

Observations of Extragalactic TEV Candidates

- The Candidates
- SED Models
- IR Absorption
- Data Set
- Sensitivity to DEC and redshift

Costamante et al 2001

28 sources

BL Lacs

Bright in Radio and X-ray

Flux Predictions using 2 models

Model 1

Parameterized SED as in Fossatti et al

Model 2

Synchrotron Self Compton

Does not include IR absorption

Also of interest

Stecker and de Jager

X-ray selected BL Lacs

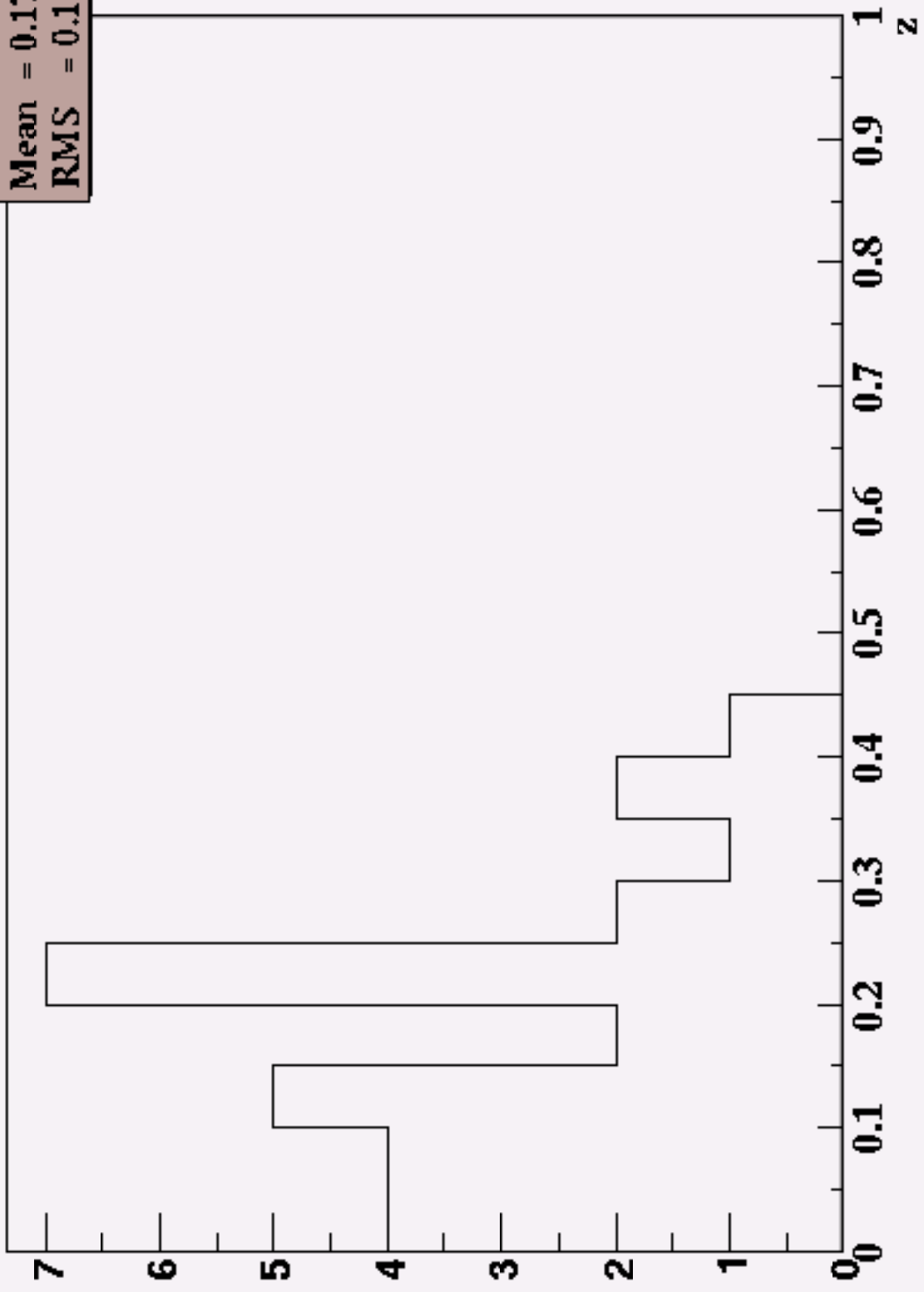
Low redshifts

SSC Model

Includes IR absorption

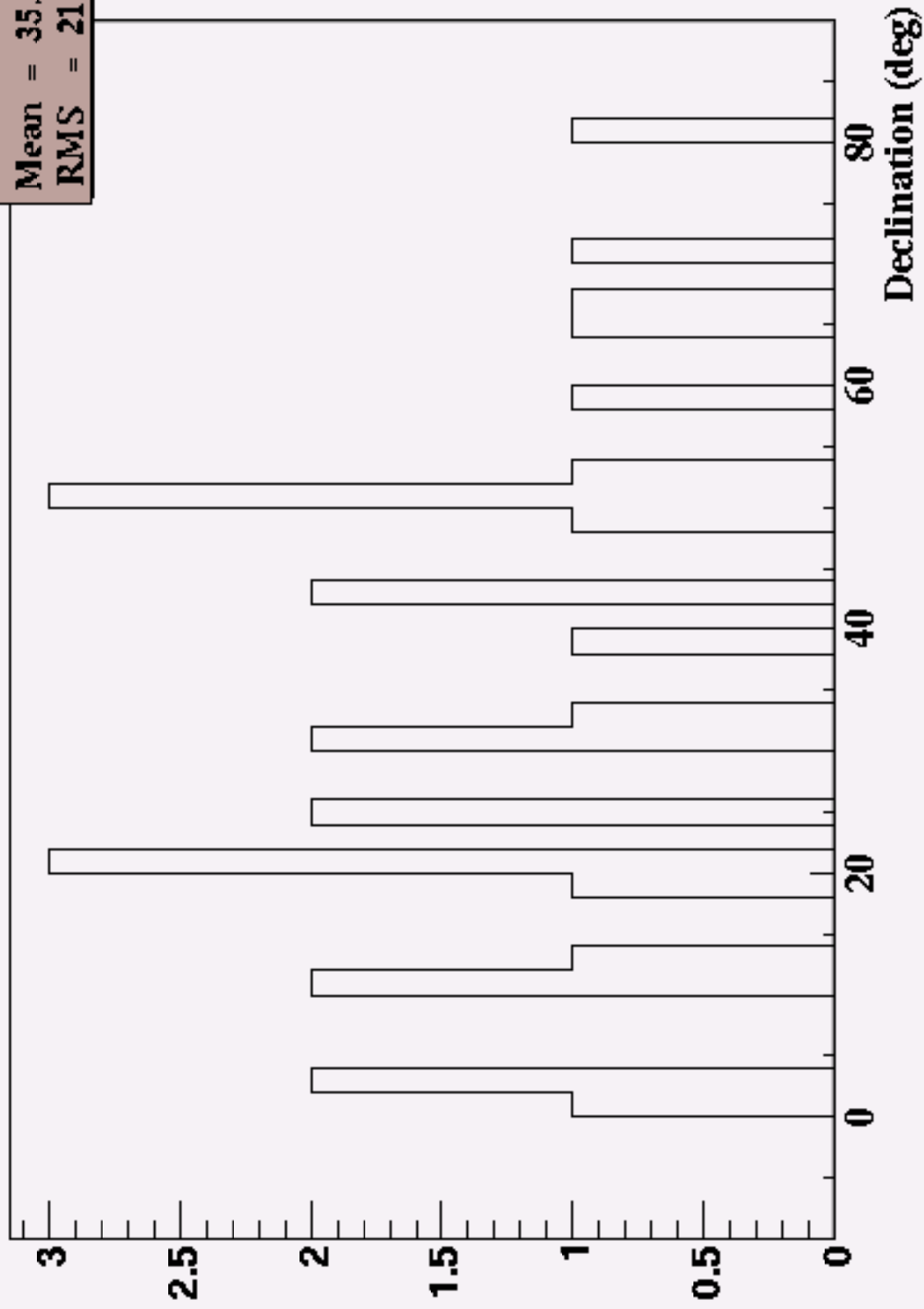
Redshift

zdist
