

# Chapter 1-9

## The Climate of Lake Biwa

### Abstract

Air currents from the ocean near the Lake Biwa area carry large amounts of precipitation. Lake Biwa not only serves as a water resource, but also fulfills the role of mitigation of the climate in the area. The Hira Mountains produce strong local winds known as “Hira Oroshi (Hira fall winds)” that affect the west shores of the lake.

**Keywords:** Annual precipitation in Shiga Prefecture, Climatic mitigation by the lake, Hira Oroshi

### 1. Air Currents in the Lake Biwa Area

Although located in an inland basin, Lake Biwa is exposed to the influx of northwesterly air currents from Wakasa Bay, southwesterly air currents from Osaka Bay and southeasterly air currents from Ise Bay as shown in Fig. 1-9-1. This means that the Lake Biwa area lies at the intersection of air currents from three directions. Wakasa Bay connects to the Sea of Japan side, while Osaka and Ise Bays to the Pacific Ocean side, and moist air currents that blow in from these bays over the sea carry abundant amounts of precipitation to the Lake Biwa area.

### 2. Amount of Precipitation on the Lake Area

Fig. 1-9-2 shows the annual amount of precipitation in Shiga Prefecture including the catchment area. Although precipitation in the south of the prefecture is no more than approximately 1500 mm, precipitation in the north reaches as much as 2000 – 2500 mm. The main reason for the high level of precipitation in the north of the prefecture is the large amount of snow and rainfall caused by seasonal winds that blow from Asian Continent in winter.

### 3. The Climatic Mitigating Effect of the Lake

Not only is Lake Biwa a valuable water resource, but it also fulfills the function of climatic mitigation of its environs. Fig.

1-9-3 shows the range of mean monthly maximum and minimum temperatures. A comparison of Hikone on its shores and Higashiomi located inland far from the lake, shows that the range of mean monthly temperatures is greater in the latter area. The difference in daytime and nighttime temperatures is small in the former area, but large in the latter. Compared to Higashiomi, the drops in temperatures during the night in Hikone are mitigated while increases in temperatures during the daytime are suppressed. This is due to differences in the specific heat of the surfaces of the lake and land. Thus, the lake affects the climate in the Lake Biwa area.

### 4. Powerful Local Winds in the Area on the West Side of the Lake

As well as land and lake breezes that occur in the environs of Lake Biwa, powerful local winds known as “Hira Oroshi,” or Hira fall winds, also occur on the west side of the lake as shown in Fig. 1-9-4. The Hira mountain range extends more or less from the north to the south of the area in the west of the lake and reaches a height of approximately 1000 m from the lake surface. Powerful winds that suddenly blow down from this mountain range present a danger to trains traveling along the west side or boats on the lake, sometimes causing damage. As shown in Fig. 1-9-5, this phenomenon is most common in the spring and autumn, and, on occasions

when a marked cold front or developed low pressure system passes over western Japan, a predominant high pressure system from the continent extends toward

the Sea of Japan side, bringing strong local winds to the area.

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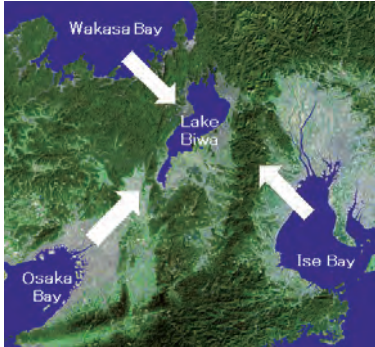


Fig. 1-9-1 Influx of wind currents

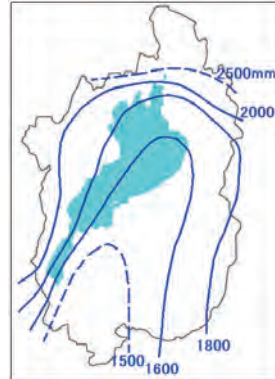


Fig. 1-9-2 Annual precipitation in Shiga Prefecture

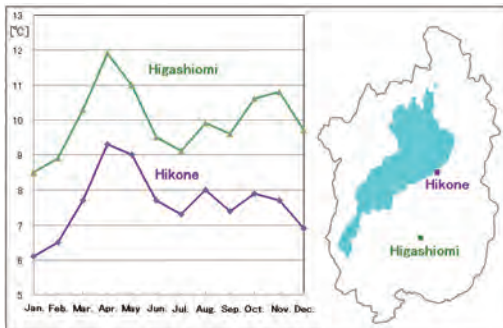


Fig. 1-9-3 Monthly mean temperature range (Maximum and minimum temperatures)



Fig. 1-9-4 Example of Hira fall wind (Sept.16, 2013)

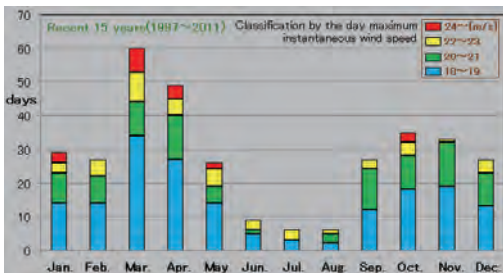


Fig. 1-9-5 Number of days in a month when Hira fall winds occur at Kita-Komatsu, Otsu

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