

SPASE - AMANDA

A First Look @ 2002 Data

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SPASE-II

Overview

- **Steep decrease of flux after the *Knee* is not understood**
- **MC does not predict a sharp *Knee* !**
- **Data shows the *Knee* around 3-4 PeV**

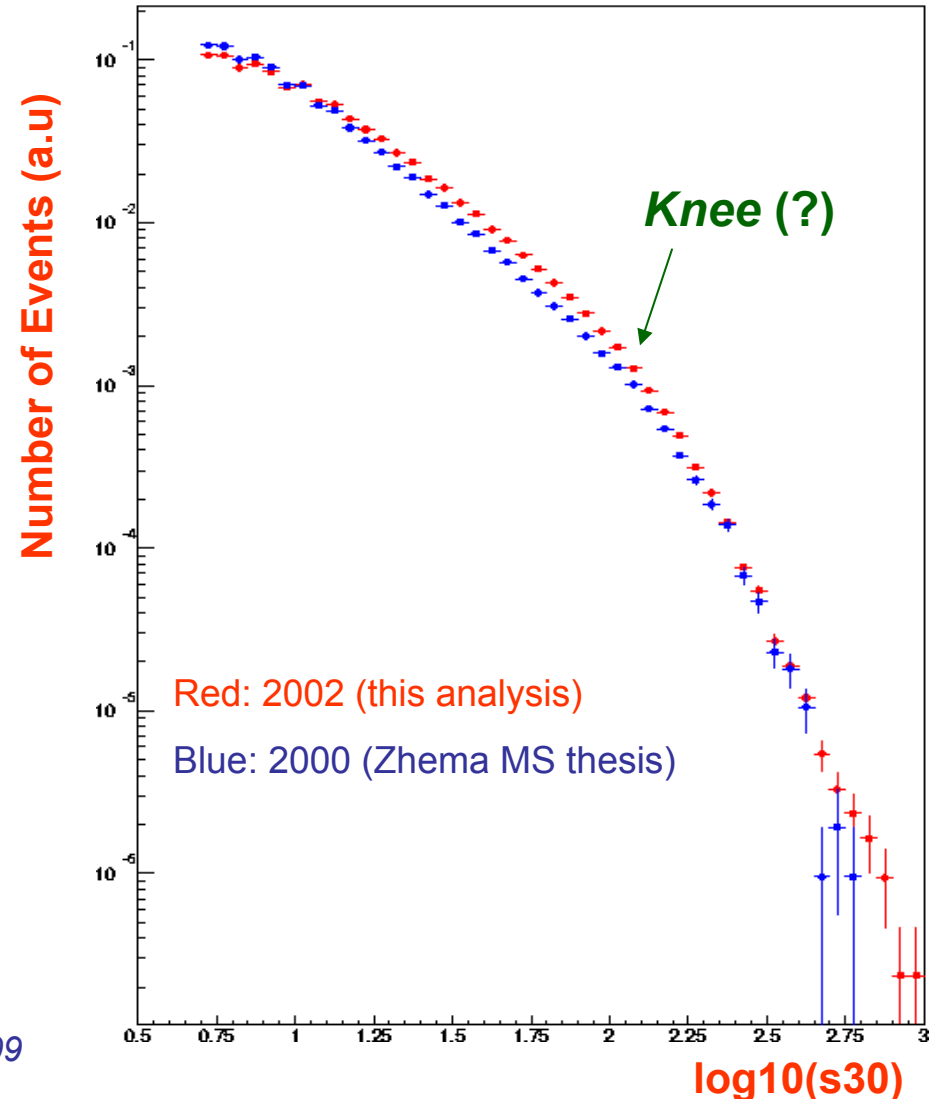
Is this a saturation problem?

What is saturating?

- **DAQ electronics**
- **PMT bases**

$$S30 \sim E^{1.09}$$

(S30 is the particle density at 30m from the shower core)



Hardware & Software Changes

- 2000 (June-November)
 - 2 out of 4 modules in each station was turned off
- 2001 (June-November)
 - trigger threshold increased to 10 fold (from normal operation of 4 fold)
- 2002
 - splitter gains reduced to half, discriminator thresholds reduced
 - data swamped by x-talk events

New software structure is introduced for 2002 data

- new calibration to accommodate lower gains
- hit cleaning (hits with $LE > 4$ not used – these are all x-talk hits)
- hit selection (only hits with proper ADC, TDC pair are used)
- event cleaning (X-talk filter)

