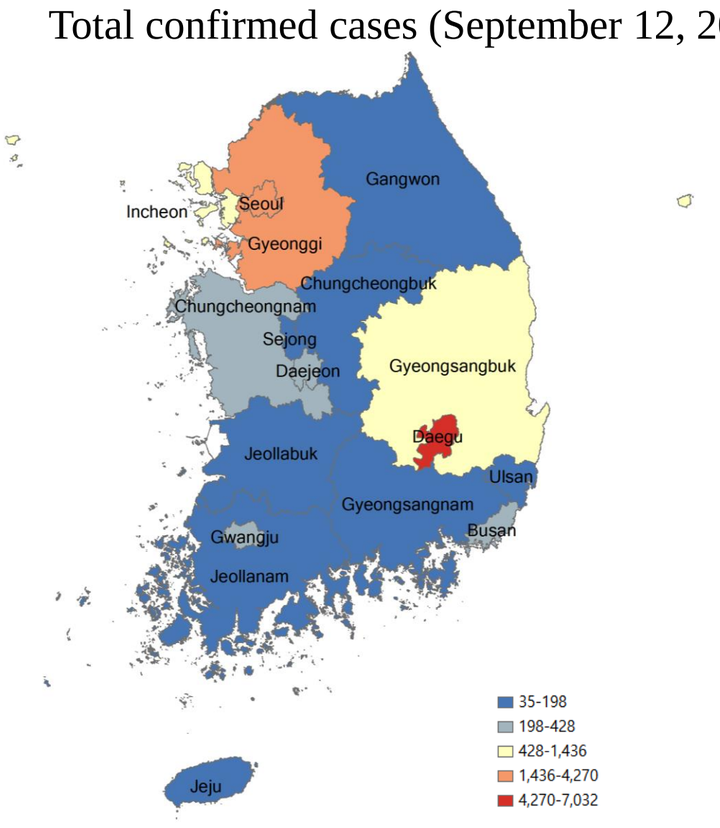
AMBIENT AIR POLLUTION, METEOROLOGY, AND COVID-19 INFECTION IN KOREA

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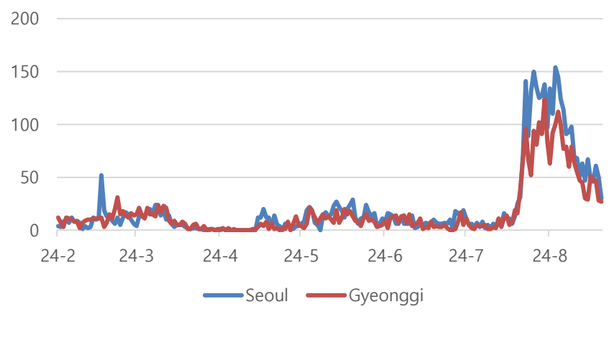
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BACKGROUND

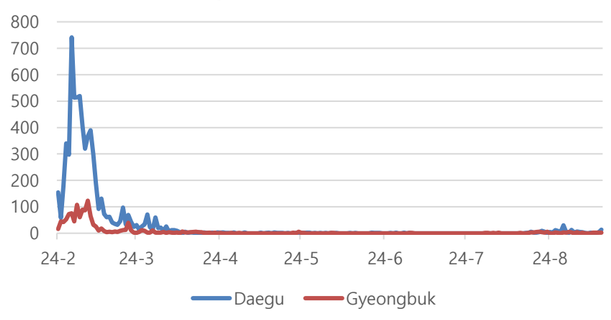
Total confirmed cases (September 12, 2020)



Daily confirmed cases



Daily confirmed cases



METHODS

❖ COVID-19 cases & Pollutant level

Generalized Additive Model

$$\ln(y_t) = \beta_0 + \beta_1 * X_t + \sum_{k=1} \beta'_k * f(C_k) + \varepsilon_t, \varepsilon_t \sim N(0, \sigma^2)$$

y_t indicates the total confirmed new cases

X_t indicates the mean level of the pollutant on day t

$f(C_k)$ represents the smooth function for meteorological factors including temperature, wind speed, humidity, and air pressure, and the linear function for the location and date