Nent = 28
Mean = 0.1785
RMS = 0.1057



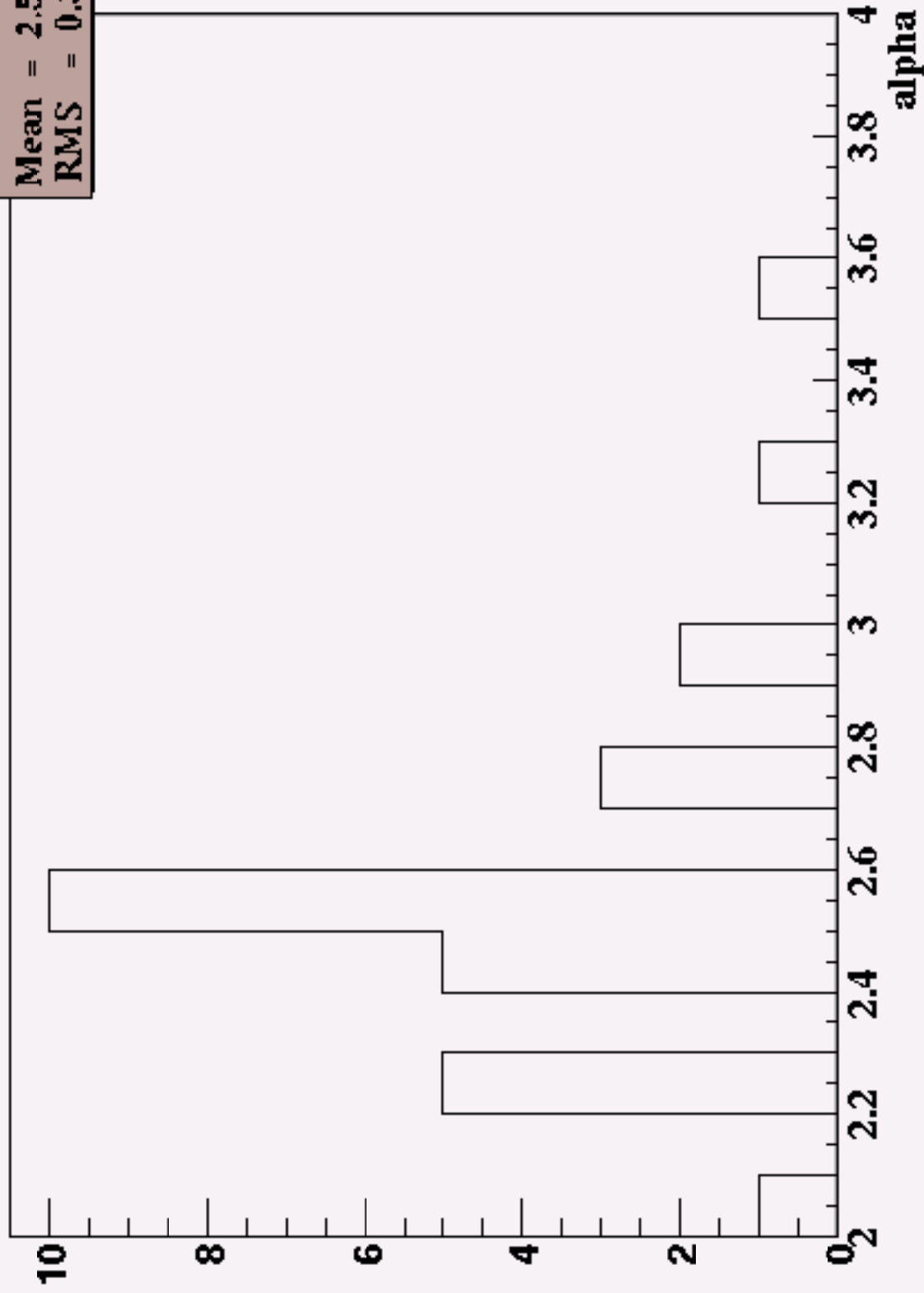
Declination

decdist
Nent = 28
Mean = 35.34
RMS = 21.92

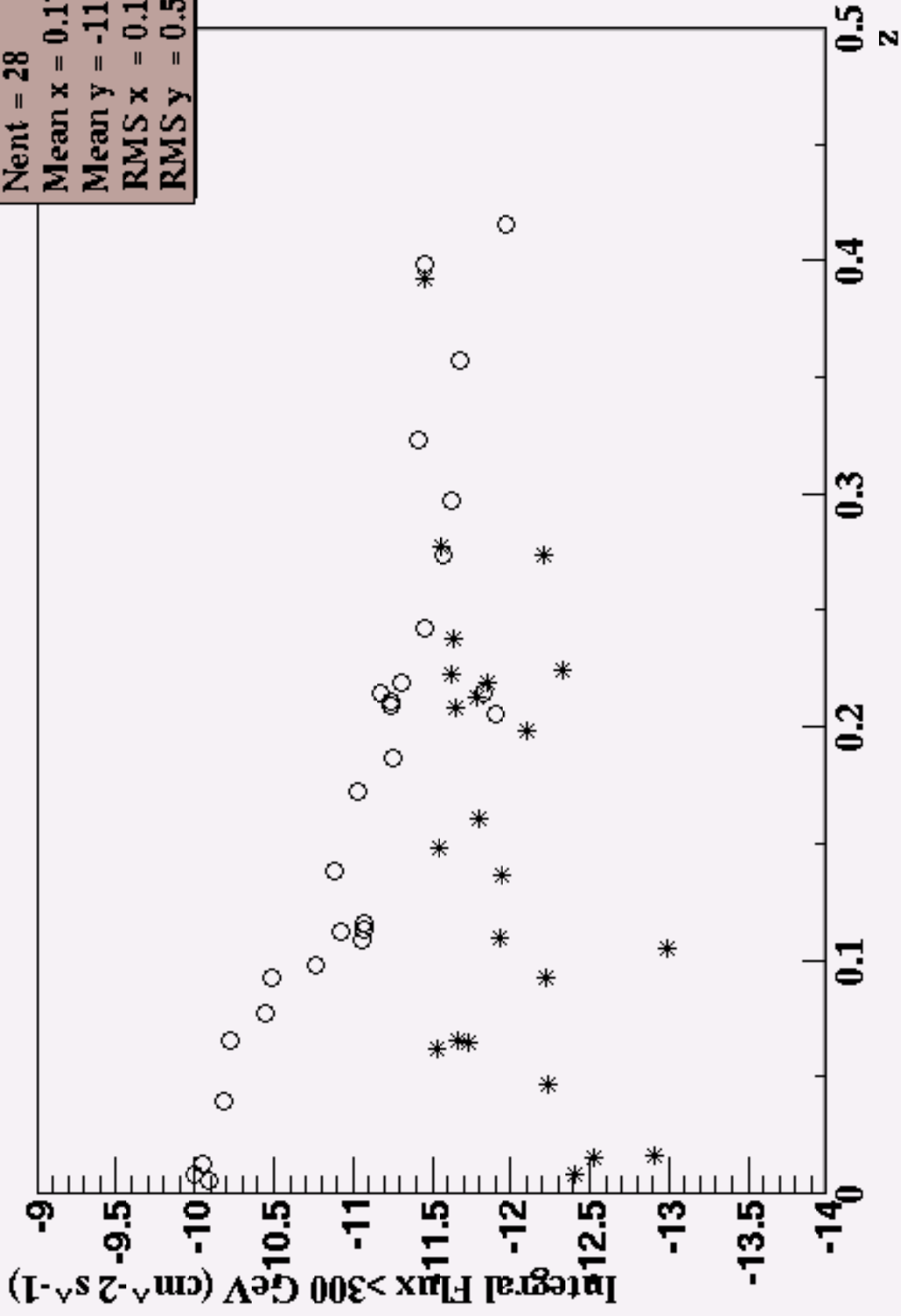


Spectral Index

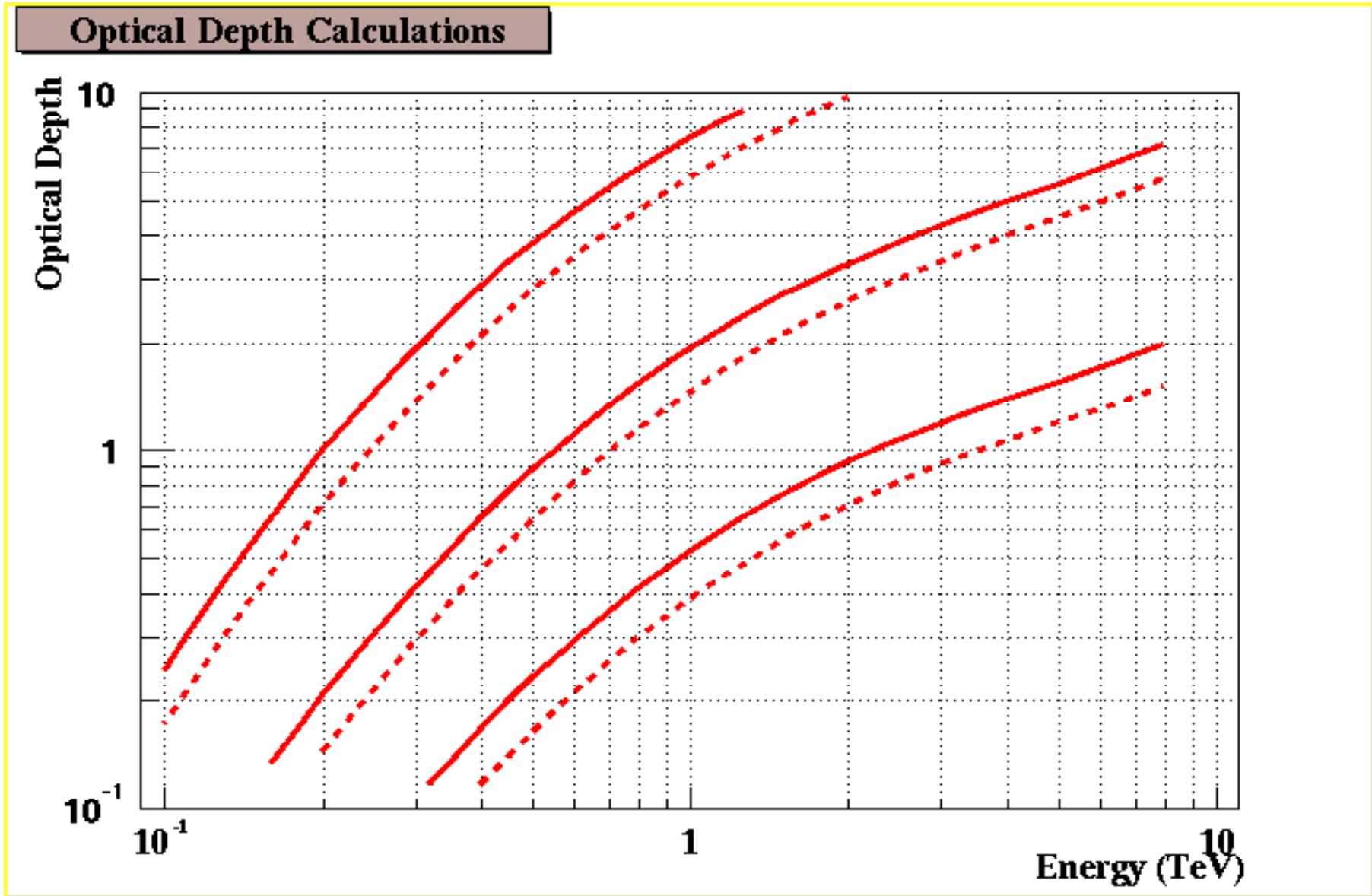
adist
Nent = 28
Mean = 2.563
RMS = 0.328



