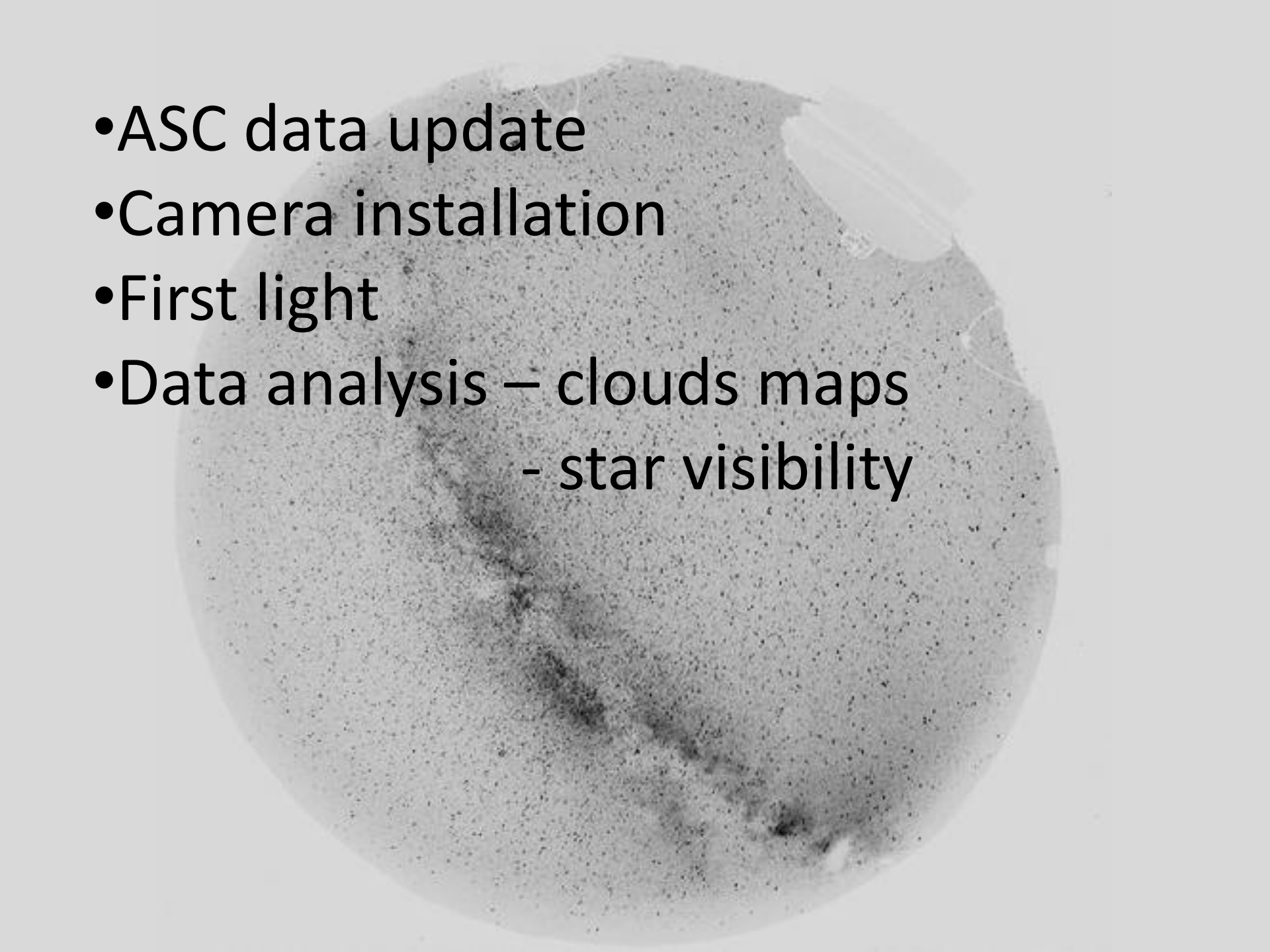
cherenkov telescope array

All Sky Cameras

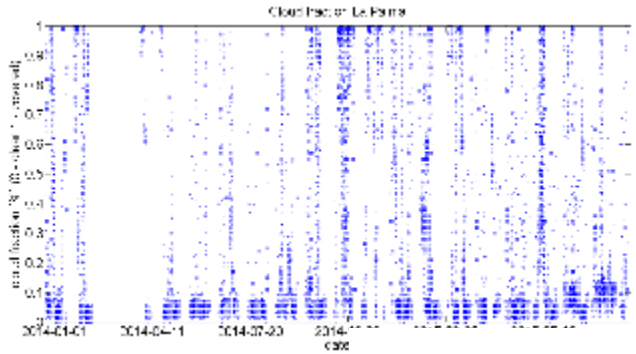
Dusan Mandat, Miroslav Pech, Jan Adam

FZÚ

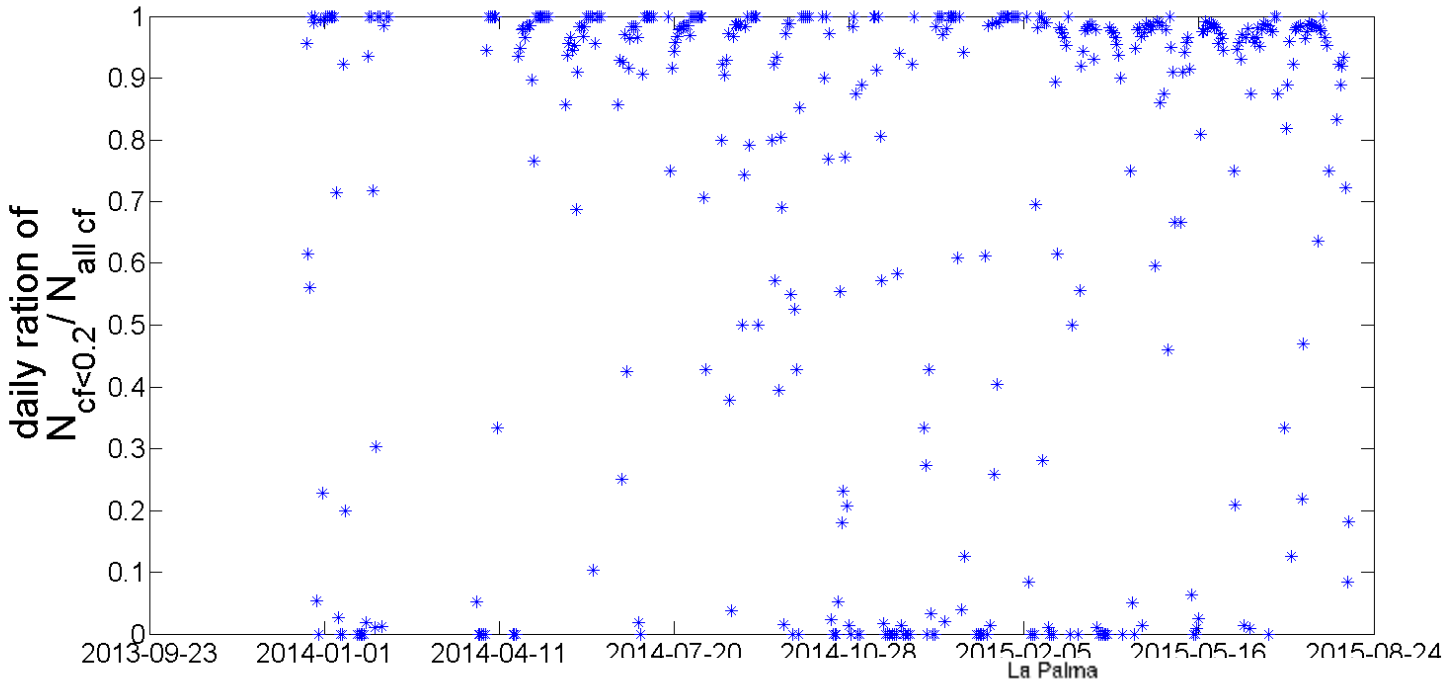
technische universität dortmund

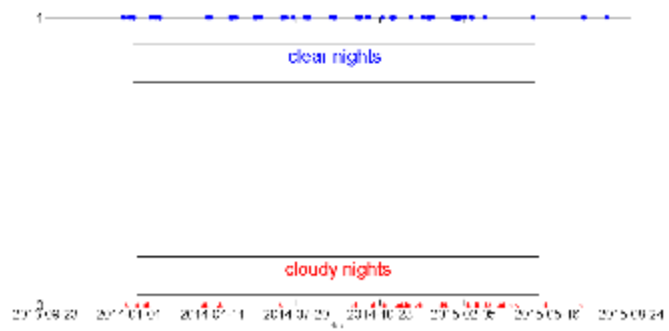


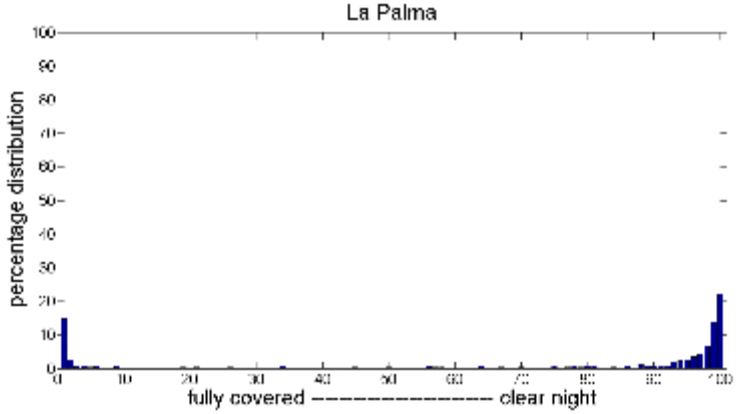
- ASC data update
- Camera installation
- First light
- Data analysis – clouds maps
  - star visibility

