Notice of the Final Oral Examination
for the Degree of Master of Science

of

TUONAN LI

BSc (University of Victoria, 2017)

“Effects of Tropical Cyclone on Air Pollution in Hong Kong”

Department of Geography

Monday, April 20, 2020
10:00 A.M.
Conducted Remotely

Supervisory Committee:
Dr. David Atkinson, Department of Geography, University of Victoria (Supervisor)
Dr. Christopher Bone, Department of Geography, UVic (Member)

External Examiner:
Dr. Ismail Gultepe, Meteorological Research Division, Environment and Climate Change Canada

Chair of Oral Examination:
Dr. Hélène Cazes, Department of French, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

Climate and weather play a significant role in patterns of air pollution occurrence and severity. An analysis of the effect of weather on pollution parameters in Hong Kong was performed. Hong Kong is one of the world’s most densely populated regions and air pollution can be problematic, which is a serious public health concern. Hong Kong is impacted by Tropical Cyclones which strongly affect weather patterns. In this research, a twelve-year record (2007-2018) of tropical cyclone (TC) and pollutant concentrations (carbon monoxide, ground-level ozone, nitrogen dioxide, sulfur dioxide, and particulate matter) were analyzed to investigate the effects of TC on air quality. It is found that the occurrences of TC are strongly related to days with elevated particulate matter, sulfur dioxide and carbon monoxide concentrations (above 90th percentile), and low concentrations (below the 10th percentile) for nitrogen dioxide. In particular, the spatial location of TC with respect to Hong Kong is found to be clearly associated with high or low pollutant concentrations. When the TC is located to the North/Northeast of Hong Kong, the air quality tends to be poor because polluted air from mainland China is advected over the city. Conversely, TC located to the West resulted in good air quality by ventilating the city with relatively clean air from the ocean.