Flux Predictions by Redshift

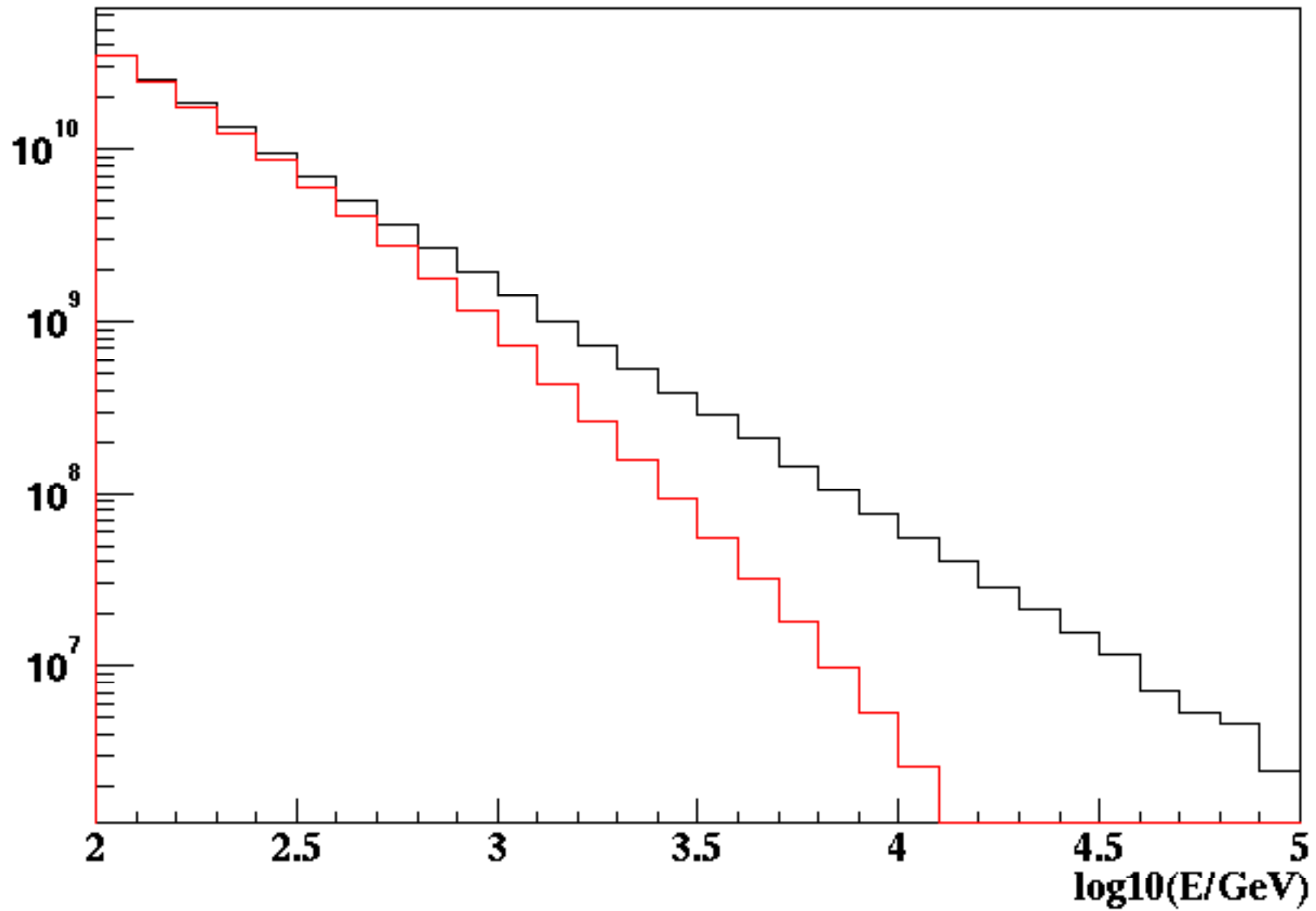


IR Absorption: Stecker and de Jager
Dotted: Model1, Solid: Model 2
Shown: $z=0.03$, $z=0.05$, $z=0.1$

