

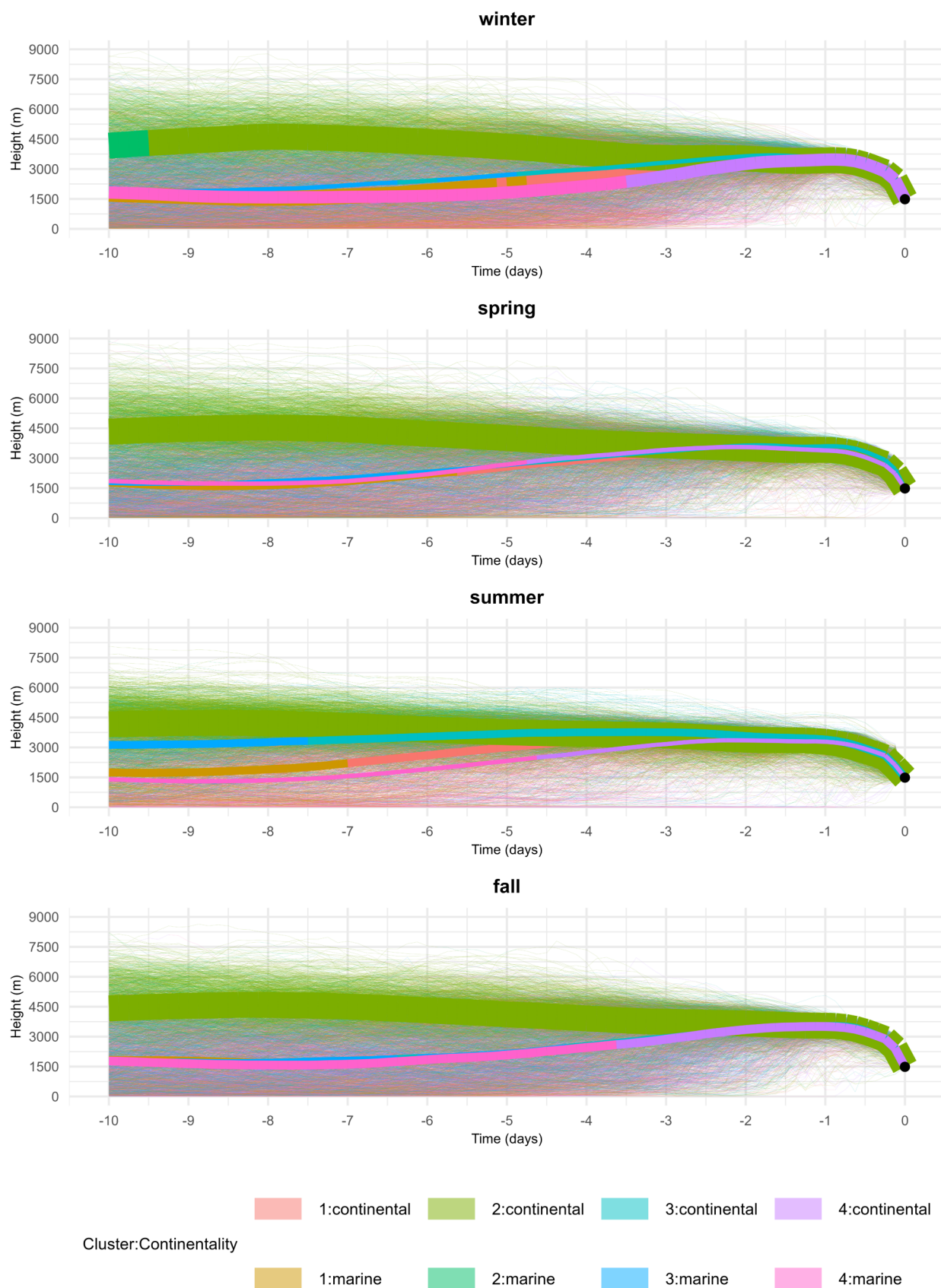


Figure S1: Height per trajectory 2010-21. This figure shows the height of each trajectory going back in time and of the average trajectory. The width of the average trajectory corresponds to the frequency of that cluster.

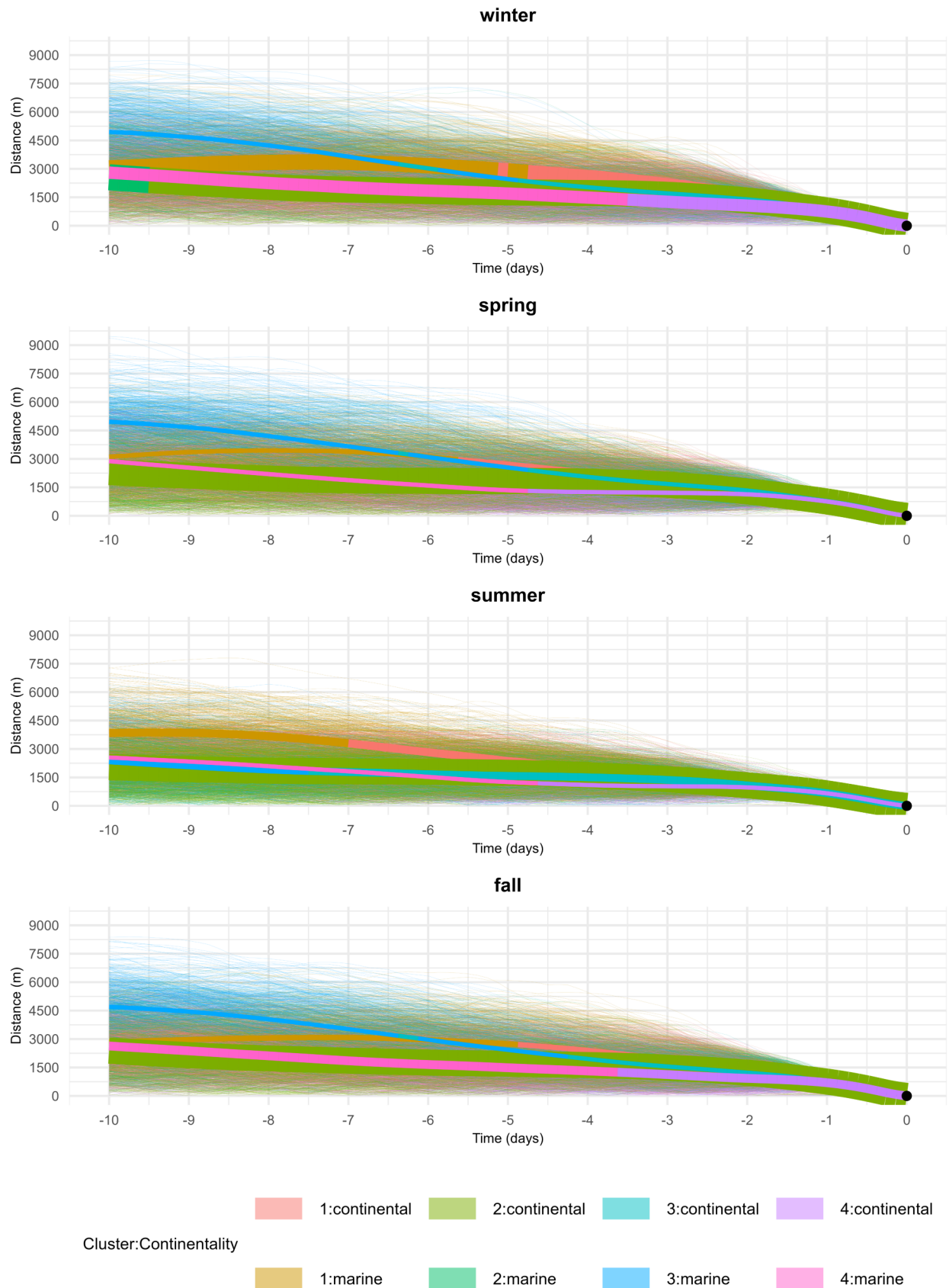


Figure S2: Distance per trajectory 2010-21. This figure shows the distance to the station of each trajectory going back in time and of the average trajectory. The width of the average trajectory corresponds to the frequency of that cluster.