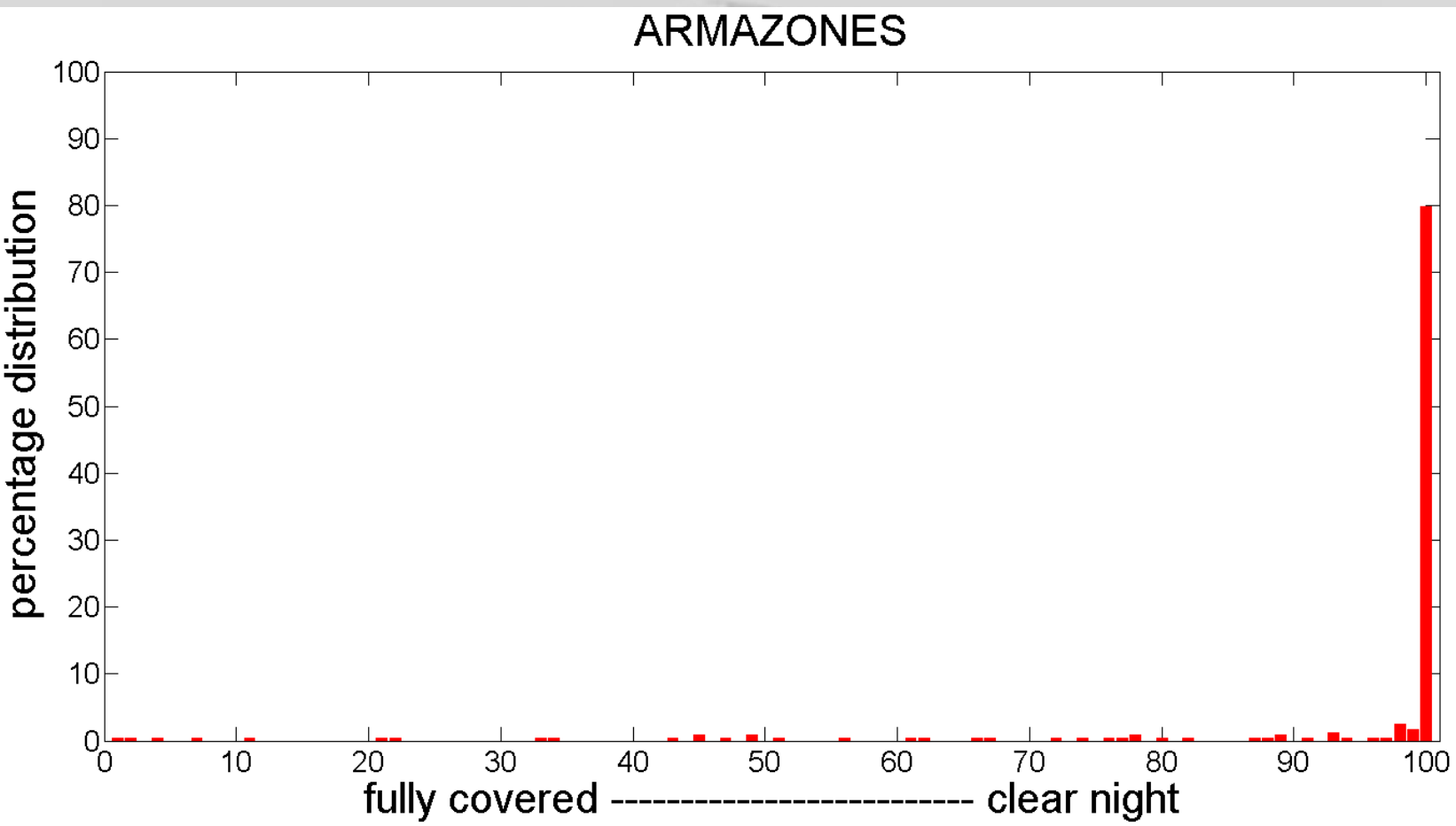


	no. nights
Total	439
clear	91
covered	64



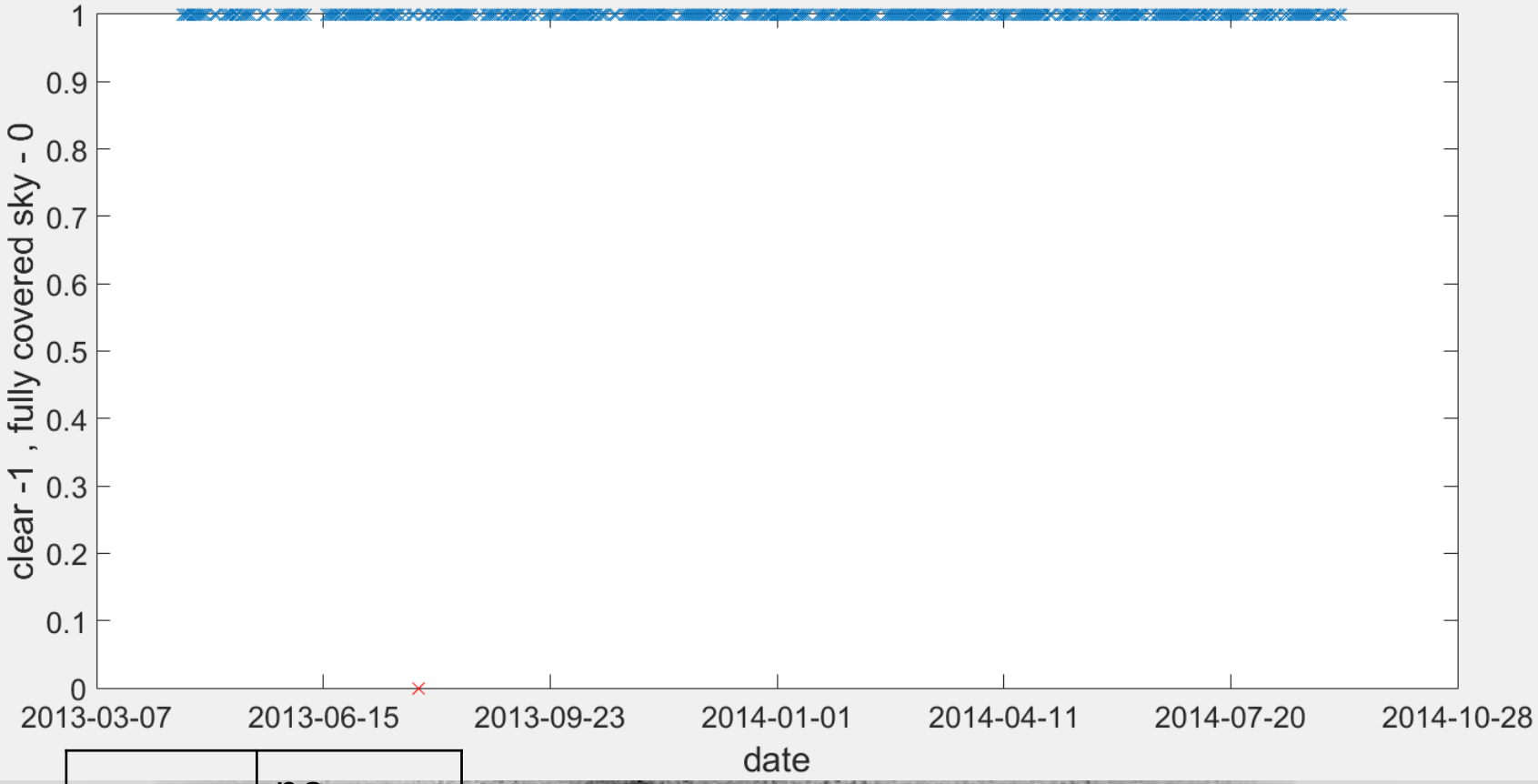




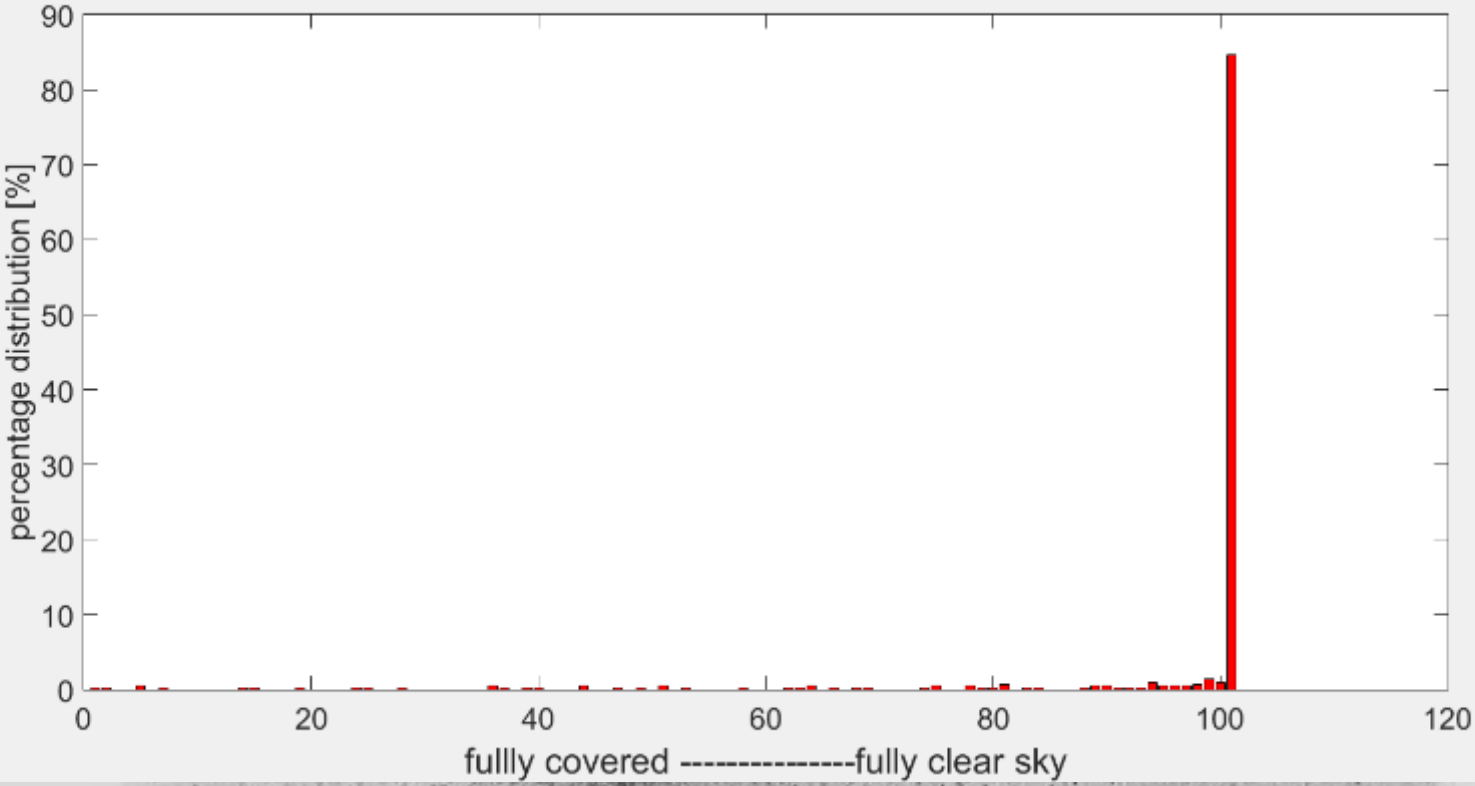


	no. nights
Total	248
clear	197
covere	1

Till end of 2013



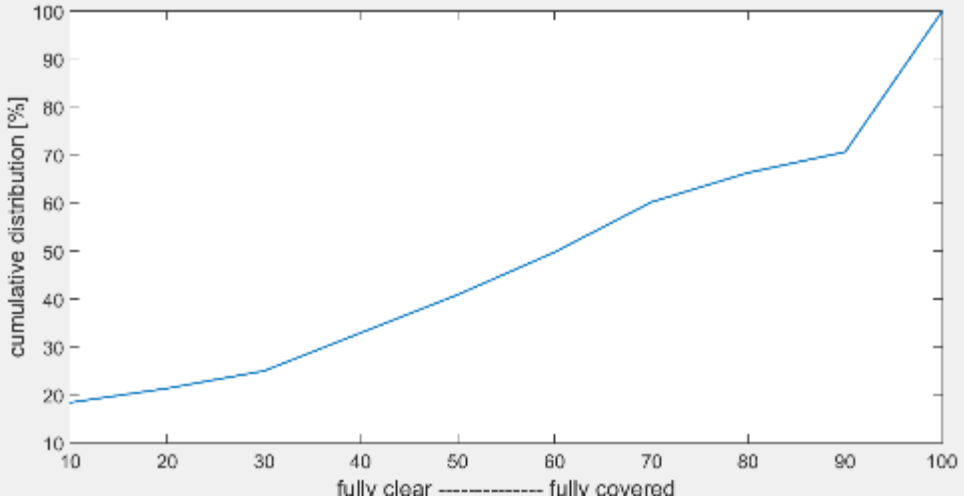
	no. nights
Total	457
clear	382
covered	1

