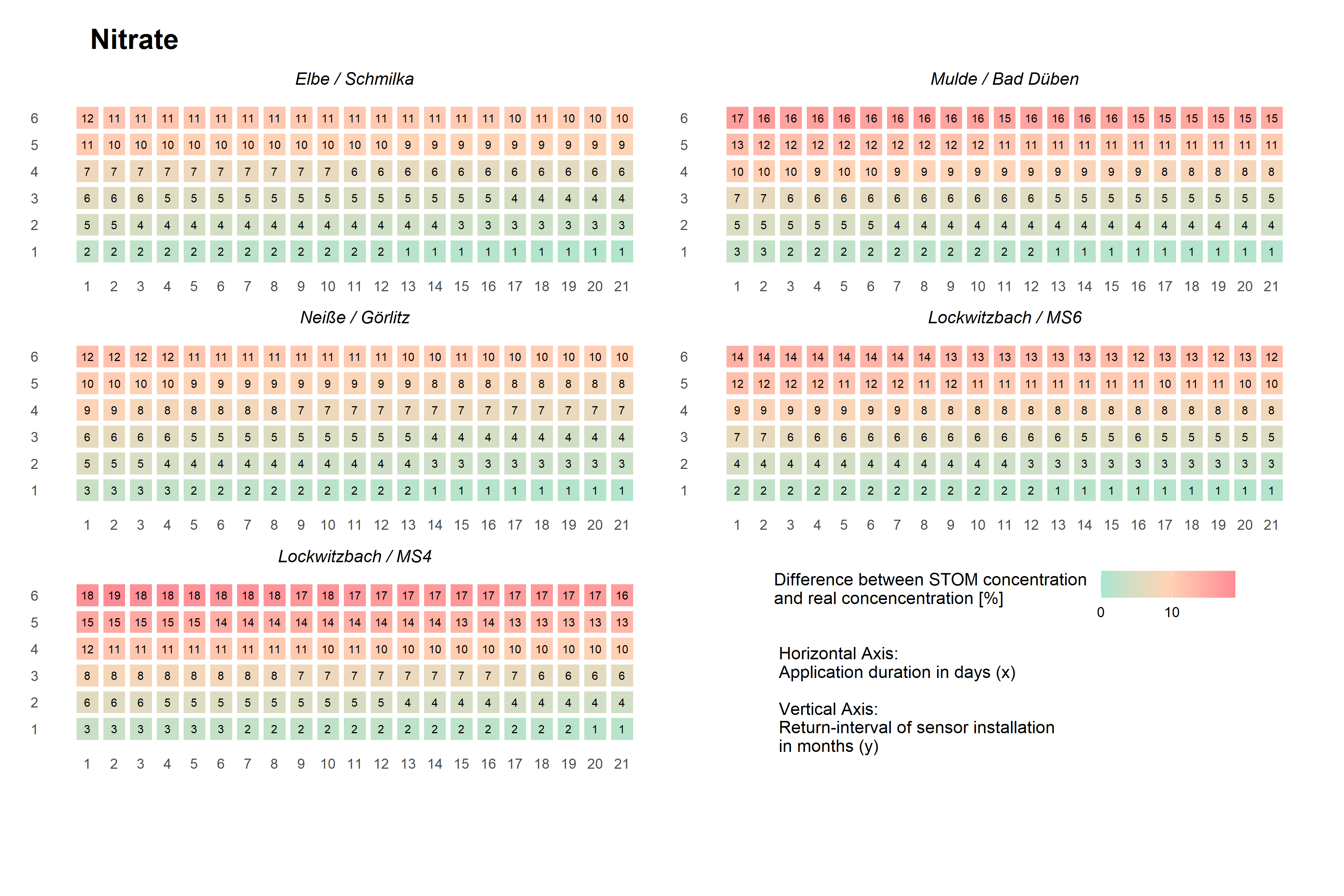


Figure 7: Difference between STOM concentration and real concentration for nitrogen-nitrate