1 day's data process time is reduced from 18 hrs to 3 hrs

CR Spectrum

$$\frac{dN}{dE} \propto E^{-2.7} \quad E < 3.10^{15} \text{ eV}$$

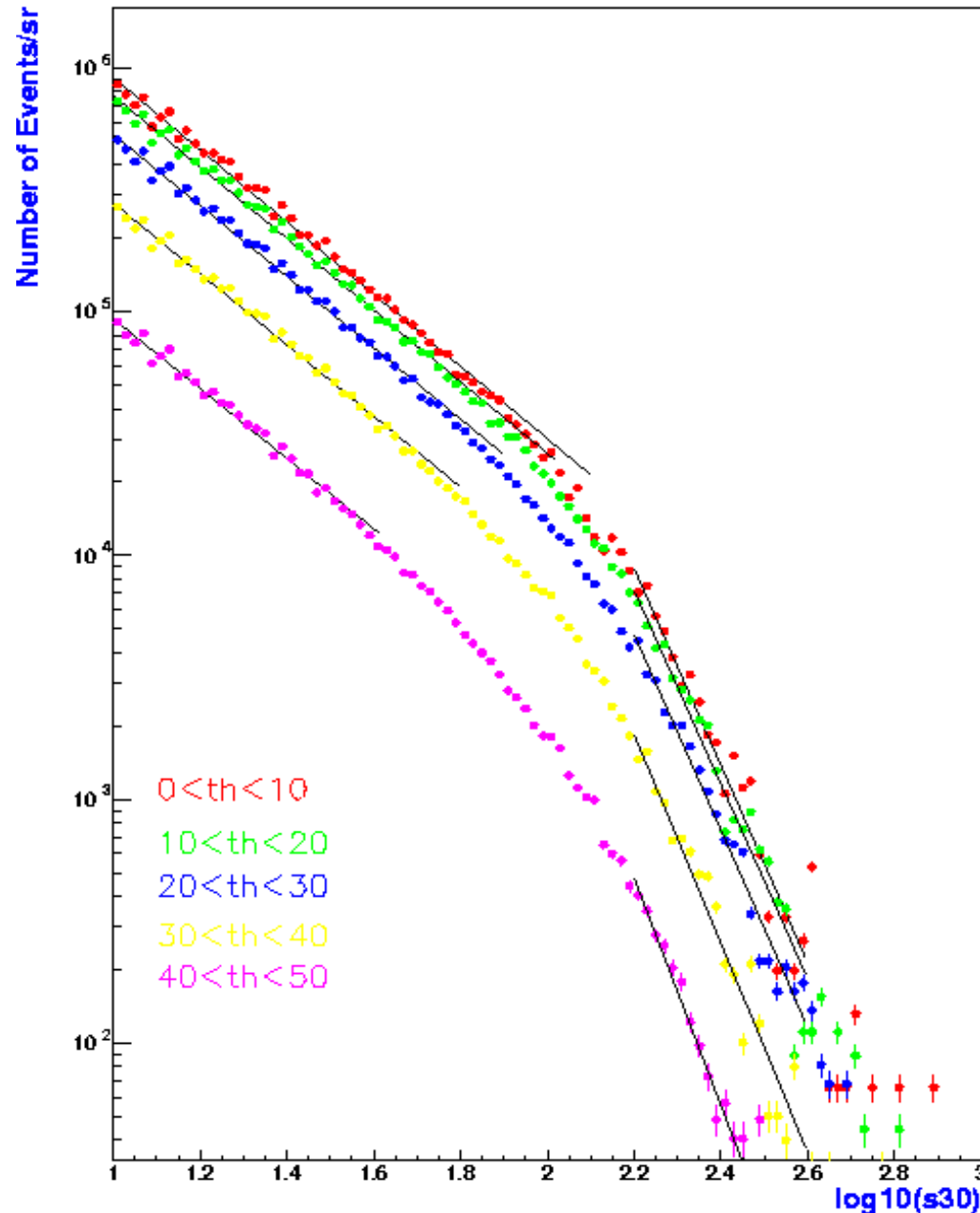
$$\frac{dN}{dE} \propto E^{-3.0} \quad E > 3.10^{15} \text{ eV}$$

$$Flux = \frac{dN / dE}{(T_{life})(A_{eff})(\Omega)}$$

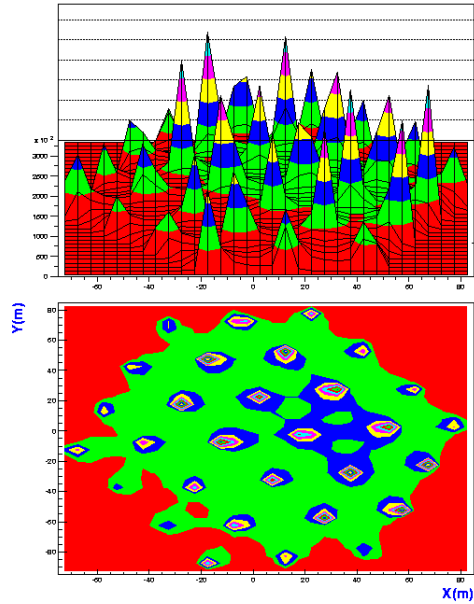
A_{eff} = constant is used so far !