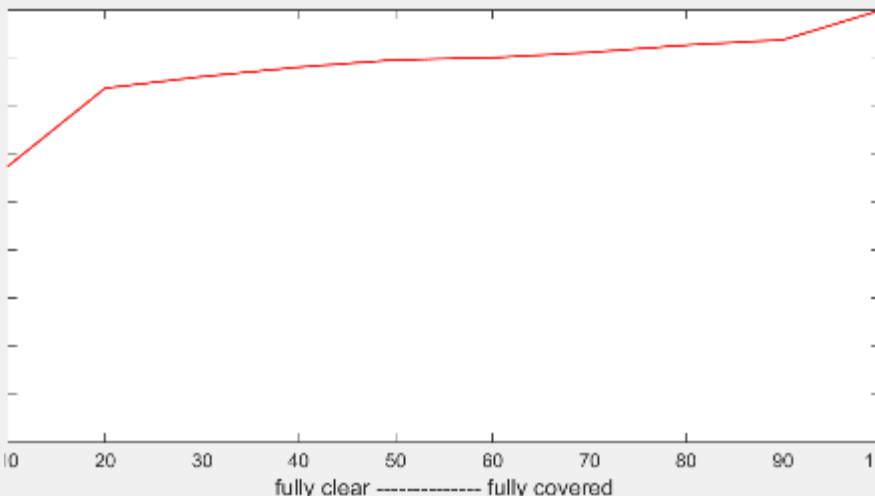


CTA criterium cf<20% - clear

La palma

Armazones

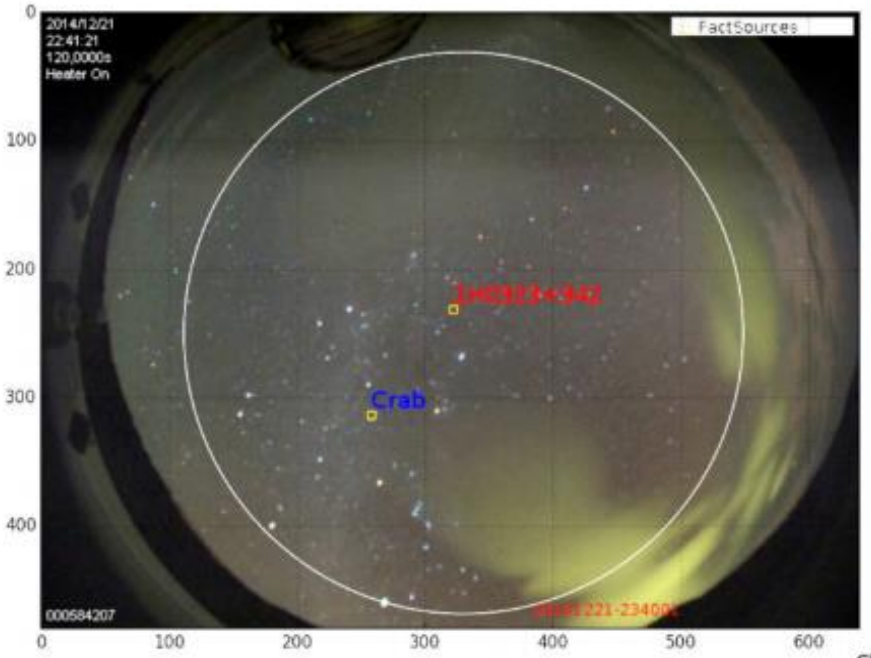


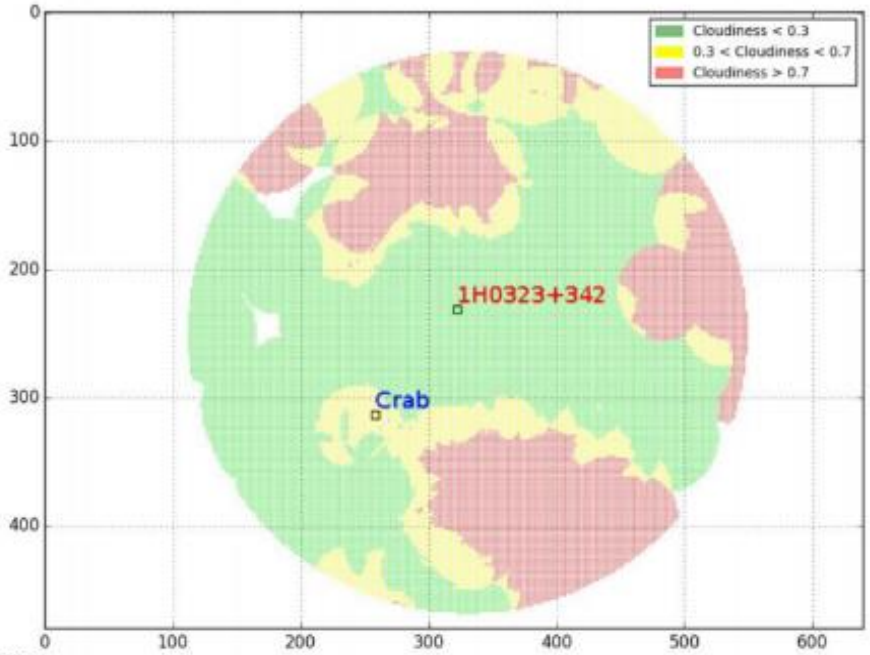


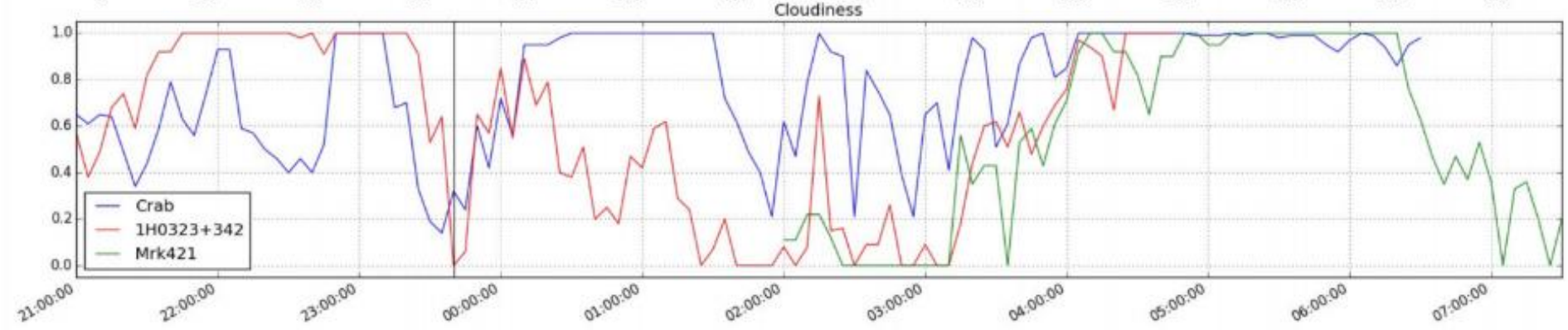
La Palma installation – 10/2015

Cloud maps by Jan Adam

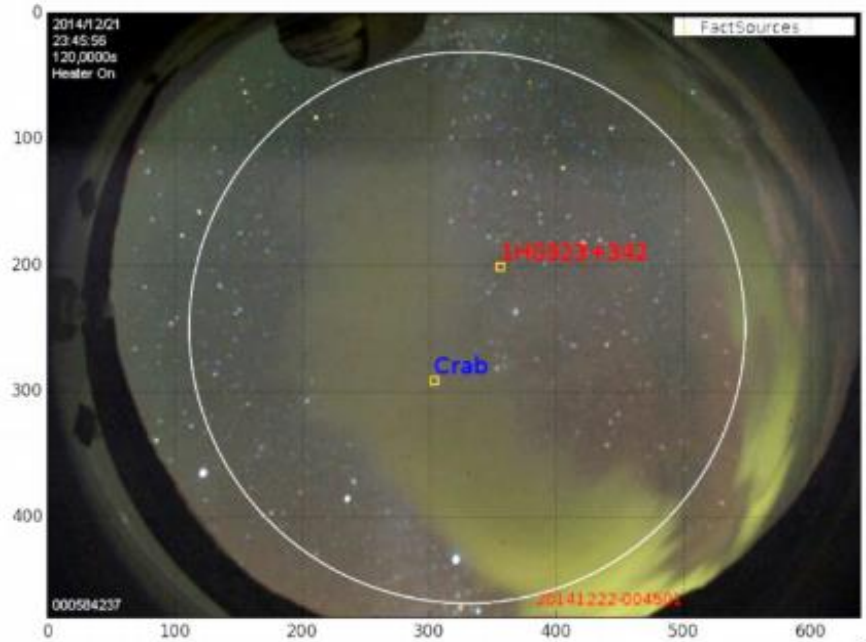
Clouds are areas with a low percentage of visible stars !

