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Weather and Climate conditions over the Arctic and mid-latitude regions affecting air quality

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Recently, it has been noticed that weather and climate changes over the Arctic and mid-latitude regions may have influenced the particulate matter concentrations and haze over East Asia. Among the various weather and climate conditions and climate indices could be an important factor in affecting variation of particulate matter (PM) concentrations. In this study, we examined the long-term changes in the sea ice cover, soil moisture, near-surface temperature and its link with the lower atmospheric circulation over Arctic and mid-latitude from 1950 to 2022, using modern reanalysis datasets. Long-term analyses show negative trends in sea ice cover over the Arctic and positive trends in near-surface temperature and SST, implying atmospheric stagnant and variation of PM concentration. Additionally, climate indices, related to teleconnection between the Arctic region and mid-latitude, co-related with understanding air quality. Based on climate indices, we have developed the air quality prediction model for reflecting variations in weather and climate conditions. Therefore, the findings in this study can likely be used for actual prediction systems based on long-term weather measurement datasets over the Arctic region.

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