

EGU21-3606

<https://doi.org/10.5194/egusphere-egu21-3606>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Innovative utilization of internet search volume data to understand public awareness and perception of air quality

Young-Hee Ryu and Seung-Ki Min

POSTECH, Pohang, Korea, Republic of (yhryu02@postech.ac.kr)

Severe air pollution is hazardous to human health and long-term exposure to air pollution degrades not only human health but also the quality of life. In the recent years, public concern and awareness of air quality have been greatly raised in South Korea, and this is somewhat contradictory to the level of particulate matter with diameters less than 10 μm (PM10). The observed PM10 levels cannot explain the elevated levels of public concern specifically after 2013–2014 because the average PM10 was much higher in the past (prior to 2013) and shows a decreasing tendency during the recent decades over South Korea. This study utilizes big data from internet search engines (internet search volume data from Google and NAVER) to understand how people perceive air quality differently from the level of observed PM10 and what influences public perception of air quality. An index, air quality perception index (AQPI), is newly proposed in this study and it is assumed that the internet search volume data with a keyword of “air quality” are representative of this index. An empirical model that simulates AQPI is developed by employing the decay theory of forgetting and is trained by PM10, visibility, and internet search volume data. The results show that the memory decay exponent and the accumulation of past memory traces, which represent the weighted sum of past perceived air quality, play key roles in explaining the public's perception of air quality. A severe haze event with an extremely long duration that occurred in the year 2013–2014 is found to trigger the increase in public awareness of air quality, acting as a turning point. Before the turning point, AQPI is more influenced by sensory information (visibility) due to the low awareness level, but after the turning point it is more influenced by PM10 and people slowly forget about air quality. The retrospective AQPI analysis assuming a low level of awareness confirms that perceived air quality is indeed worst in the year 2013–2014. In other words, the high level of awareness after experiencing the record-long severe haze event in 2013–2014 makes people remember longer and more sensitive to the level of pollutants, thus explaining the increased public concerns in the recent years. Our results suggest the promising potential of social data for a better understanding of public perception and awareness of other natural and/or man-made hazards.