VO auger

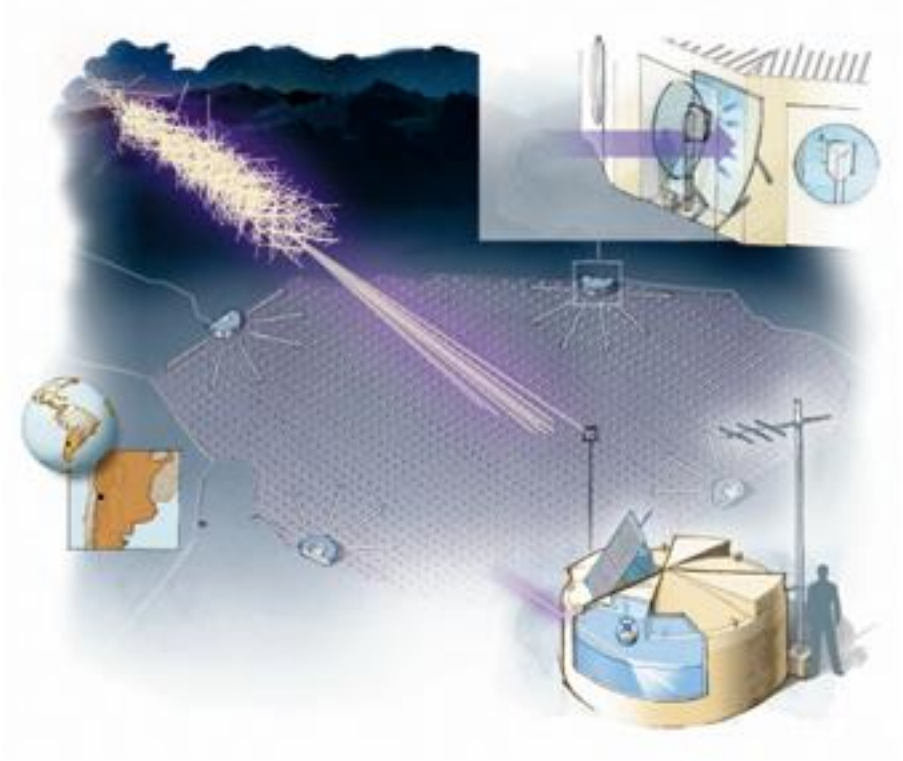
Jiří Chudoba

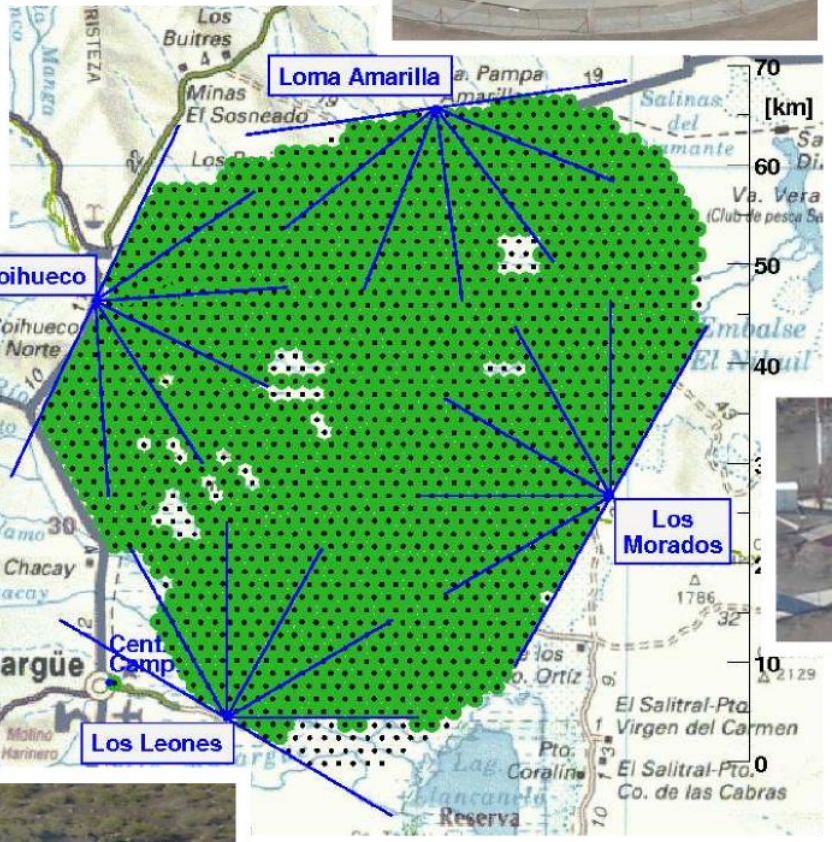
10.2.2011

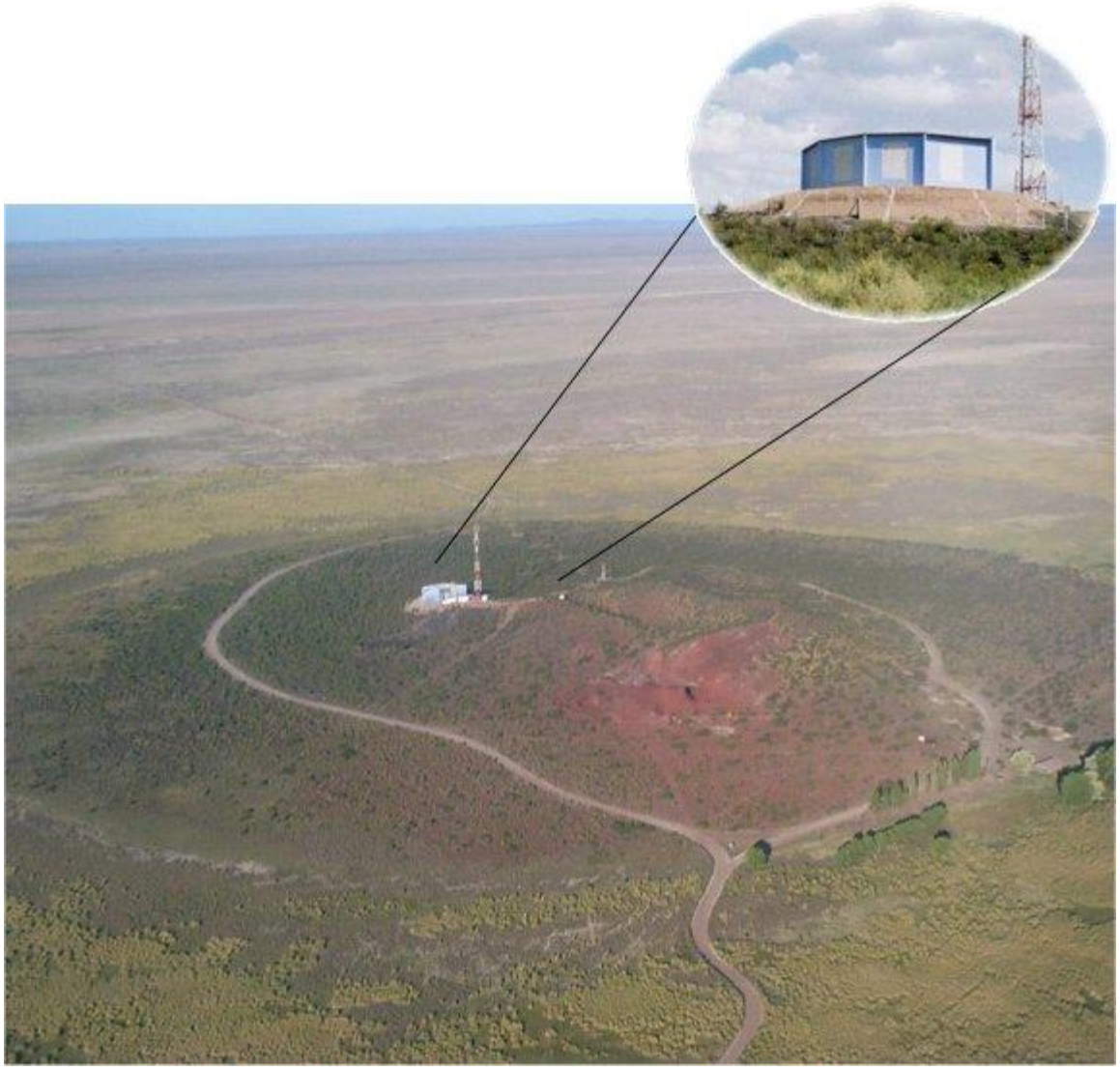
Institute of Physics, Prague

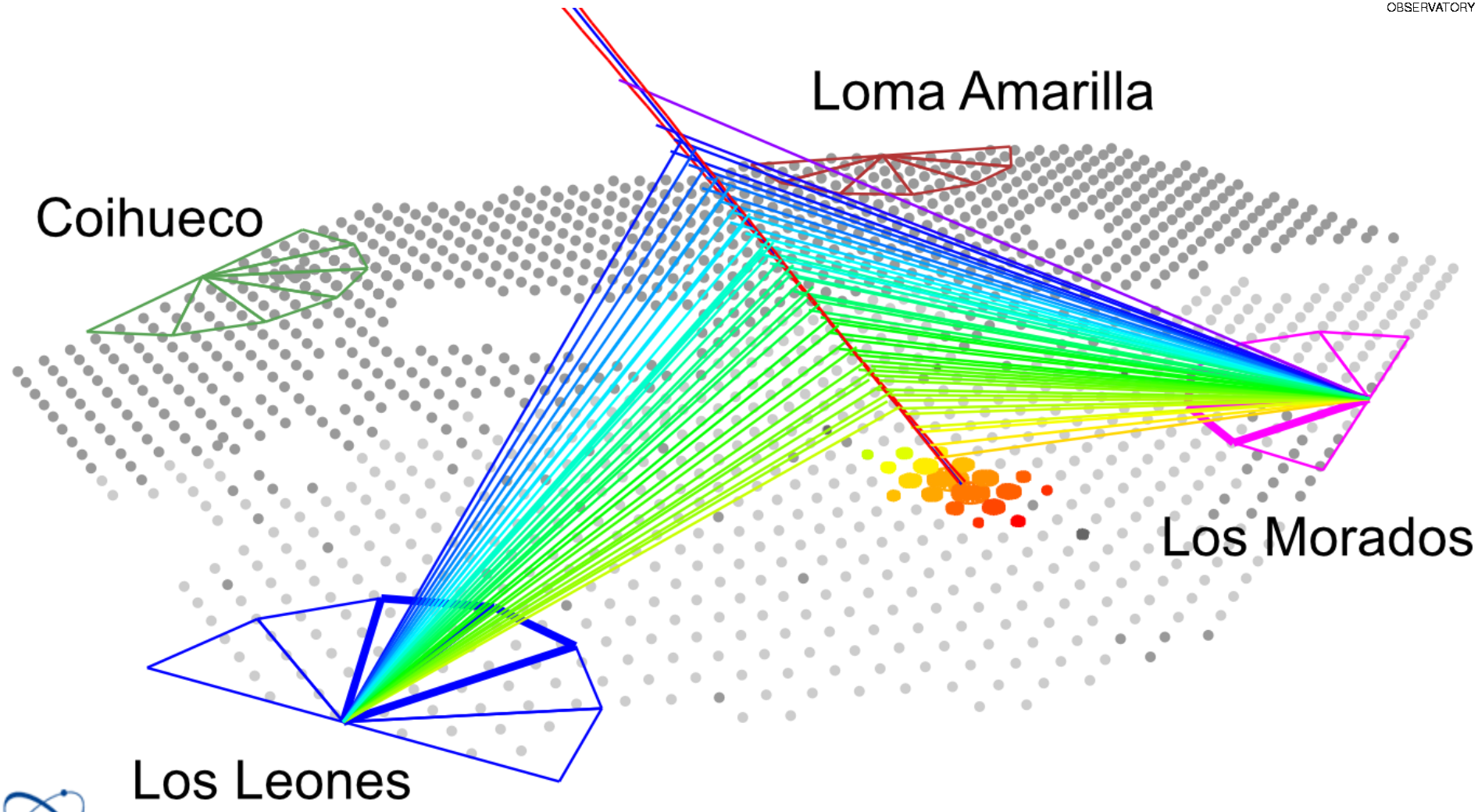
