Fine dust air pollution and respiratory health issue in South Korea

Meen Wook Jung

In South Korea, air pollution has been recently recognized as a severe issue in the environmental and social field. According to Greenpeace's analysis of the 2019 World Air Quality Report, the annual average fine particulate (PM 2.5) concentrations in South Korea was the highest level among OECD member countries (AirVisual, 2020). Furthermore, Greenpeace indicated that the concentration level in South Korea has been continuously increasing. The increasing pollutants have been being combined with air stagnation caused by Urban Heat Island phenomenon, resulting in a serious public health issue. According to Shin (2007), micron particle-sized fine dust can be associated with stroke and respiratory disease by accumulating in the brain and lungs.

Despite such health concerns, there is not enough data on how the micron-sized fine dust particles had affected respiratory disease-related mortality. To address this issue, it is required to accumulate the long-term data associated with fine dust concentrations and respiratory disease for regression analysis. Therefore, analyzing the correlation between the fine dust level and respiratory disease mortality is the very starting point. This project aims to visualize not only fine dust and mortality data but also the result of the correlation analysis as interactive maps. To achieve this purpose, several web mapping technologies will be applied as follows:

- *GitHub*: a repository of mapping data and HTML code

- *Leaflet*: a Javascript library for making interactive maps

- *Leaflet Plugin*: plugins for displaying various data formats in a leaflet map

- *GeoJSON*: an open standard data format for geographic features

- *GIS Softwares*:

  - **ArcGIS** for computing correlation between the two variables

  - **QGIS** for converting .shp format to .geojson format

With the aid of the technologies above, I will create interactive maps with the level of fine dust pollution data and the record of respiratory disease mortality in Korea from 2014 to 2018. Moreover, I will

add the variation of the correlation in the interactive maps.

- ***The status of fine dust air pollution***

  https://sgis.kostat.go.kr/view/thematicMap/thematicMapMain?stat_thema_map_id=9pyrpJvwHw20160121115806991GvpLyuuwDt&theme=CTGR_005&mapType=05&CTGRS=CTGR_001:recommend,CTGR_002:recommend,CTGR_003:recommend,CTGR_004:recommend,CTGR_005:recommend

- ***The record of respiratory disease mortality***

  http://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1B34E13&conn_path=I2

My anticipated challenge is to find a method to effectively express time series data in one map. Because of the characteristic of time series data, lots of layers should be shown on the one interactive map. Therefore, my expectation is that expressing the time-series data in pop-up displays can be one method.

Reference

AirVisual. (2020). 2019 World Air Quality Report. IQAir AirVisual.

Shin, D. C. (2007). Health effects of ambient particulate matter. *Journal of the Korean Medical Association*, *50*(2), 175-182.