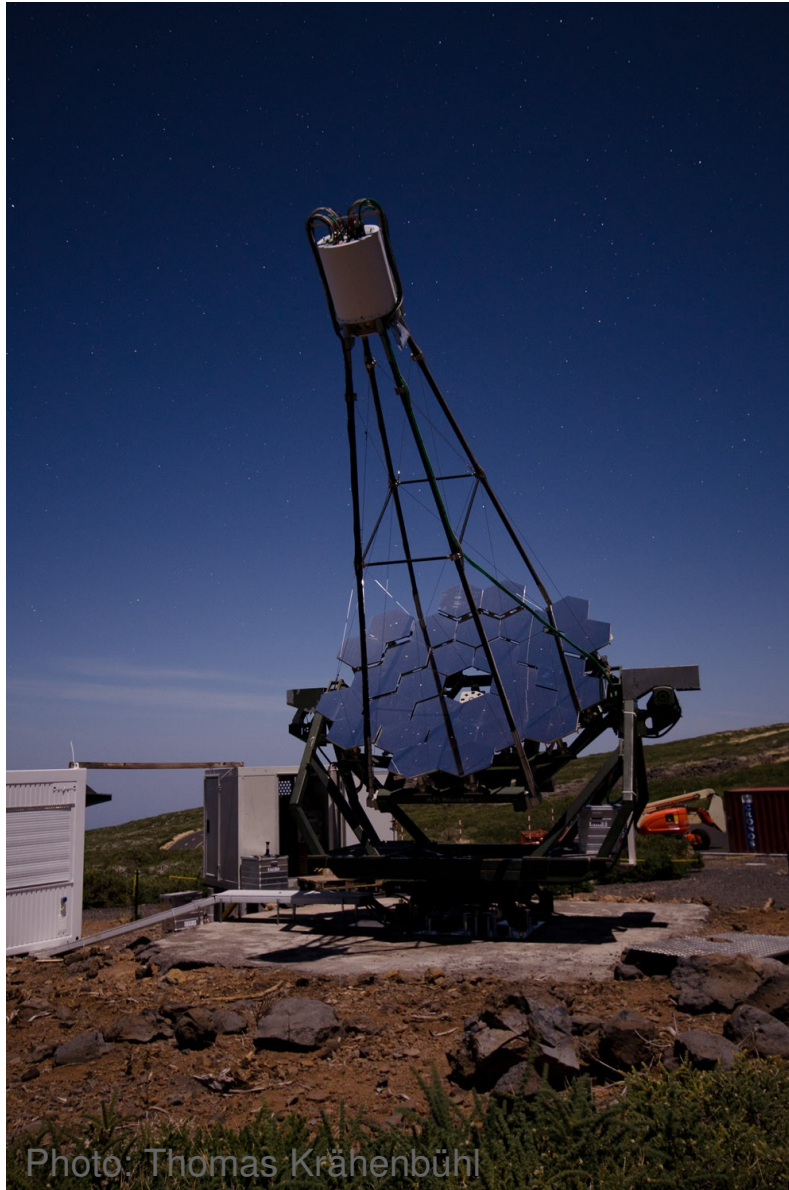


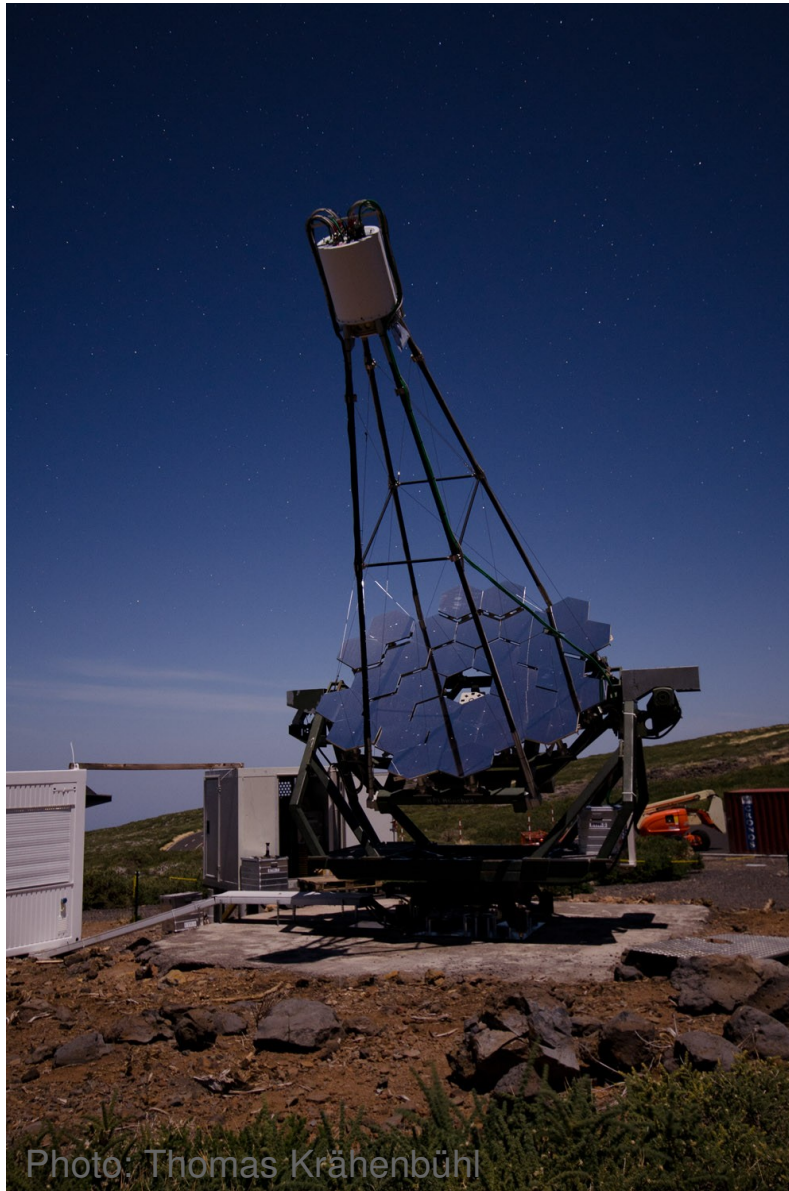
Data Formats in FACT



- Quick reminder FACT
- Analysis SW and pipelines
- Data formats

Daniela Dorner, University of Würzburg,
currently at FAU Erlangen

First G-APD Cherenkov Telescope



- Long-term monitoring of bright TeV blazars since Oct 2011
- 2200 m a.s.l.
Observatorio del Roque de los Muchachos, La Palma
- 9.5 m² mirror area
- G-APD camera
 - Silicon based photosensors
 - 4.5° FoV, 1440 pixels à 0.11°
- Remote and Automatic Operation
- Open Data Policy
 - Goal to make all data public
→ Interested in common IACT data format
 - Result of Quick Look Analysis already publicly available

Photo: Thomas Krähenbühl

Analysis in FACT

- Two software packages
 - MARS
 - this presentation
 - FACT Tools
 - Kai's presentation
- Mars: Modular Analysis and Reconstruction Software
 - ≠ Mars in MAGIC
- Based on ROOT/c++
- Includes detector simulation (ceres)
- Includes pipeline software (ROOT macros, shell scripts, interface to MySQL database)



Data Formats in FACT

