

© 2011: Instituto de Astronomía, UNAM - Astronomical Site Testing Data in Chile
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Synthetic turbulence profile generation
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ABSTRACT
 To better understand the performance of adaptive optics (AO) of an observatory before a connected, AO simulations must be run using realistic atmospheric conditions. This means that using only a few specific cases such as median conditions or their 50% percentile only give a limited picture of the actual performance of the AO. The better alternative is of course to run the simulations on actual data, of which there are more than 2 years worth per site in the case of the Thirty Meter Telescope (TMT) candidate sites. Doing so, however, is impossible as the simulations are computationally intensive and may take too long to be practical.

A solution proposed by Herriot et al. [1] is to produce a synthetic time series of a parameter of interest (seeing in this case) of manageable length (say a few hours) and that retains the statistical and temporal characteristics of the original dataset using an autoregressive model. Our goal in this work was to test the method on C₂ profiles and determine whether the method can be used when the layers are treated as independent.

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INTRODUCTION
 "Seeing Seeing Time Series" by Herriot et al., a statistical model to generate a synthetic time series of seeing using three years of seeing measurements performed by the team TMT Site Testing Data. The model is based on a log-normal distribution which is an approximation of the log of the seeing function of log (σ). The distribution of variance equal to 0.5. The autoregressive model based on the generated back to series of seeing or C₂ profiles measured with an adaptive optics system and an 80 time series was produced.

METHOD
 The ground layer profile, with data obtained from the TMT Site Testing Data, was used to generate turbulence profiles up to heights less than 0.5 km. The model was used to generate a synthetic data set, with the exception of the ground layer. The model was used to generate a synthetic data set, with the exception of the ground layer. The model was used to generate a synthetic data set, with the exception of the ground layer.

RESULTS
 As shown in Tab. 1, the comparison between original and generated turbulence profiles is pretty good. This is particularly true with the middle layers where the cross-correlation was strong. For the top and bottom layers the mean values agree to a better level but the standard deviations are still too large.

CONCLUSION
 In this analysis, we have attempted to use the model with the C₂ real and synthetic data, more than 90% on the third layer, and for the top layer. This cross-correlation was strong for most pairs of layers apart from the bottom two layers and the top two layers. This indicates a good agreement between generated and real data. Reconstructing the seeing from the generated profiles, we find that the seeing correlation creates a difference of 2% between the profiles of the generated profiles and the real data. The model must therefore be adapted to include the effect of cross-layer layers before it can be applied to turbulence profiles of other turbulence profiles.

"Implementation of WRF meteorological model for the Paranal Observatory - First Step"
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ABSTRACT
 The WRF model was compared with radiosonde launches at Paranal Observatory in 2009 and near-surface data from the weather station.

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SITE MONITORING AT THE UC OBSERVATORIO DE SANTA MARTINA
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ABSTRACT
 We present an astroclimatic analysis of the UC Observatorio site - Santa Martina. The site is located near Santiago at lat. 33.3 S, long. -70.5 W and an altitude of 1492 meters. Since the foundation of the observatory in 2005, a systematic study of the site conditions was missing, which causes uncertainty on the sky's quality and observational constraints.

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METHOD
 The analysis was performed using data of temperature, humidity, and wind collected with a Davis Net Pro2 meteo station in a period from december 2007 to present. We estimated average values for the site monitored on different time scales and as well as seasonal variations.

RESULTS
 We computed mean value of the temperature on monthly basis. Fig. 1. We found a consistent yearly trend with a mean value of 12.5 [°C] for the entire baseline.

CONCLUSION
 Humidity is one of the most important factors to analyze for the site and its effect on the seeing time value is 57.1%. The seeing time value is 1014.4 [μPa].

Effect of the Altiplanic Winter on ALMA's Observing Conditions at Llano de Chajnantor
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ABSTRACT
 During the summer season, the water vapor content increases as the result of the South American Monsoon System. During this period occurs the Altiplanic Winter, characterized by intense rainstorms in the Altiplano region. At Llano de Chajnantor, high PWV events are present affecting the correct performance of ALMA. Using the available NRAO site observation data from May 1999 to August 2004, we study the observing conditions (PWV and Phase Stability) at Llano de Chajnantor during the "Altiplanic Winter", and their impact on ALMA scientific operations. The results suggest that during this period ALMA observations will be limited to lower frequency bands and compact array configurations. In terms of only the PWV, observations are possible until Band 4 (~230 GHz) the 70% of the time. Phase stability conditions suggest that atmospheric phase correction is not necessary during this period, allowing us to observe in the compact configuration of Band 3 (100 GHz) about 25% of the time.

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