

# Effect of Taebaek Mountains on the Spatial Distribution of PM<sub>10</sub> and PM<sub>2.5</sub> in Gangwon Province

Jae-Heon Lee<sup>1</sup>, Song-Lak Kang<sup>2</sup> (corresponding author, [slkang@gwnu.ac.kr](mailto:slkang@gwnu.ac.kr))

<sup>1,2</sup>Dept. of Atmospheric & Environmental Sci, Gangneung-Wonju National University

## Introduction

West side (YS) on Taebaek Mountains region in Gangwon province, South Korea refers to vulnerable, while east side (YD) is relatively free from air pollution due to the blocking of the Taebaek Mountains.

We examined the variation in concentrations of transported PM<sub>10</sub> and PM<sub>2.5</sub> over the Taebaek Mountains.

## Data

### Analysis period

- 2015 to 2021 (7-year)

### Variables

- 1 min wind direction and speed
- 1 hour PM<sub>10</sub> and PM<sub>2.5</sub>
- \* The collected data underwent a 3-hour averaging process.

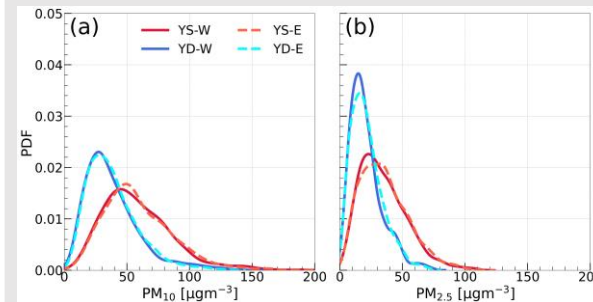
### Wind direction range

- Taebaek Mountains range  
- EEW(337.5 deg) ~ SSE(157.5 deg)
- West-blowing wind condition  
- Wind blows west side to east side
- East-blowing wind condition  
- Wind blows east side to west side

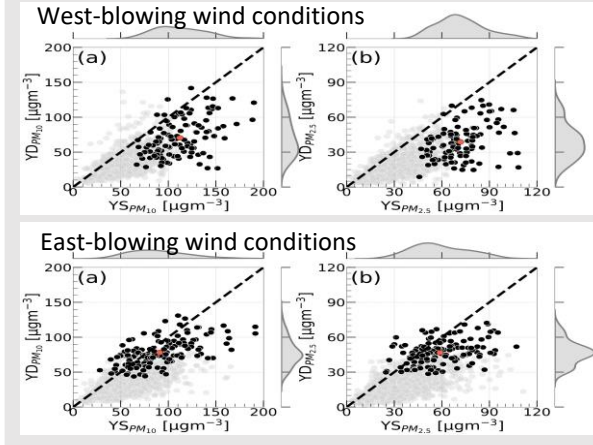
## Results

### 1) Concentration distribution with different 3-hr mean wind direction

Regional differences in 3-hr mean concentrations between east side (YD; blue) and west side (YS; red) were observed, unaffected by 3-hr mean wind direction (West & East).

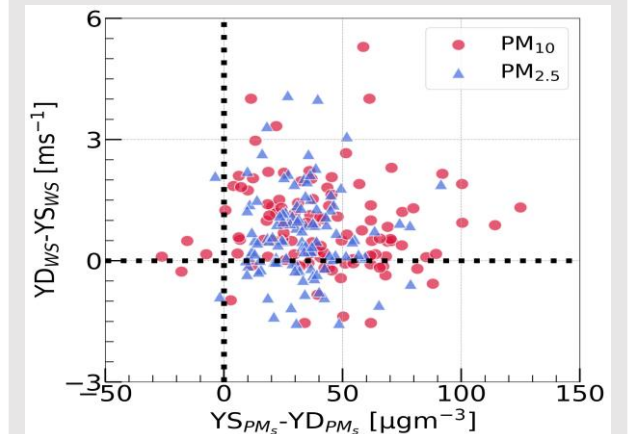


### 2) Correlation between concentrations of both YD and YS with high-level concentration (>90%)



For west-blowing wind conditions, the high-level concentration samples are distributed towards YS. For east-blowing wind conditions, the samples are relatively uniformly distributed.

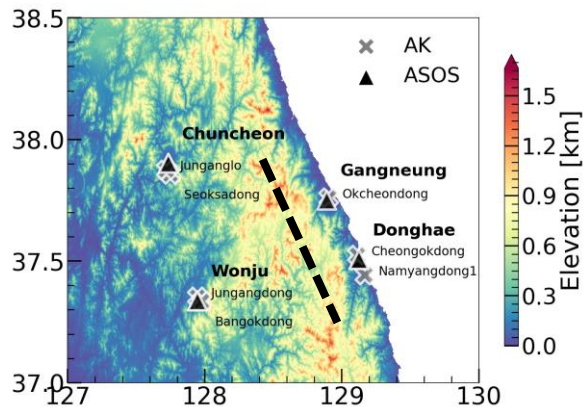
### 3) Correlation between difference in concentration and wind speed for west-blowing wind condition



PM10, including large particles, showed a greater difference compared to PM2.5. When pollutants from west side move over the Taebaek Mountains to east side, the wind speed increased.

## Conclusions

- Both PM10 and PM2.5 exhibit lower concentration levels on the east side (YD) compared to the west side (YS), especially notable in high-level concentrations.
- PM10 is mitigated relatively more than PM2.5 when crossing the Taebaek Mountains.



ASOS : Automated Synoptic Observation System  
AK : Air Korea  
CAPSS : Clean Air Policy Support System