

EGU2020-6534

<https://doi.org/10.5194/egusphere-egu2020-6534>

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



Atmospheric physics and microphysics research project in the Central Peruvian Andes. A multilateral approach.

Yamina Silva¹, Daniel Martínez-Castro², Aldo Moya-Álvarez¹, René Estevan¹, José Flores Rojas¹, and Shailendra Kumar¹

¹Geophysical Institute of Peru, Atmospheric and Hydrological Sciences, Peru (fsilva@igp.gob.pe)

²Instituto de Meteorología de Cuba.

The Mantaro river basin is surrounded by the central Andes of Peru, with altitudes of up to 5300 m.a.s.l. The Mantaro valley, has great economic and social importance for its rich agriculture, as well as water resources, of considerable weight in the generation of power supply electricity and drinking water. This favors the presence of numerous urban centers in the region, highlighting the city of Huancayo with more 500,000 population. The incidence of convective precipitation systems, influenced by the local orographic circulation, in agriculture and social activities in the region is conspicuous, both from the point of view of water supply and as potential weather hazards, in the case of hailstorms and heavy rains, as well as frost event. The project “Strengthening the research line on Atmospheric Physics and Microphysics” was conceived with the objective of developing a multilateral research on the conditions of formation of precipitation systems in the basin, the dynamical factors influencing their development and the microstructure and phase composition of clouds and precipitation over the valley. The project includes three main components: 1. Characterization of the structure and evolution clouds and precipitation; 2. Study of the atmospheric aerosols in the region and their relationship with solar radiation and 3: Development of customized numerical weather forecasting tools focused on different scales and forecast terms, based mainly on the WRF-ARW modeling system. The experimental base of the project was centered in the instrumental complex of the Atmospheric Microphysics and Radiation Laboratory (LAMAR), in the Huancayo Observatory (3300 m.a.s.l), located in the Mantaro Valley. As a result of the project, an atmospheric database with very complete characteristics has been developed, which serves as a test base for the verification of models in different meteorological conditions, including the occurrence of dangerous phenomena. The project started in April, 2017 and must finish in April 2020. To date, twelve papers have been published in peer-reviewed journals, on topics such as the study of convective cloud fields and precipitation over South America and Peru from remote satellite sensors, tuning of the configuration of numerical models for the conditions of the central Andes of Peru, numerical weather forecast, study of the structure of convective systems producing rain in the valley, characteristics of atmospheric aerosols over the valley and the radiative balance. Because of these researches, new numerical modeling tools have been developed for the conditions of the central Peruvian Andes. In this paper we will present the main results from the project, that contributed to increase our understanding of the Andes climate.