$A_{eff}(E)$ is more realistic

A_{eff} decreases with E

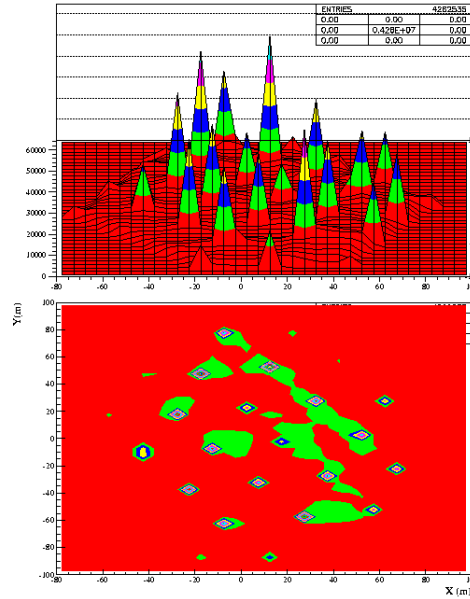


Core Locations



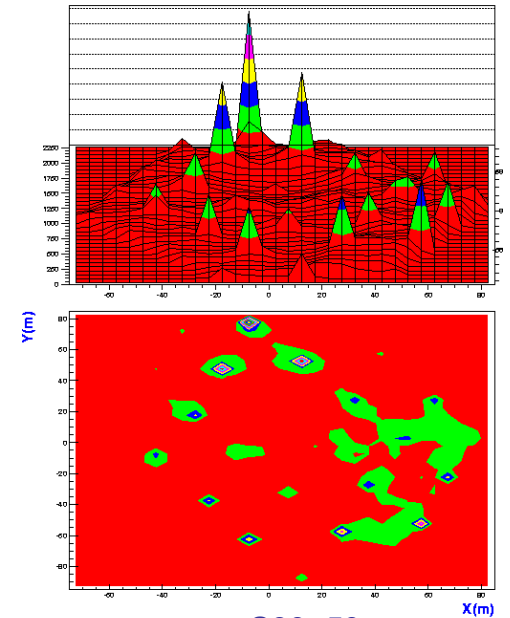
S30>0

Core Locations



S30>5

Core Locations



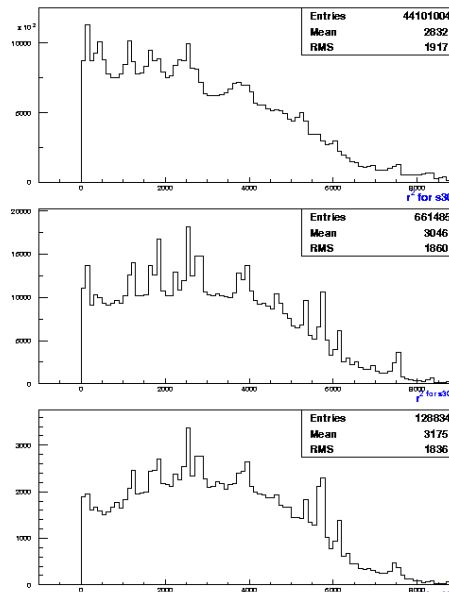
S30>50

snow drift is a problem

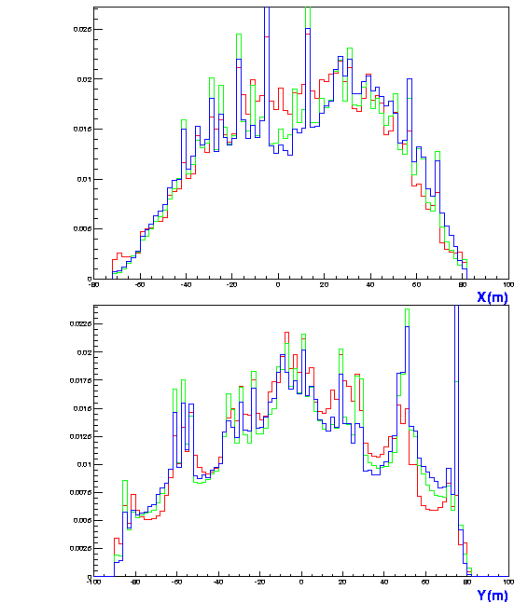
30cm (front of the shack)
to
3m (behind the shack)
in the prevailing wind direction

