

Statistical features of gust events near the Hira mountains seen in the AMeDAS data

*Sho Okuno¹, Masato Noda¹, Miyu Watanabe¹, NAGATA HARUKA¹, Kawami Mayu¹, Kazunori Ogohara¹

1. Kyoto Sangyo University

The Hira mountains are located on the western shore of the Lake Biwa in Shiga Prefecture. The "Hira Oroshi," a local wind blowing at the southeastern slope of the Hira Mountains, is a northwesterly strong wind. It blows 30 m/s or higher. It goes down the steep southeastern slope of the Hira Mountains from the Tamba Highlands toward Lake Biwa. This localized strong wind has a great impact on the JR Kosei Line running along the foot of the mountains, the operation of ships on the lake, and the cultivation of agricultural crops. In particular, the JR Kosei Line, which is entirely elevated, is strongly affected by the Hira Oroshi, causing frequent delays due to suspended or slowed train operations. To prevent such damage, it is essential to understand when or what kind of meteorological situation 'Hiraoroshi' occurs. However, there have been few studies on local winds in the area. Kodama (1973) described the "lake-breeze" circulation and slope winds around the Lake Biwa, but did not deal with gusty winds near the Hira mountains. Matsui (2021) and Matsui and Takeda (2001) reported in detail the characteristics of local winds using data from many anemometers installed in Shiga Prefecture. Minami (2022) also reported seasonal changes in the frequency of the Hira Oroshi. However, in any case, consistent results have not been obtained due to the different definitions of Hira Oroshi. Furthermore, if gusts are defined using only gust factor, there is a problem that events with extremely large gust factors become weak wind events with extremely small mean wind speeds.

Therefore, we defined a gust event in several ways according to gust factor and maximum instantaneous wind speed and examined the statistical characteristics of gusty winds in the Hira mountain in this study. We used 146 months of data from Minami-Komatsu AMeDAS for the period 2008 –2020. For example, we counted the days when maximum instantaneous wind speed was 15 m/s or higher and gust factor was 3 or higher. The number of gusty wind cases was 12. We also classified the weather maps at the time of gust occurrences into four patterns. The results showed that the Hira Oroshi occurred more frequently in winter although previous studies showed that the frequency of occurrence was greatest in the spring season. Most of the gust events during summer and autumn were associated with typhoons. When gusts were defined as having a maximum instantaneous wind speed of 20 m/s or higher and a gust factor of 2 or higher, there were 21 cases of gust events during the same period. When only gust factor was used as the threshold, gusts were particularly frequent in spring, while when only maximum instantaneous wind speed was used as the threshold, gusts were more frequent in winter.

Keywords: AMeDAS, gust, local wind