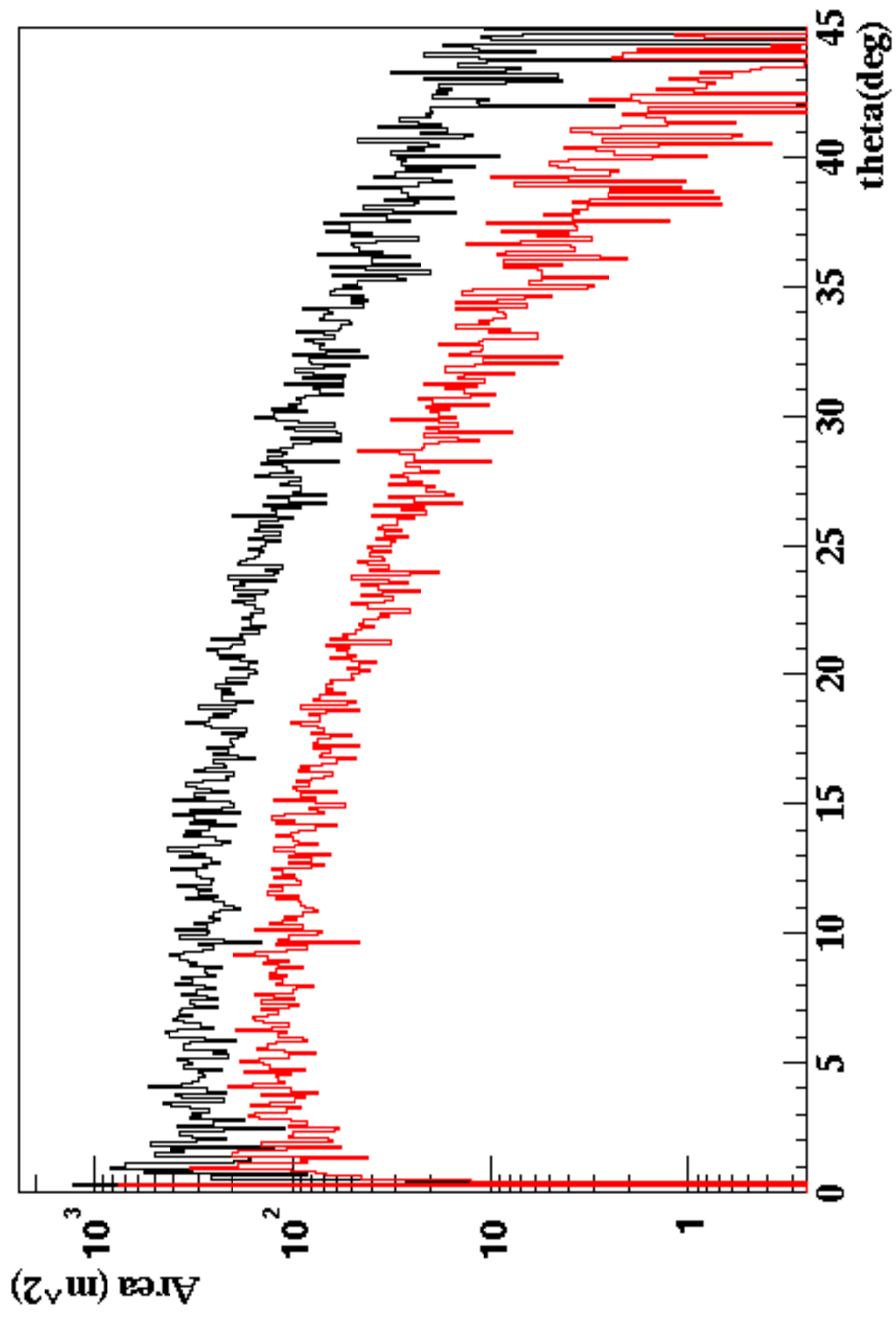


Red: $z=0.05$ Black: $z=0$

Energy Spectra with and without IR absorption



Effective Area



Data

Dec 15 2000: Greg's Core Fitter online

Feb 12 2003: Outrigger Core Fitter online

Exposure: 721.5 days

Analysis

NFit>20

X²>2.5

2.1 deg smoothed square bins

Crab

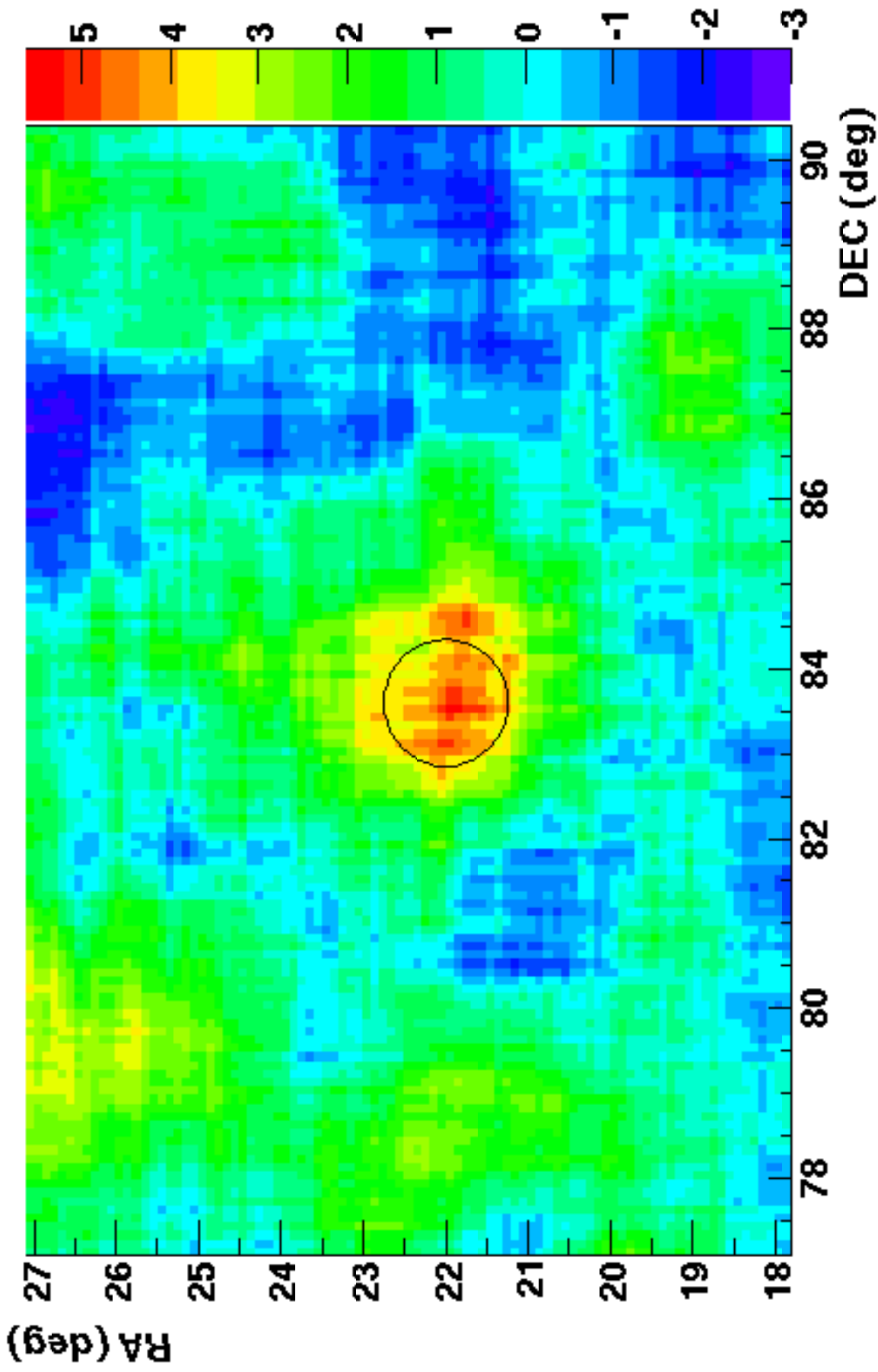
On: 1866574

Off: 1860197.5

Excess: 6376.5

Significance: 4.85 sigma

Crab Significance: 2.1 deg bin, 4.85 σ in Crab bin



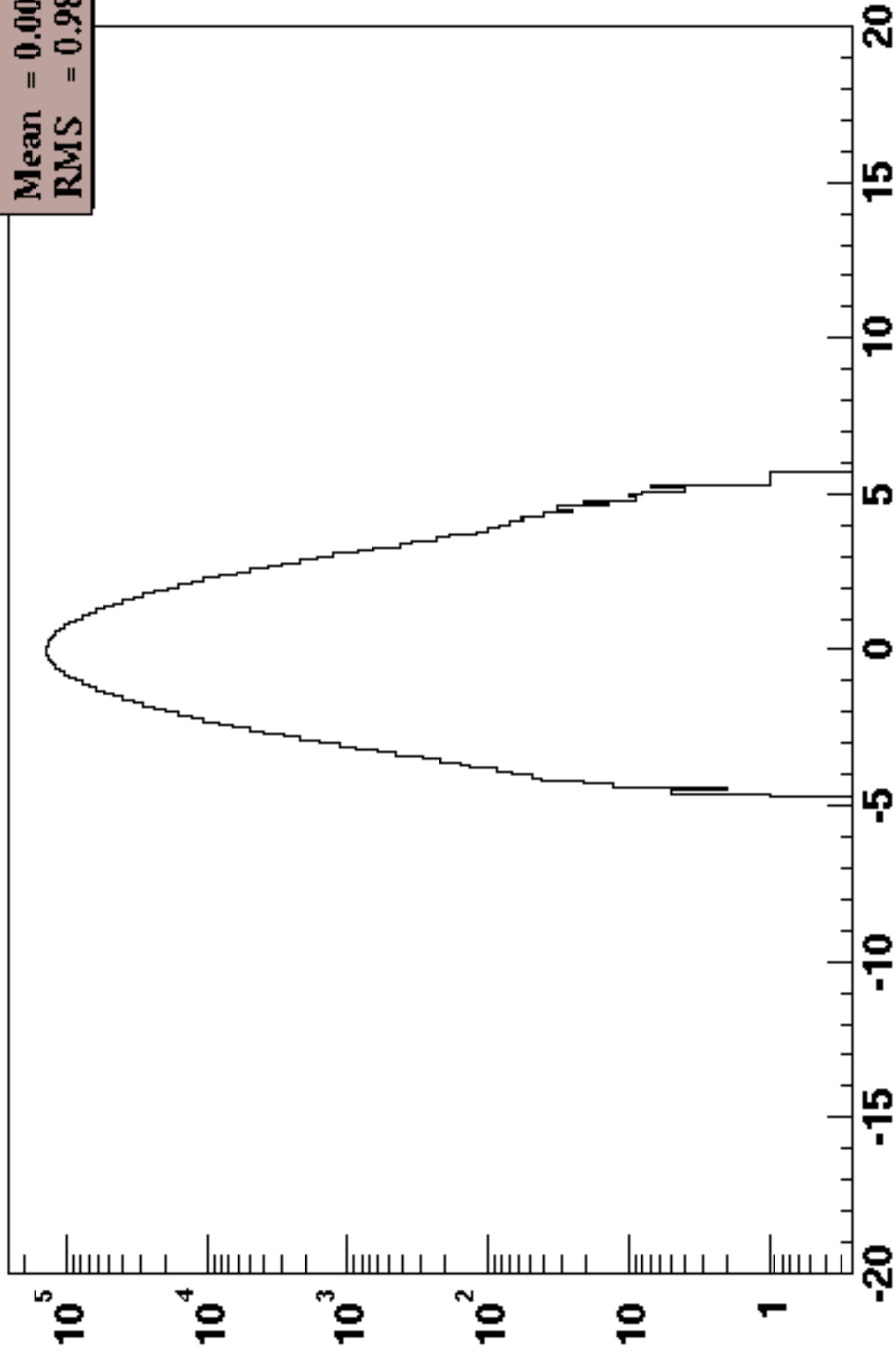
All Sky Distribution of Excesses Oversampled