this effect is not in MC

SPASEII 2002 Data 212 Calendar Days



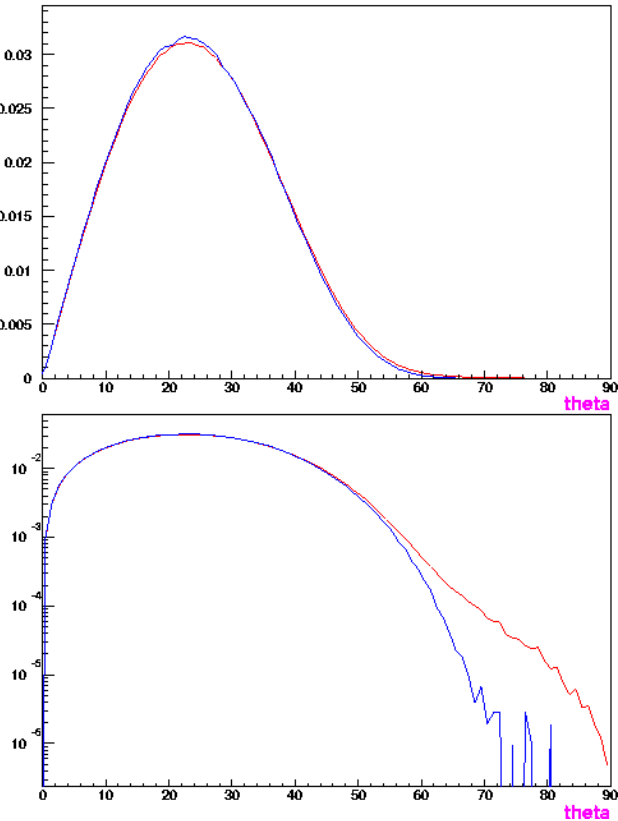
Core Locations



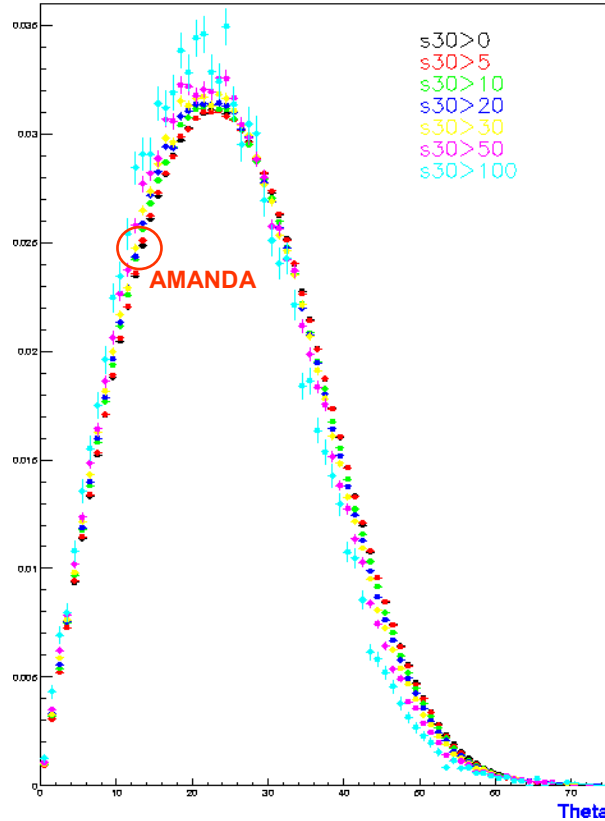
(radius)²

CR theta distribution is well produced up to $\theta = 56^\circ$

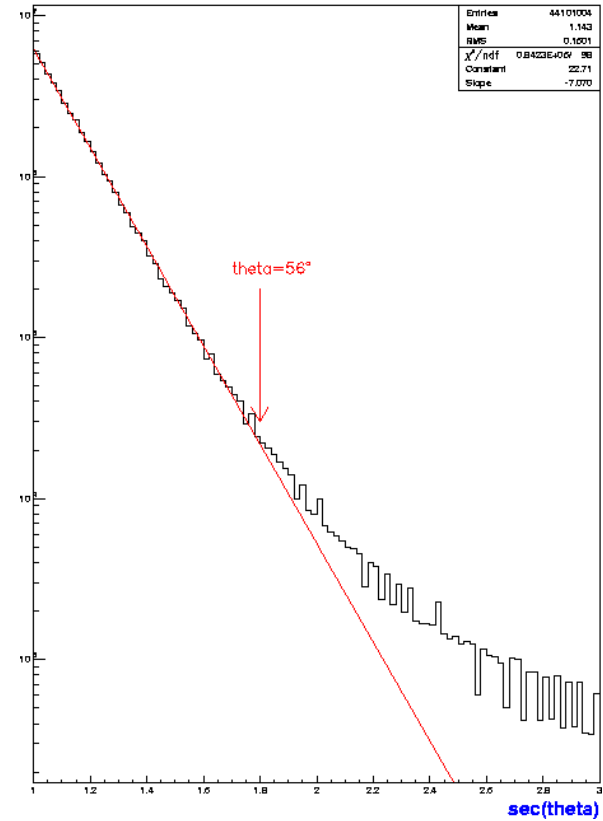
SPASEII 2002 Data 212 Calendar Days



SPASEII 2002 Data 212 Calendar Days



SPASEII 2002 Data 212 Calendar Days



86M events processed

24M identified as Xtalk events

62M events analyzed



44M events reconstruct

(71% reconstruction efficiency)

212 calendar days



lifetime = 192.93 days



Final SPASE rate = 2.63 Hz

Year

AMANDA

SPASE

2002

Filtering run by "ofip", raw triggered data available at Bartol and UW

Splitter gains were changed, resulting in a lower trigger rate/threshold. To compensate, discriminator thresholds were lowered around day 110. Splitter noise a big problem.

2001

Filtered data available at UW

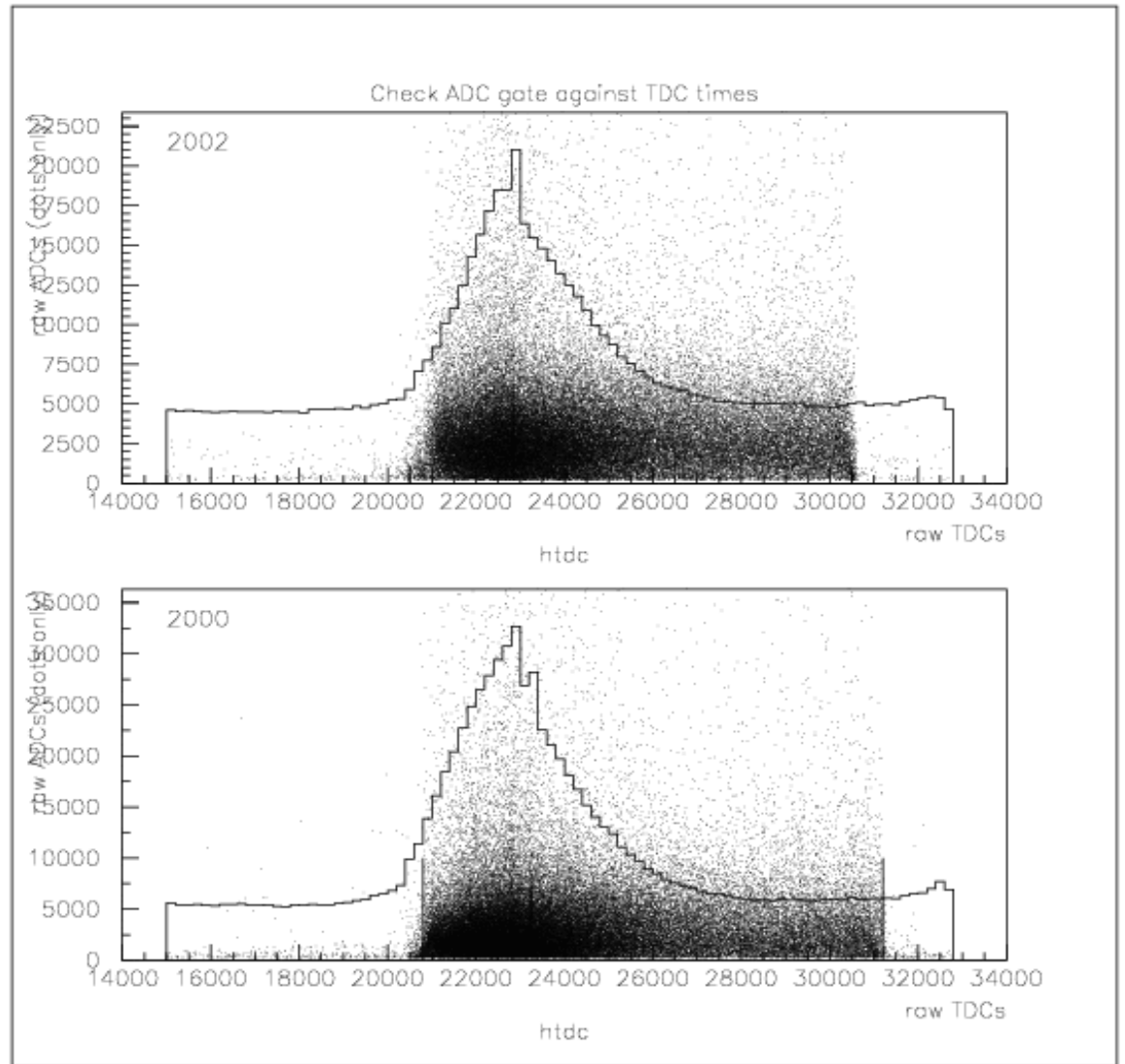
Not running for part of the year (day 84 - day 131). Run normally at 4-fold until day 162, then the multiplicity was turned up to 10 (low threshold detector). Also some modules turned off intermittently in 2nd half of year.

