

An Investigation of Winter Rainfall and Snowfall in the Mountain and Coast

HYO CHOI^{1,2}

¹*Dept. of Atmospheric Environmental Sciences, Kangnung National University*

²*State Key Joint Lab. of Environ. Simul. & Poll. Control, College of Environmental Sciences, Peking University*

Driving mechanisms of rainfall and snowfall in the mountain and coast in the winter season were explained by theoretical and numerical methods [1]. In order to generation of the rain and snowfalls in the study, which has different topographical characteristics of mountain in the west of Kangnung city (center) with the East Sea (east) of Korea was investigated from 0900LST, January 13 through 15, 2003, using MM5 model. Before the rainfall event in the Kangnung city, a synoptic scale pressure pattern of high pressure of 1038mb in the central and extended to the northeastern part of China (Manchuria) and low pressure in the south-eastern part of Korea extended to the central part of Japan generated northerly wind and northeasterly wind, which did not drive sufficient moisture from the continent of northern China into the Korean peninsula. At the state of rainfall and snowfall, the high pressure became intensified into 1057mb in the central China and 1040mb in the Manchuria. The wind direction was still in the same, but the pressure gradient became stronger, which could induce a lot of moisture from the East Sea surface by strong surface wind. The moisture induced by strong low-pressure system in the Japan Sea obtained further some more amounts of moisture induced by easterly seabreeze into the coastal basin, retaining more and more amounts of moisture contents in the air parcels. These moisturized air parcels went up to the top of the mountain in the west and saturated the parcels, enhancing the condensation of air and resulting in the formation of a great cloud. The lifted moisture toward the mountain top was cooled down along the eastern slope of the mountain, especially near the mid of the mountain, showing the minimum sensible heat flux in the surface boundary layer and minimum air temperature, while the large magnitude of 160W/m² was on the coastal sea surface, resulting in warming up air parcels from relatively warm sea water masses and forming few degree higher air temperature. Relative humidity in the coastal mountain side of cooling air was 100% under the air temperature below 0°C and this condition induced the formation of snowfall.

Key words: Rainfall, Snowfall; Cloud mixing ratio; Sensible heat flux

References

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