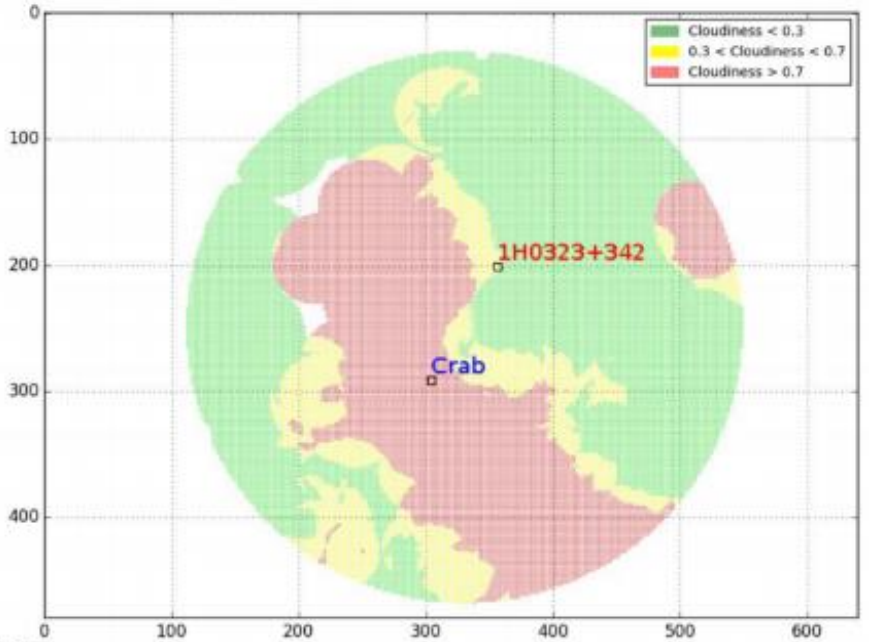


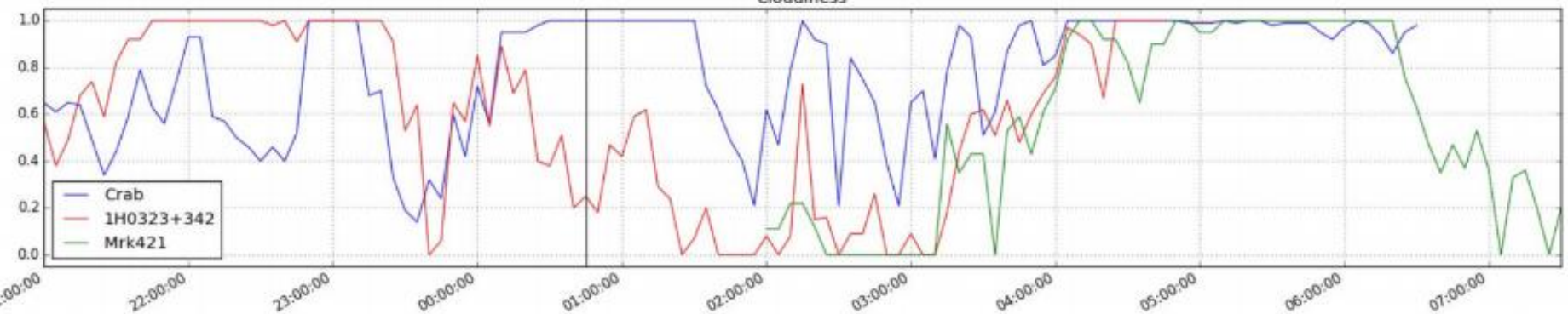




Cloud maps by Jan Adam

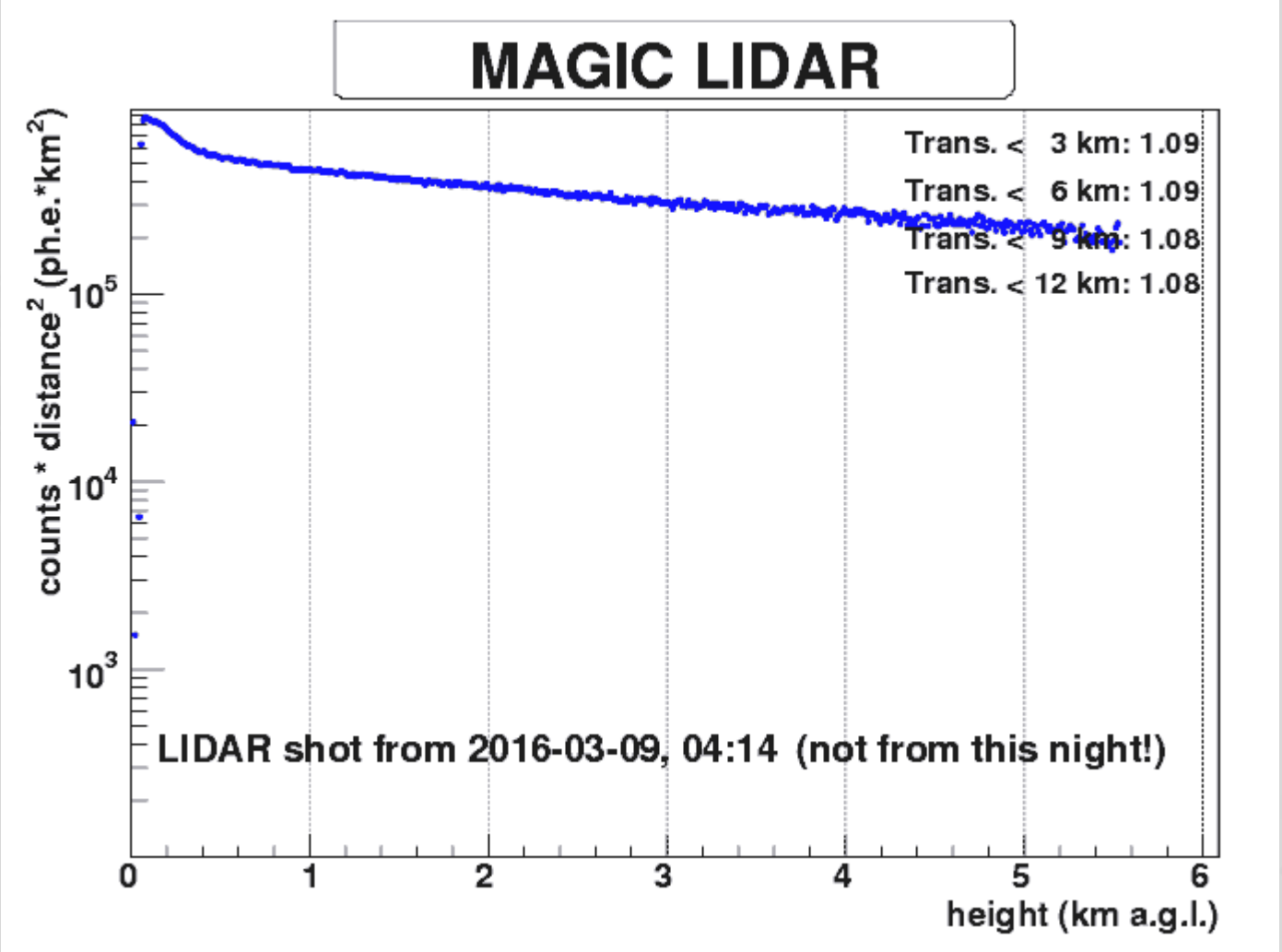






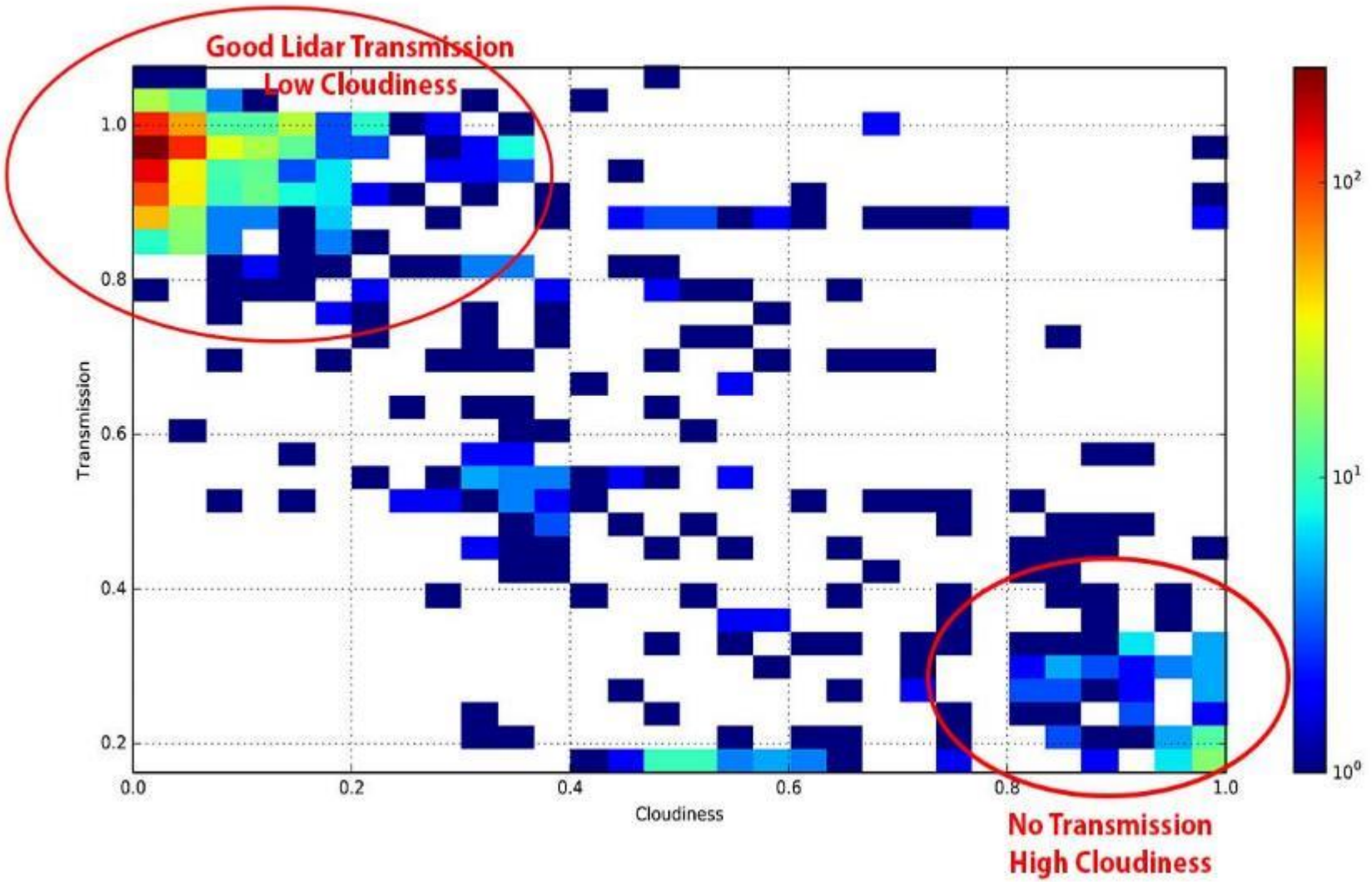
Cloud maps by Jan Adam

Magic lidar transmission vs. cloudiness
(moon below horizon)



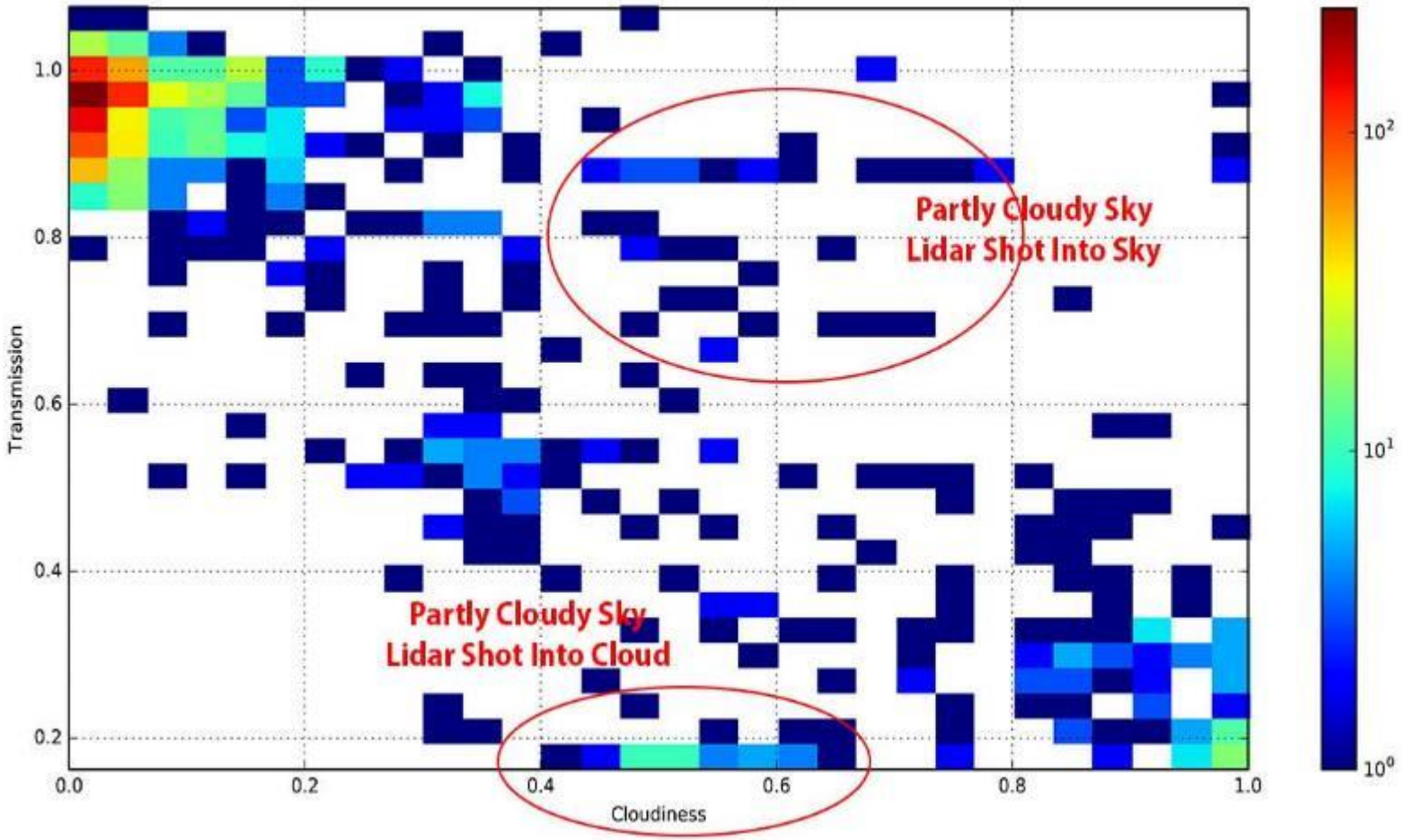
Cloud maps by Jan Adam

Magic lidar transmission vs. cloudiness
(moon below horizon)



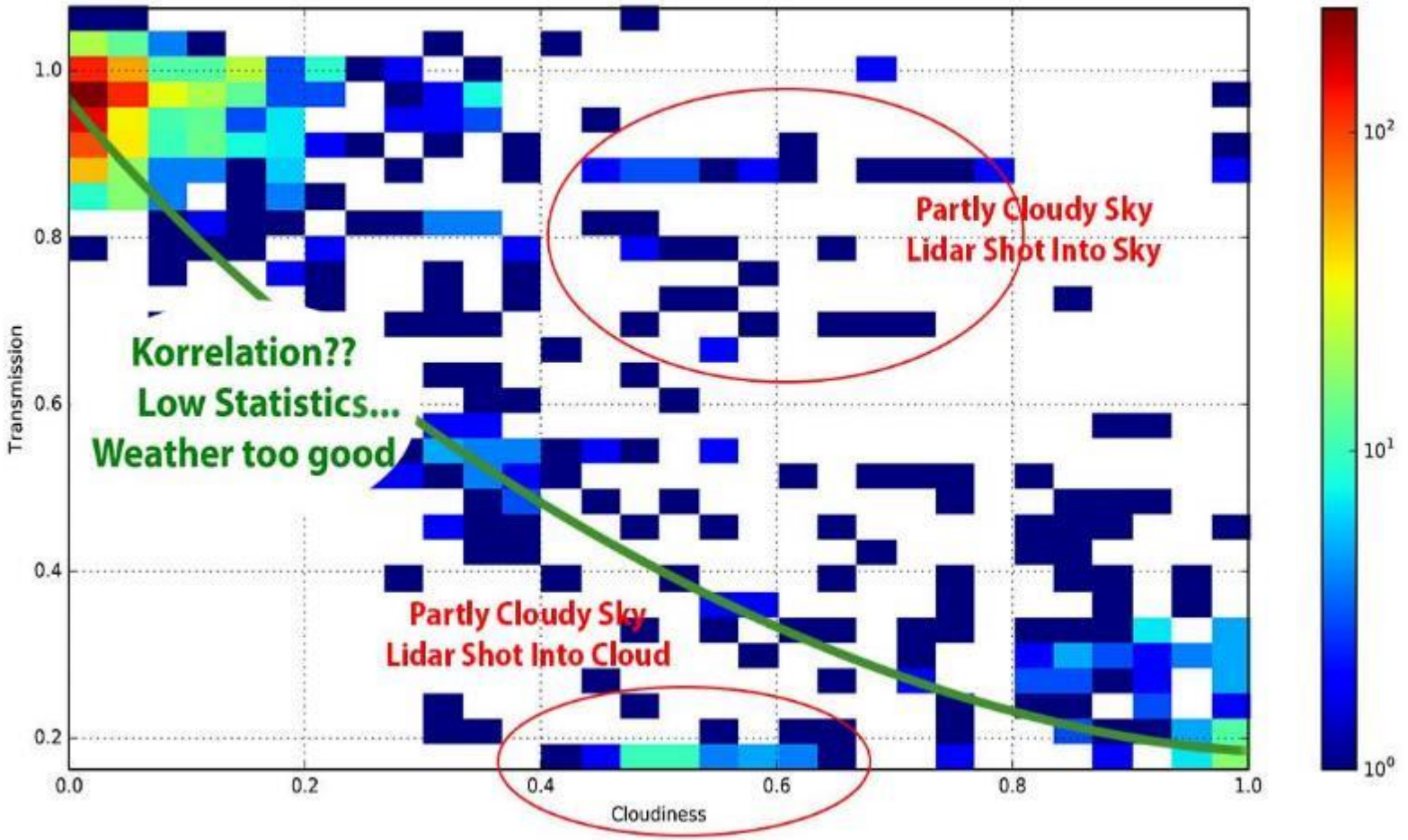
Cloud maps by Jan Adam

Magic lidar transmission vs. cloudiness
(moon below horizon)