2000

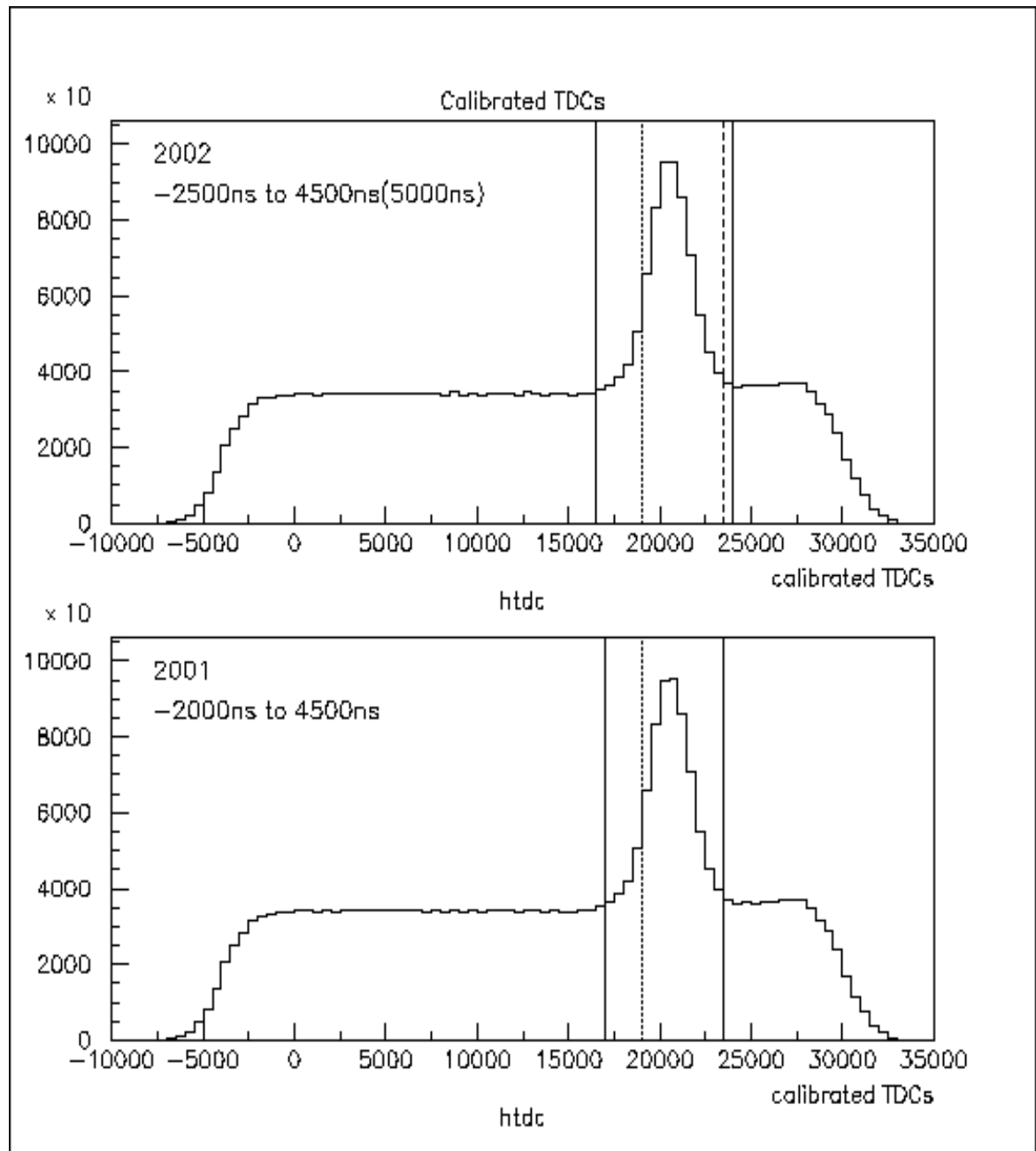
SPASE stream not available- must be pulled out by Zeuthen

Half of the array (2 modules in each station) was turned off for the 2nd half of the year (basically useless). About 50 days of good data.

