

## 1.4 MULTI-INSTRUMENT RAINFALL RATE ESTIMATION IN THE PERUVIAN CENTRAL ANDES (12.0°S)

D. SCIPION<sup>1</sup>, J. VALDIVIA<sup>2</sup>, F. SILVA<sup>2</sup>, M. MILLA<sup>3</sup>

<sup>1</sup> Instituto Geofísico del Perú, Lima, Perú

<sup>2</sup> Subdirección de Ciencias de Atmósfera e Hidrosfera, Instituto Geofísico del Perú, Lima, Perú

<sup>3</sup> Radio Observatorio de Jicamarca, Instituto Geofísico del Perú, Lima, Perú  
dscipion@igp.gob.pe

Agriculture is one of the main economic activities in the Peruvian Andes, where most of the vegetables of the whole country are produced. Rain water alone irrigates more than 80% of the fields for agriculture purposes. However, the cloud and rain generation mechanisms in the Andes still remain mostly unknown.

In early 2014, The Instituto Geofísico del Perú (IGP) decided to intensify studies in the central Andes in order to better understand cloud microphysics, and the Atmospheric Microphysics And Radiation Laboratory (LAMAR) was finally founded in 2015 in the Huancayo Observatory (12°02'18"S, 75°19'22"W) at 3330 m.a.s.l.

As part of LAMAR, a Ka-band cloud profiler (MIRA-35C) was installed in late 2015, for cloud and rainfall estimation, along with a disdrometer (PARSIVEL2) and a few rain gauges. LAMAR also served as a testbed for UHF wind profiler (CLear-Air and Rainfall Estimation CLAIRE) radar also developed at IGP's Radio Observatorio de Jicamarca. CLAIRE was designed to operate at 445 MHz, which makes it sensitive to turbulence and precipitation.

In this work, we will present a combination of precipitation observations at LAMAR by the two radar systems, showing their similarities and differences due to the operational frequencies and scattering mechanisms. Doppler spectra vertical velocity are used to estimate the drops size distribution, and in turn to estimate the rainfall rate. These radar-based estimates will also be validated by the disdrometer and rain gauges. Causes for over/under-estimation of the rainfall estimated will also be discussed in the paper.