Pierre Auger Observatory

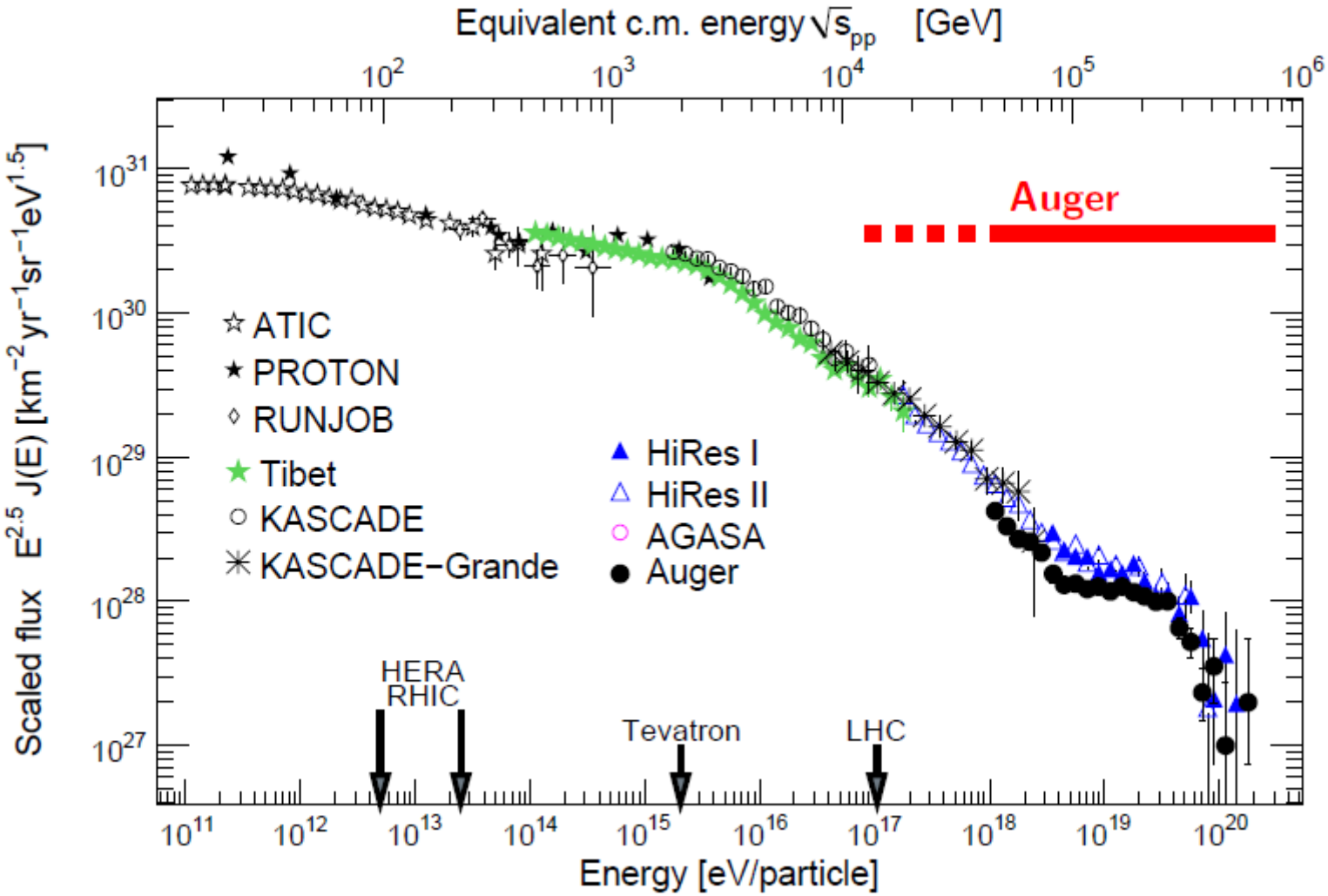
- The largest Cosmic Rays Observatory
  - 3 000 km^2 – in the Argentina Pampa
  - 1 600 Surface Detectors (Cherenkov)
  - 4 Fluorescence Telescopes
    - 6 x 4 Fluorescence Cameras
    - 10 % of the time (night – no moon)
  - Hybrid Events : SD + FD
    - Better determination of the energy
- High Energy Cosmic Ray
  - Energy 10^{20}
  - 1 / km^2 / century
  - Expected : 30 events/year
- Pierre Auger Observatory
  - Experimental Array : 2001-2004
  - Production Area : 2004
    - Full production : 2006
    - Inauguration in 2008
  - Observed UHECR : 50 (GZK effect)