- **Check the ADC gate**

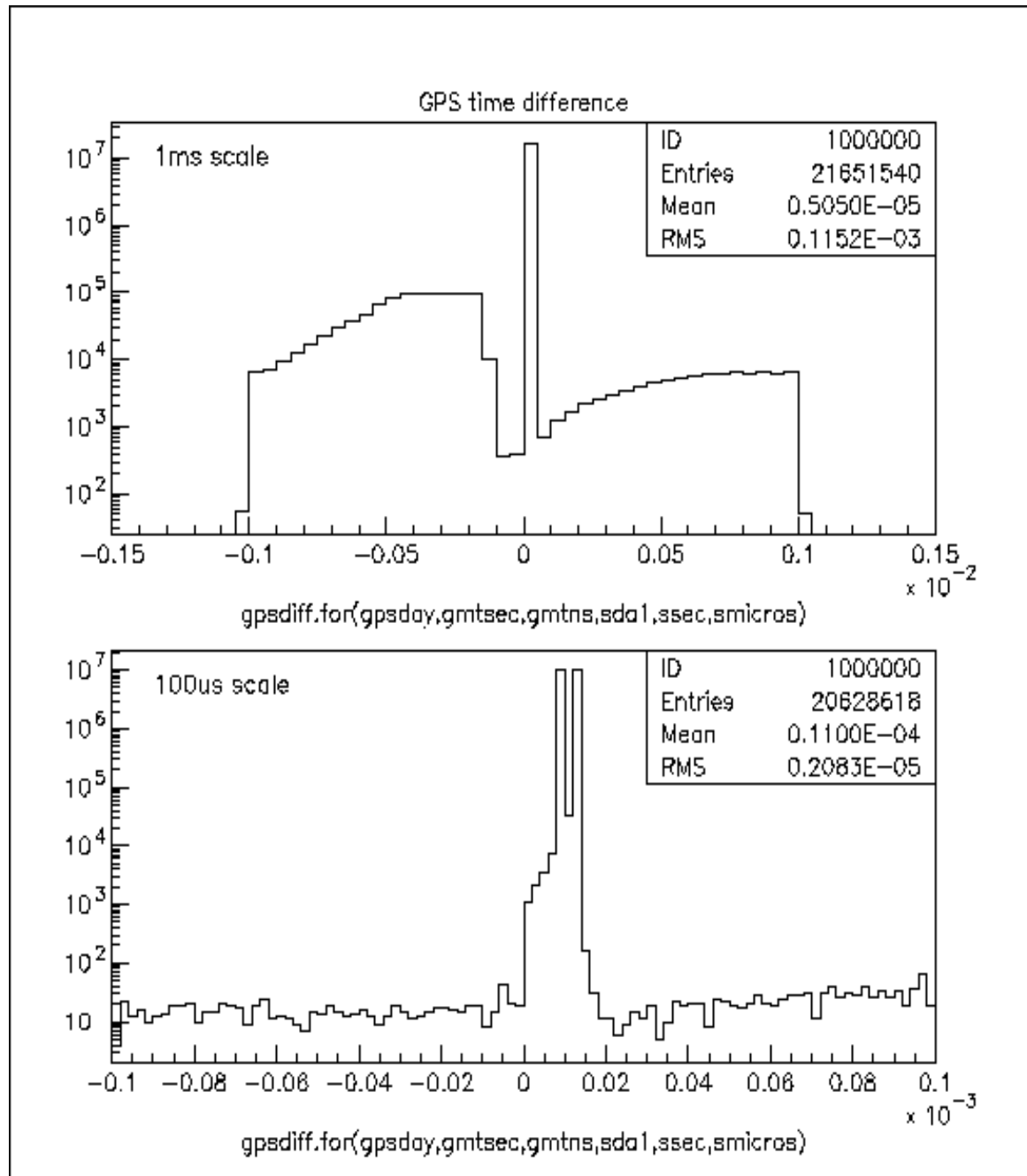


- **Check the TDC's**