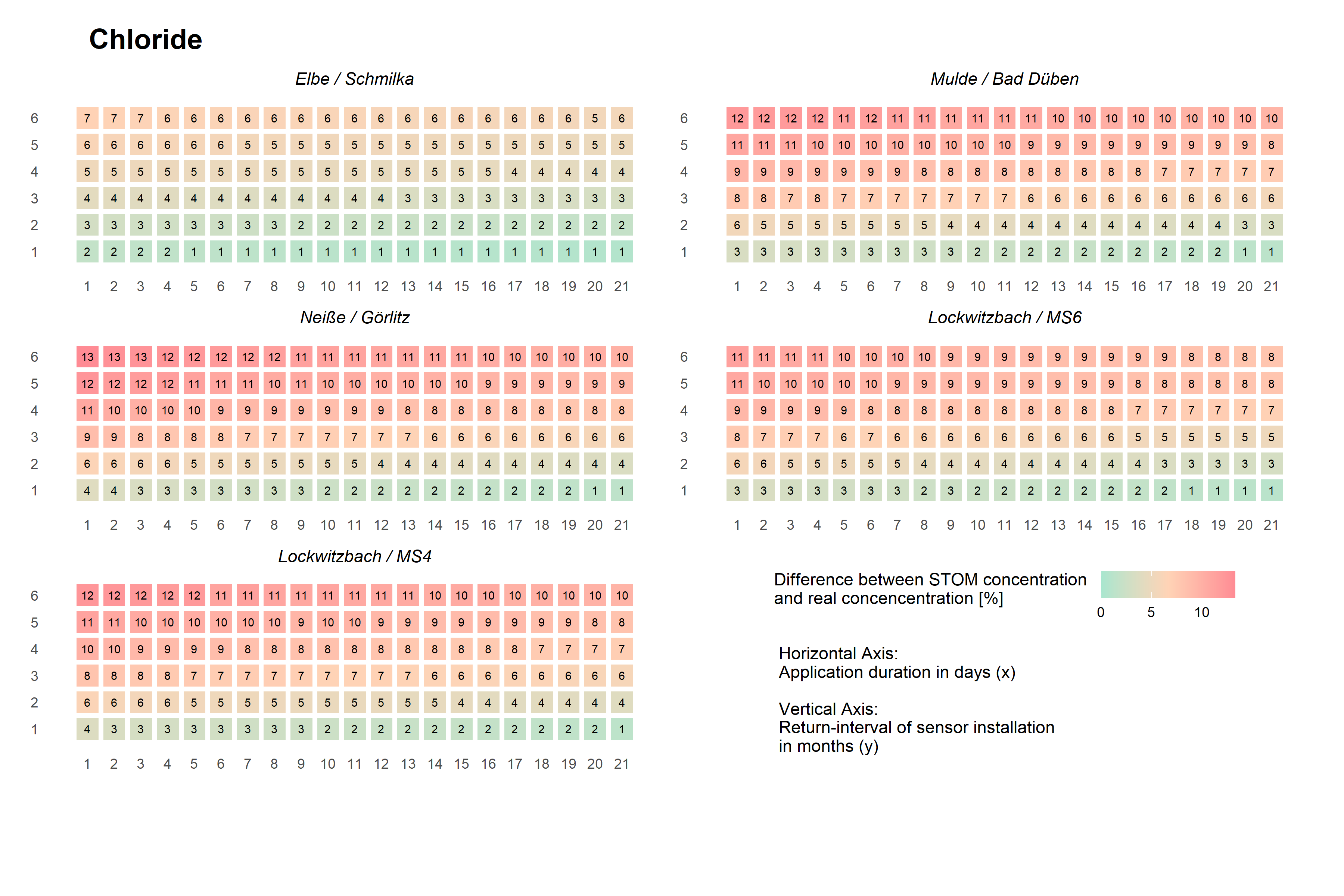


Figure 8: Difference between STOM concentration and real concentration for cholride