SIGDIST

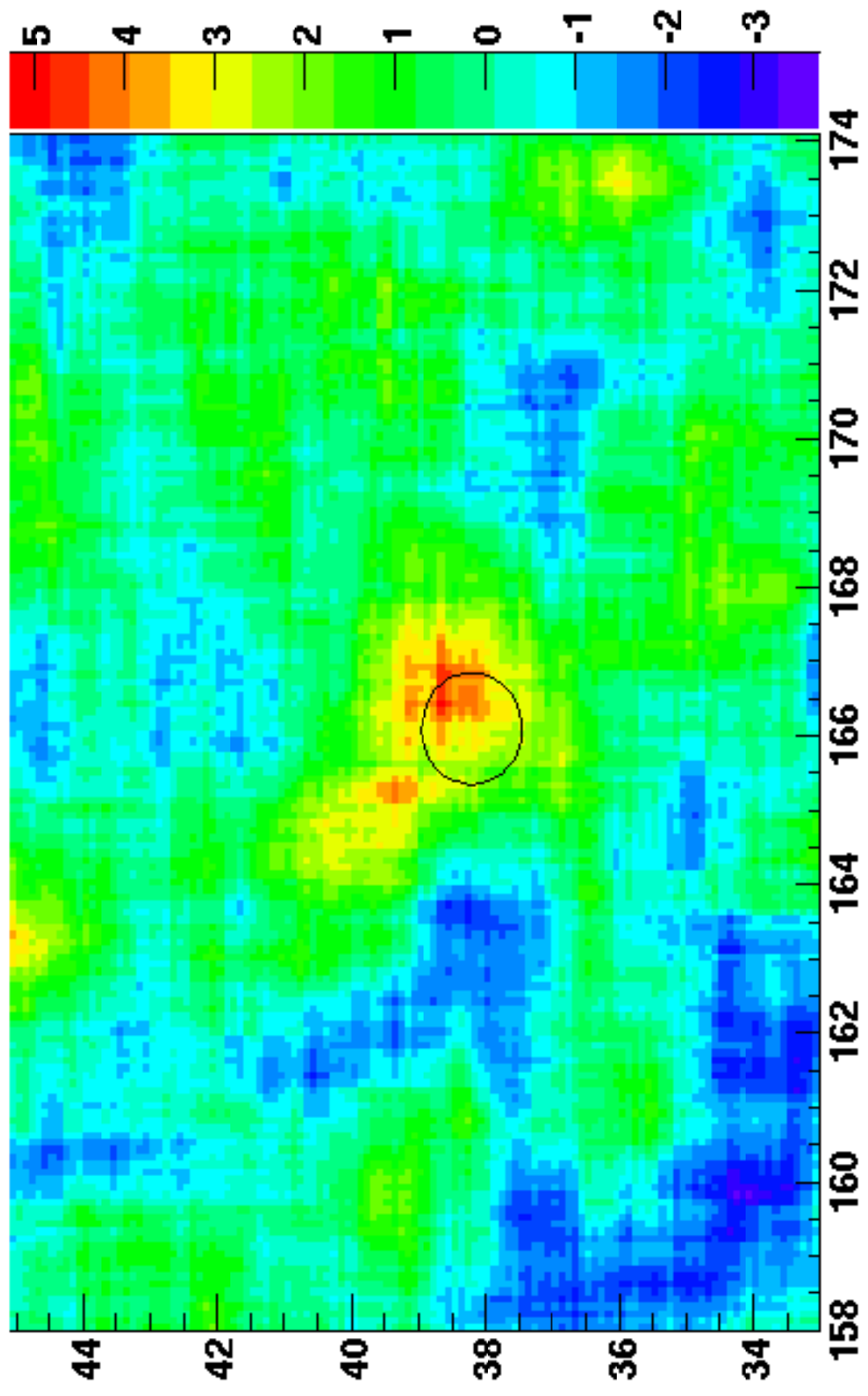
Nent = 3420000

Mean = 0.000305

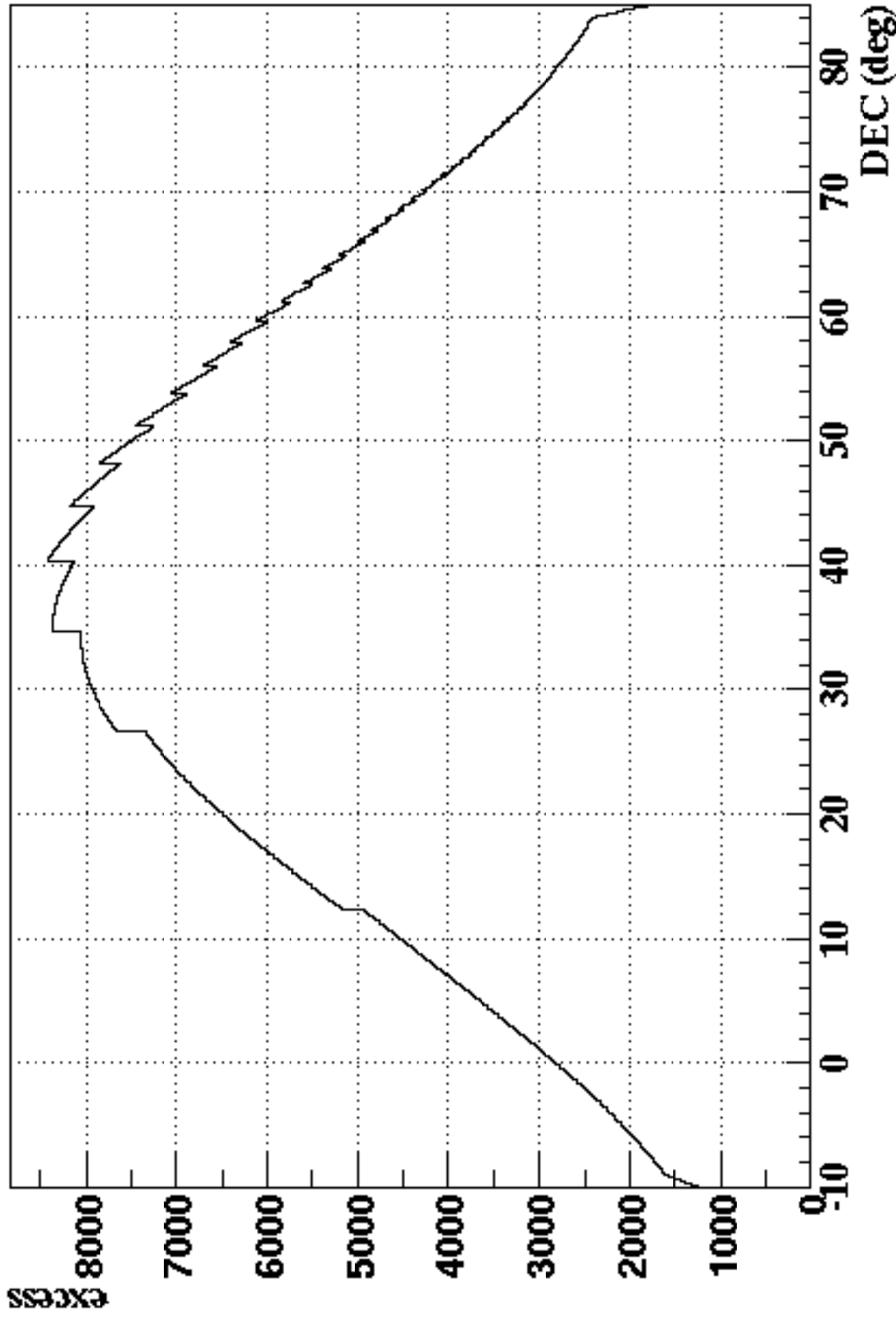
RMS = 0.9874



Significance Map



5 σ excess by Declination: 2000-12-15 to 2003-2-12



MC Data Analysis

100GeV - 100TeV

pmtcount>55 (VME trigger Simulator)