- Raw data: fits
 - 1 file per run (1 or 5 min)
- Auxiliary files: fits
 - 1 file per night and service (one sub system can have several services)
- Analysis pipelines:
 - Quick Look Analysis (QLA) in La Palma
 - Offline analysis at ISDC
- Calibrated data: root files
 - 1 file per run
- Event list with image parameters after image cleaning: root files
 - 1 file per run
- Event list after background suppression (and energy estimation): root files
 - 1 file per run or data sample
- Excess rates: MySQL data base
 - publicly available via website www.fact-project.org/monitoring
- Meta data: MySQL data base



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Files after Background Suppression

- Background suppression: ganymed.C
- Output:
 - *-analysis.root
 - Status display with result and quality plots
 - Events after cuts
 - *-summary.root
 - Events after quality cuts

/home/dorner/analysis.2015.01.11/crab_samples/crab_train1sample_newcd_newdisp-analysis.root

MStatusDisplay;1

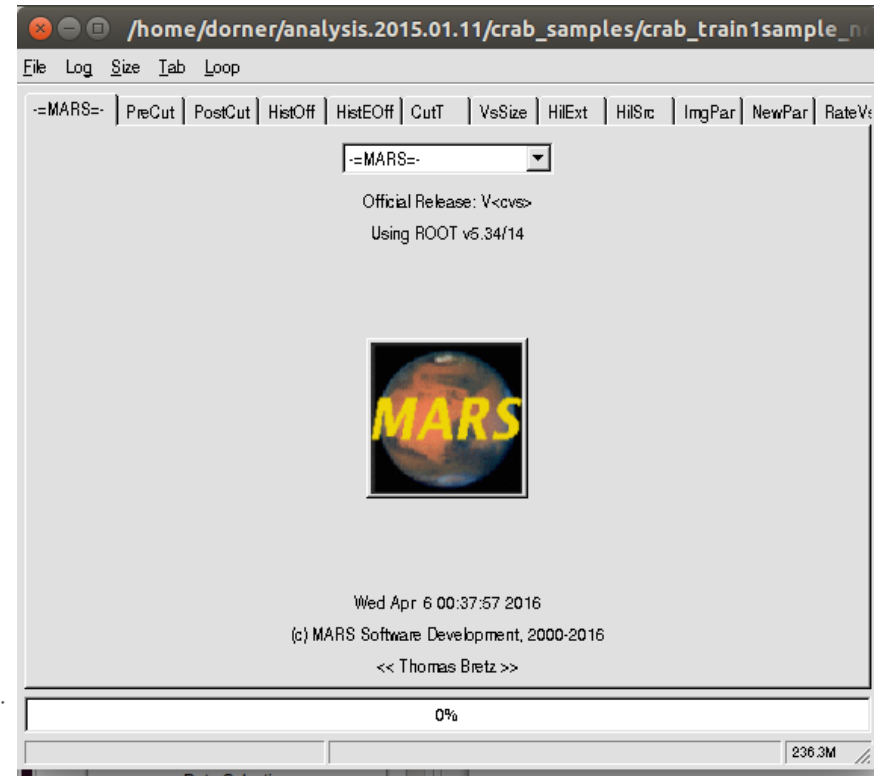
Status Display: quality and result plots