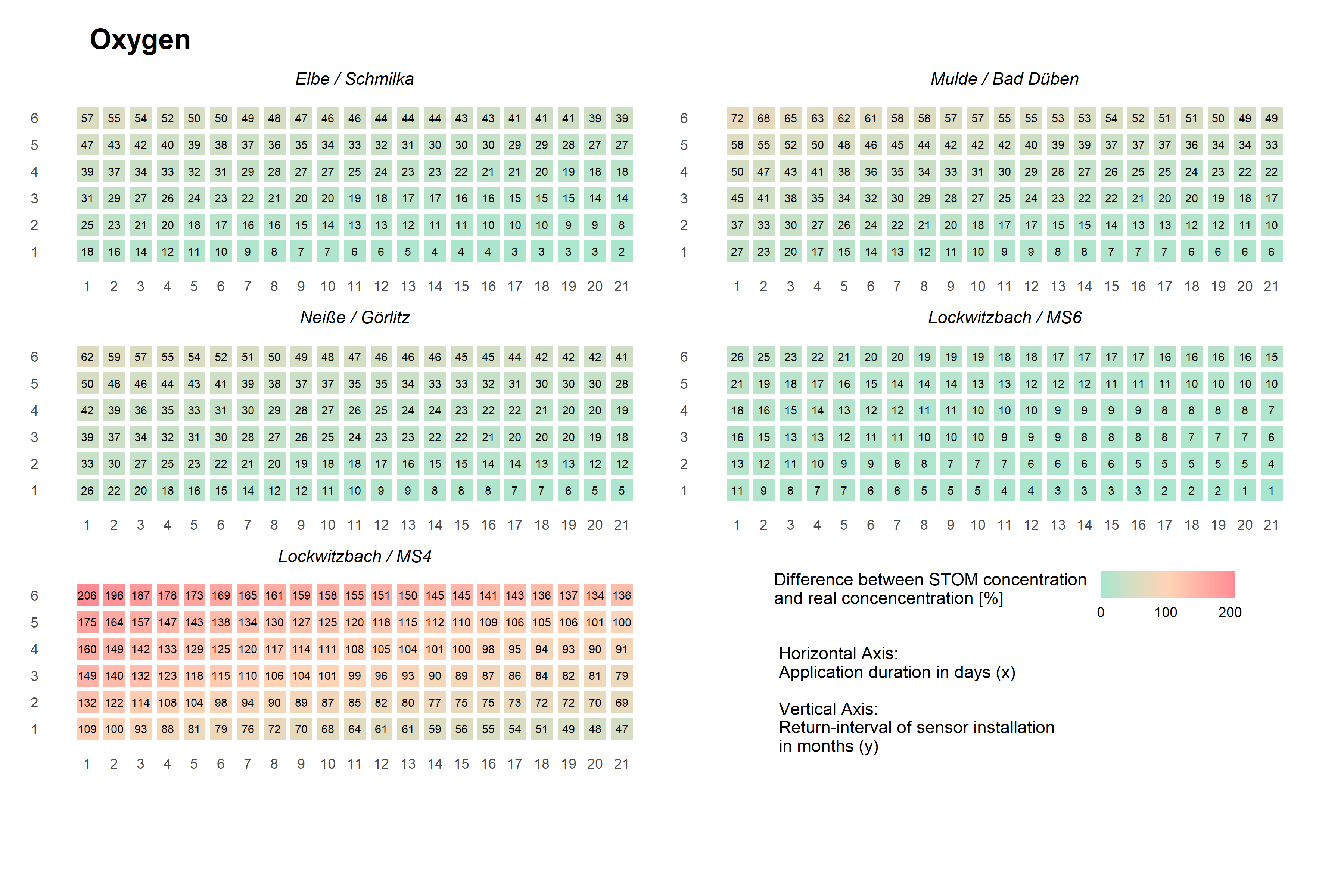


Figure 9: Difference between STOM concentration and real concentration for oxygen

