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SITE MONITORING AT THE U.C. OBSERVATORY OF SANTA MARTINA

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RESUMEN

Este trabajo presenta un análisis astro-climático del sitio donde se emplaza el Observatorio Santa Martina de la Pontíficia Universidad Católica de Chile. Este lugar se ubica cerca de la ciudad de Santiago en la latitud 33.3°S, longitud 70.5°W y a una altitud de 1492 metros sobre el nivel del mar. El análisis fué realizado usando datos de temperatura, presión atmosférica, humedad, y viento medidos con una estación meteorológica Davis Net Vantage Pro 2, y en el período desde diciembre 2007 a enero 2001. De estas observaciones se han estimado los valores promedio a diferentes escalas de tiempo y se ha examinado variaciones diarias y estacionales. También se estimó el porcentaje de tiempo en que el observatorio no ha operado debido a cobertura de nubes en un 37.23% de las noches durante 2010. La humedad y el viento también han sido estudiados. La humedad relativa promedio es de 49%, y el viento predominante (24% de las ocasiones) es del sur-suroeste con una magnitud promedio de 0.6 m/s. Finalmente, se describen las observaciones de *seeing* obtenidas con un monitor DIMM recientemente instalado en este lugar.

ABSTRACT

This work presents an astroclimatologic analysis of the UC Santa Martina Observatory site. This site is located near Santiago at latitude 33.3°S, longitude 70.5°W and an altitude of 1492 meters above sea level. The analysis was performed using data of temperature, pressure, humidity, and wind collected with a Davis Net Vantage Pro 2 meteo station in a period from December 2007 to January 2011. We estimated average values for the parameters monitored on different time scales and examined daily as well as seasonal variations. We also estimated the downtime due to clouds average with an 37.23% of nights in 2010, humidity, wind over the period examined. The average relative humidity is 49%, wind is predominantly (24% of time) from southsouthwest with an average speed of 0.6 m/s. Finally, we describe Seeing measurements obtained with a DIMM monitor recently installed in the site.

Key Words: atmospheric effects — site testing

1. INTRODUCTION

This proyect presents an astroclimatologic analysis of the UC Observatory site. The site is located near Santiago at latitud 33.3°S, longitud 70.5°W and an altitude of 1492 meters above sea level. Since its founding in 2005, has not made a study of site conditions which cause uncertainty of the sky's quality and observational constraints of the site.

1.1. *Results*

1.2. *Meteorological Conditions*

Temperature of the site reflects the dominance of two strong annual conditions: high temperatures for a long time focused on the summer months with a mean of 14 and a cold season during the winter months with an average 9. This is related to the rainy season and drought climate zone experiences semi-arid and therefore also the cloudiness that occurs, so that it generates during the months between May and September there is high probability that the observations suffer cancellations due to weather conditions.

The average relative humidity present at the site during night hours is 57%. The mean atmospheric pressure was 1014.

The site is dominated by winds from the south and south-west, which is consistent with the record of wind from the coast and entering the Santiago basin. The Andes mountain range prevents more records from the east and mountain ranges with heights near the site around 2000 meters above sea level measurements also decreased from the north. The data for the night time show an average speed of 0.5 measured at a height of 2 meters above the surface.

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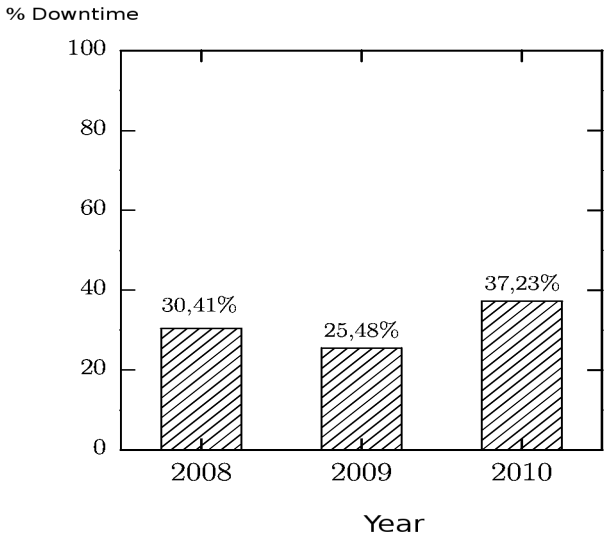

Fig. 1. Annual downtime percentage at U.C. Observatory of Santa Martina.

The percentage of observation time lost is 39%, ie approximately 220 nights available, concentrated in summer.

1.3. *Seeing*

We started seeing measurements for the site using a dimm monitor, which consists of a Meade30 (d=30 cm) telescope and a mask with two apertures. One of them has a prism of 150″ wedge angle. Images of a bright star are taken with 1/60 sec exposure time.

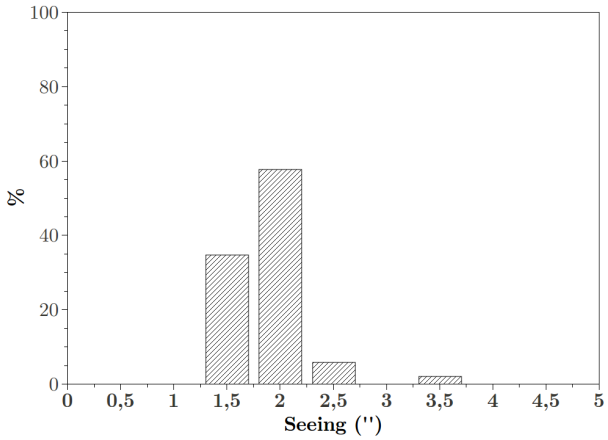

Fig. 2. Seeing Histogram registered at U.C. Observatory of Santa Martina.

The analysis consists of measuring the position of the two images formed by the system and determining the centroid positions for estimating FWHM. The highest frequency of the data is around 2″, with the best record in december 2010 with a seeing 1.4″. This study is preliminar because only have 10 night in the statistics (Figures 1 and 2).

2. CONCLUSIONS

UC Observatory is a site that offers important advantages for observation despite being near a capital city. However, initial measurements of Seeing is not good, but it's necessary continue studies for a longer period of time.