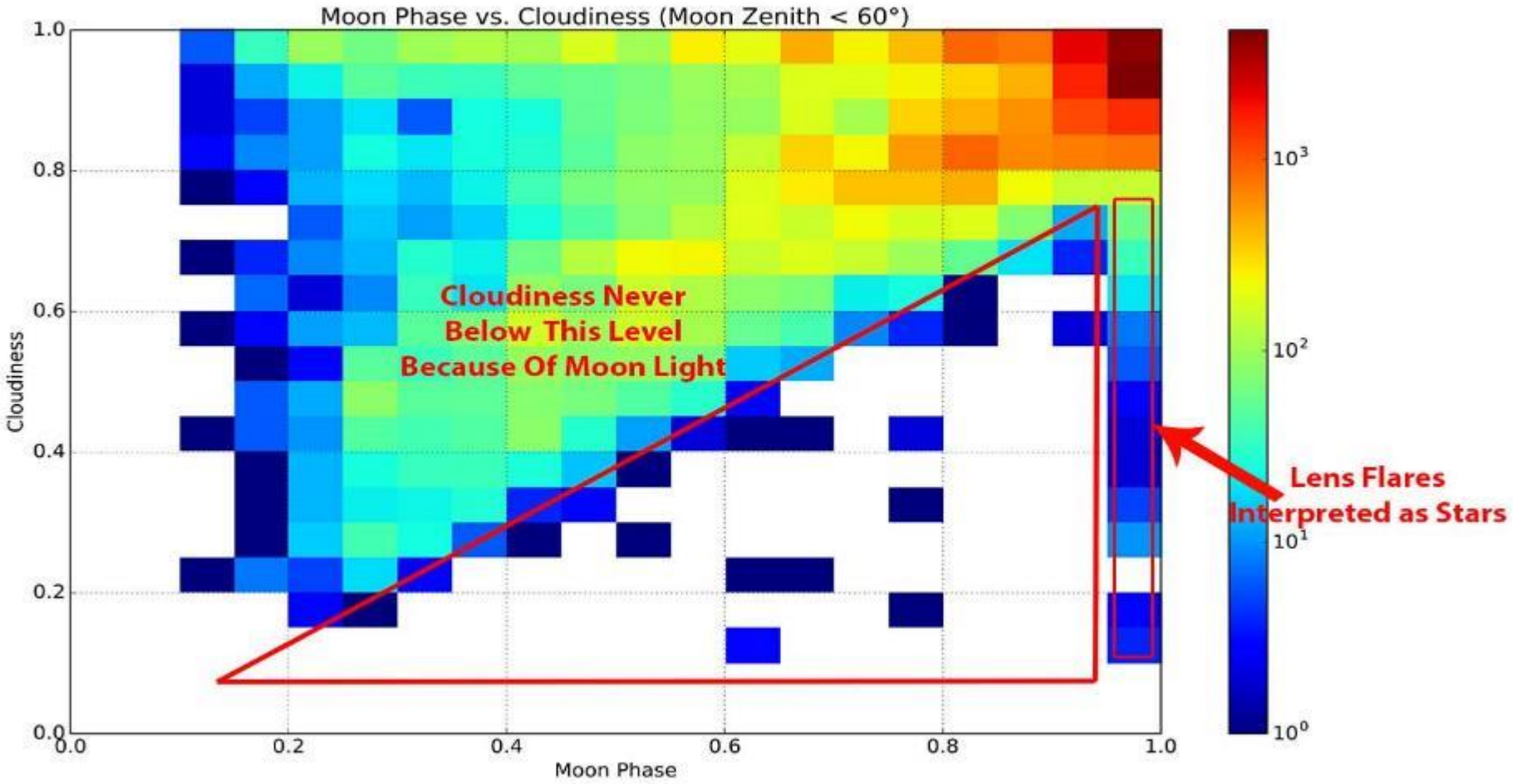
Cloud maps by Jan Adam

Magic lidar transmission vs. cloudiness
(moon below horizon)



Cloud maps by Jan Adam

Using a fixed threshold to determine whether a star is visible or not does not work while the moon is up

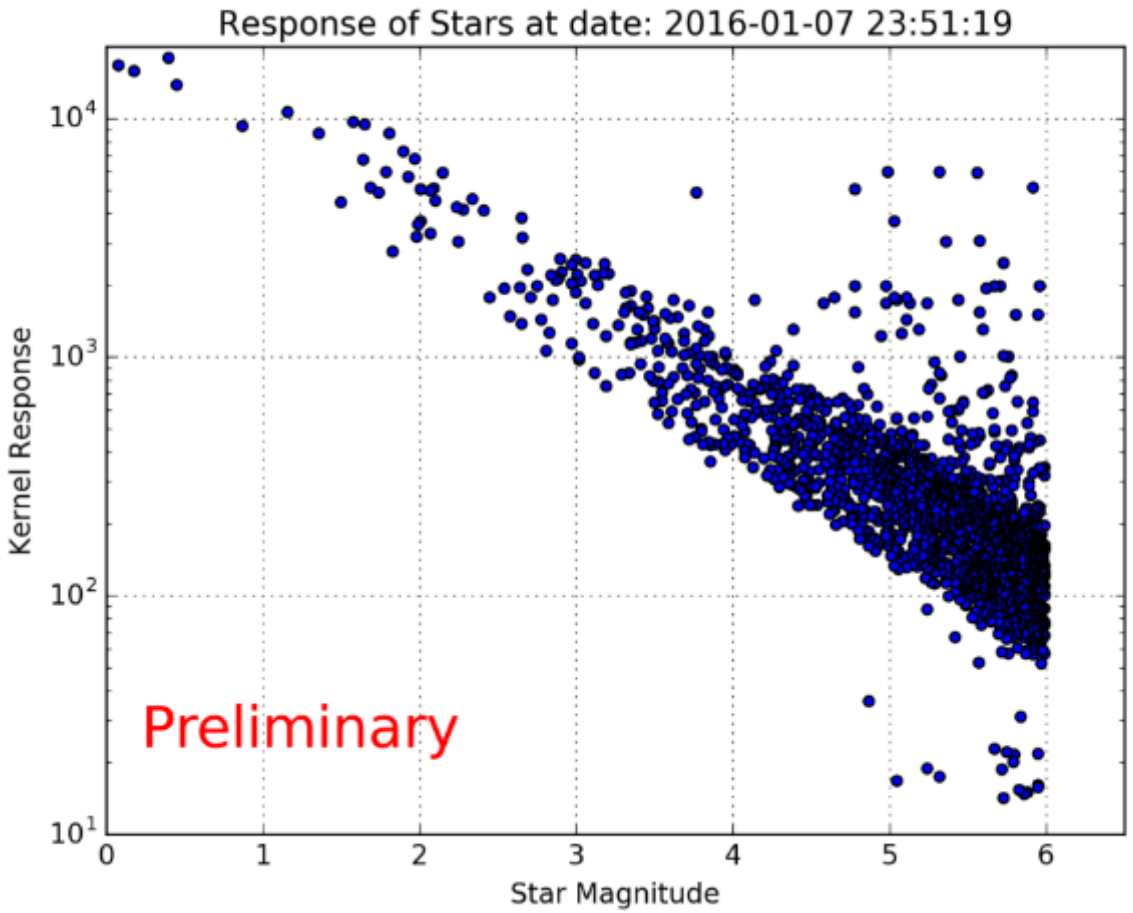


star visibility by Jan Adam & La Palma ASC

Laplacian of Gaussian kernel, number is 0 if the image has an equal brightness (no star) and gets bigger if the center of that image region is brighter than the surroundings.
Mean values of ~50 pictures and the standard deviation is around 10%.
So far - star is visible yes/no, future - using this plot star is visible to 70% so the atmosphere is transparent to 70%.

verification by using MAGIC lidar yet to be done

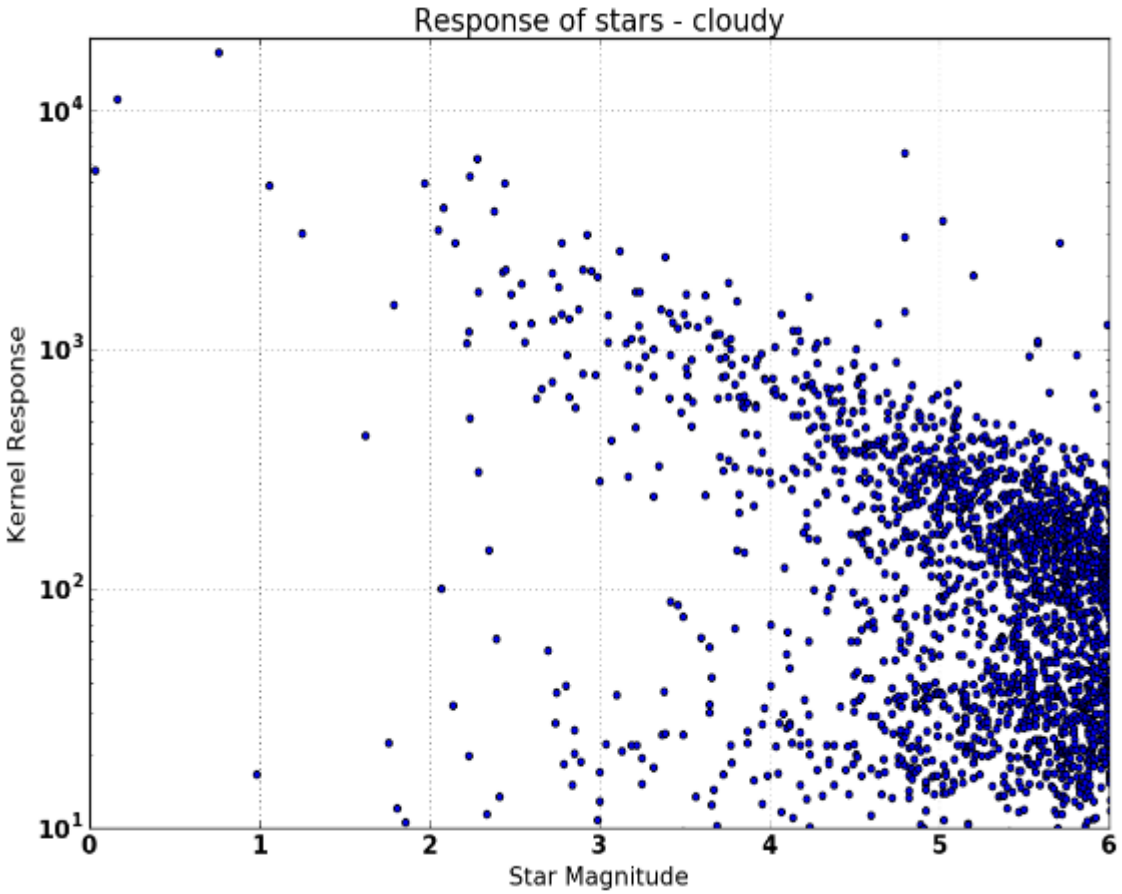
Analysis of a starry night



star visibility by Jan Adam & La Palma ASC

Laplacian of Gaussian kernel, number is 0 if the image has an equal brightness (no star) and gets bigger if the center of that image region is brighter than the surroundings.
Mean values of ~50 pictures and the standard deviation is around 10%.
So far - star is visible yes/no, future - using this plot star is visible to 70% so the atmosphere is transparent to 70%.