nfit>20

delangle<1.2 deg

weighted in $\cos(\theta)$

spectrum reweighted for spectral index

includes dead tubes

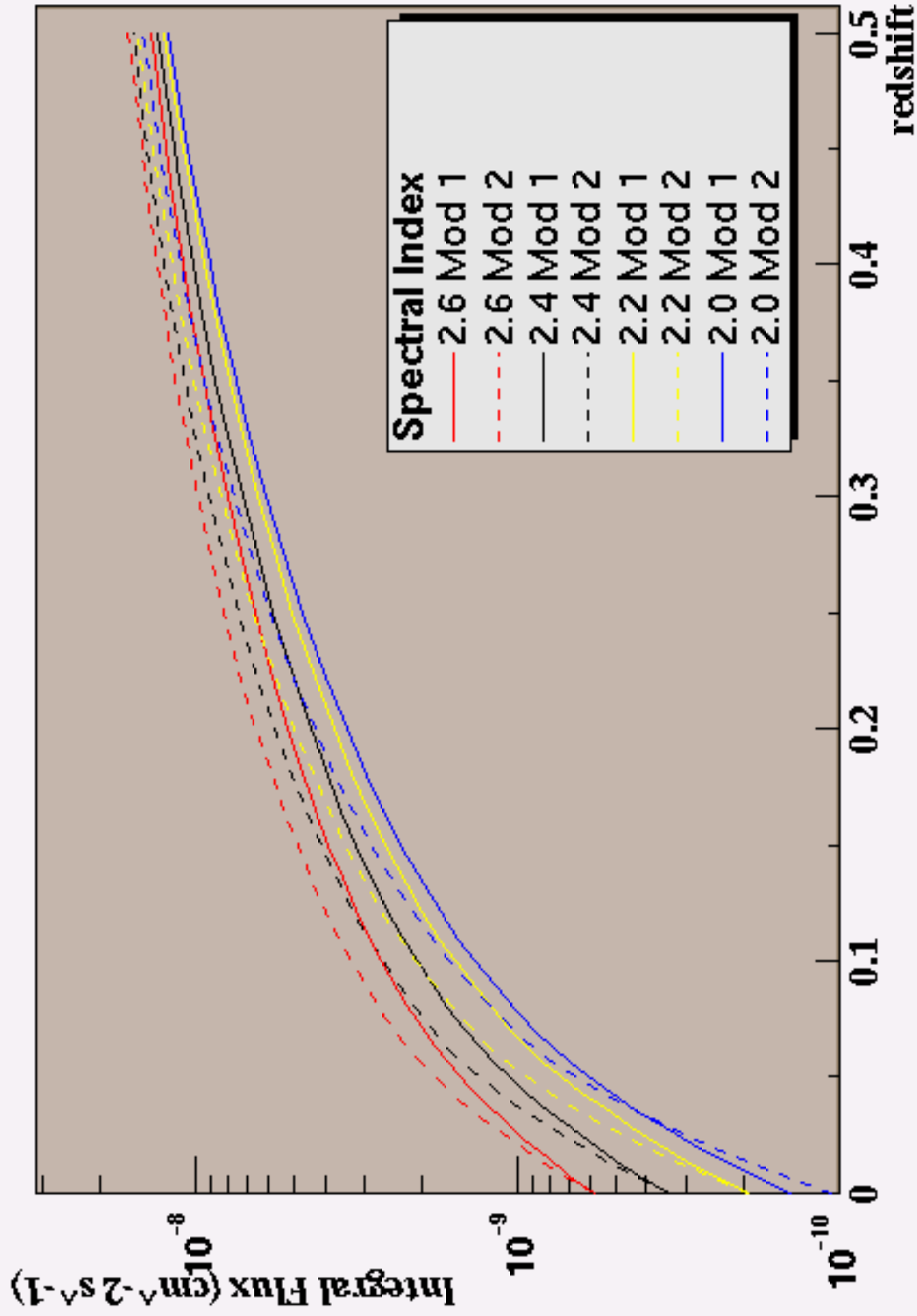
dead time 94%

Crab Flux:

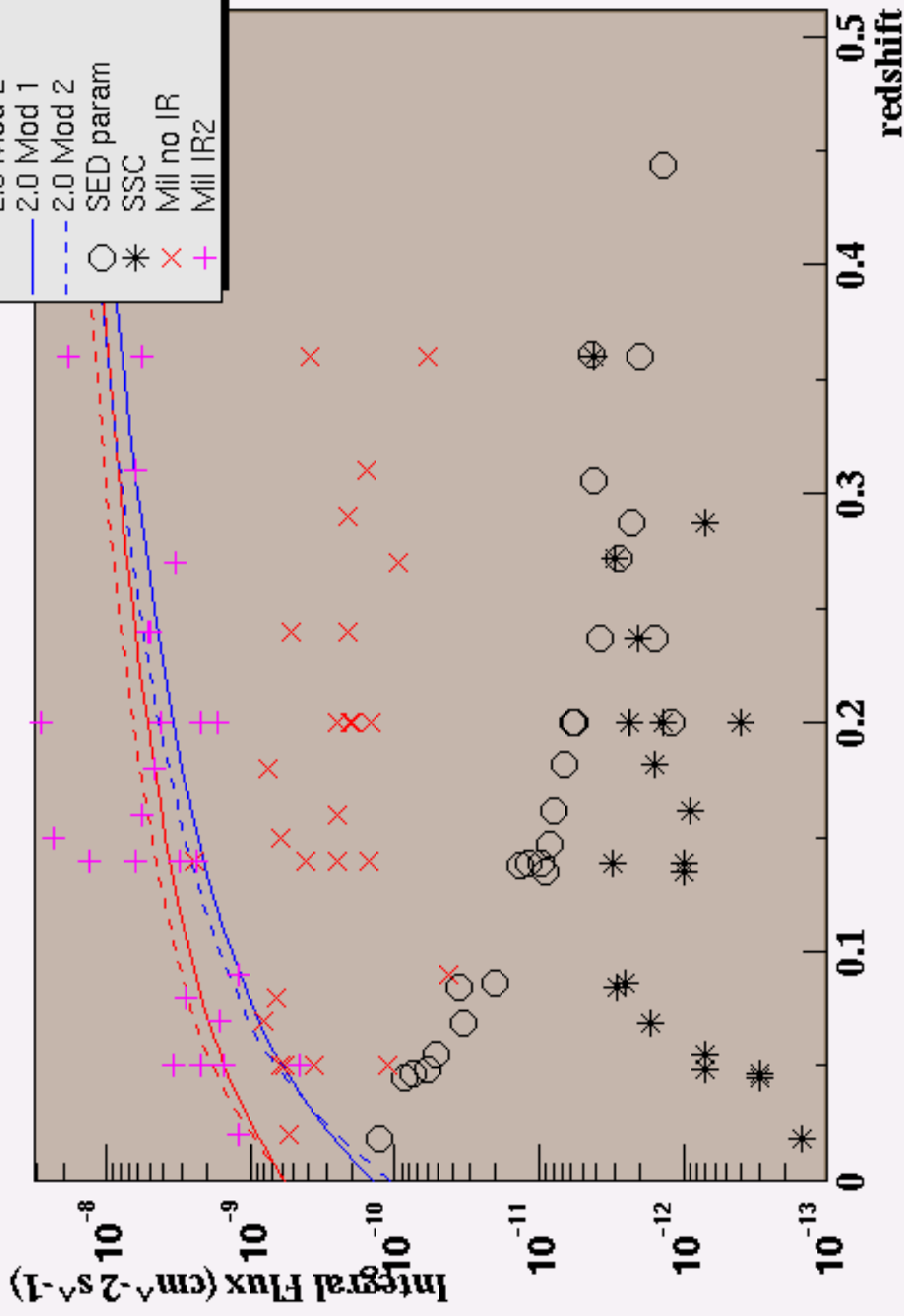
9.7 events/day

$I_0 = 1.71 \pm 0.34 \times 10^{-7}$ photons/ m² s TeV

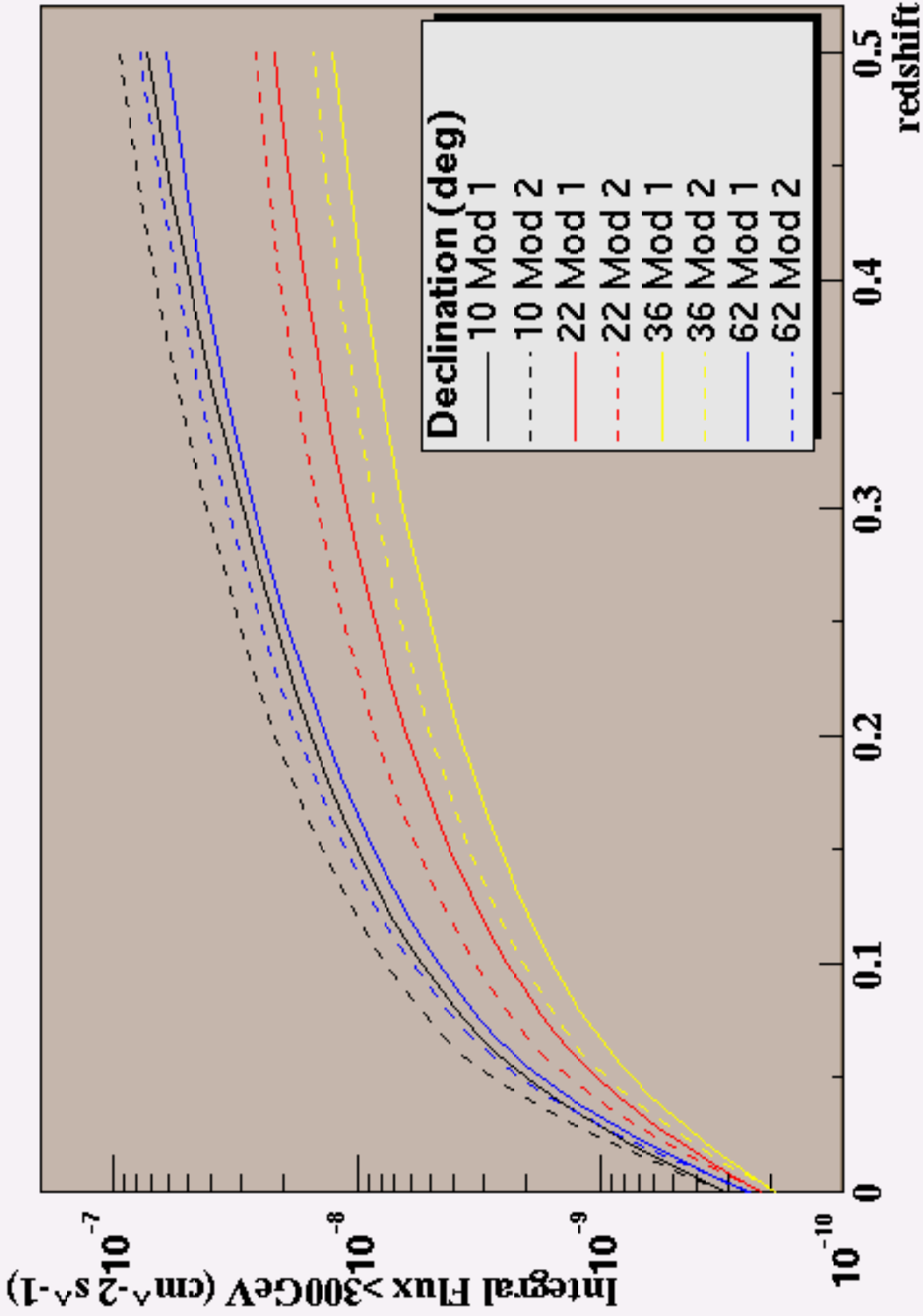
5 σ Integral Flux by Spectral Index



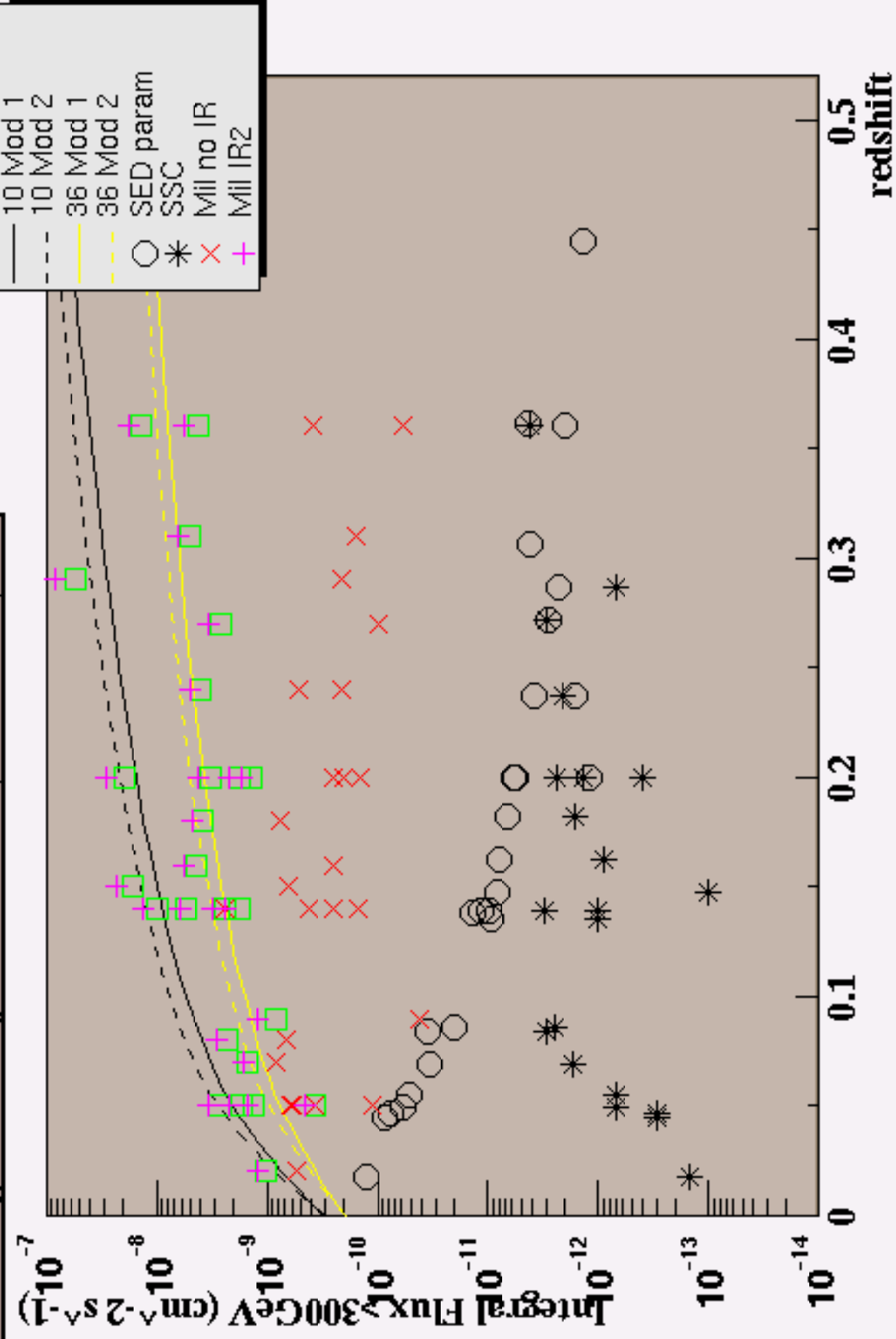
5 σ Integral Flux by Spectral Index



Integral Flux by Declination ($\text{cm}^{-2} \text{s}^{-1}$)



Integral Flux by Declination ($\text{cm}^{-2} \text{s}^{-1}$)



Predictions and Limits