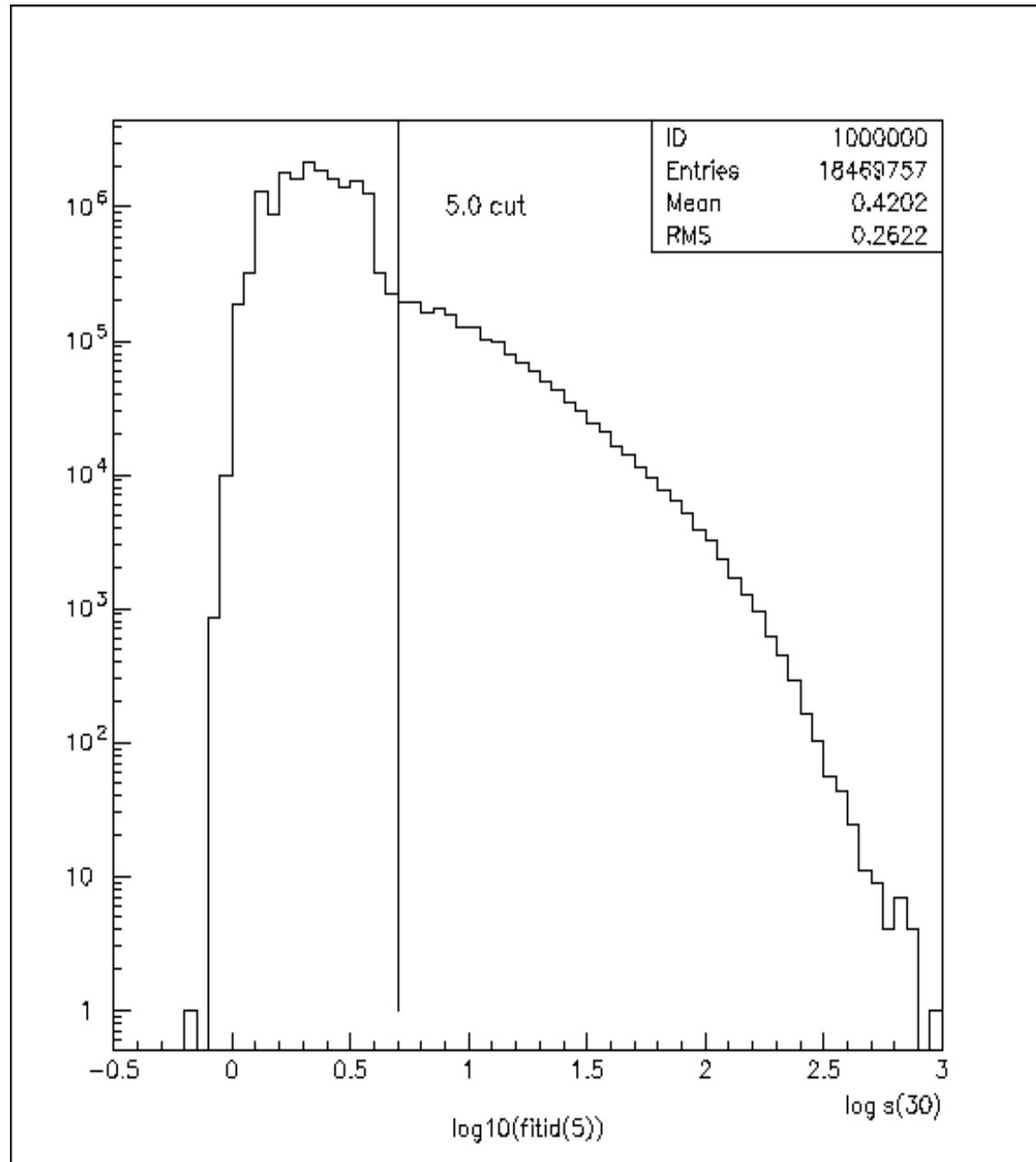


- Check the GPS times

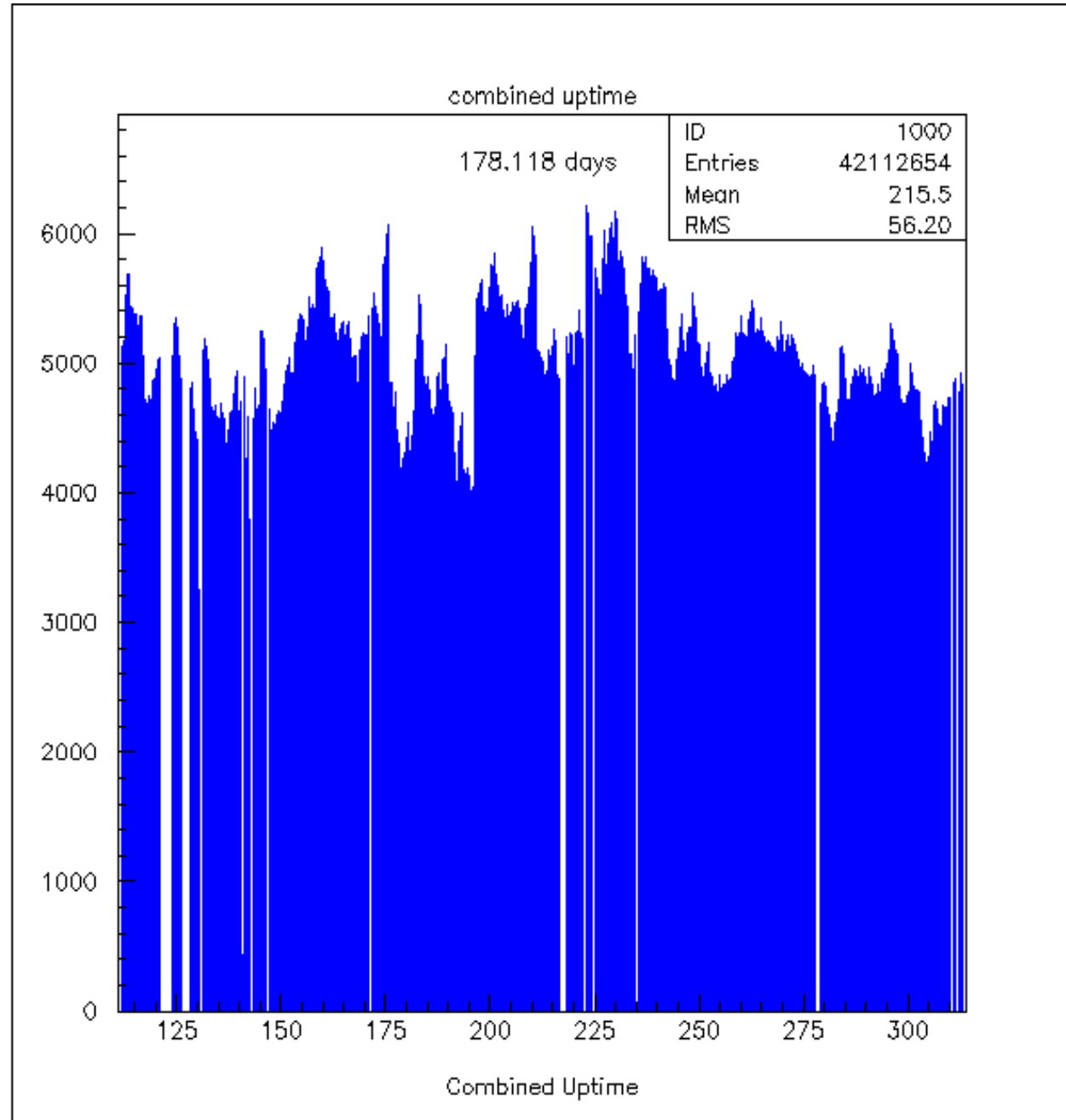
GPS(A)-GPS(S)