Title
PreCut
PostCut
HistOff
HistEOff
CutT
VsSize
HiExt
HiSrc
ImgPar
NewPar
RateVsRun
SrcPos
Hist
HistE
ObsTime
OnTime
Rate
RateZd
CamTemp
CamHum
ZdTime
MJD
SizeBins

Events;1

Events;1

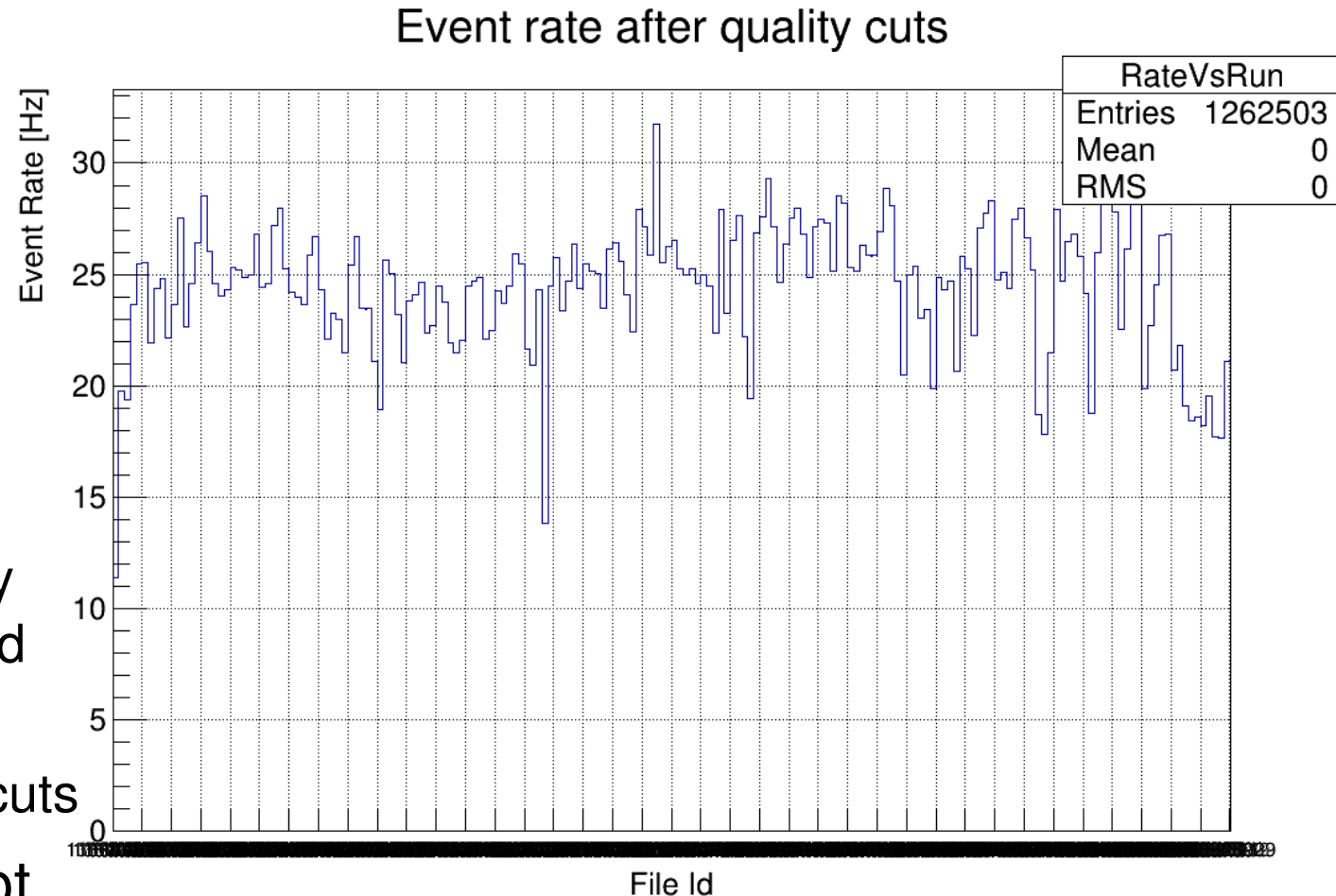
MHillas.
MHillasSrc.
MHillasExt.
MPointingPos.
MHillasSrcAni.
MImagePar.
MNewImagePar.
MSrcPosCam.
MSrcPosAni.
ThetaSquared.
Disp.
Ghostbuster.
MEnergyEst.
MTime.
DataType.
Weight.
Field.
EvNumber.



