주별 미세먼지농도와 오염물질간 상관관계

```
load('../../refinedata/analysis/analysis_total_Fixed.rda')
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.6.3
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(FinCal)
```

```
## Warning: package 'FinCal' was built under R version 3.6.3
```

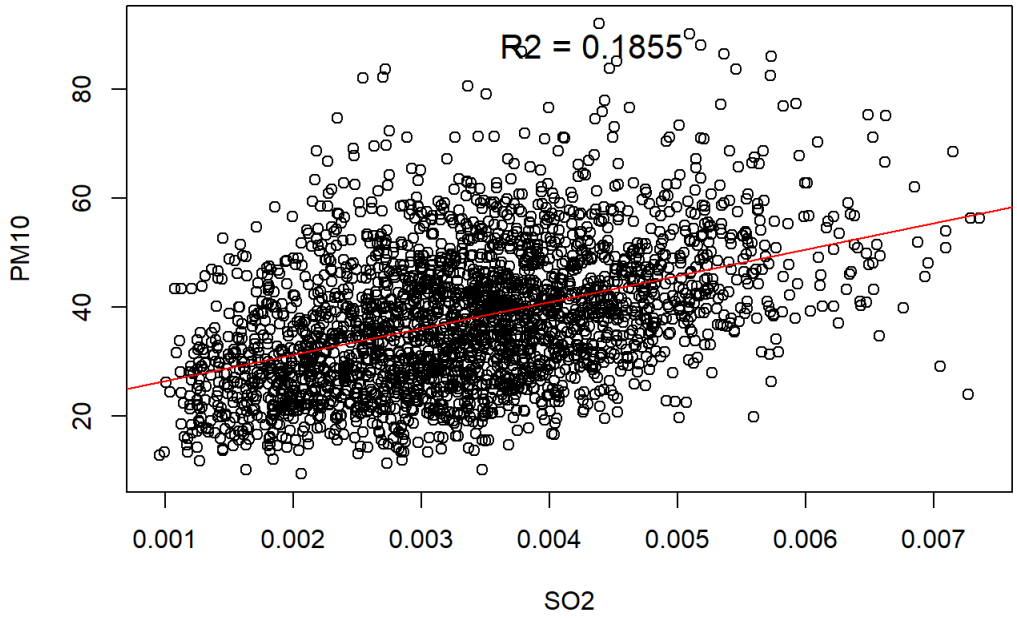
```
n <- rep(1:157,each = 7)
analysis_total_Fixed$주 <- rep(n[1:1096], 17)
analysis_total_Fixed <- as.data.frame(analysis_total_Fixed)
analysis_total_week <- analysis_total_Fixed %>%
  group_by(시도, 주) %>%
  summarise(`평균기온(°C)` = mean(`평균기온(°C)`),
            `평균 풍속(m/s)` = mean(`평균 풍속(m/s)`),
            `평균 현지기압(hPa)` = mean(`평균 현지기압(hPa)`),
            `일강수량(mm)` = mean(`일강수량(mm)`),
            SO2 = geometric.mean(SO2),
            CO = geometric.mean(CO),
            O3 = geometric.mean(O3),
            NO2 = geometric.mean(NO2),
            PM10 = geometric.mean(PM10),
            PM25 = geometric.mean(PM25),
            발병률 = sum(발병률)
            )
```

```
# PM과 오염물질 상관관계 및 산점도

fit <- lm(PM10 ~ SO2, analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = PM10 ~ SO2, data = analysis_total_week)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -32.676  -8.504  -1.166   6.798  49.243
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   21.5987     0.6977   30.96   <2e-16 ***
## SO2         4832.8728   195.8654   24.67   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 11.62 on 2667 degrees of freedom
## Multiple R-squared:  0.1859, Adjusted R-squared:  0.1855
## F-statistic: 608.8 on 1 and 2667 DF,  p-value: < 2.2e-16
```