circular plot of marine contribution

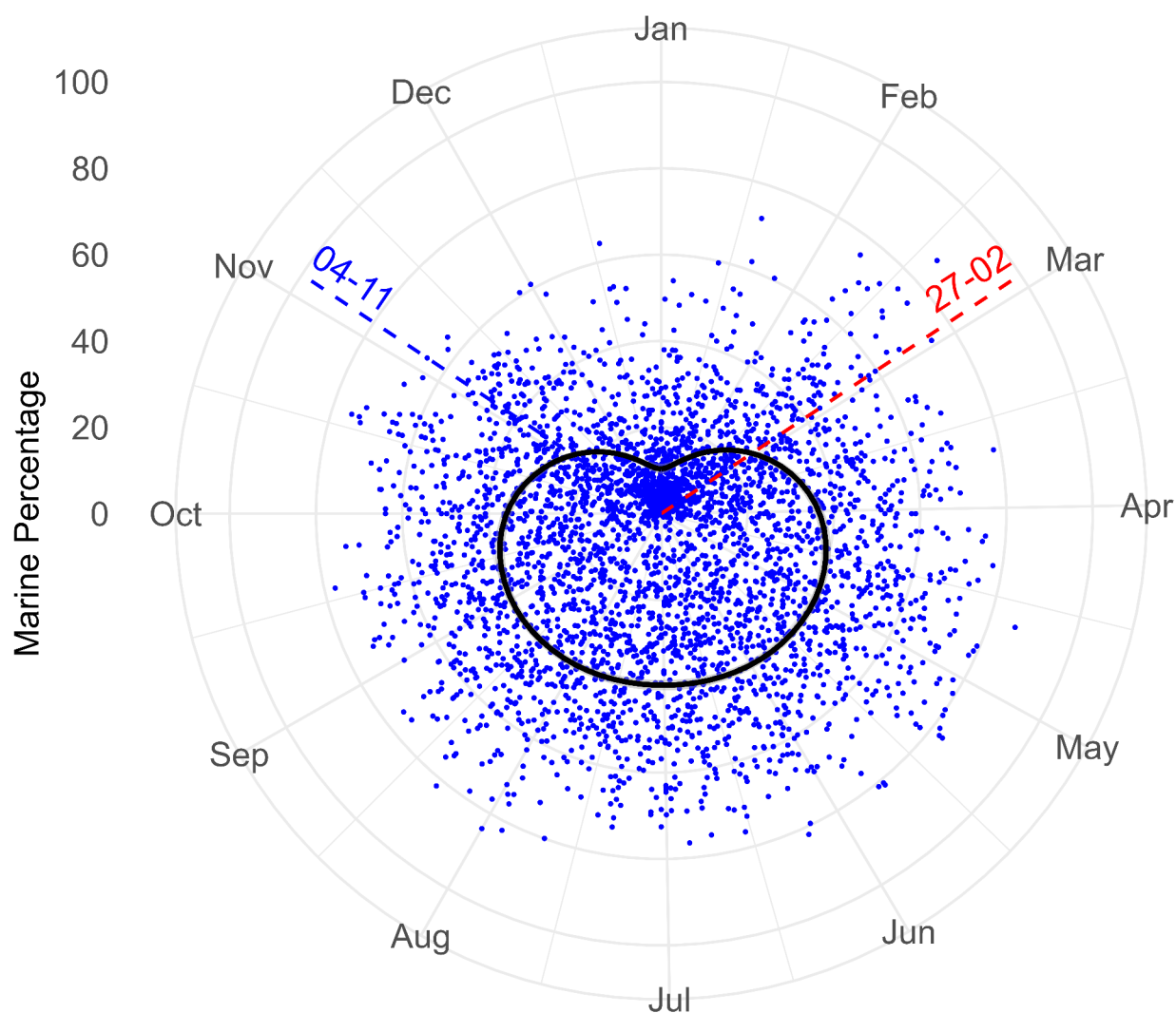
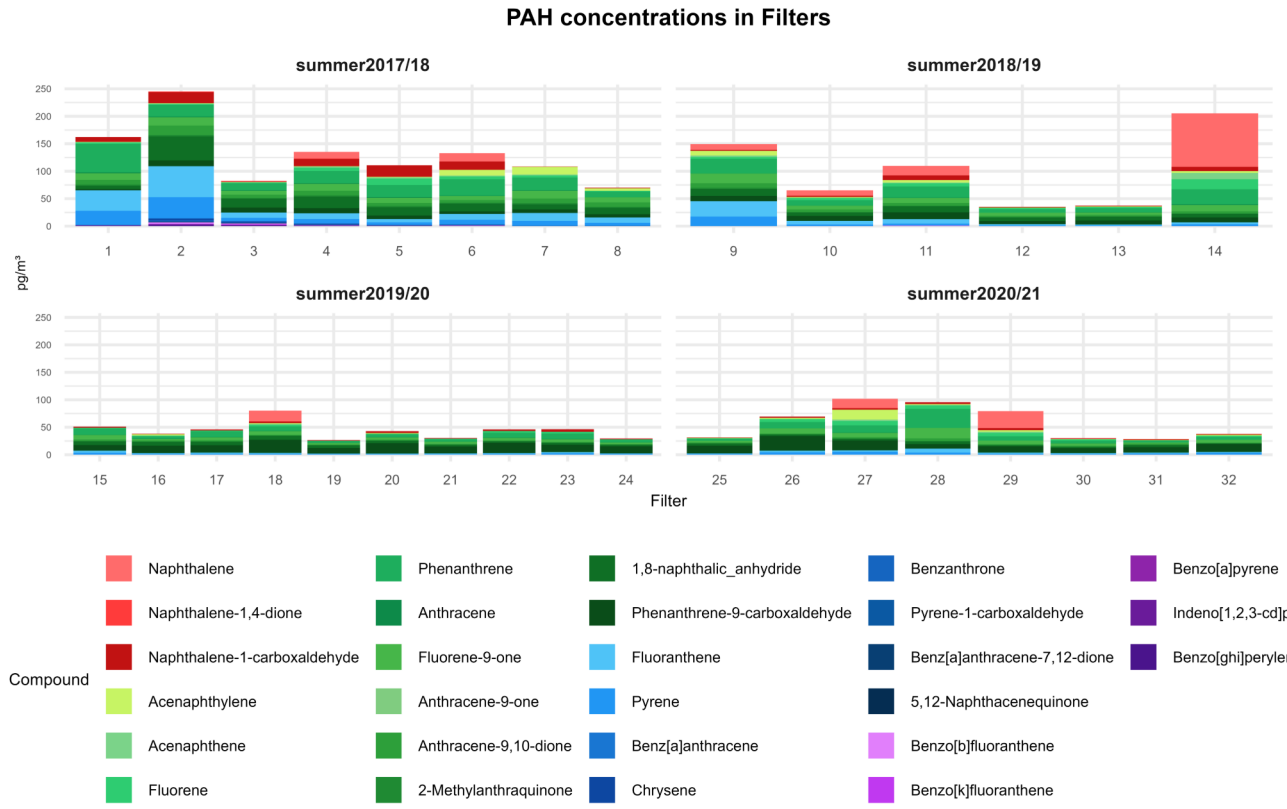
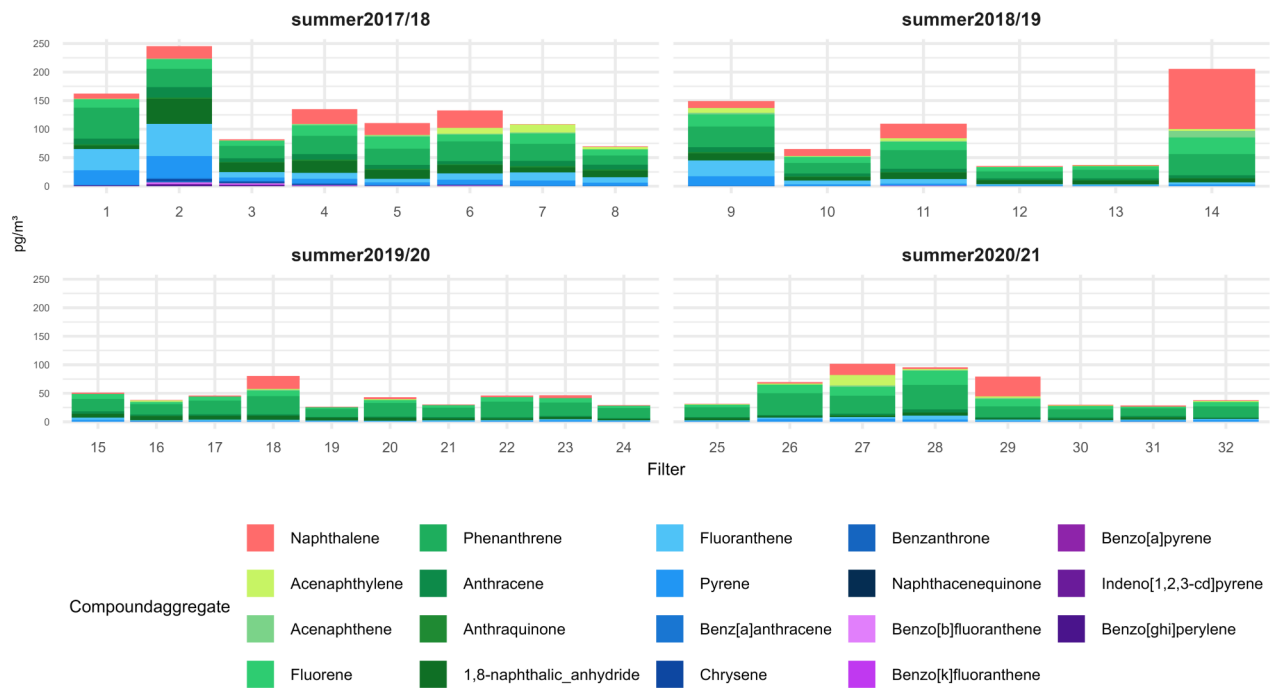


Figure S3: Seasonal variability in marine air-mass contribution during 2010–2021 shown as a circular generalized additive model (GAM). Each blue point represents the mean marine contribution (%) of all trajectories starting on the same calendar day, arranged by day of year around the circle. The black curve shows the fitted circular spline GAM. Dashed vertical lines indicate the days of maximum (red) and minimum (blue) rate of change in marine contribution, with corresponding dates annotated.