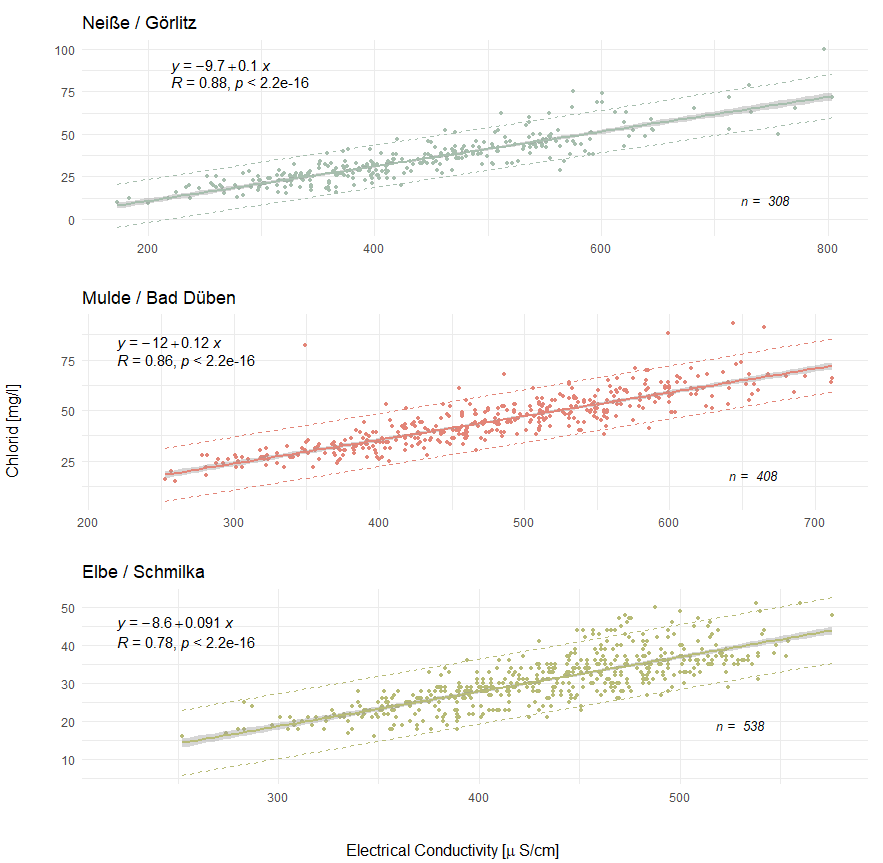


Figure 10:Linear relation between electrical conductivity and chloride concentration at Mule / Bad Düben, Lausitzer Neiße / Görlitz and Elbe / Schmilka. Shaded area: 95%-confidence interval, dashed lines: Prediction interval

