

## High resolution numerical study of migrating strong downslope wind "Hira-Oroshi" in Japan

HIGASHI, Kuniaki<sup>1\*</sup> ; FURUMOTO, Jun-ichi<sup>1</sup> ; HASHIGUCHI, Hiroyuki<sup>1</sup>

<sup>1</sup>Research Institute for Sustainable Humanosphere Kyoto University

This paper studied the generation mechanism of a unique downslope wind in the west coast of Lake Biwa, Shiga, Japan. This strong downslope wind, feared as "Hira-Oroshi" for millennial years shows the narrow gust of a few kilometers in the various location within 10 km width area. This feature cannot be explained by the conventional mechanism of previous studies: the location of downslope wind is strongly restricted by the location of valley in mountain range. Due to such distinct characteristic, the numerical prediction of this gust wind is too inaccurate to use operationally.

Considering strong demands to the prediction of this gust wind, this study aims to elucidate the mechanism via very fine numerical forecast model with the horizontal resolution of 50 m. The results successfully represented the narrow gust wind structure in the edge of the mountain range. The spots of gust wind due to complicated topographical structure is also seen in the simulation results, although the gust wind speed changes with the larger scale wind direction and speed. Because the stagnant region due to the breaking of the mountain wave is widely extended in the leeward of the mountain range in the free atmosphere (~1 km), the location of the gust wind looks to be determined by the detailed topographic structure of the mountain range and the a kilometer-scale eddies over the Lake Biwa.

The simulation results suggested these synergy effects determined the gust generation and its location. The unveiled behavior of the gust wind is also beneficial to the improvement of the gust prediction.

Keywords: High resolution numerical simulation, Downslope wind, Local wind