The following figures are combined in Figure S4 and illustrate PAH concentrations measured on individual filters at increasing levels of data aggregation. The first panel presents concentrations for individual compounds, distinguishing between PAHs and oPAHs but not separating gas and particle phases. The second panel shows the same data with oPAHs aggregated together with their corresponding PAHs (referred to as compound aggregate). The third panel further aggregates the data by chemical group and phase only. The fourth panel displays concentrations for each compound aggregate, showing their distribution across filters and indicating whether they occur in the gas or particle phase. Note the different scales for each compound in the last panel.

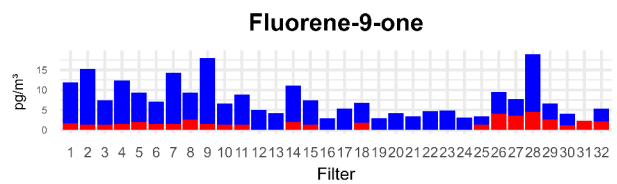
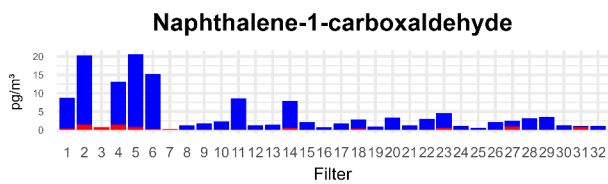
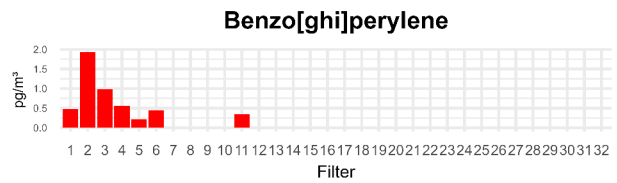
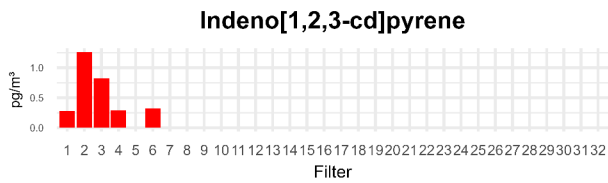
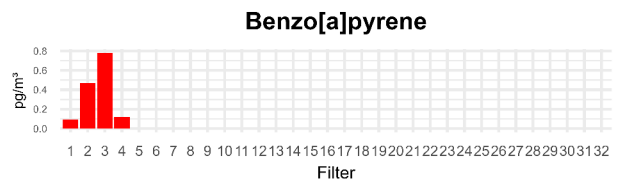
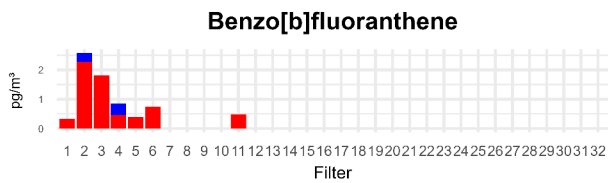
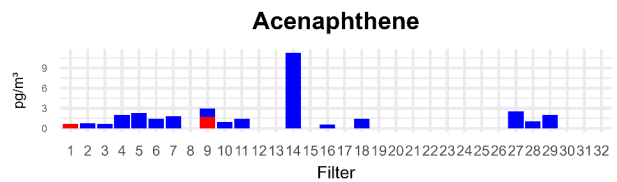
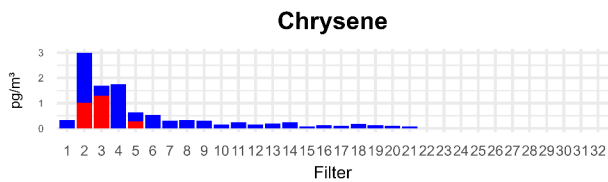
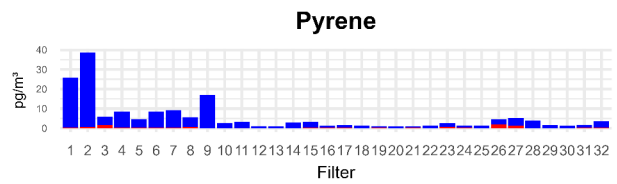
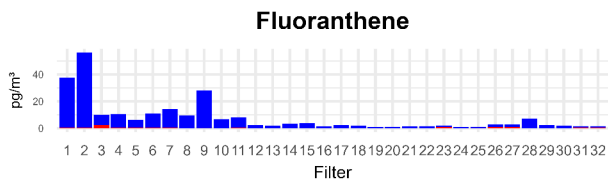
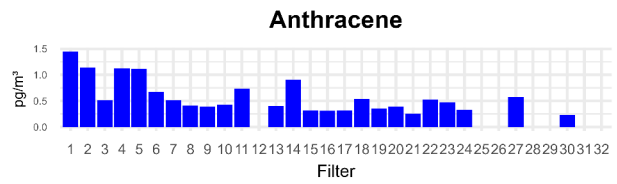
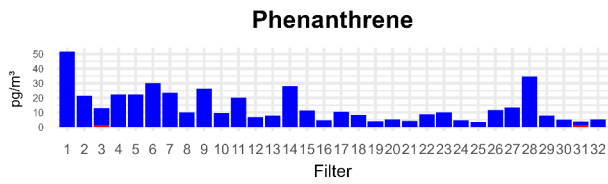
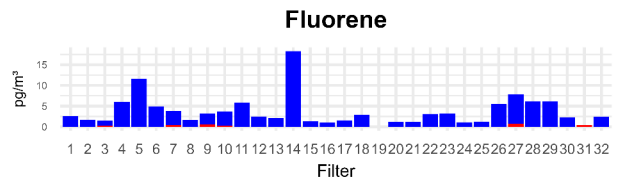
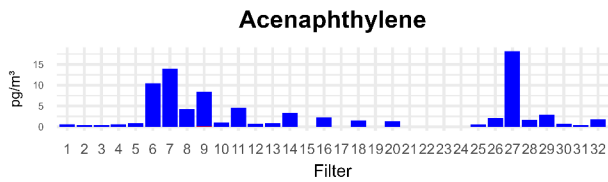