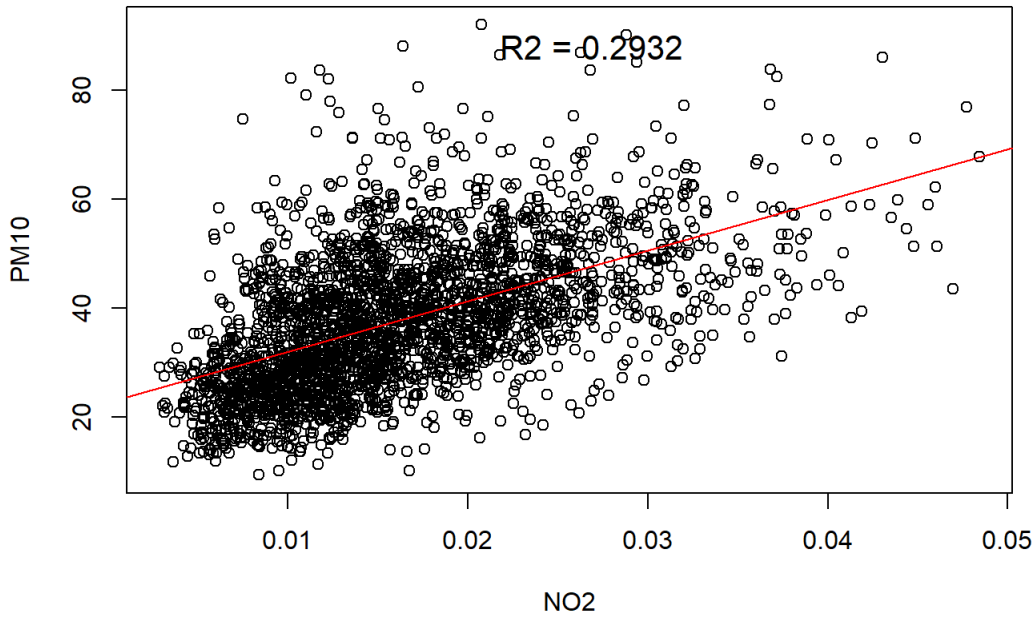
```
plot(PM10 ~ SO2, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(PM10 ~ NO2, analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = PM10 ~ NO2, data = analysis_total_week)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -28.098  -7.485  -1.397   6.612  50.204
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  22.7199     0.5018   45.28   <2e-16 ***
## NO2         929.1042    27.9148   33.28   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 10.83 on 2667 degrees of freedom
## Multiple R-squared:  0.2935, Adjusted R-squared:  0.2932
## F-statistic:  1108 on 1 and 2667 DF,  p-value: < 2.2e-16
```

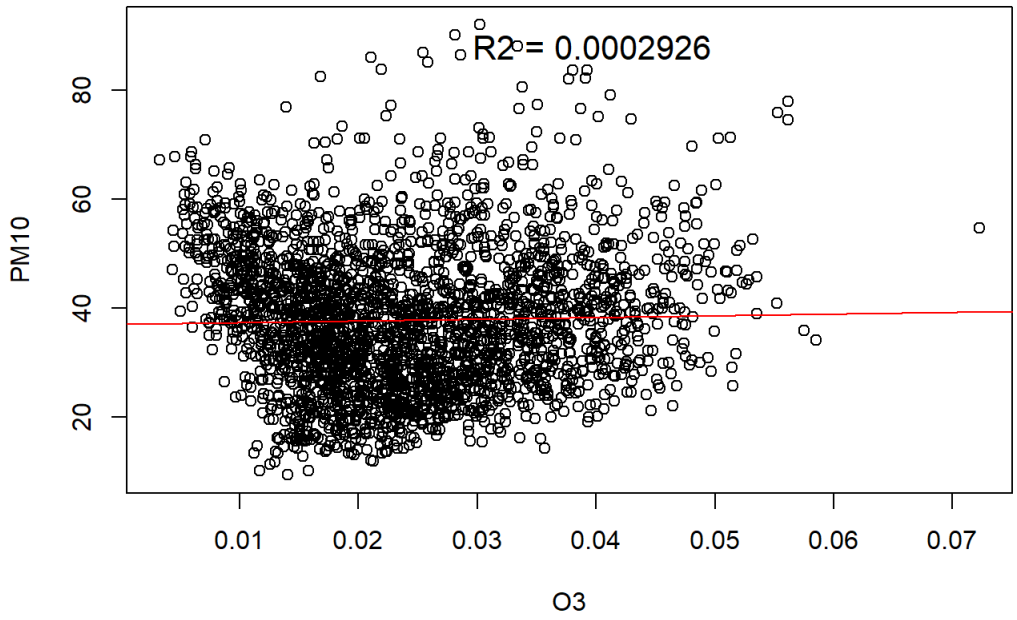
```
plot(PM10 ~ NO2, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(PM10 ~ O3,analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = PM10 ~ O3, data = analysis_total_week)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -28.146  -9.779  -0.696   8.039  53.981
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  37.1153     0.6352  58.433   <2e-16 ***
## O3           32.0494    24.0166   1.334    0.182
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.88 on 2667 degrees of freedom
## Multiple R-squared:  0.0006673,  Adjusted R-squared:  0.0002926
## F-statistic: 1.781 on 1 and 2667 DF,  p-value: 0.1822
```