Analysis of a partly cloudy night

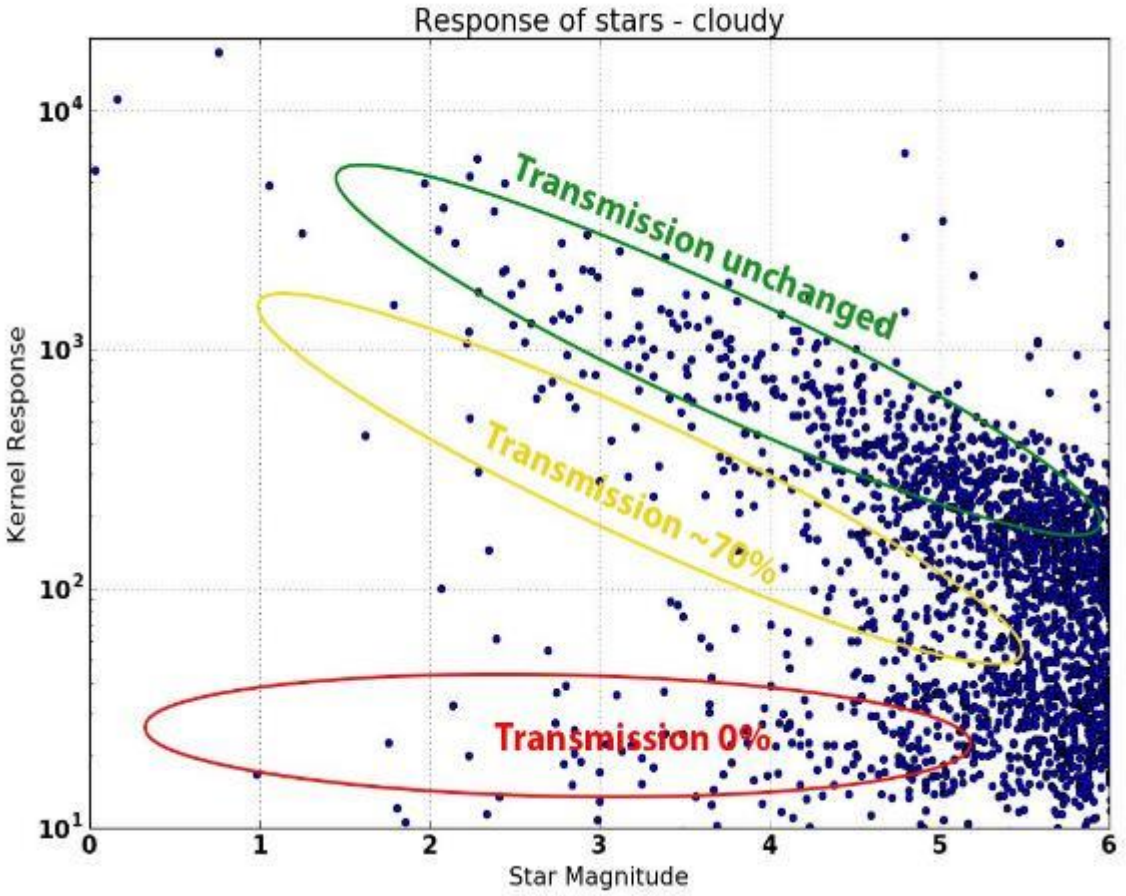


star visibility by Jan Adam & La Palma ASC

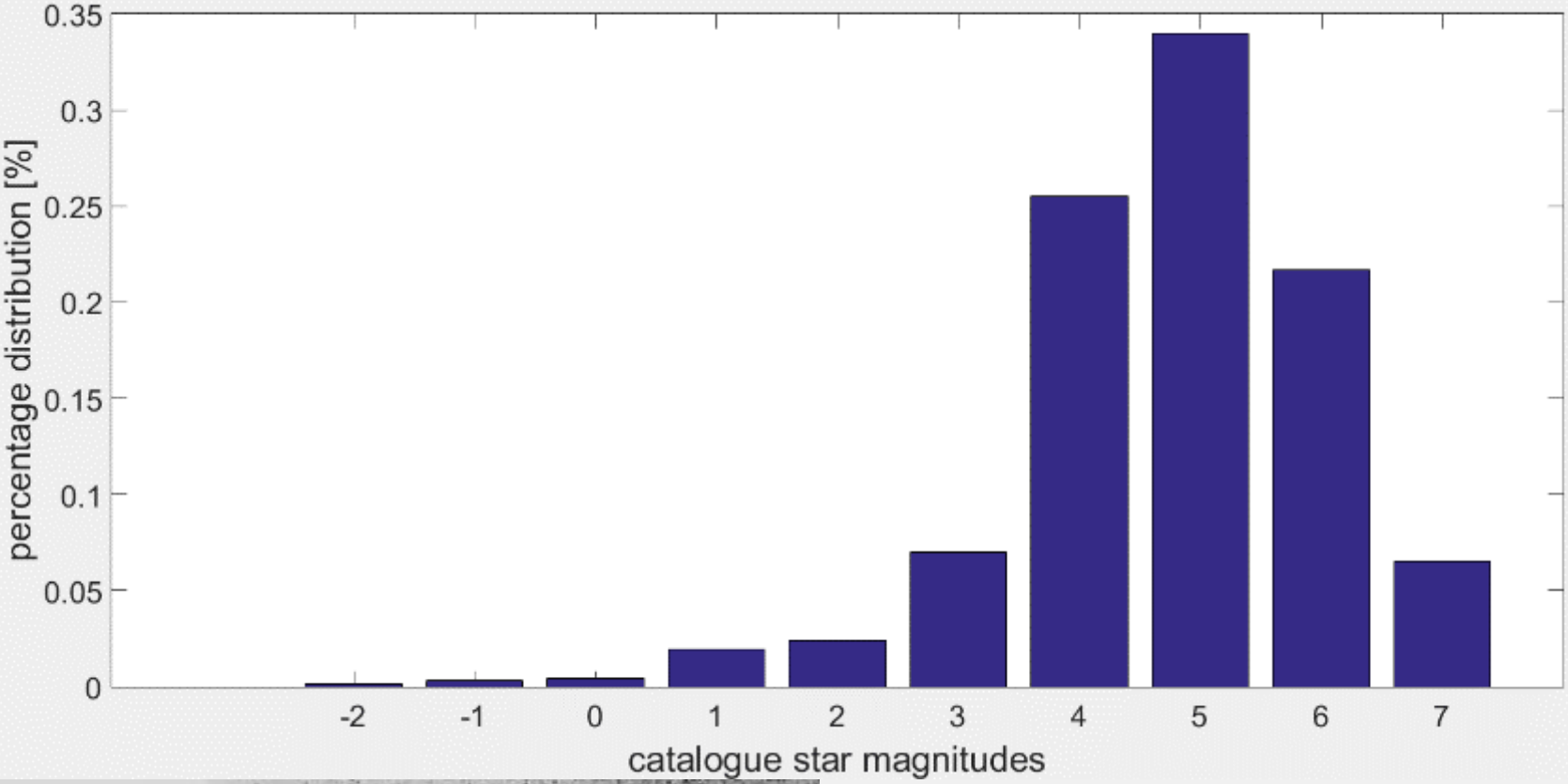
Laplacian of Gaussian kernel, number is 0 if the image has an equal brightness (no star) and gets bigger if the center of that image region is brighter than the surroundings.
Mean values of ~50 pictures and the standard deviation is around 10%.
So far - star is visible yes/no, future - using this plot star is visible to 70% so the atmosphere is transparent to 70%.

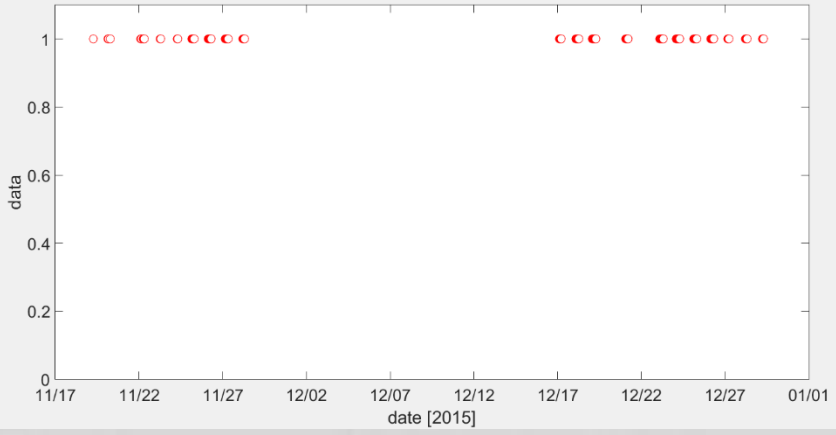
Transmission **approximation** of the whole sky in just 1 minute
In addition to a lidar that takes several minutes for a **single spot measurement**

Analysis of a partly cloudy night

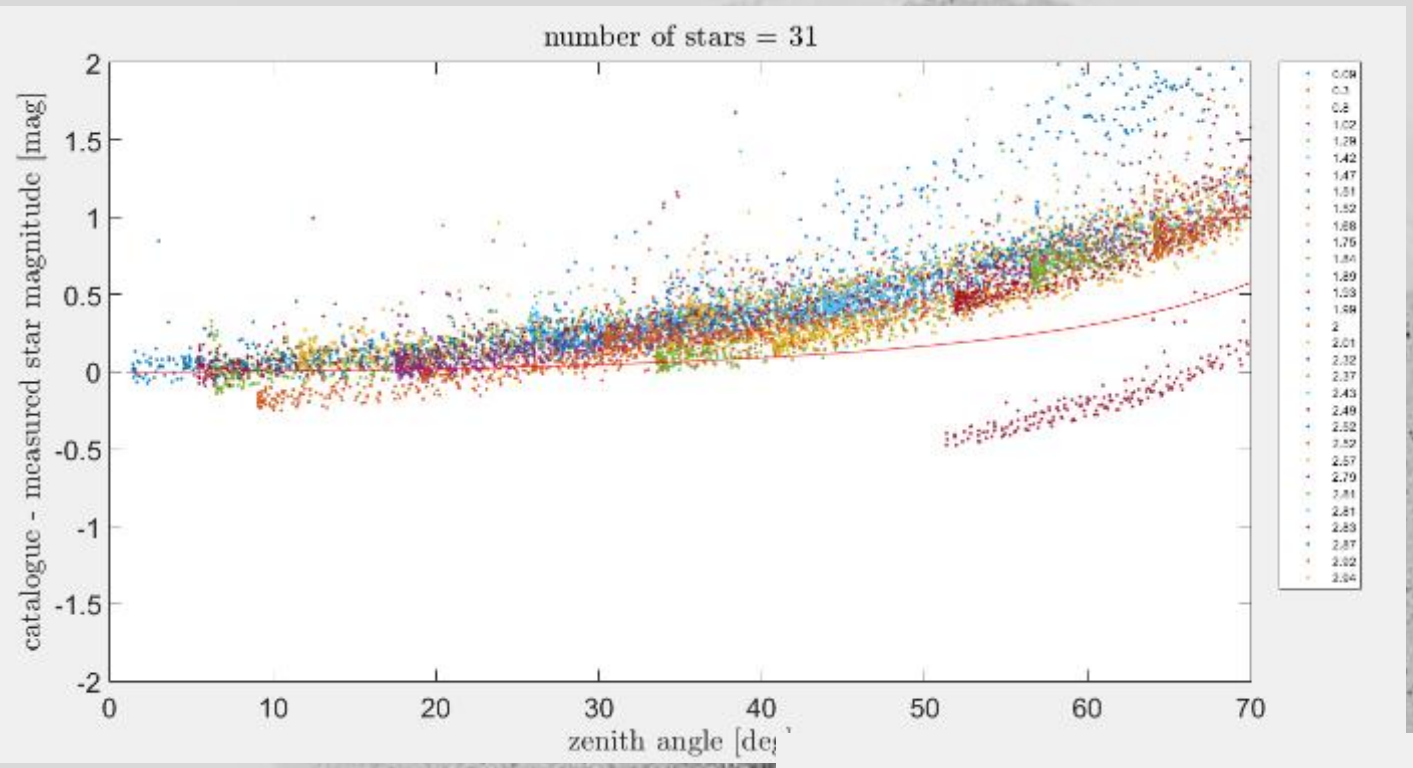


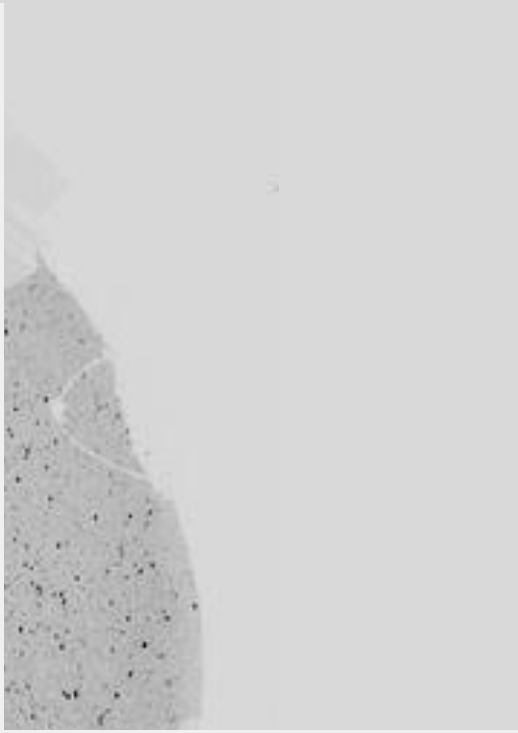
star visibility by Dusan, Mira & Los Leones ASC