PAH concentrations in Filters



PAH concentrations in Filters





Phase ■ gas ■ particle Phase ■ gas ■ particle Phase ■ gas ■ particle

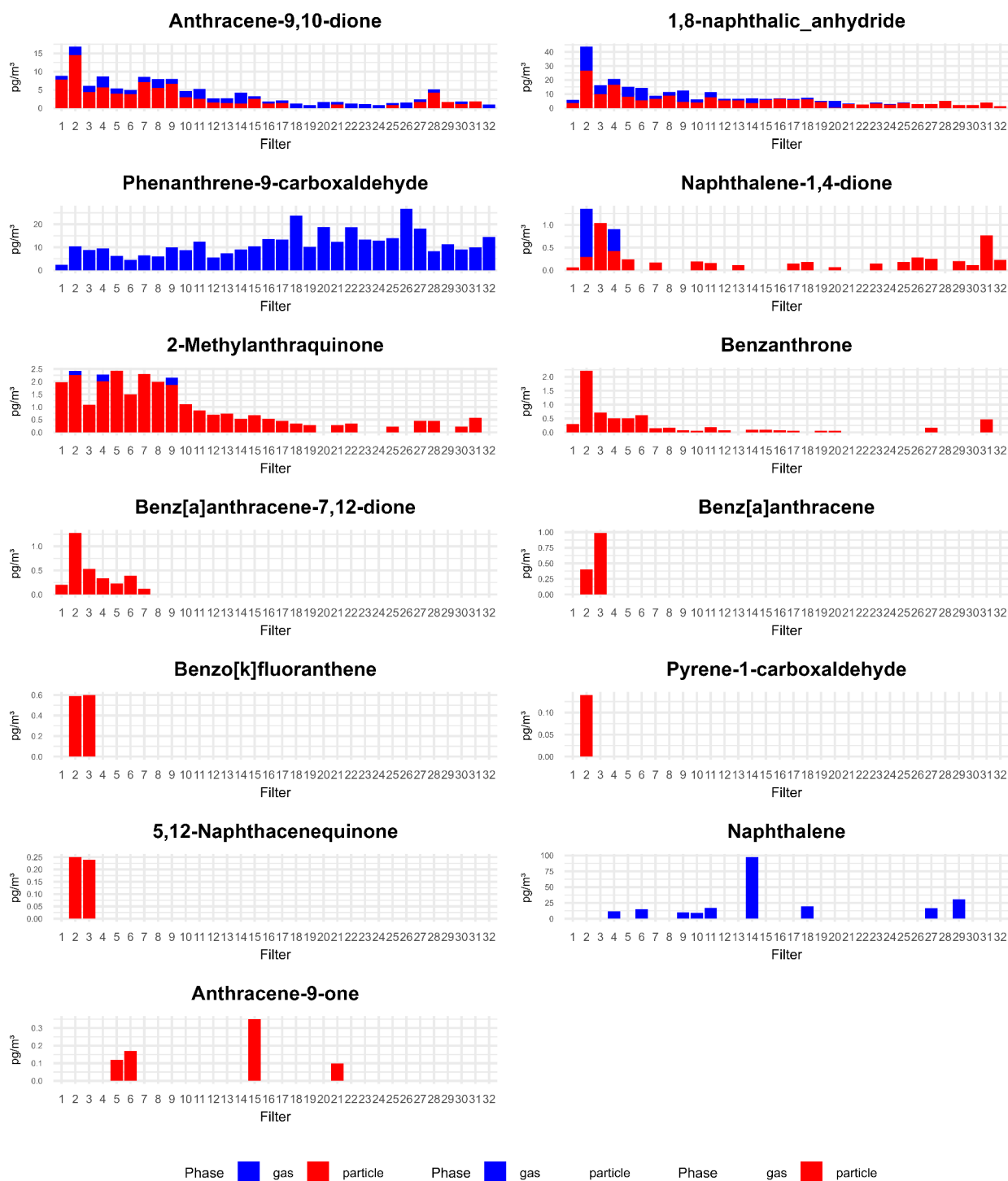
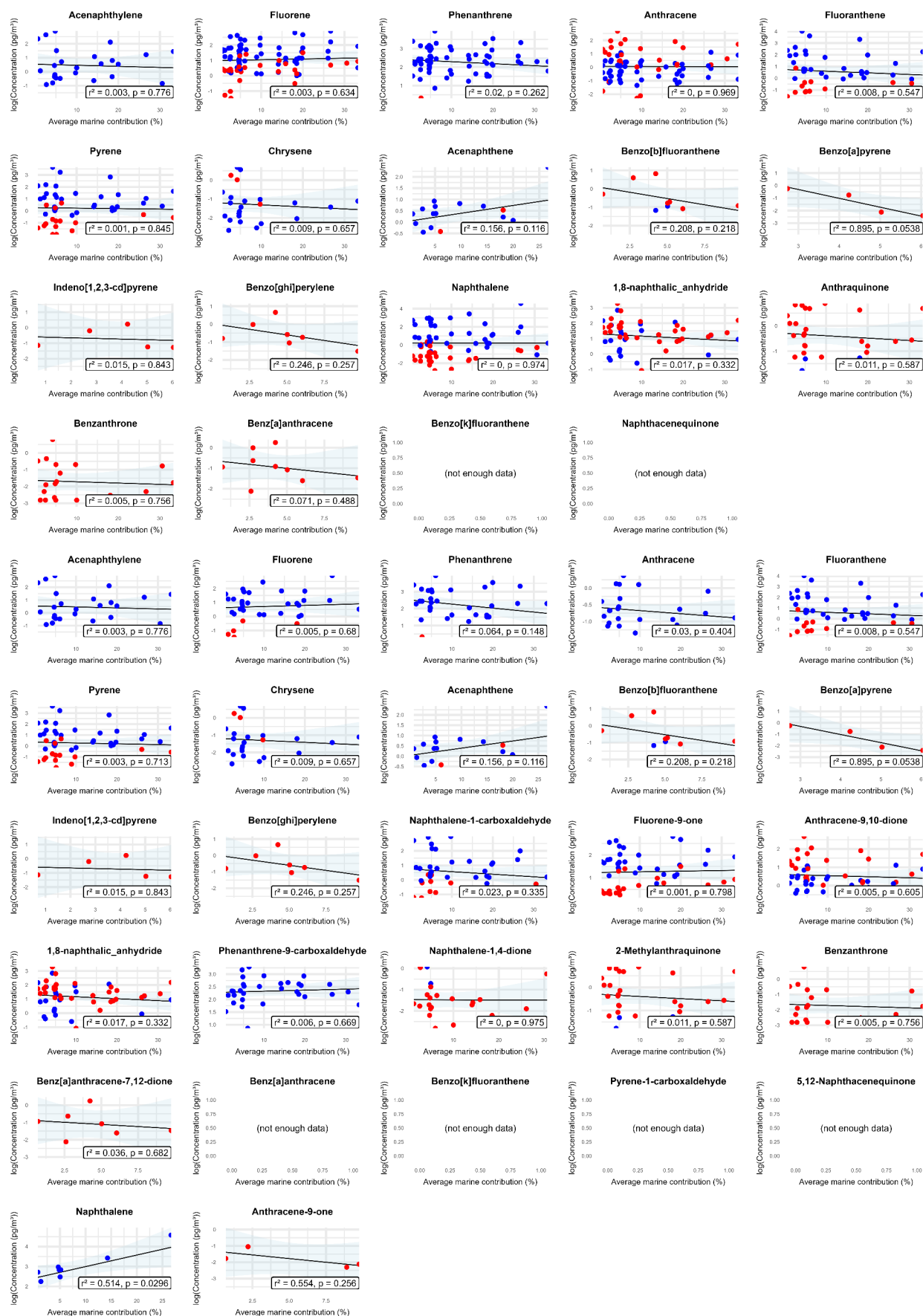


Figure S4: PAH data concentrations. Top: compound aggregates, second: full compound, Color scale is based on number of rings in the chemical structure. third: type and phase, fourth: by compound, note the different scales.

The following plots are effect plots for all compounds and models. Effect plots showing the influence of (S5.1) marine contribution, (S5.2) distance to the station, (S5.3) time since the most recent marine influence, and (S5.4) average temperature. Panels are arranged to illustrate different levels of data aggregation. The top panel shows compound aggregates, with PAHs and their corresponding oPAHs grouped together. The panel directly below presents results for individual compounds. On the following page, the first panel separates PAHs and oPAHs by gas and particle phase. The final panel groups the data by compound class and phase (PAH gas, PAH particle, oPAH gas, and oPAH particle). Red dots refer to particulate phase, blue dots to gas phase. Figure S6 is very similar, but given that station temperature does not depend on the air mass trajectories, it is given a separate number.



