



Quasi x-z cross section analysis of the flow over the mountain by simultaneous multiple radiosonde observation in a narrow area

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Simultaneous multiple radiosonde observation is a useful method to understand the flow structure over the mountain. Because a number of radiosondes are simultaneously launched at multipoint observatories among windward to leeward side, many vertical profiles can be observed in the flow over the mountain. There are some advantages in this method: horizontal and vertical atmospheric fields can be observed directly, and the cost of field experiment becomes lower than airborne observation. Furthermore when we use all multipoint radiosonde data, we can draw a vertical cross section between upwind and downwind along radiosonde trajectories. We defined this vertical cross section as “Quasi x-z cross section”. Quasi x-z cross section is able to show the flow structure in detail.

We executed field experiment in order to understand local lee wind referred to as “Suzuka-oroshi”. Suzuka-oroshi is the strong wind generated by the Suzuka mountain range frequently occurs in central parts of Japan in winter season. We simultaneously launched six balloons with GPS radiosonde at four observatories along the prevailing wind from the windward to leeward through the Suzuka-mountain range. The horizontal distance between the windward and leeward observatories was about 35 km.

In addition we manipulated the amount of helium gases to control the balloon buoyancies. Balloon trajectories which have different buoyancy do not become same as each other because balloon has small buoyancy rise more sideling than large buoyancy balloon by wind. As a result, atmospheric field in quasi x-z cross section can be drawn more detail.