Trees with image and quality parameters

Files after Background Suppression

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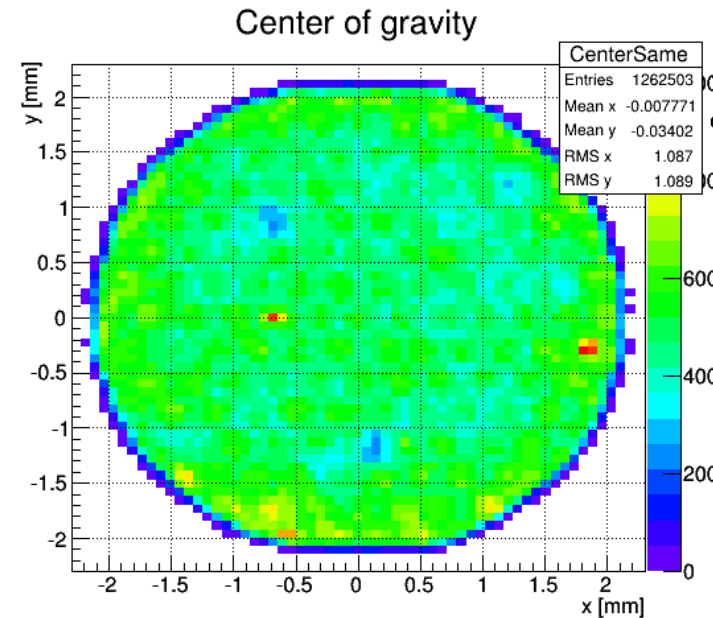
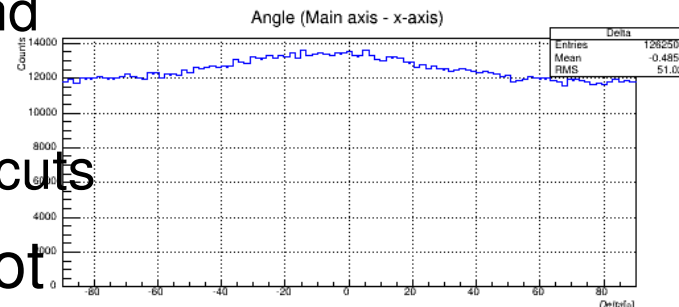
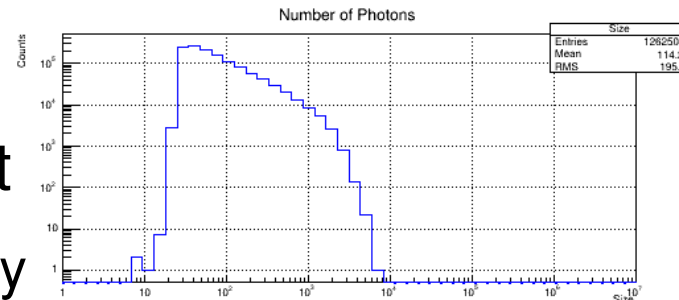
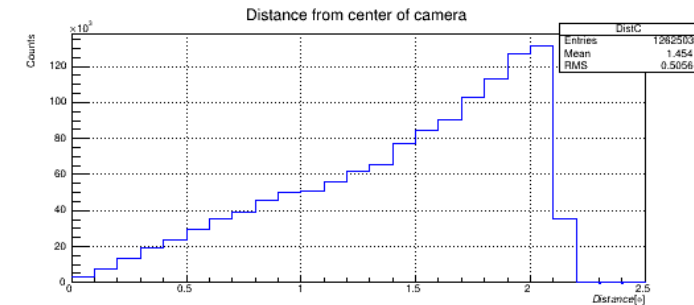
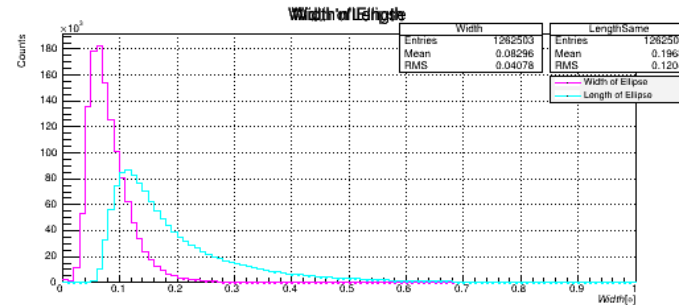