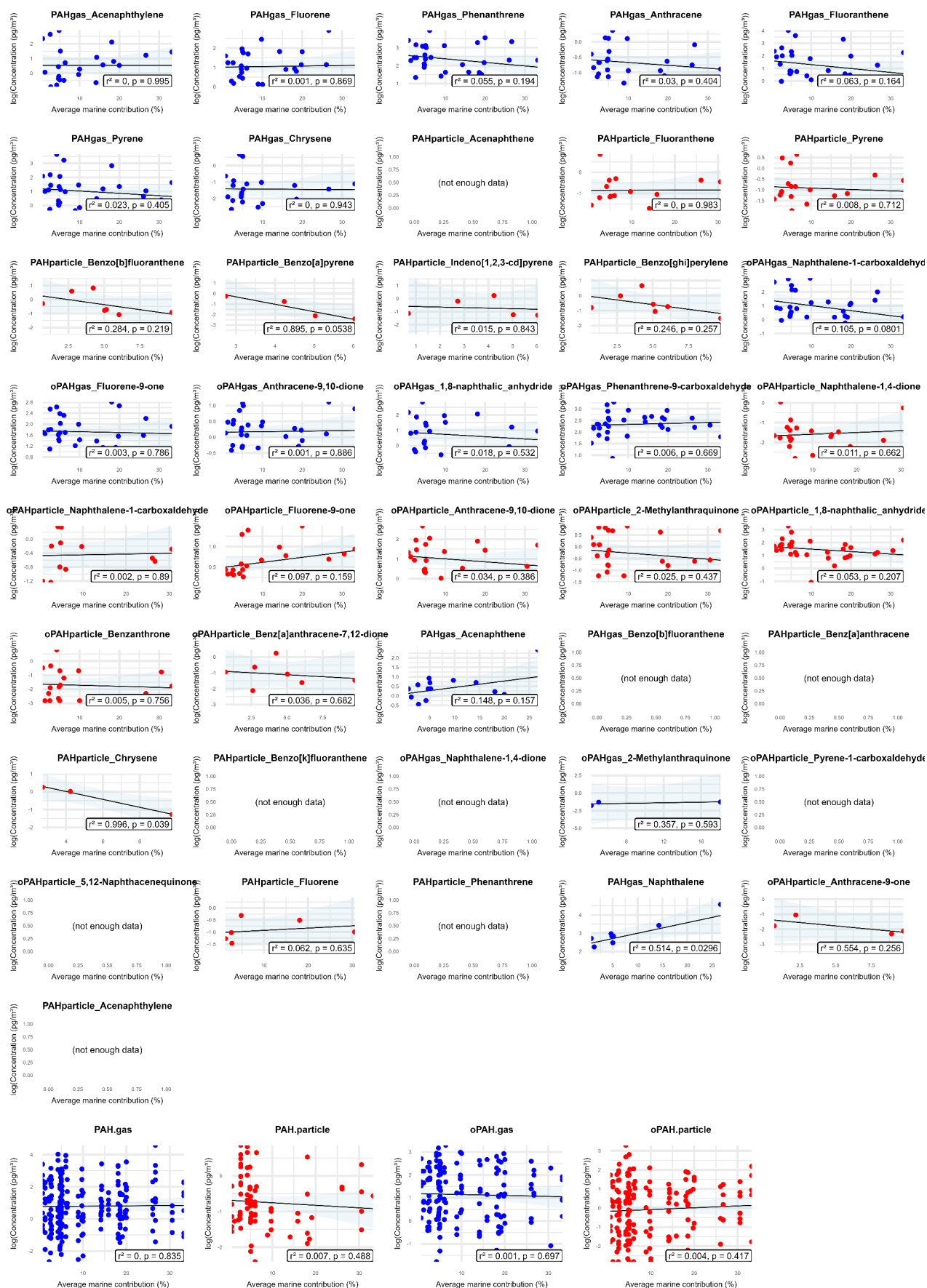
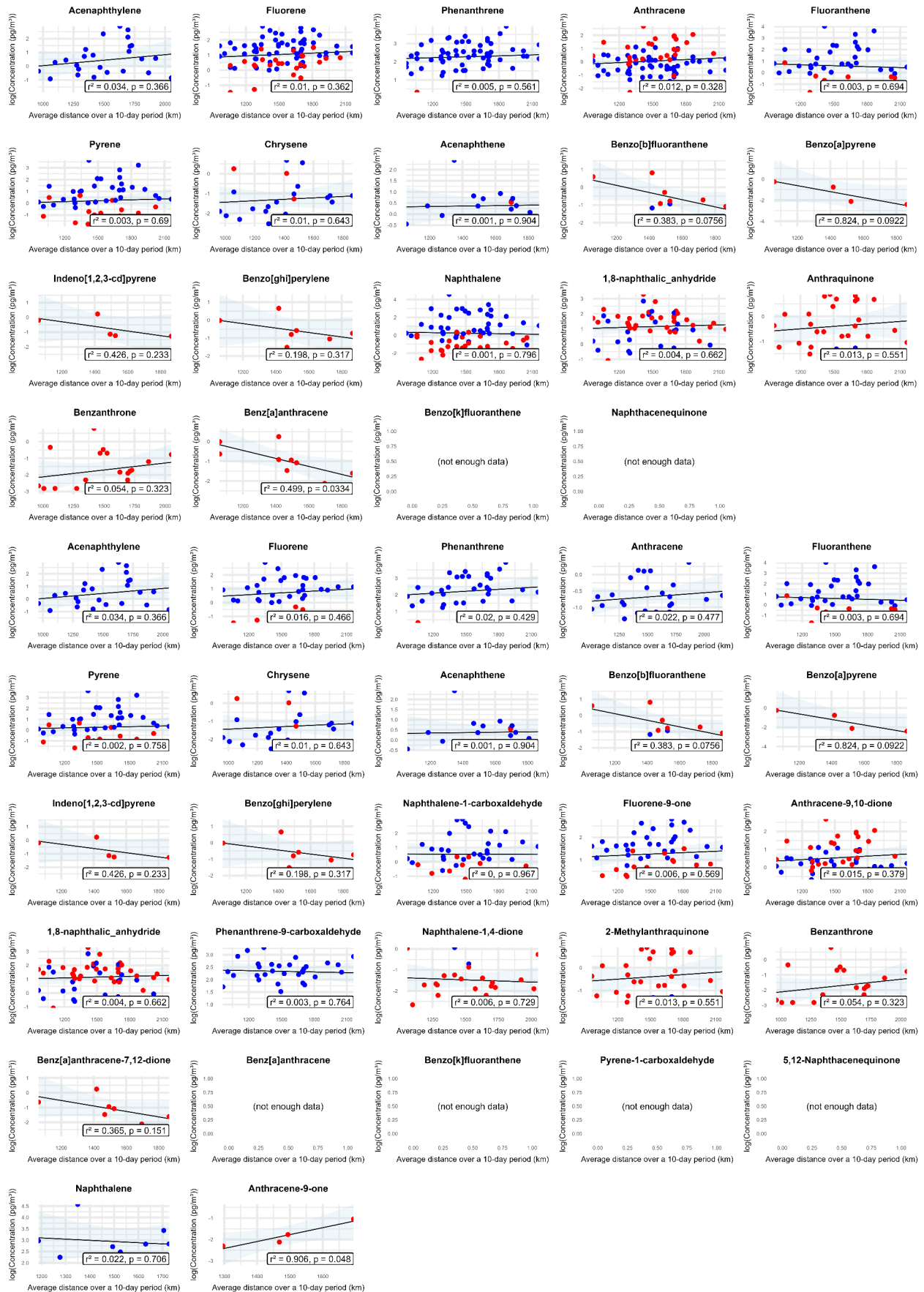


Figure S5.1: Marine effect plots.