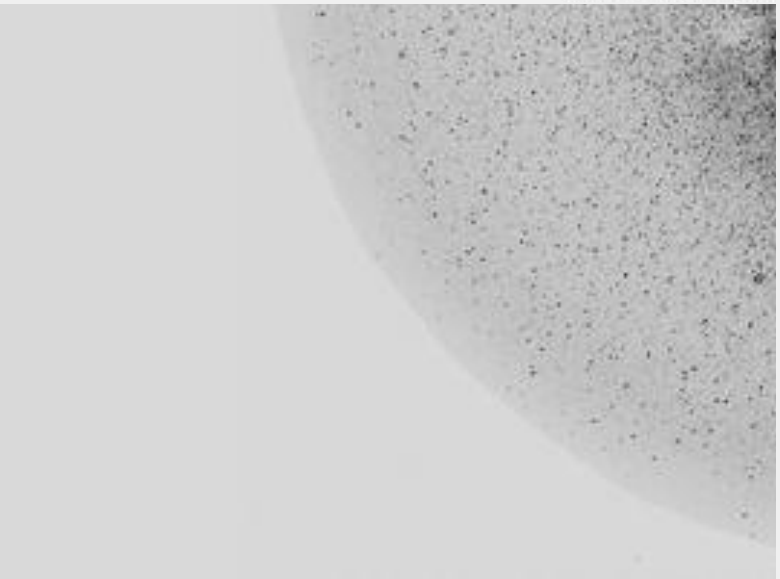


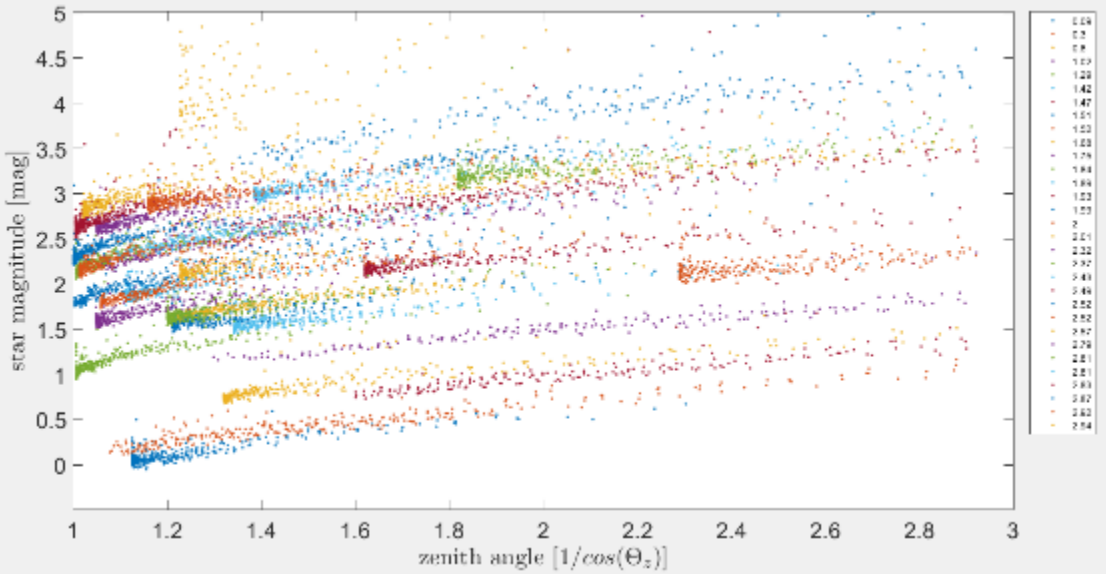


star visibility by Dusan, Mira & Los Leones ASC

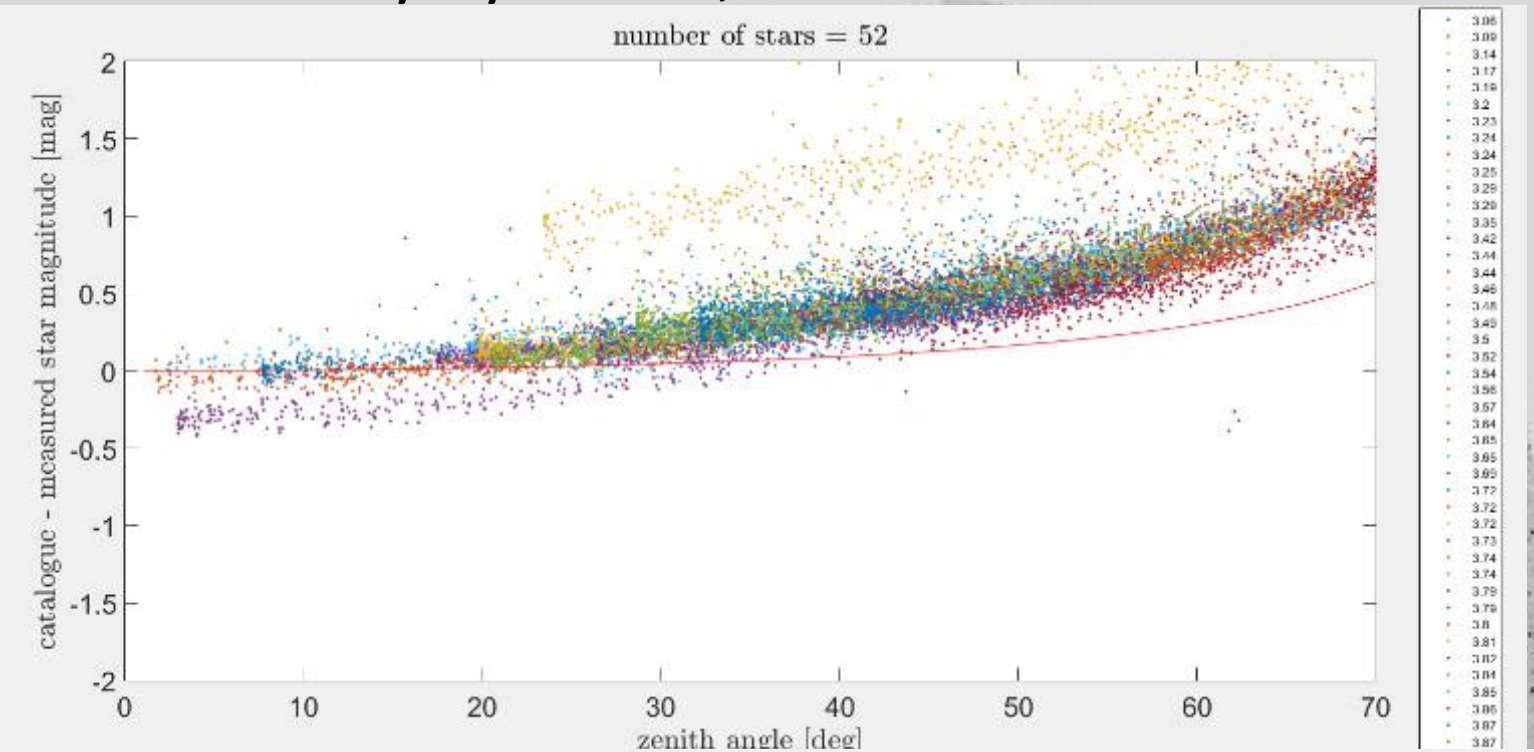


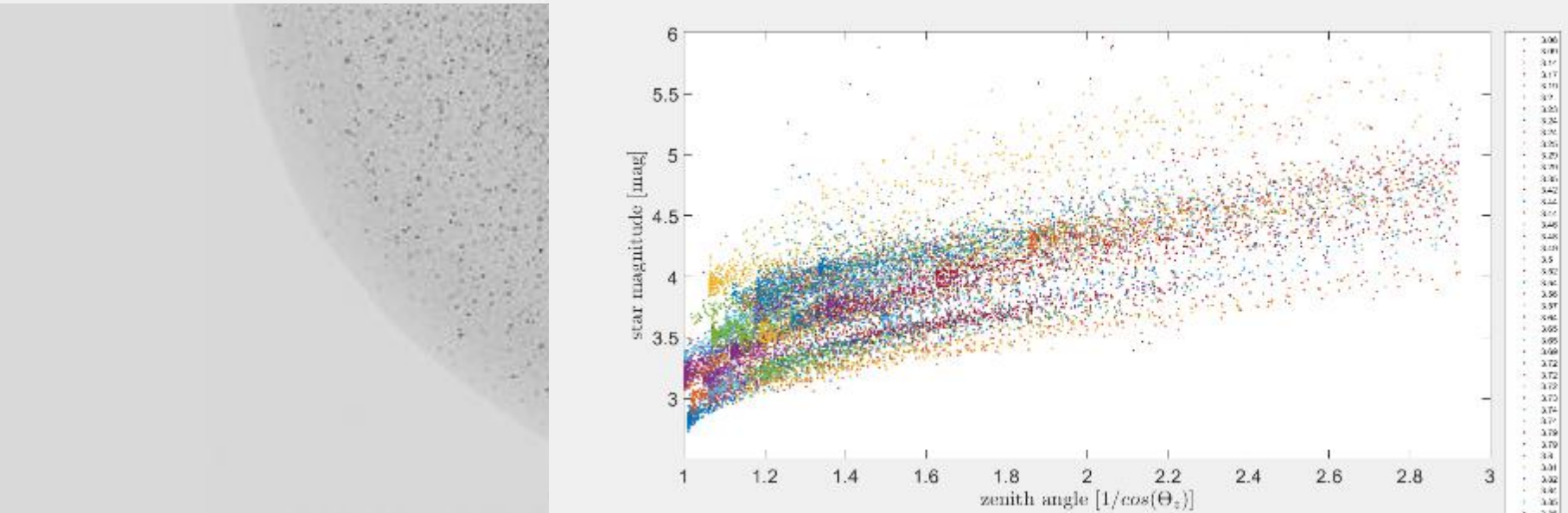


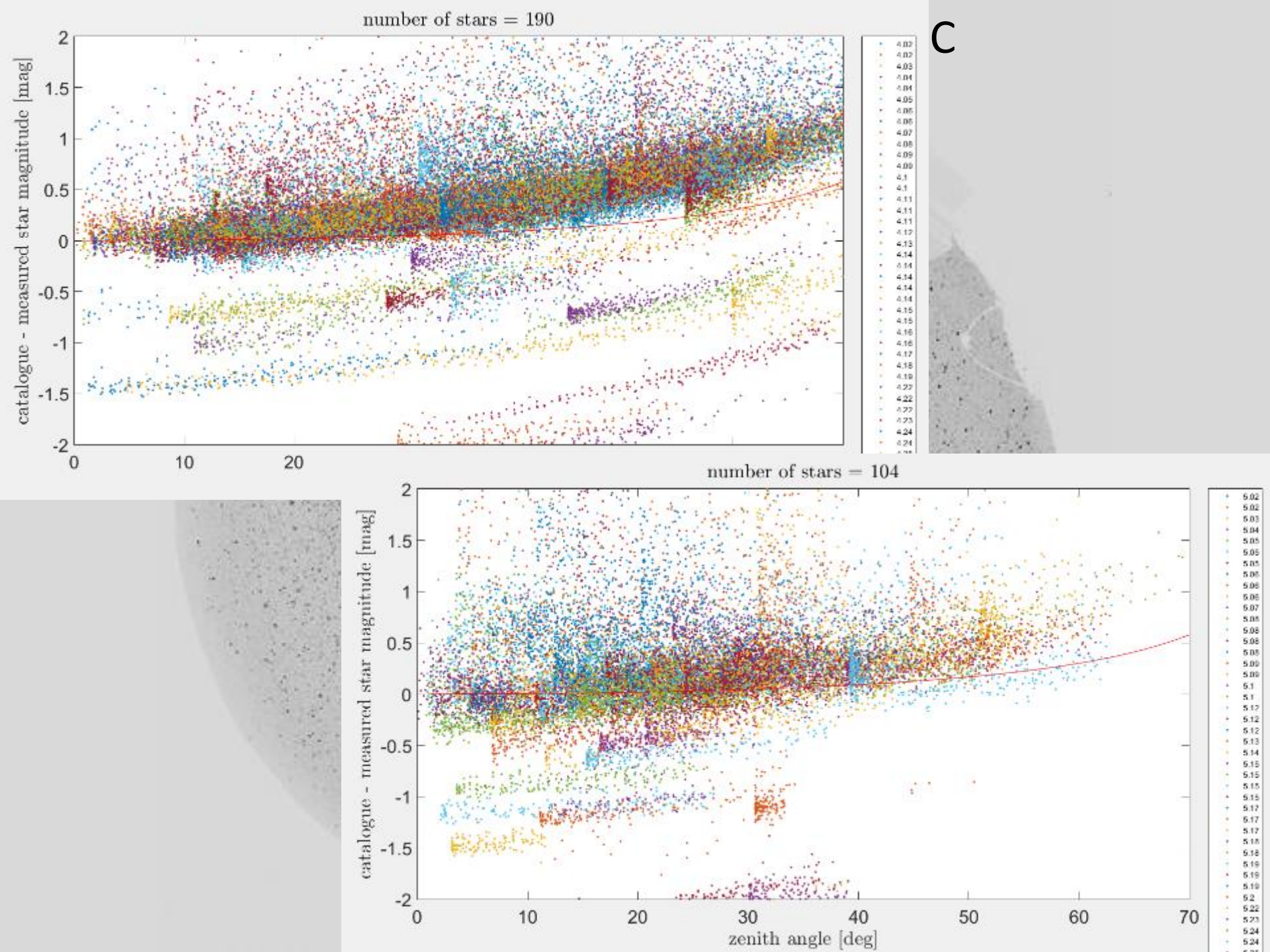




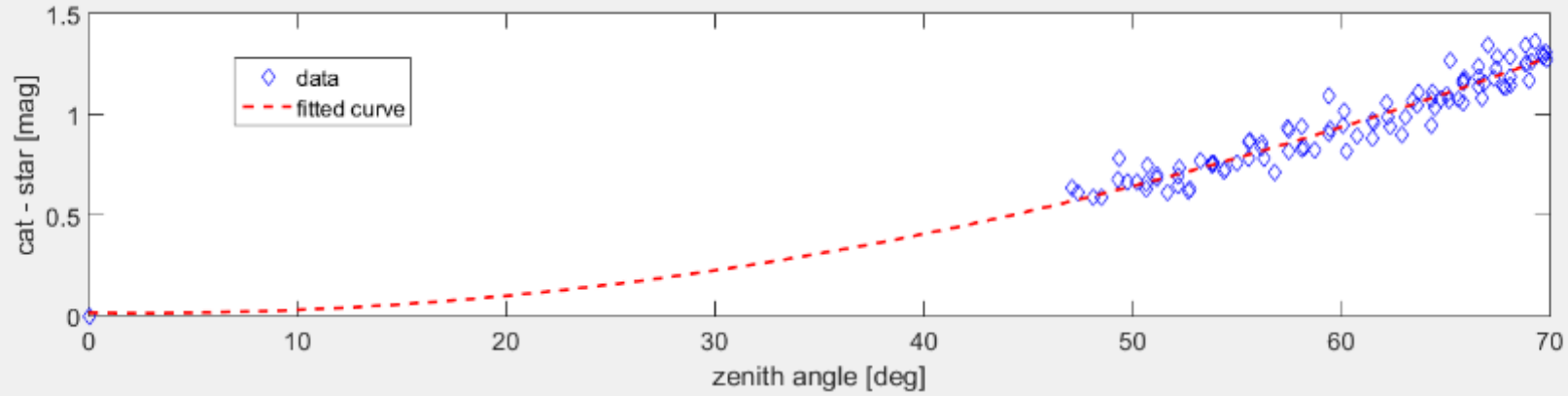
star visibility by Dusan, Mira & Los Leones ASC