Files after Background Suppression

- Background suppression: ganymed.C

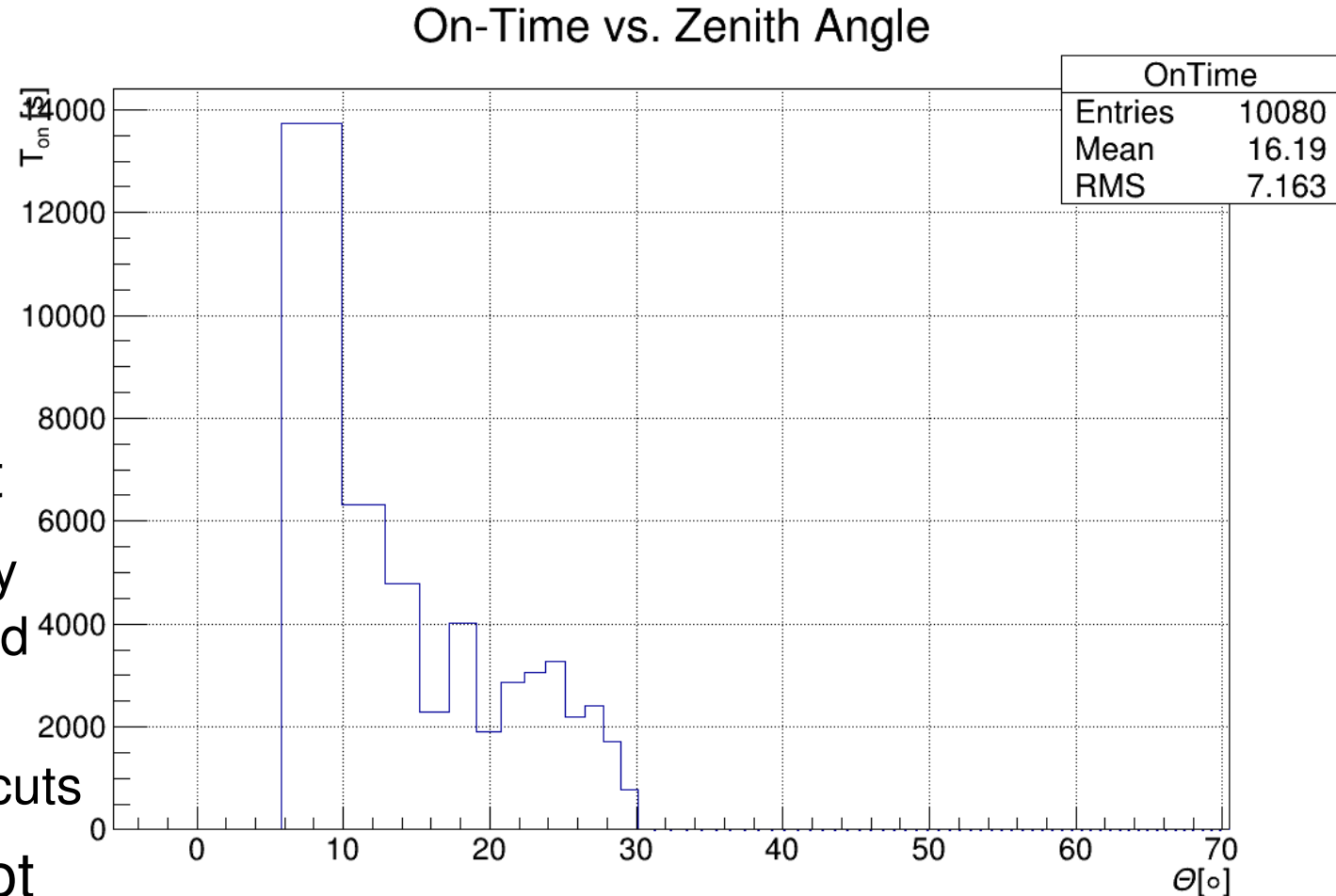
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MySQL Data Base

- Information / quality parameters mostly on run-basis extracted from:
 - Raw files
 - Auxiliary files
 - Analysis output
 - Other external information
- Other information
 - Schedule
 - MC information
 - Ratescans



MySQL Data Base

- Information / quality parameters mostly on run-basis extracted from:

- Raw files
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- Other external information

- Other information

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- MC information
- Ratescans

- Analysis results from both pipelines on run-basis

Field	Type	Null	Key
fRunID	int(10) unsigned	NO	PRI
fNight	int(10) unsigned	NO	PRI
fNumEvtsAfterCleaning	int(10) unsigned	YES	
fNumEvtsAfterQualCuts	int(10) unsigned	YES	
fNumEvtsAfterBgCuts	int(10) unsigned	YES	
fNumBgEvts	float(6,1)	YES	
fNumSigEvts	float(6,1)	YES	
fNumExcEvts	float(6,1)	YES	
fNumIslandsMean	float(6,2)	YES	
fOnTimeAfterCuts	float(7,2)	YES	
fLastUpdate	timestamp	NO	