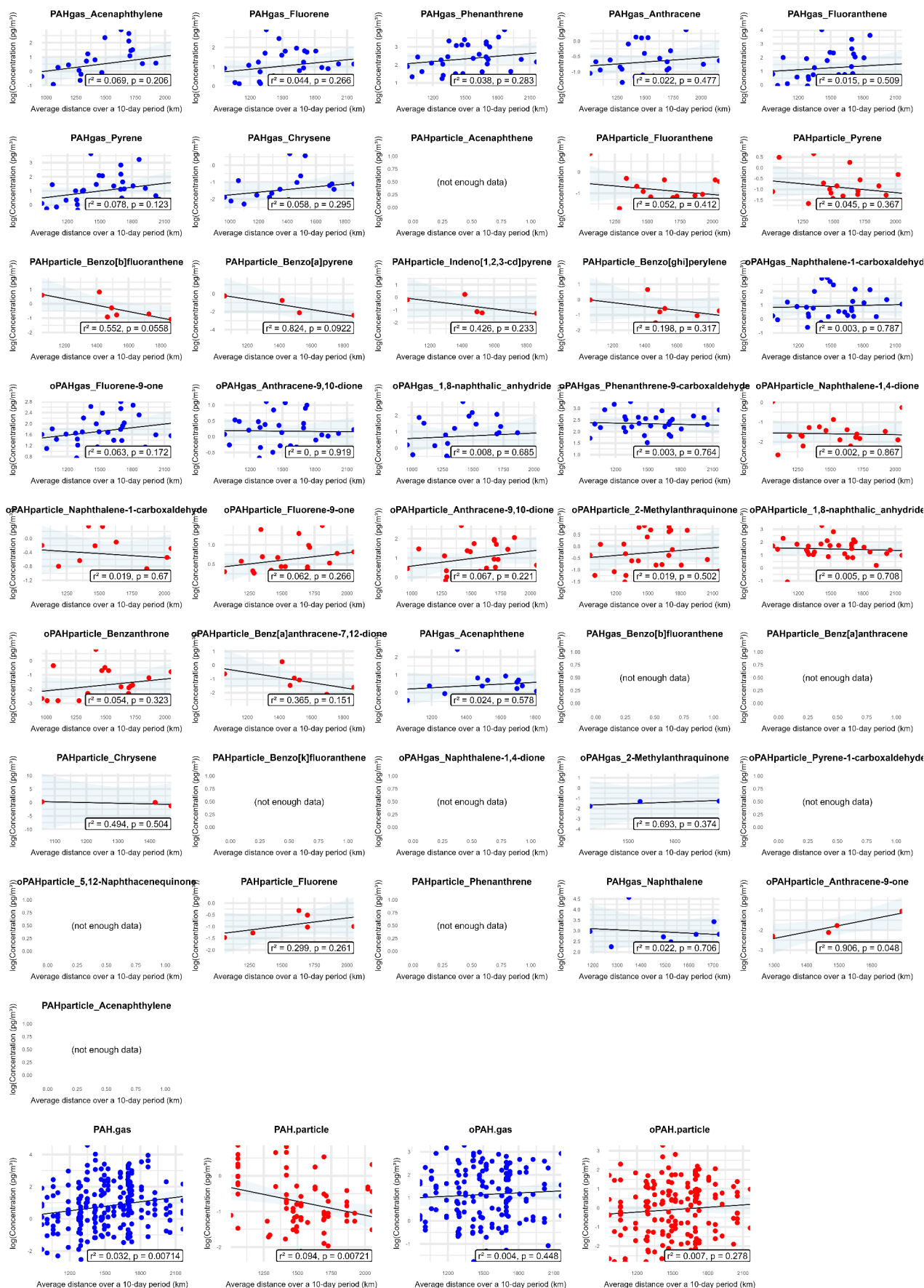


Figure S5.2: Distance effect plots



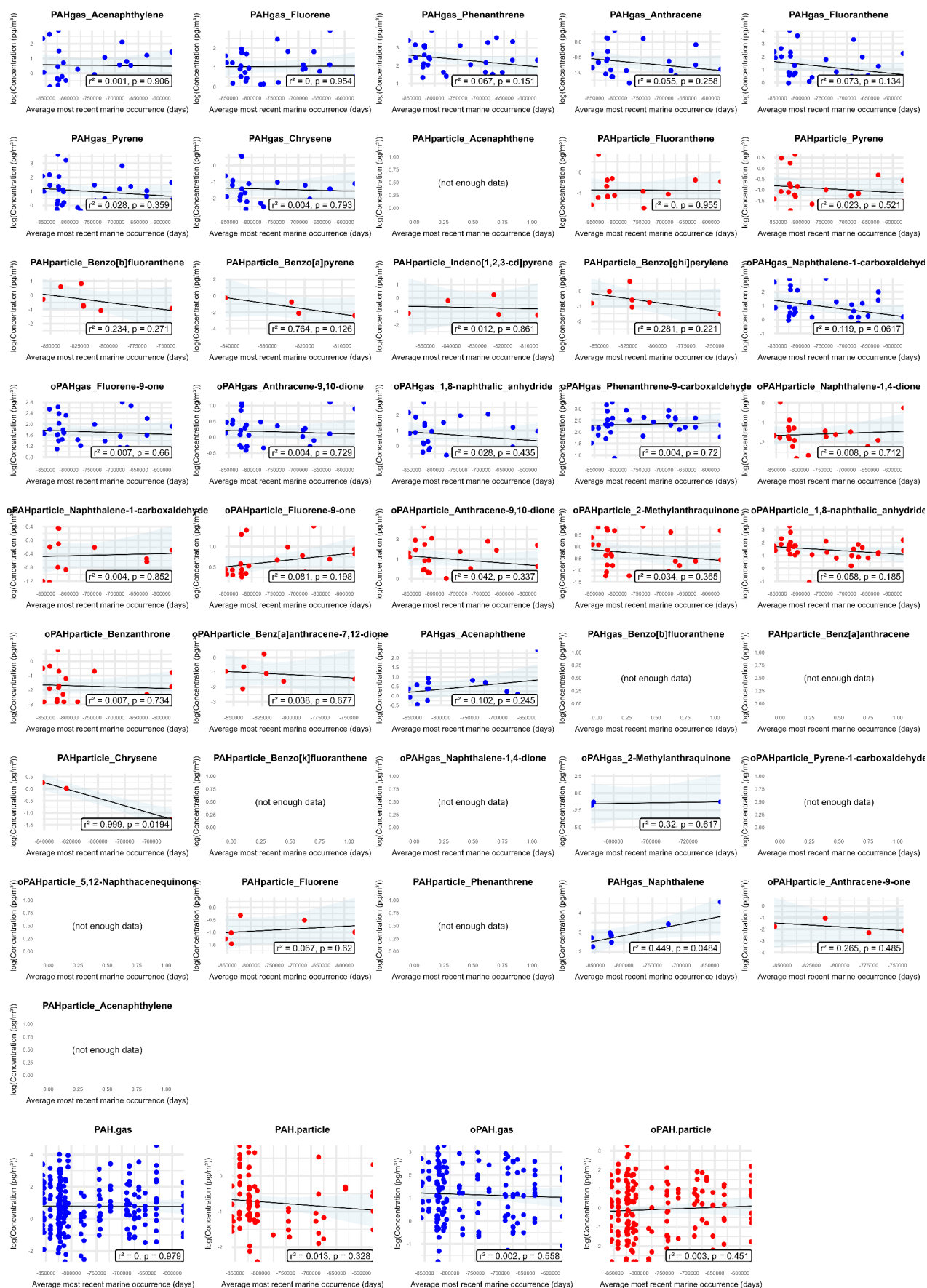
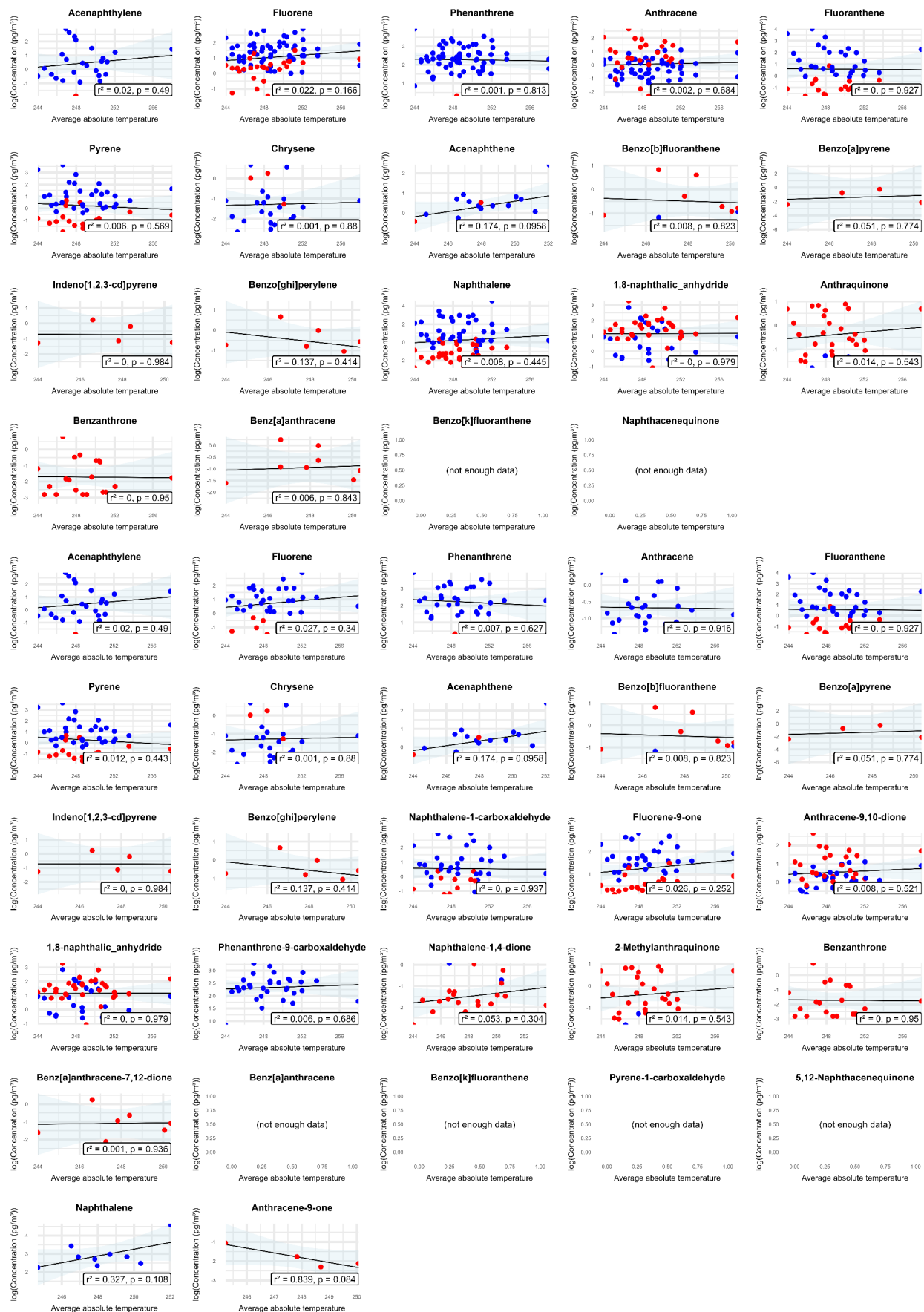


