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New 1-m Telescope in the Southern Peruvian Andes

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Introduction

CONIDA conducted a search for the best potential astronomical sites in the Peruvian territory based on meteorological information from 40 years of data from the International Satellite Land-Surface Climatology Project (ISLSCP), the Surface meteorology and Solar Energy (SSE) database and continously monitoring of several meteorological stations. We looked for sites over 4000 meters of altitude with the lowest cloud coverage, humidity and wind velocity, preferably far from active volcanoes, the lowest geological risk and favourable logistic situations (i. e. roads, water and energy proximity). From 2004 to 2008 CONIDA performed missions of astronomical observation in southern Peru in order to characterize the quality of the sky and find the best site for the implementation of an astronomical observatory. The measurements showed that a site in the Southern Peruvian Andes at 4511 meters above the sea level has a favorable atmosphere and weather condition for the operation of an astronomical observatory. In 2015 CONIDA adquired a 1-m Alt-Az Ritchey-Chrétien telescope from AMP Telescopes, which is arriving in Peru in 2017.

Location of the Observatory

The site of the future astronomical observatory and where will be installed the 1-m telescope is in the Southern of Peruvian Andes at ~4511 meters above the sea level on the Sasahuine mountain. This place is located near the township of Cambrune in the departament of Moquegua. The Figure 1 shows the site where will be located the astronomical observatory. The upper-left figure shows the full map of Peru where in red is the departament of Moquegua. The upper right maps shows the departament of Moquegua. The bottom figure shows the Sasahuine mountain where the label in red one is the site where will be the observatory.

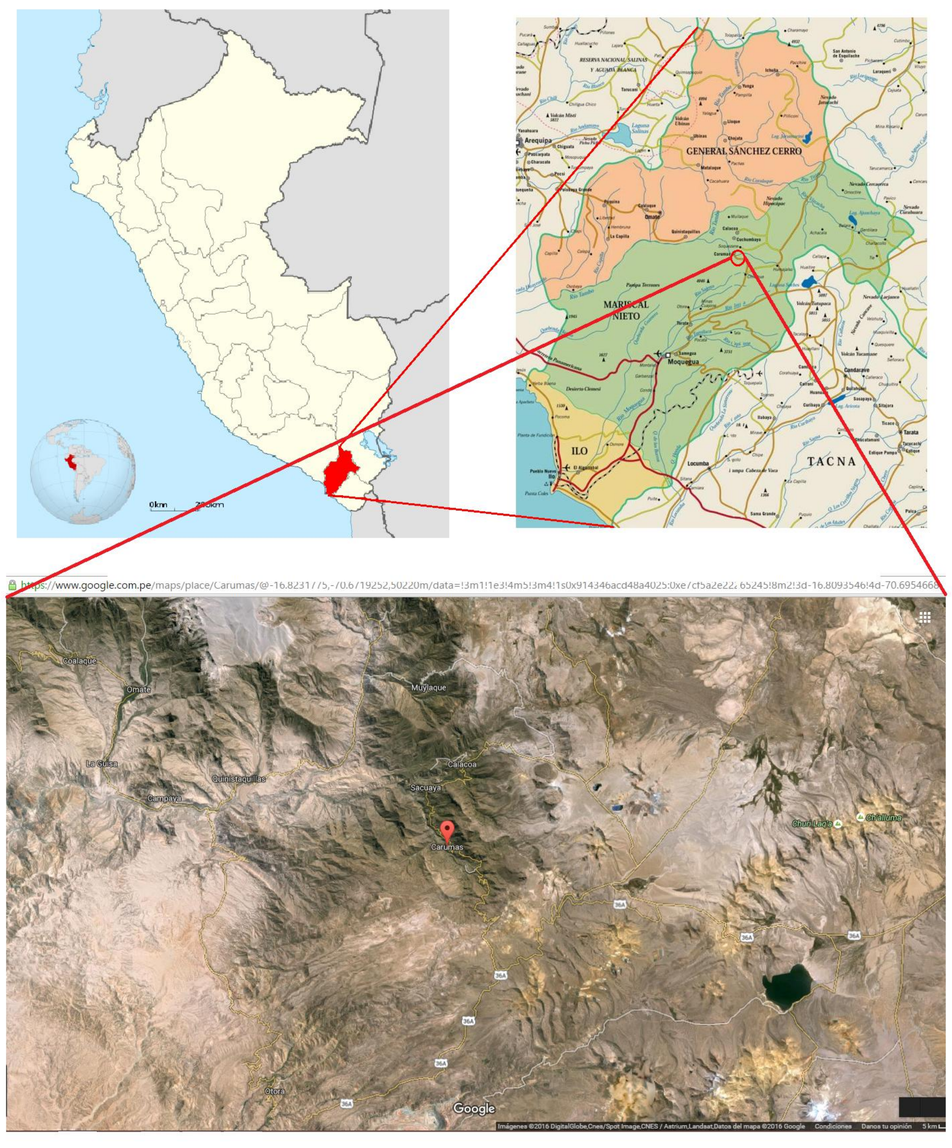

Figure 1. Location of the future astronomical observatory.