Table 1: Result of 500 simulation runs of grab sampling according to OGewV rules with standard deviation. Sampling frequency were varied between once to every month to two times per year.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Grab sampling every month** | | | | | **Grab sampling every fourth month** | | | | | |
|  | Nitrate-Nitrogen [mg/l] | Chloride  [mg/l] | | | Dissolved Oxygen [mg/l] | | Nitrate-Nitrogen [mg/l] | | Chloride  [mg/l] | | Dissolved Oxygen [mg/l] |
| Mulde / Bad Düben | 4.2 ± 0.1 | 41 ± 1.7 | | | 11.1 ± 0.3 | | 4.2 ± 0.5 | | 40.9 ± 4.7 | | 11.1 ± 0.8 |
| Elbe / Schmilka | 3.3 ± 0.1 | 30.2 ± 0.7 | | | 10.4 ± 0.3 | | 3.3 ± 0.3 | | 30.2 ± 2.1 | | 10.4 ± 1 |
| Neiße / Görlitz | 2.8 ± 0.1 | 35.3 ± 1.8 | | | 10.5 ± 0.2 | | 2.7 ± 0.3 | | 35.3 ± 4.8 | | 10.5 ± 0.7 |
| Lockwitzbach /MS6 | 7 ± 0.2 | 43 ± 2.2 | | | 11.2 ± 0.2 | | 7 ± 0.8 | | 42.9 ± 5.5 | | 11.1 ± 0.7 |
| Lockwitzbach /MS4 | 6.3 ± 0.3 | 41.9 ± 2.2 | | | 12.6 ± 0.5 | | 6.4 ± 1 | | 42 ± 5.9 | | 12.5 ± 1.1 |
|  | **Grab sampling every second month** | | | | | **Grab sampling every fifth month** | | | | | |
|  | Nitrate-Nitrogen [mg/l] | Chloride  [mg/l] | | | Dissolved Oxygen [mg/l] | | Nitrate-Nitrogen [mg/l] | | Chloride  [mg/l] | | Dissolved Oxygen [mg/l] |
| Mulde / Bad Düben | 4.2 ± 0.3 | 40.9 ± 2.9 | | | 11.1 ± 0.5 | | 4.2 ± 0.6 | | 40.9 ± 5.5 | | 11 ± 1.1 |
| Elbe / Schmilka | 3.3 ± 0.2 | 30.2 ± 1.2 | | | 10.4 ± 0.5 | | 3.4 ± 0.4 | | 30.3 ± 2.4 | | 10.4 ± 1.2 |
| Neiße / Görlitz | 2.8 ± 0.2 | 35.3 ± 2.9 | | | 10.5 ± 0.4 | | 2.7 ± 0.3 | | 35.5 ± 5.6 | | 10.5 ± 0.9 |
| Lockwitzbach /MS6 | 7 ± 0.4 | 43.1 ± 3.5 | | | 11.2 ± 0.4 | | 7 ± 0.9 | | 42.6 ± 6.9 | | 11.1 ± 0.8 |
| Lockwitzbach /MS4 | 6.3 ± 0.5 | 41.9 ± 3.7 | | | 12.6 ± 0.8 | | 6.3 ± 1.1 | | 41.5 ± 6.6 | | 12.5 ± 1.4 |
|  | **Grab sampling every third month** | | | | | **Grab sampling every sixth month** | | | | | |
|  | Nitrate-Nitrogen [mg/l] | | Chloride [mg/l] | Dissolved Oxygen [mg/l] | | Nitrate-Nitrogen [mg/l] | | Chloride [mg/l] | | Dissolved Oxygen [mg/l] | |
| Mulde / Bad Düben | 4.2 ± 0.4 | 41 ± 4 | | | 11.1 ± 0.7 | | 4.2 ± 0.9 | | 40.9 ± 6.4 | | 11.1 ± 1.2 |
| Elbe / Schmilka | 3.3 ± 0.2 | 30.2 ± 1.7 | | | 10.4 ± 0.7 | | 3.3 ± 0.5 | | 30.2 ± 2.6 | | 10.4 ± 1.4 |
| Neiße / Görlitz | 2.8 ± 0.2 | 35.3 ± 3.9 | | | 10.5 ± 0.6 | | 2.7 ± 0.4 | | 35.3 ± 6 | | 10.5 ± 1.4 |
| Lockwitzbach /MS6 | 7 ± 0.6 | 42.9 ± 4.5 | | | 11.1 ± 0.6 | | 7 ± 1.2 | | 42.8 ± 6.7 | | 11.1 ± 1.1 |
| Lockwitzbach /MS4 | 6.4 ± 0.7 | 41.8 ± 4.7 | | | 12.5 ± 1.1 | | 6.4 ± 1.5 | | 41.9 ± 7.9 | | 12.5 ± 1.6 |

Table 2: Monitoring costs for STOM in Euro per year

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Return interval in months | | | | | |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 |
| Application duration in days | 1 | 8011 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 2 | 8011 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 3 | 8011 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 4 | 8011 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 5 | 8011 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 6 | 8011 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 7 | 8011 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 8 | 8011 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 9 | 10154 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 10 | 10154 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 11 | 10154 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 12 | 10154 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 13 | 10154 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 14 | 10154 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 15 | 12297 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 16 | 12297 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 17 | 12297 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 18 | 12297 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 19 | 12297 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 20 | 12297 | 5077 | 4099 | 3610 | 3316 | 3121 |
| 21 | 14439 | 5077 | 4099 | 3610 | 3316 | 3121 |