Figure S5.3: Time effect plots



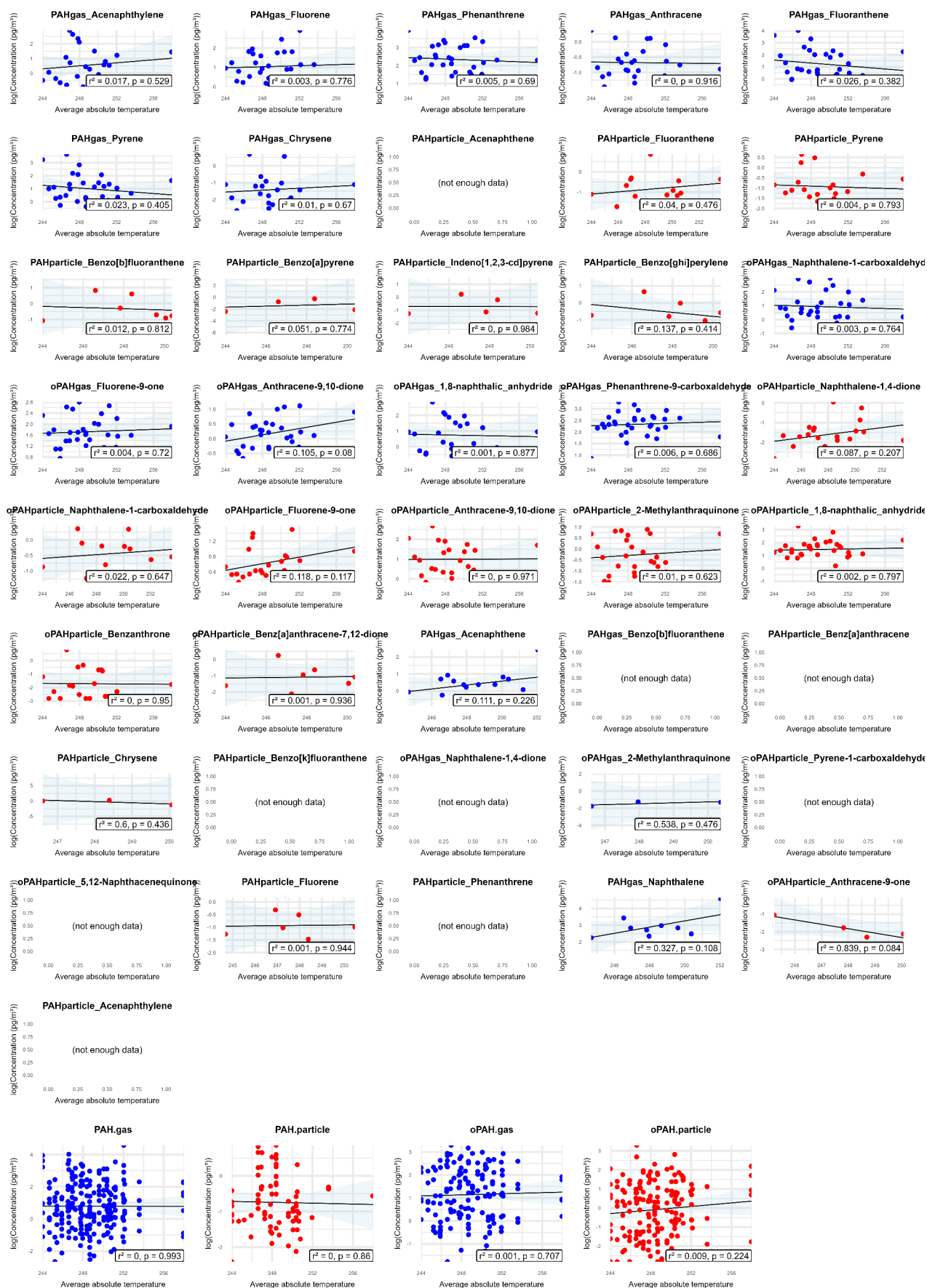
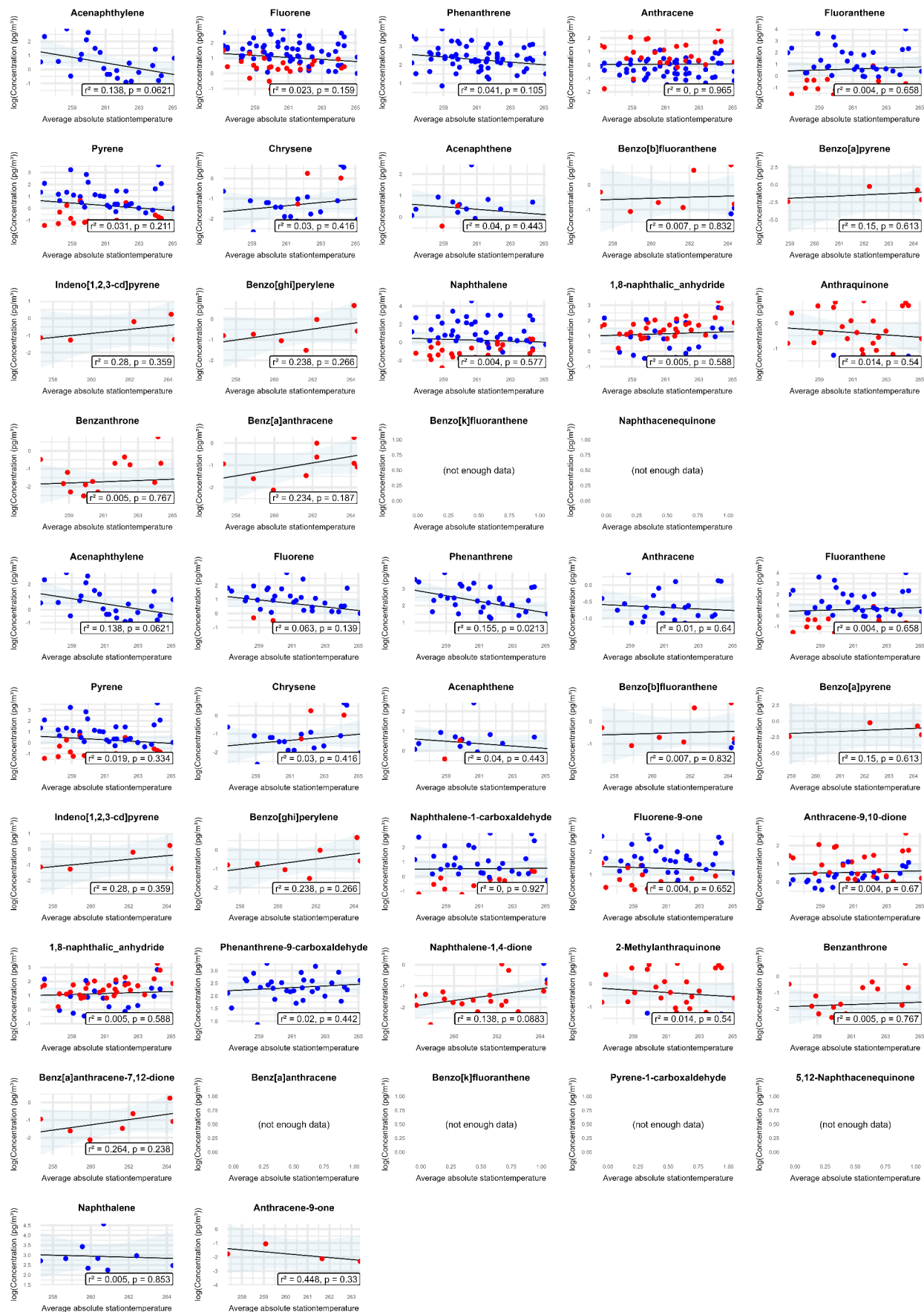