➔ Odds ratio (95% confidence interval) for the effect of measurement for the whole country

RESULTS

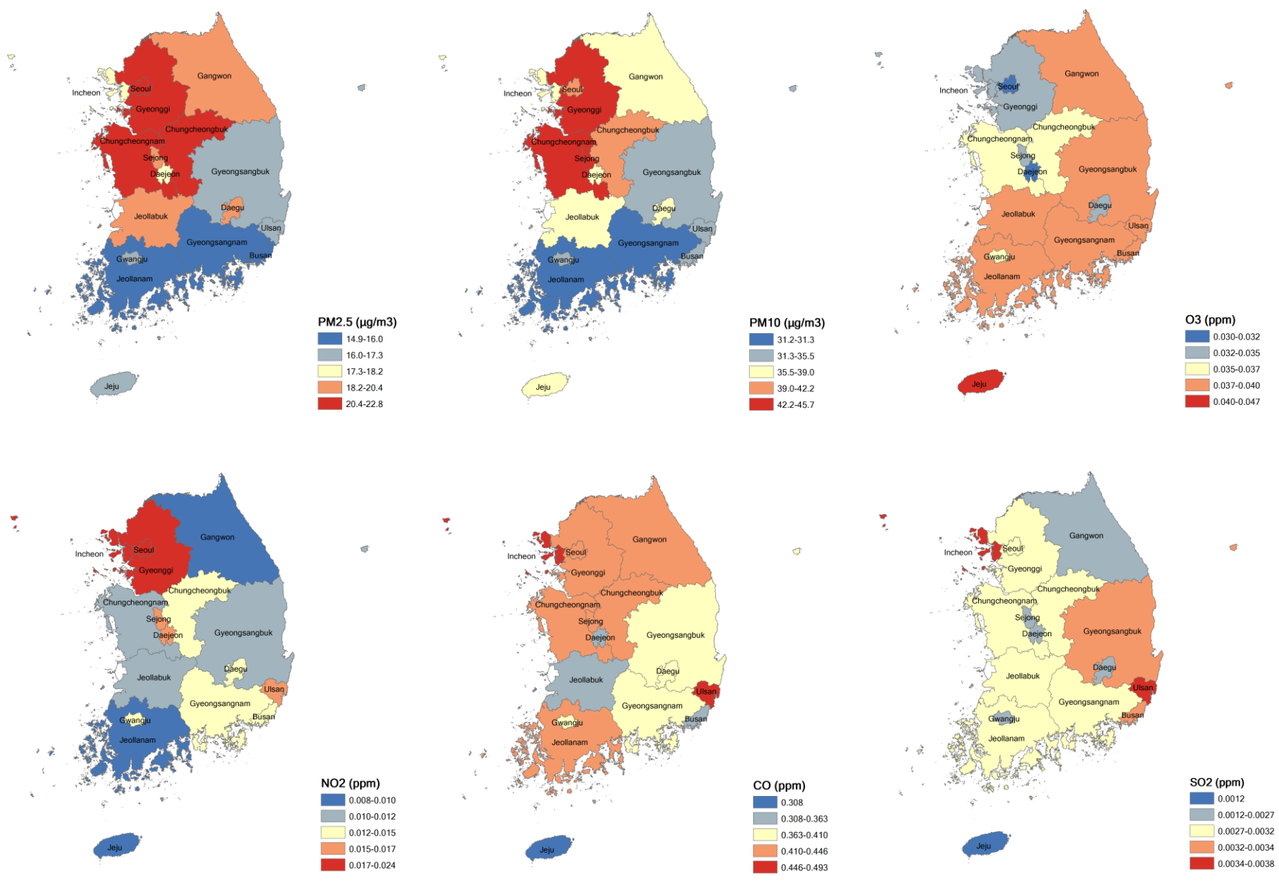


Figure 1. Regional distribution of air pollutants in Korea

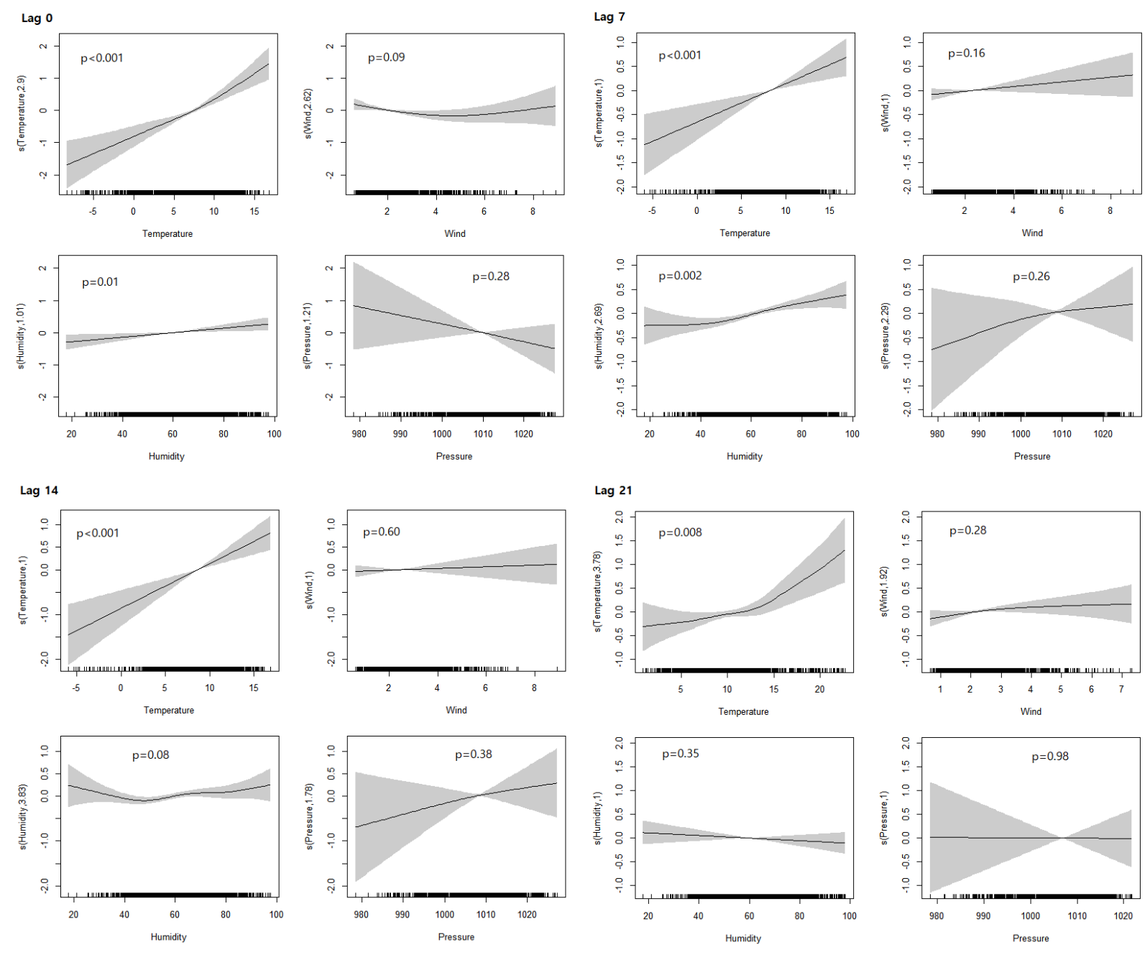


Figure 2. Effects of temperature, wind speed, humidity, and air pressure on COVID-19 confirmed cases in Korea

The x axis represents the mean level of each meteorological variable (0-day, 7-day, 14-day, and 21-day moving). The y axis represents the smoother to the fitted values. P-value indicates the significant level of the smooth terms.

