

OROGRAPHIC PRECIPITATION OBSERVATION IN JEJU ISLAND, KOREA (2012-2013)

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In summer monsoon season, a Korean Peninsula is influenced by several weather phenomena such as the Changma-front, typhoon, strong low pressure, and local heavy precipitation. Especially, the orography plays an important role in controlling the cloud formation, amount and precipitation distribution. To find out the precipitation development mechanism by orographic effect, we performed the intensive field observation around Mt. Halla in Jeju island (33.21 N and 126.32 E, width 78 km and length 35 km) which is located at the southern part of Korea with JNU (Jeju National University), KNU (Kyungpook National University), IJU (Inje University), KMA (Korea Meteorological Administration), and NIMR (National Institute of Meteorological Research). We installed and arranged the observational instruments such as, AWS, radiosonde (including mobile sonde and ship sonde), Parsivel, 2DVD, ultrasonic anemometer, and raingauge along the altitudes in Jeju island. Each disdrometer sites were located in straight line considering topography between two S-band Doppler radars. We analyzed synoptic condition by NCEP/NCAR reanalysis data and kinematic characteristics of precipitation by dual Doppler radar analysis using S-band radars in KMA.

In 2012 case, the Changma-front was located in the northern part of the Jeju island and the precipitation system passed from the southwest to the northeast. The accumulated precipitation (31.7 mm) was recorded at the site PR4 which was placed in the highest (H: 975 m). During the passage of precipitation, the south westerly wind ($>12 \text{ m s}^{-1}$) with warm and humid air and the cold (lower layer) and warm advection (upper layer) were observed. From the microphysical analyses, PR2 (windward side, H: 571 m) and PR6 (leeward side, H: 324 m) sites indicated high rain rate about 60 to 75 mm hr^{-1} by orographic effect.

In 2013 case, the Changma-front located in the center of Jeju island and precipitation system passed from the southwest to northeast. The warm advection in lower layer and cold advection in upper layer were observed by radiosonde analyses, relatively. Strong southwesterly winds were blown with moist environment in surface layer. By the wind field analysis, convergence in west and divergence in east were existed and updraft in Jeju island and downdraft in ocean area, relatively. High number concentration at PR4, 5 and PR8 were shown with small size raindrops (less than 2 mm), however large size raindrops (larger than 6 mm) were distributed at PR7(northeast in island) and PR9(southwest in island).

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