MySQL Data Base

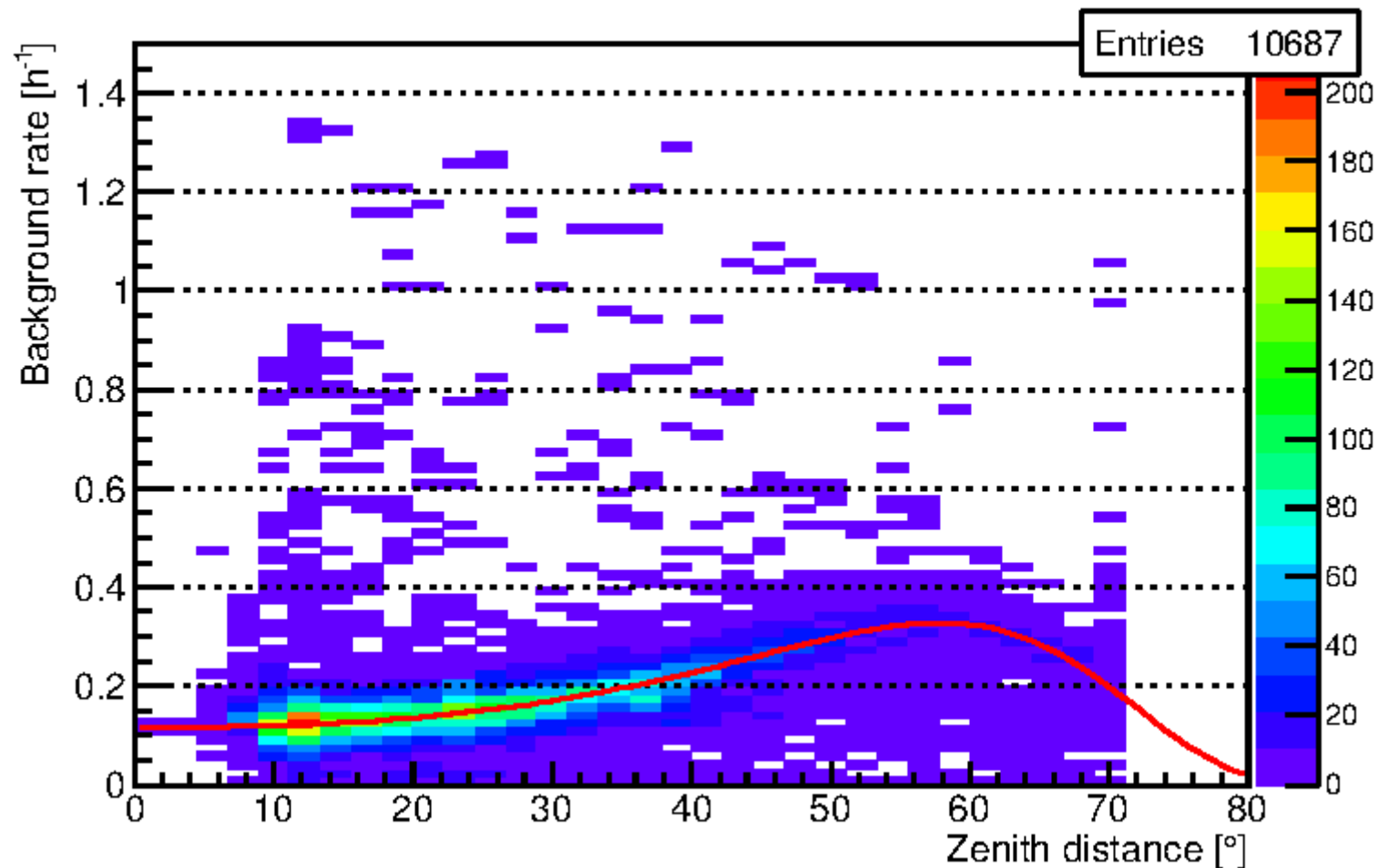
- Information / quality parameters mostly on run-basis extracted from:
 - Raw files
 - Auxiliary files
 - Analysis output
 - Other external information
- Other information
 - Schedule
 - MC information
 - Ratescans
- Analysis results from both pipelines on run-basis
- Data selection based on meta data
 - Data quality
 - Background rates
 - Weather information
 - Measured/predicted currents
 - Specific subsamples
 - Currents
 - Zenith distance



