Gwangju Institute of Science and Technology
Official Press Release (https://www.gist.ac.kr/)

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Release Date	2020.11.11	

Professor Jin-Ho Yoon's research team suggests the possibility of air quality deterioration on the Korean Peninsula due to weather patterns

☐ GIST (Gwangju Institute of Science and Technology, President Kiseon Kim) School of Earth Sciences and Environmental Engineering Professor Jin-Ho Yoon's research team investigated the relationship between weather patterns and high-concentration ozone cases through data analysis over 50 years.

◦ Among the various synoptic weather* patterns affecting the Korean Peninsula, the increased frequency of dry tropical (DT) air mass, which has high ozone generation efficiency, suggests that more frequent occurrences of high concentrations of ozone could worsen the air quality of the Korean Peninsula.

* synoptic weather: refers to weather conditions (barometric pressure, low pressure, power lines, typhoons, etc.) having a scale of 1,000 km or more and is an important meteorological factor to forecast the weather

☐ Despite policies to improve air quality, surface ozone concentrations in the summer tend to increase steadily, and scientific debate is underway because the exact cause is still unknown. In many previous studies, changes in emissions or effects on long-distance transport have been revealed, but the clear cause is still unclear, and changes in weather patterns have been pointed out as the main cause.

◦ The research team used Spatial Synoptic Classification (SSC) data and various observational data for more than 50 years since 1965 and confirmed that high

concentrations of ozone cases are closely related to dry tropical air masses represented by increased ground temperatures and decreased relative humidity.

□ Professor Jin-Ho Yoon said, "Through the analysis of past data, we confirmed that the occurrence frequency of dry tropical air masses is increasing, and the occurrence of high-concentration ozone is also increasing. This suggests that ozone generation frequency, which is considered to be the main cause of deterioration in summer air quality, is increasing due to global warming."

□ The research was led by GIST School of Earth Sciences and Environmental Engineering Professor Jin-Ho Yoon and conducted by Ph.D. student Dasom Lee in conjunction with the National Fine Dust Information Center, the United States National Oceanic and Atmospheric Administration (NOAA), the University of Maryland, the Georgia Environmental Protection Division, and Ajou University with support from the National Air Emission Inventory and Research Center (NAIR) and the International Research & Development Program of the National Research Foundation of Korea (NRF) and was published online on October 12, 2020, in the *Atmosperic Environment*, an renowned international journal of atmospheric science, and will be published in print on January 1, 2021.