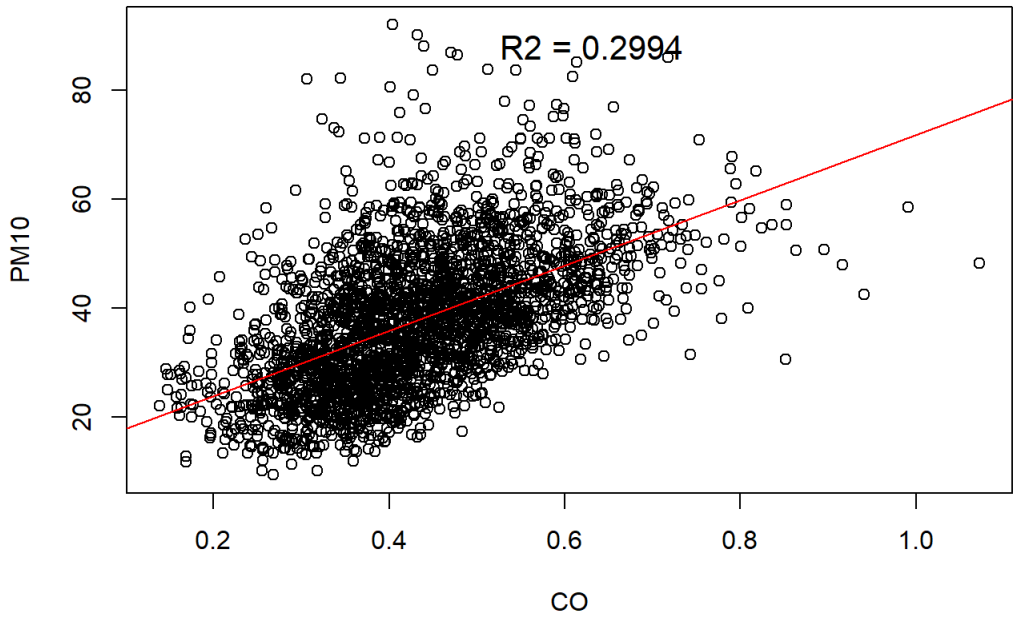
```
plot(PM10 ~ O3,analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```




```
fit <- lm(PM10 ~ CO,analysis_total_week)
summary(fit)
```

```
##
## Call:
## lm(formula = PM10 ~ CO, data = analysis_total_week)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -32.286  -7.510  -1.265   6.119  55.910
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  11.9746     0.7952   15.06   <2e-16 ***
## CO           59.8840     1.7729   33.78   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 10.78 on 2667 degrees of freedom
## Multiple R-squared:  0.2996, Adjusted R-squared:  0.2994
## F-statistic:  1141 on 1 and 2667 DF,  p-value: < 2.2e-16
```

```
plot(PM10 ~ CO, analysis_total_week)
abline(fit, col = 'red')
legend("top", bty="n", cex = 1.3,
       legend=paste("R2 =",
                    format(summary(fit)$adj.r.squared, digits=4)))
```


R2 = 0.2994
PM10
20
40
60
80
0.2
0.4
0.6
0.8
1.0
CO