HyARC Seminar (HyARC Seminar#164)

Date: February 13 (Thursday) 16:00-

Room: The meeting space (#617) of Research Institutes Building.

Speaker: Prof. Dong-In Lee (Pukyong National University)

Title:Orographic precipitation observation in JEJU island, Korea (2012-2013)

Abstract:

In summer monsoon season, Korean peninsula is influenced by several weather phenomena such as Changma-front, typhoon, strong low pressure, and local heavy precipitation. Especially, orography plays an important role in controlling cloud formation, amount and precipitation distribution. To find out precipitation development mechanism by orographic effect, we performed 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, 2 AWSs, 4 radiosondes (including mobile sonde and ship sonde), 7 Parsivels, 3 2DVDs, 3 ultrasonic anemometers, and 15 raingauges along the altitudes in Jeju island (25 June-15 July 2012 and 13 June-18 July 2013). 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.

We analyzed two precipitation cases from 1150 to 1300 LST on 13 July 2012 and from 0210 to 0320 LST on 26 June 2013.

In 2012 case, Changma-front was located in the northern part of 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 m/s) with

warm and humid air and the cold (lower layer) and warm advection (upper layer) were observed. From Parsivel and Raingauge 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 by orographic effect.

In 2013 case, Changma-front was located in the center of Jeju island and precipitation system passed from the southwest to the 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 (lager than 6 mm) were distributed at PR7(northeast in island) and PR9(southwest in island).

(given in English)