

Diurnal cycle of the wind direction and its seasonality at Manila for the late 19th century

*Ikumi Akasaka¹, Masumi Zaiki², Jun Matsumoto³

1. Senshu Univ., 2. Seikei Univ., 3. Tokyo Metropolitan Univ./JAMSTEC

In most of the Southeast Asian countries, it is difficult to study the climate and its variability before the middle of the 20th century due to lack of the older meteorological data. In the Philippines, the meteorological observations were conducted by Spanish Jesuits for the late 19th century followed by U.S. administration for the early 20th century. These data have been archived in different places (e.g. UK, Spain and Japan). To investigate the longer-term variability in the climate of the Philippines, we have collected and digitized the older meteorological observation records since the late 19th century under the data rescue projects in Japan. Of these data, in particular, meteorological data for the late 19th century have rarely been utilized. Therefore, we aim to reveal diurnal cycle of the wind direction and its seasonality at Manila for the late 19th century using newly digitized dataset from the databook “Observatorio Meteorologico de Manila”. Additionally, it is necessary to analyze the characteristics on the climate of Manila for the late 19th century for checking quality of the historical meteorological data.

We mainly used the three-hourly wind direction and force, excluding 3 a.m. and 12 p.m. at local time, which were observed at Manila Observatory from January of 1868 to June of 1883. To clarify the characteristics on diurnal cycle and its seasonality, we calculated three-hourly wind direction frequency for May–October, November–January and February–April. When the wind force was zero, we counted as calm in the wind direction frequency.

As a result, calm and westerly wind were most frequently observed from 9 p.m. to 6 a.m. and at 12 a.m., respectively, throughout the year. Westerly wind during daytime hours corresponds to the sea breeze around the Manila Bay. For May–October, the sea breeze and the southwest monsoon were most frequently observed around noon and the early-evening, respectively. For November–April, easterly and southeasterly winds, which correspond to the trade wind and the land breeze, prevailed from 3 p.m. to 9 p.m. For February–April, the winds from west-south quadrant were scarcely observed. We will compare these characteristics on the diurnal cycle of the wind direction and seasonality to those for the late 20th century.

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