Figure S5.4: Temperature effect plots



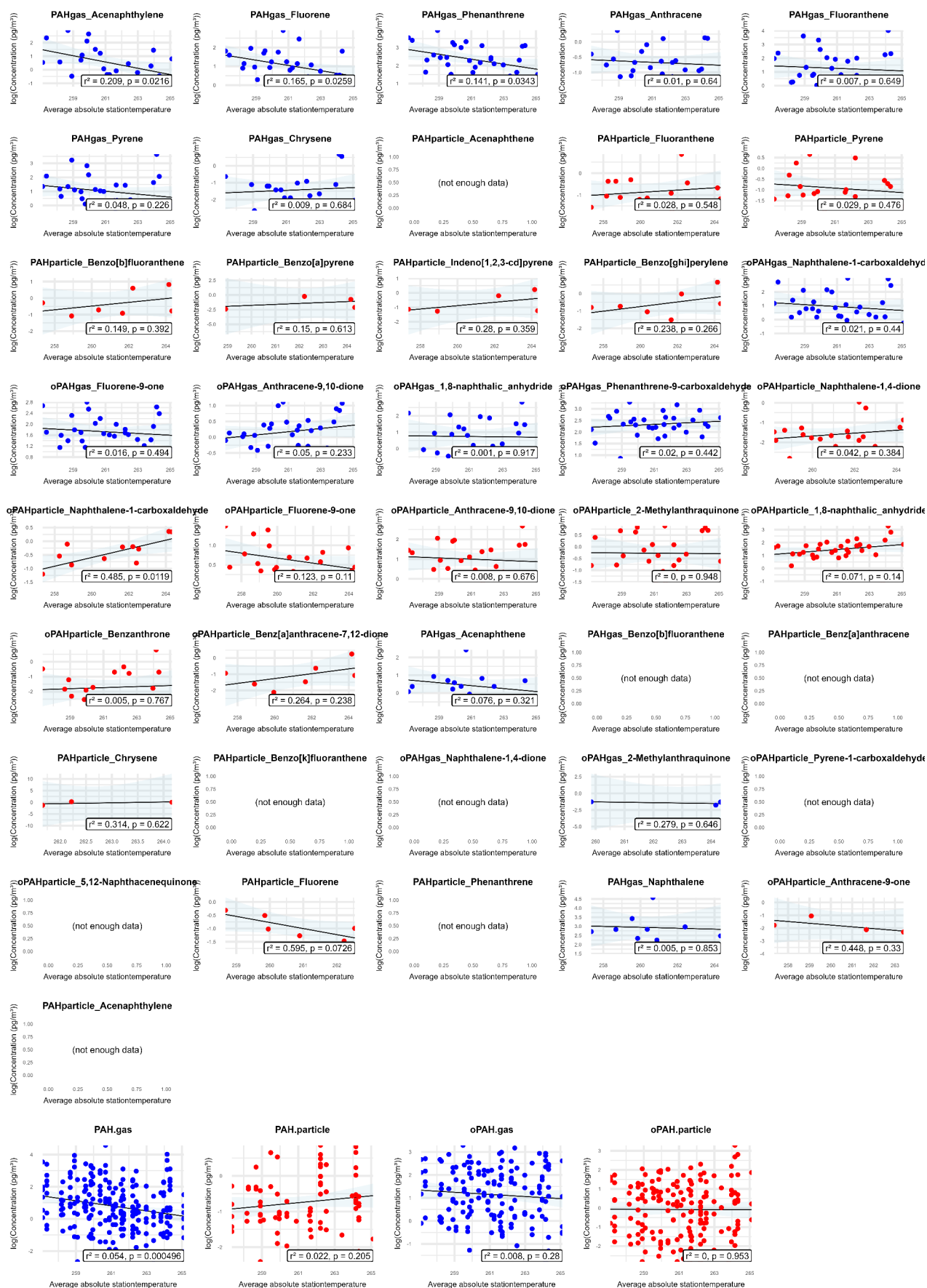


Figure S6: Station temperature effect plots

Table S1: Overview of data models

~ represents either log(Value) or Value

Original models (without temperature)

```
fit100= ~ marine
fit101= ~ log(distance)
fit102= ~ scale(SECS)
fit103= ~ marine + scale(SECS)
fit104= ~ marine * scale(SECS)
fit105= ~ marine * dominantcluster
fit106= ~ marine + dominantcluster
fit107= ~ scale(SECS) + log(distance)
fit108= ~ marine + log(distance)
fit109= ~ marine * log(distance)
fit110= ~ marine * scale(SECS) * log(distance)
fit111= ~ marine * dominantcluster + log(distance)
fit112= ~ marine + dominantcluster + log(distance)
fit113= ~ scale(SECS) * dominantcluster + log(distance)
fit114= ~ log(distance) * dominantcluster
fit115= ~ scale(SECS) * log(distance)
fit116= ~ log(distance) + dominantcluster
fit117= ~ marine + scale(SECS) + log(distance)
fit118= ~ marine * scale(SECS) + log(distance)
fit119= ~ marine * log(distance) + scale(SECS)
```

Mixed models (without temperature)

```
fit120 = ~ marine + (1 | dominantcluster)
fit121 = ~ log(distance) + (1 | dominantcluster)
fit122 = ~ scale(SECS) + (1 | dominantcluster)
fit123 = ~ marine + log(distance) + (1 | dominantcluster)
fit124 = ~ marine * log(distance) + (1 | dominantcluster)
fit125 = ~ marine * scale(SECS) * log(distance) + (1 | dominantcluster)
fit126 = ~ marine * dominantcluster + log(distance) + (1 | dominantcluster)
fit127 = ~ log(distance) * dominantcluster + (1 | dominantcluster)
fit128 = ~ marine + scale(SECS) + log(distance) + (1 | dominantcluster)
```

Mixed models with random slopes (without temperature)

```
fit129 = ~ marine * log(distance) + (log(distance) | dominantcluster)
fit130 = ~ marine * scale(SECS) + (scale(SECS) + marine | dominantcluster)
fit131 = ~ marine * scale(SECS) * log(distance) + (scale(SECS) + marine +
log(distance) | dominantcluster)
```

--- New models including temperature as an additional variable ---

```
fit132= ~ marine + temperature
fit133= ~ log(distance) + temperature
fit134= ~ scale(SECS) + temperature
fit135= ~ marine + scale(SECS) + temperature
fit136= ~ marine * scale(SECS) + temperature
fit137= ~ marine * dominantcluster + temperature
fit138= ~ marine + dominantcluster + temperature
fit139= ~ scale(SECS) + log(distance) + temperature
fit140= ~ marine + log(distance) + temperature
fit1440 = ~ temperature
fit1441 = ~ log(temperature)
```

```

fit141 = ~ marine + temperature + (1 | dominantcluster)
fit142 = ~ log(distance) + temperature + (1 | dominantcluster)
fit143 = ~ marine + log(distance) + temperature + (1 | dominantcluster)

### --- New models including station temperature as a variable ---

fit201 = ~ stationtemperature
fit202 = ~ marine + stationtemperature
fit203 = ~ log(distance) + stationtemperature
fit204 = ~ scale(SECS) + stationtemperature
fit205 = ~ marine + scale(SECS) + stationtemperature
fit206 = ~ marine * scale(SECS) + stationtemperature
fit207 = ~ marine + dominantcluster + stationtemperature
fit208 = ~ marine * dominantcluster + stationtemperature
fit209 = ~ scale(SECS) + log(distance) + stationtemperature
fit210 = ~ marine + log(distance) + stationtemperature
fit211 = ~ marine * log(distance) + stationtemperature
fit212 = ~ marine * scale(SECS) * log(distance) + stationtemperature
fit213 = ~ marine + dominantcluster + log(distance) + stationtemperature
fit214 = ~ marine * dominantcluster + log(distance) + stationtemperature
fit215 = ~ scale(SECS) * dominantcluster + log(distance) + stationtemperature
fit216 = ~ log(distance) * dominantcluster + stationtemperature
fit217 = ~ marine + scale(SECS) + log(distance) + stationtemperature
fit218 = ~ marine * scale(SECS) + log(distance) + stationtemperature
fit219 = ~ marine * log(distance) + scale(SECS) + stationtemperature
fit220 = ~ stationtemperature + (1 | dominantcluster)
fit221 = ~ marine + stationtemperature + (1 | dominantcluster)
fit222 = ~ log(distance) + stationtemperature + (1 | dominantcluster)
fit223 = ~ scale(SECS) + stationtemperature + (1 | dominantcluster) ,
fit224 = ~ marine + log(distance) + stationtemperature + (1 | dominantcluster)
fit225 = ~ marine * log(distance) + stationtemperature + (1 |
dominantcluster) ,
fit226 = ~ marine * scale(SECS) * log(distance) + stationtemperature + (1 |
dominantcluster) ,
fit227 = ~ marine + scale(SECS) + log(distance) + stationtemperature + (1 |
dominantcluster) ,
fit228 = ~ marine * log(distance) + stationtemperature + (log(distance) |
dominantcluster
fit229 = ~ marine * scale(SECS) + stationtemperature + (scale(SECS) + marine |
dominantcluster)"
fit230 = ~ marine * scale(SECS) * log(distance) + stationtemperature +
(scale(SECS) + marine + log(distance) | dominantcluster)

```