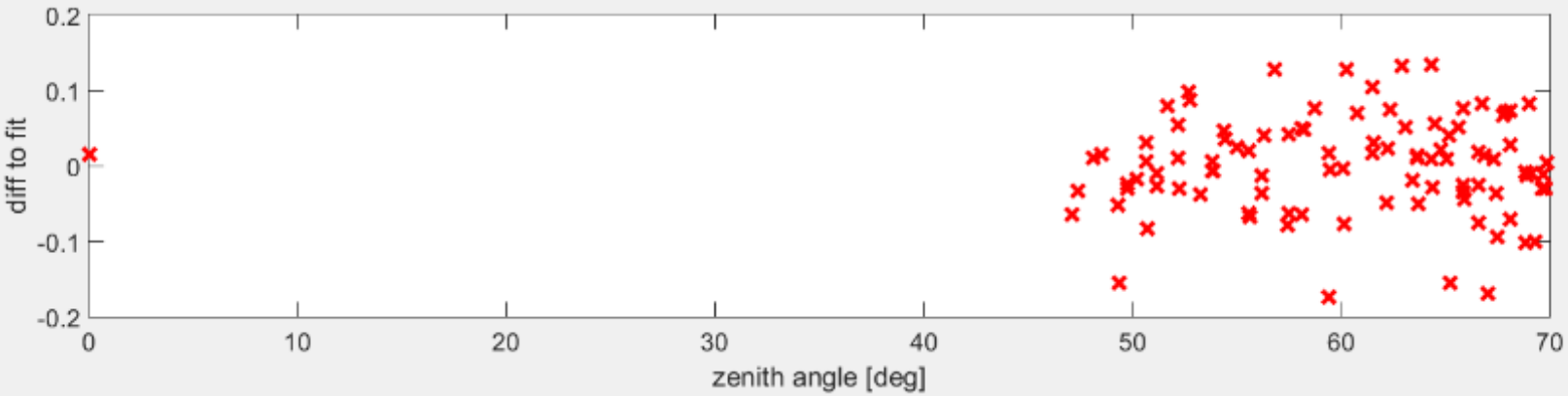




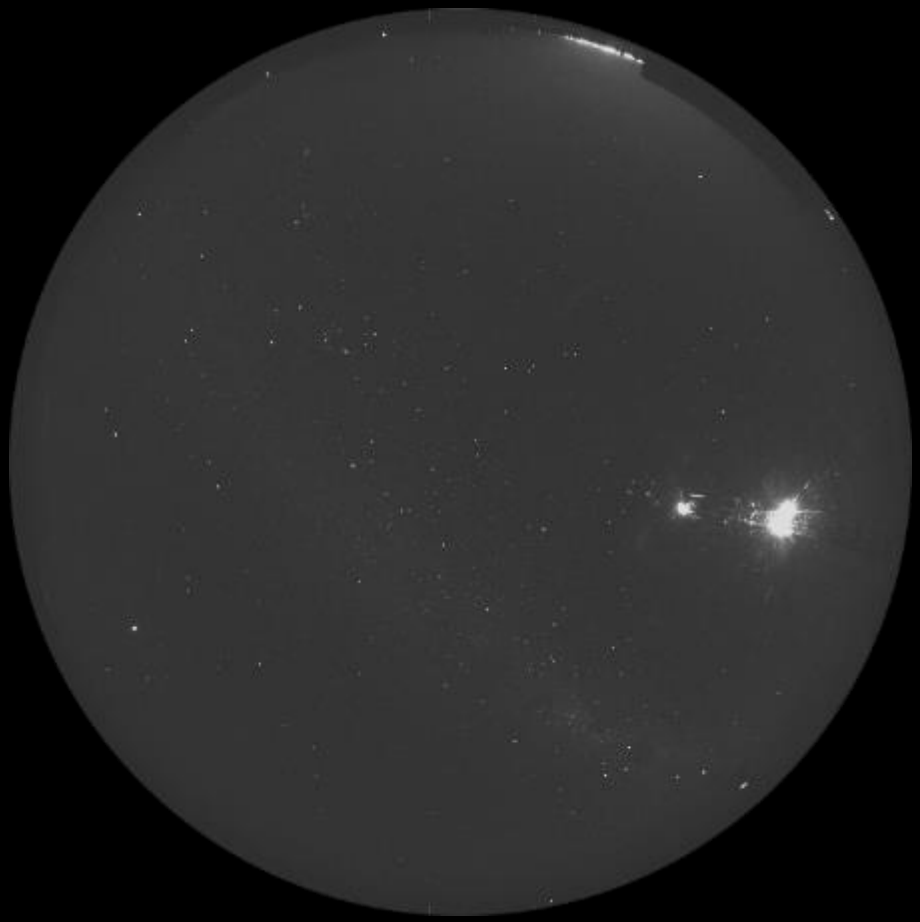

number of stars = 190
catalogue - measured star magnitude [mag]
C
number of stars = 104
catalogue - measured star magnitude [mag]
zenith angle [deg]

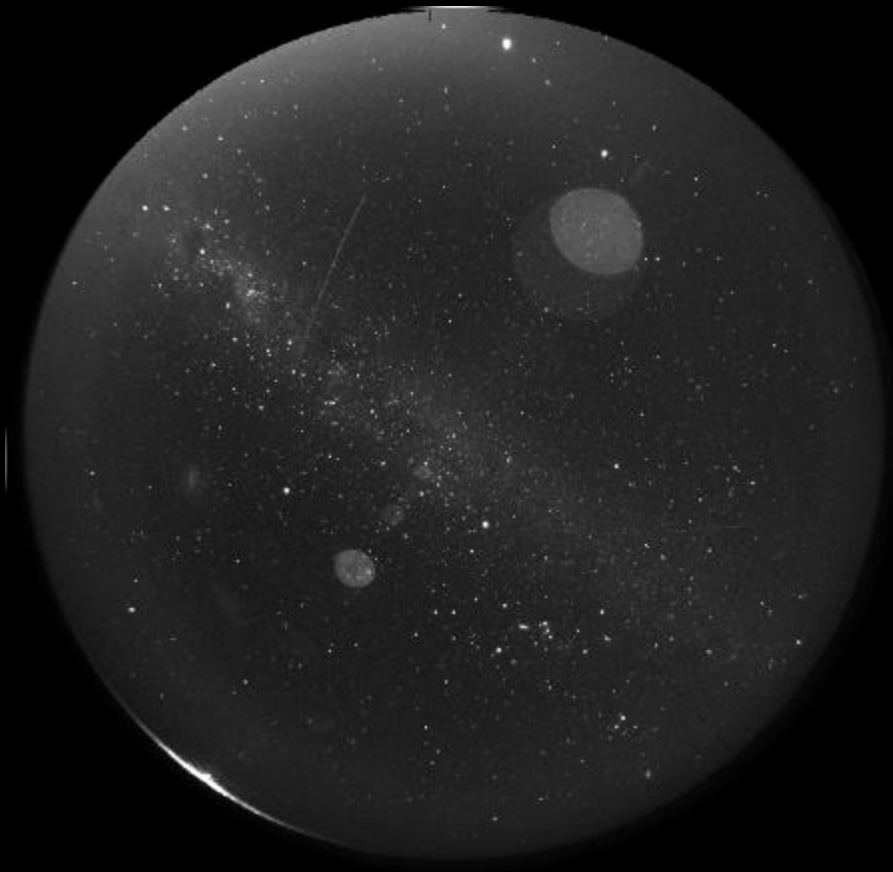
star visibility by Dusan, Mira & Los Leones ASC





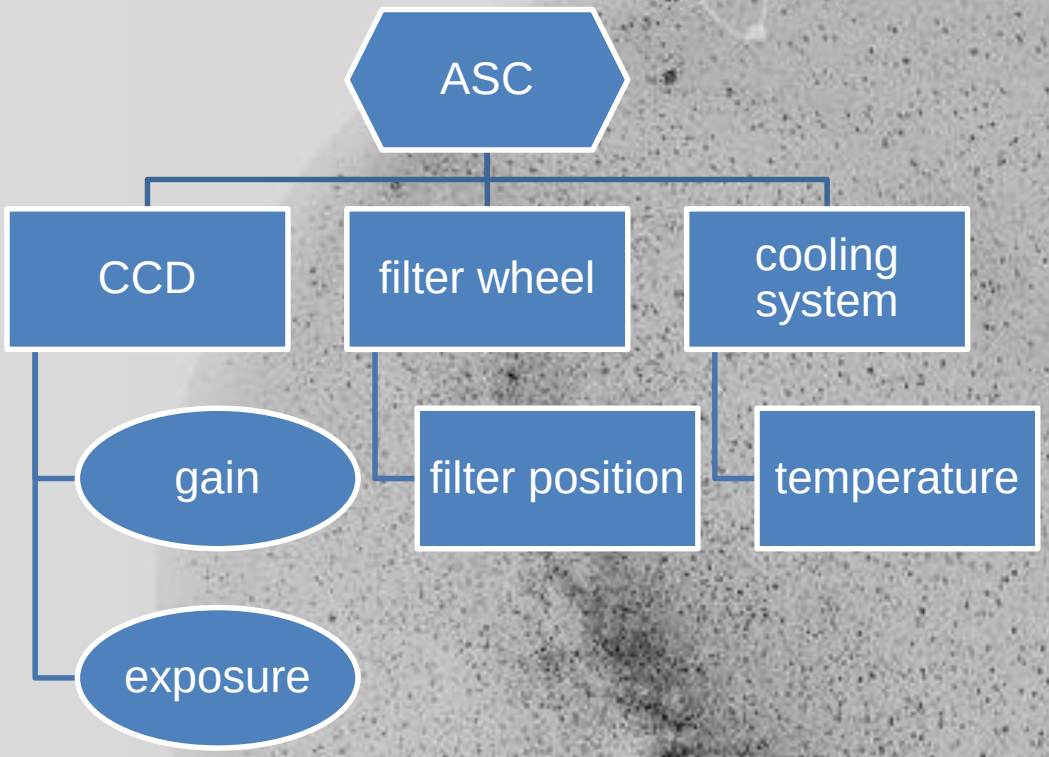
Star 3.7 mag





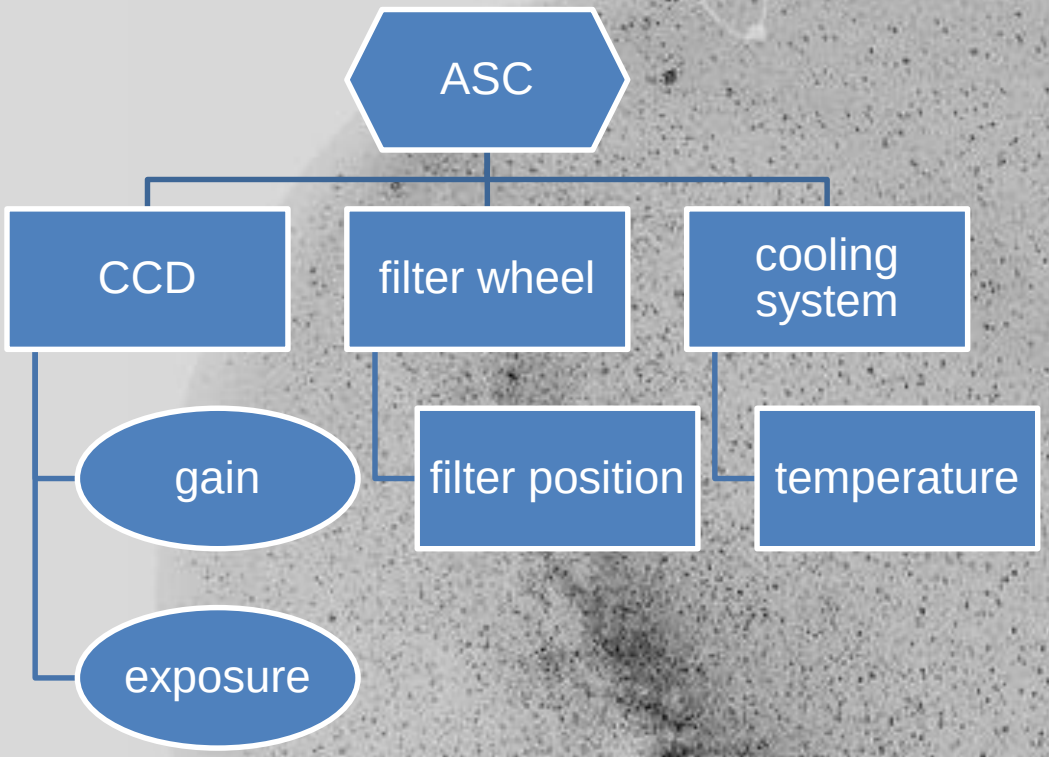

2015/11/21 08:31:27 UTC

ACTL inputs



Gain – get/set
Exposure – get/set
Filter wheel - get/set
Temperature – get/set

ACTL inputs



CTAS.ASC01.CCD.DVR.Filter_wheel_position
CTAS.ASC01.CCD.DVR.Exposure

Conclusions:

Clouds map algorithm in development

ASC LP & ARM in operation

10k files LaPalma – 200 GB

3k Armazones 2K – 30 GB (limited speed of the Wi-Fi link)

Atmosphere transparency analysis in progress