

# How do tropical cyclones affect the air quality of Hong Kong?

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Aside from emission sources, prevailing meteorological conditions constitute another important factor affecting air quality. Tropical cyclones, one of the major atmospheric activities in summer and autumn, have an important influence on air quality. Dr. Eric C. H. CHOW, Dr. Richard C. Y. LI and Associate Professor Wen ZHOU, from the City University of Hong Kong, used 16 years of global meteorological data, local pollutant concentrations and tropical cyclone data to study their relationship. They found that the pollution level in Hong Kong is mainly determined by the locations of tropical cyclones. However, the impact of tropical cyclones on PM10 (relatively coarse particulate matter) and ozone is different.

They further examined the impact on pollution levels under the presence of [tropical cyclones](#) east of Hong Kong near Taiwan, southeast of Hong Kong, and south or west of Hong Kong. Dr. CHOW explained their findings: "Northerly wind is dominant when TCs [tropical cyclones] are located east of Hong Kong near Taiwan, with the concentration of PM10 generally reaching serious levels of pollution. When TCs are located southeast of Hong Kong, the concentration is generally high, associated with northeasterly coastal wind. And when TCs are south or west of Hong Kong, the wind direction is generally easterly and the [air quality](#) generally good."

Dr. LI further explained that tropical cyclones are one of the strongest forms of atmospheric convective activity. Their landfall and associated rainfall favor the dispersion of pollutants, whereas the descending

motion in their outer periphery favors the accumulation of pollutants. Actually, the impact of tropical cyclones on PM10 and ozone is different, related to differences in emission sources and their transportation pathways.

"When a TC is located southwest of Taiwan, the descending motion moves to the north of Hong Kong, as compared to the presence of a TC over Taiwan, reducing the deposition of ozone and its precursors from remote coastal regions," explains Associate Professor ZHOU.

**More information:** Eric C. H. Chow et al, Influence of Tropical Cyclones on Hong Kong Air Quality, *Advances in Atmospheric Sciences* (2018). [DOI: 10.1007/s00376-018-7225-4](https://doi.org/10.1007/s00376-018-7225-4)

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