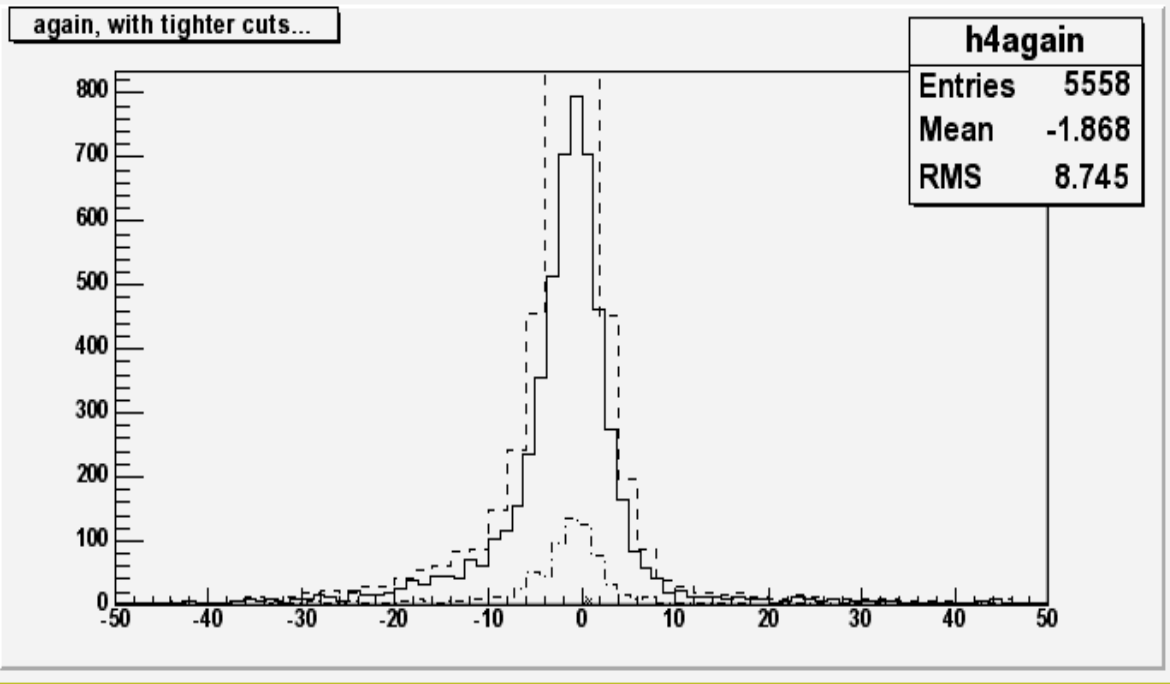
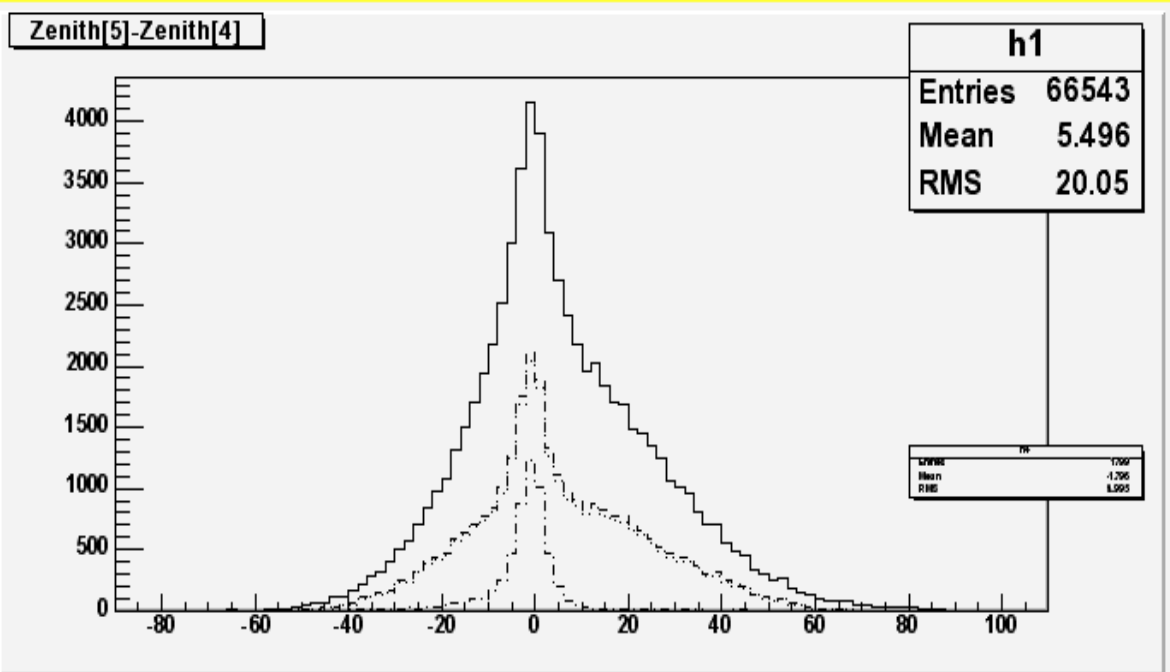
- **The S(30)
spectrum**



- **Combined detector uptime**



- **Do a Level-2 reconstruction and try some cuts**



- NdirB
- LdirB
- logLup-logLdown
- szyldirc
- Δ GPS
- s30
- SPASE track dir

Angular Resolution

& Pointing

$$\sigma_{63}^{B10} = \sqrt{(\sigma_{63}^{S2B10})^2 - (\sigma_{63}^{S2})^2}$$

$$\sigma_{63}^{S2} = 1.5^\circ$$

B10: $\sigma_{63}^{S2B10} = 5.2^\circ$

$$\sigma_{63}^{B10} = 4.9^\circ$$

median = 3.8

zenith offset = 1.5deg

AI: $\sigma_{63}^{S2AI} = 3.0^\circ$

$$\sigma_{63}^{AI} = 2.6^\circ$$

median = 2.4

zenith offset = 0.5deg