Data Selection

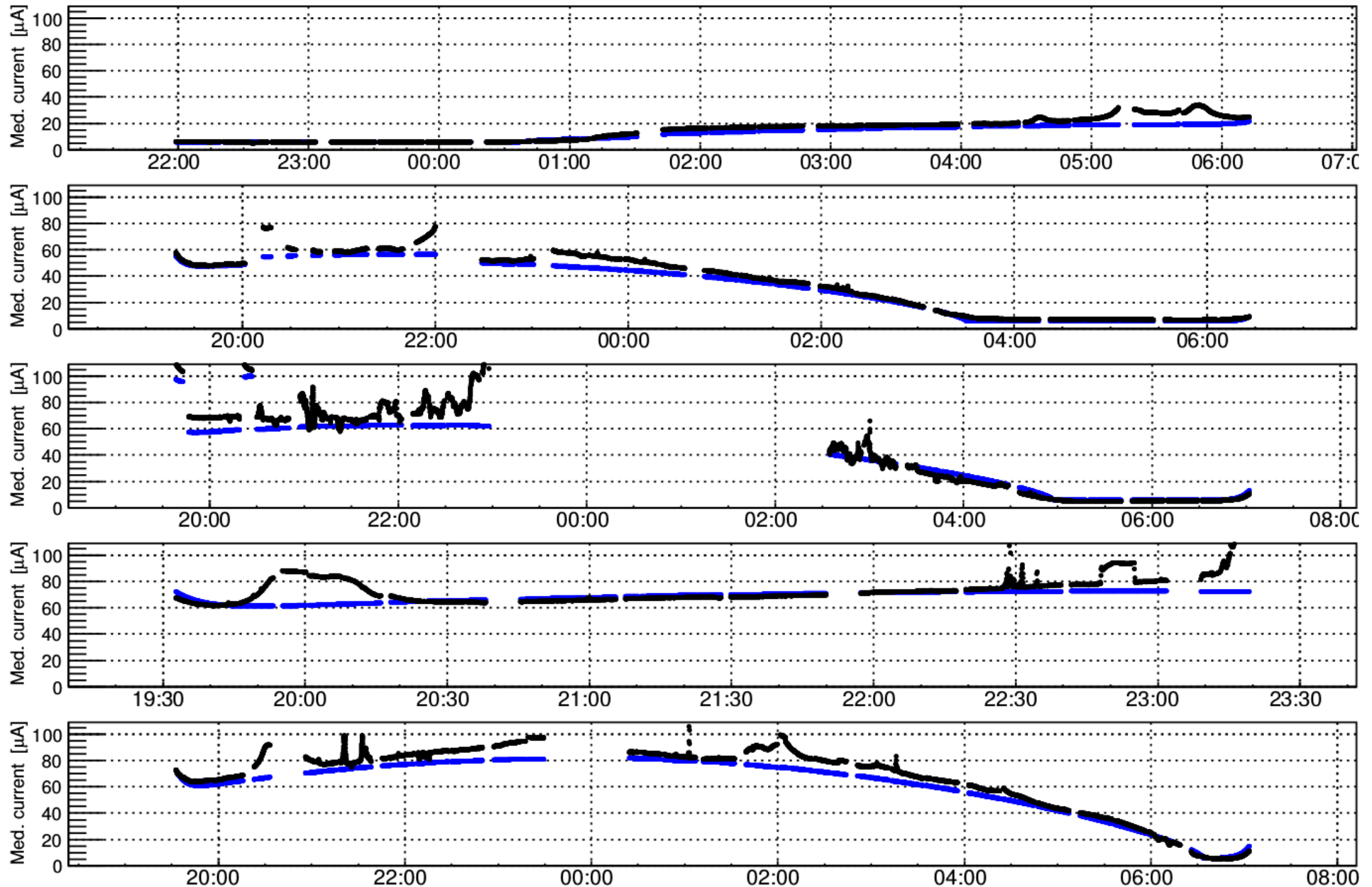


Data Selection – Background Rate

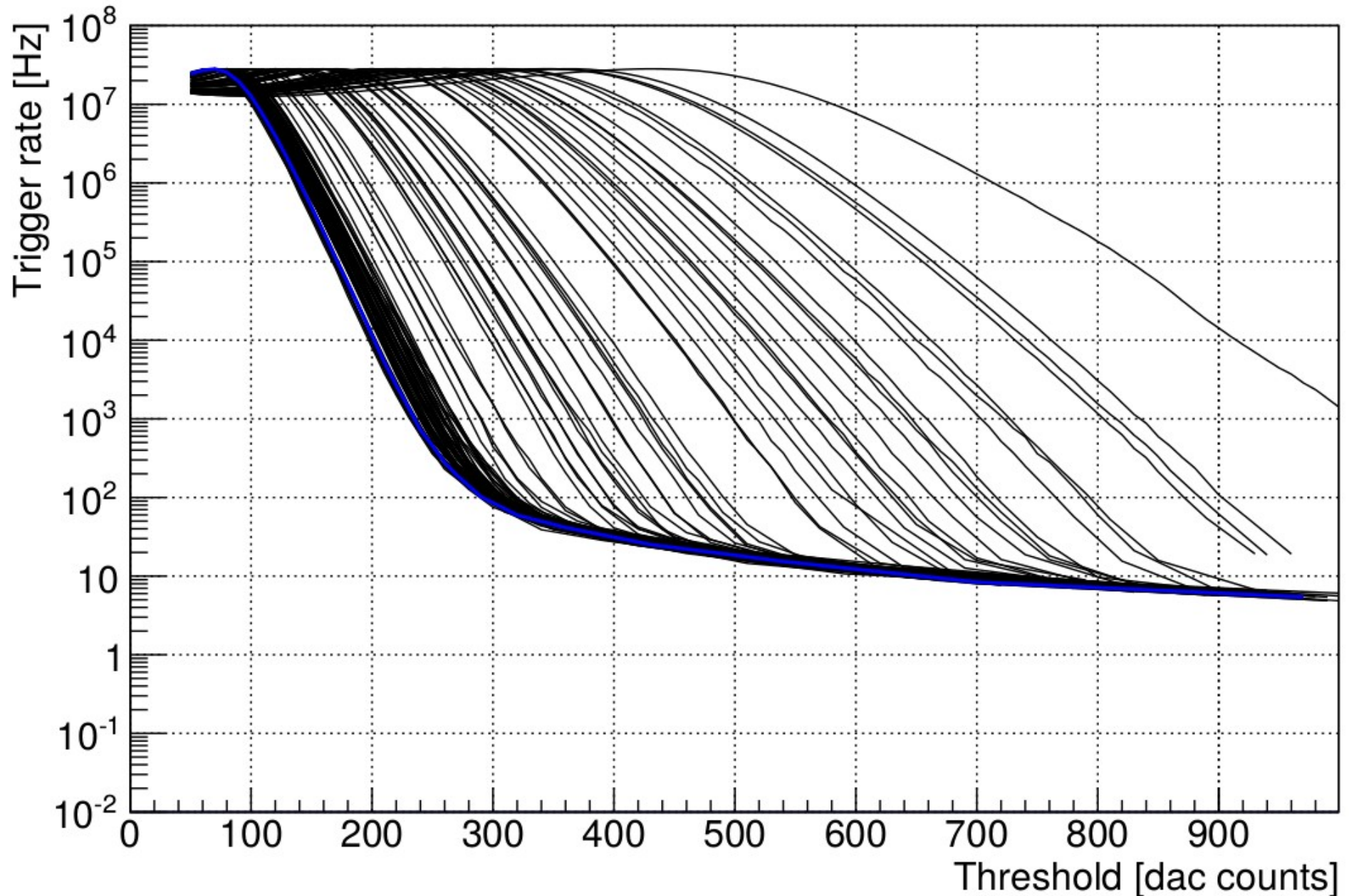


Dorner et al. (FACT Collaboration), ICRC 2013

Data Selection – Currents

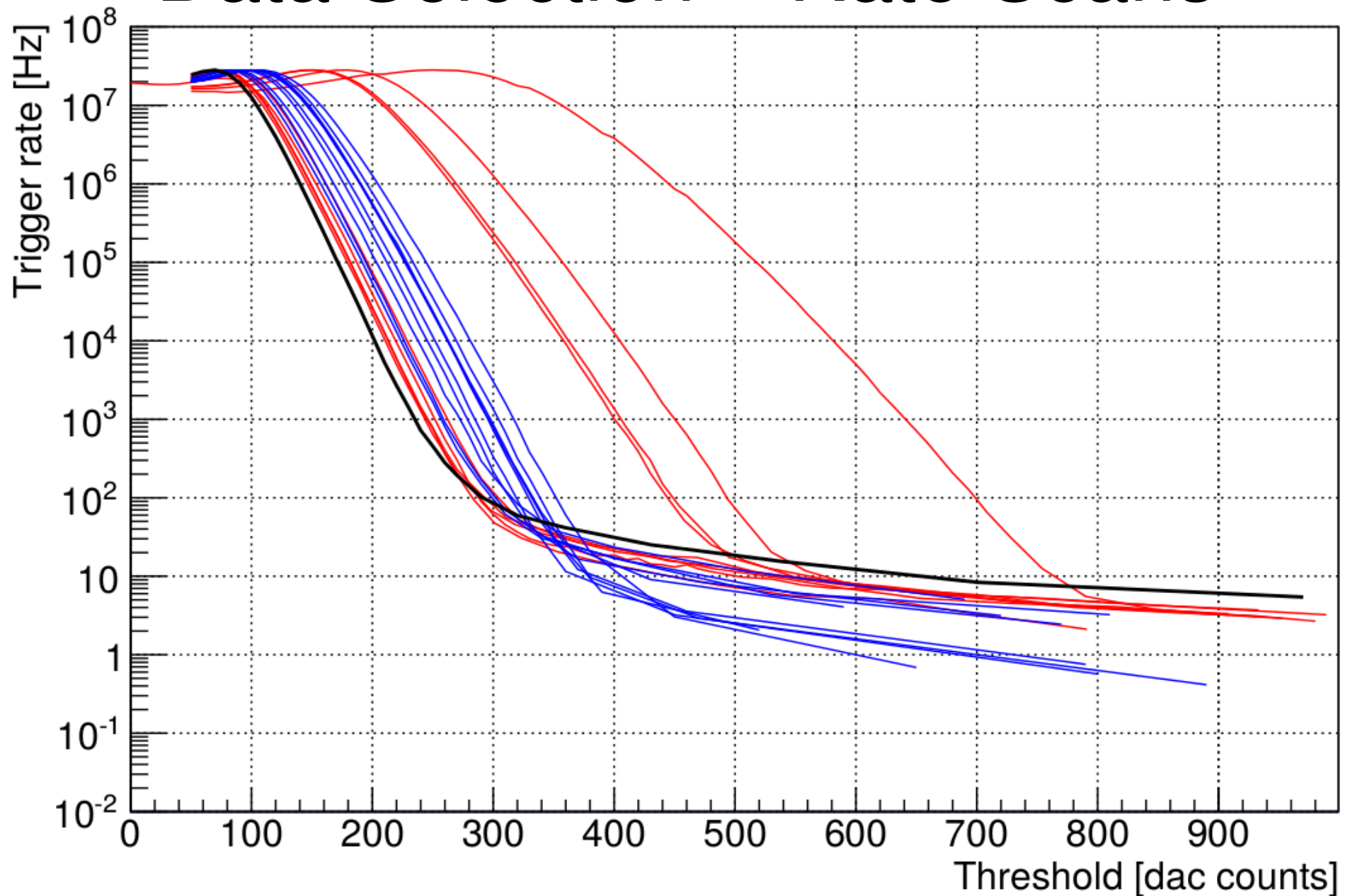


Data Selection – Rate Scans



Biland et al. (FACT Collaboration), JINST 9 (2014) P10012

Data Selection – Rate Scans



Data Selection – All-Sky Cameras

Cloudiness during one Night

Cloudiness around source within a 50 pixel radius