Preliminary results

The seeing is the astronomical term for the extent of resolution degradation of an image caused by the Earth's atmospheric turbulence. This degradation in image quality results from fluctuations in the refractive index of air as a function of position and time. In Astronomy it is quantifed using the stellar profile, measuring the full width at half maximum (FWHM) which is the angular size of the image of a star with half the peak intensity level. From 2004 to 2008 we took measurements of the first-order atmospheric extinction coefficient k'_b, mainly in the B, V and R bands on the photometric UBV system and measurements of seeing in the V, R, and I bands (using different instruments and in different locations), at the Sasahuine mountain in the Andes of Moquegua, in Southern Peru. The observational missions were called JANAX missions. JANAX is in vocable Quechea that means *world in the sky.*

JANAX I and JANAX II were realized in the 2004 and 2005 respectively. The instrument was a Reflex camera of 35 mm and with focal of 1.4, here was used a Trix Kodak film, after that the imagens were digitallized with a scanner to 1200 dpi. From JANAX III to JANAX V the instrument was a 14" Ritchey-Crétien telescope with camera CCD of 765x510 pixels with UBVRI Jhonson-Morgan filters wheel. The next table shows the values of k'_b and in comparation with the observatory of Czech Republic and Argentina (Mikulásek at al. 2003; Minniti D. et al. 1989).

Observatory	k'_b	altitud (m)
Brno (Czeh)	0.36 ± 0.05	1800
CASLEO (Argentina)	0.28 ± 0.02	2552
Janax I (Moquegua Peru)	0.29 ± 0.11	4327
Janax II (Moquegua-Peru)	0.41 ± 0.13	4330

The Figure 2 shows the results of the average seeing values obtained for visual, blue and red filters at the Sasahuine montain for 4 missions. For the V filter, the highest average seeing value was 2.4 arcsec, corresponding to 2006, and the minimum value obtained was 0.4 arcsec, corresponding to July 2008. These measurements were carried to 4300 meters above the sea level approximately.

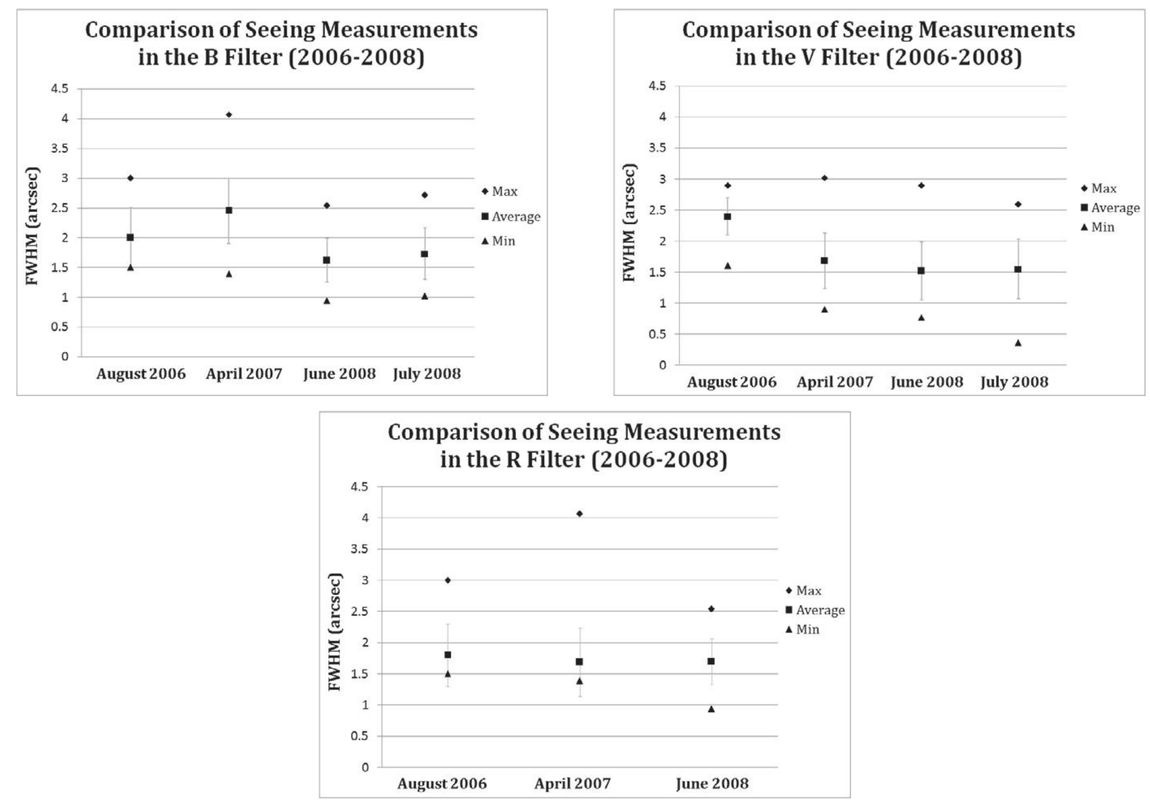

Figure 2. Here shows the results of the average seeing for JANAX III, JANAX IV and JANAX V in 2006, 2007 and 2008 respectively.

Telescope

In 2015 CONIDA acquired a 1-m Alt-Az Ritchey-Chrétien telescope (Fig. 3) from APM Telescopes through of a project of public investiment, and which is arriving in Peru in 2017. Currently the telescope is asambly in Saarbrücken, Germany.

Figure 3. 1-m Ritchey-Chrétien telescope (APM Telescopes) in its assambly location in Saarbrücken, Germany with coauthor V. Navarrete in the foreground.

Tentative projects and collaborators

1. Observation of supernovae and their remnants (Dra. Melina Bersten-UNLP)
2. Systematic search of massive binary systems (Dr. Gabriel Ferrero and Dr. Roberto Claudio-CONICET-UNLP)
3. Monitoring and observation of cosmic ray burst (Dr. Alberto Castro-Tirado-IAA)
4. Photometric observation of asteroids (Dr. Jorge Gonzales-CONIDA)

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