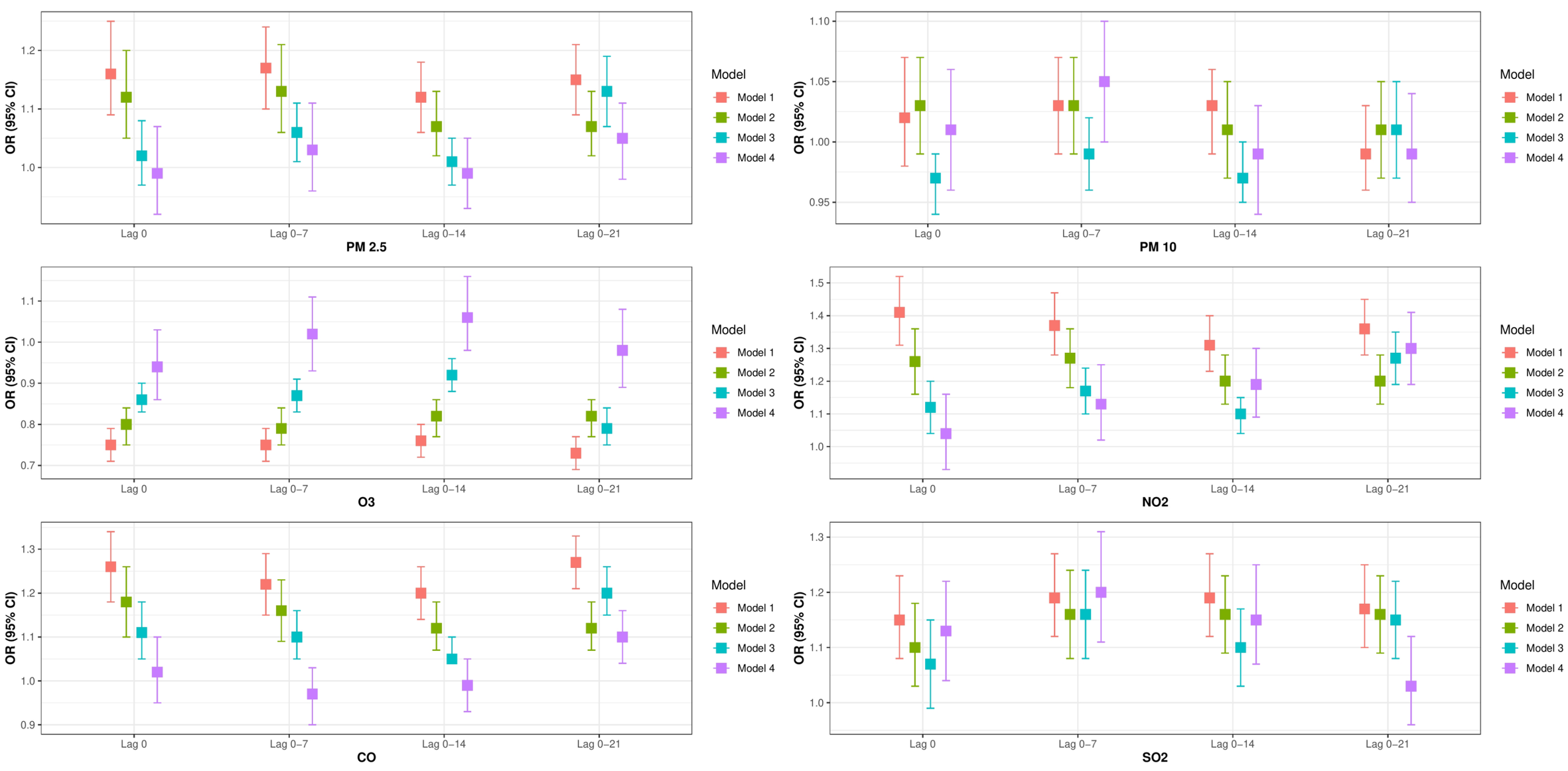


Figure 3. Temporal relationship between ambient air pollution and COVID-19 confirmed cases in Korea

Model 1: univariate; Model 2: model 1 + adjusted for location;

Model 3: model 2 + smooth function of temperature, wind speed, humidity, and air pressure; Model 4: model 3 + adjusted for date

ACKNOWLEDGEMENT

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CONCLUSION

There were significantly temporal associations between temperature, NO2, CO, and SO2 concentrations and daily COVID-19 confirmed cases in Korea.