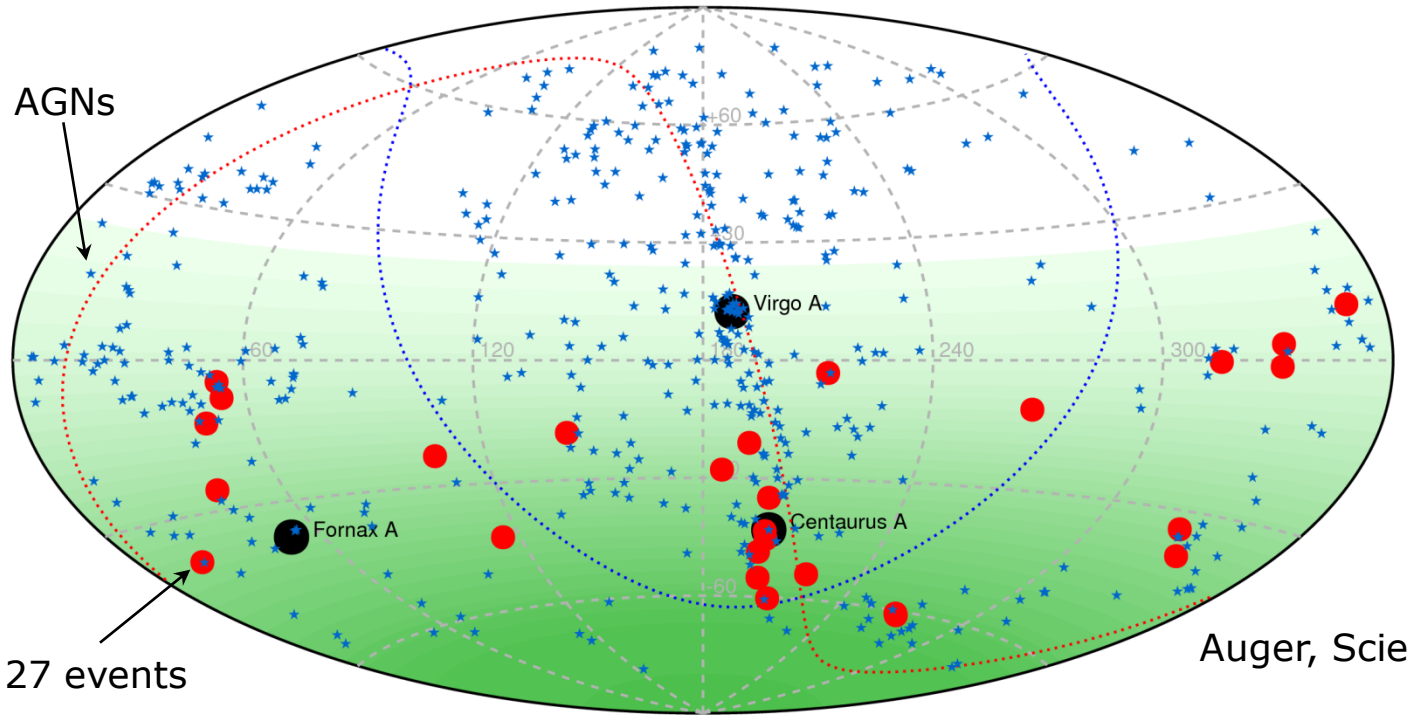

Loma Amarilla
Coihueco
Los Morados
Los Leones
Cent. Camp
Malargüe
Los Buitres
Minas El Sosneado
Coihueco Norte
El Chacay
Salinas del Diamante
Va. Vera
Embalse
El Nihuil
El Salitral-Pto. Virgen del Carmen
El Salitral-Pto. Co. de las Cabras
Pto. Coralino
Reserva
[km]
70
60
50
40
10
0




Loma Amarilla
Coihueco
Los Morados
Los Leones


Equivalent c.m. energy $\sqrt{s_{pp}}$ [GeV]
10^2
10^3
10^4
10^5
10^6
Scaled flux $E^{2.5}$ J(E) [$km^{-2}yr^{-1}sr^{-1}eV^{1.5}$]
10^{31}
10^{30}
10^{29}
10^{28}
10^{27}
Auger
ATIC
PROTON
RUNJOB
Tibet
KASCADE
KASCADE−Grande
HiRes I
HiRes II
AGASA
Auger
HERA
RHIC
Tevatron
LHC
10^{11}
10^{12}
10^{13}
10^{14}
10^{15}
10^{16}
10^{17}
10^{18}
10^{19}
10^{20}
Energy [eV/particle]

AGN Correlation

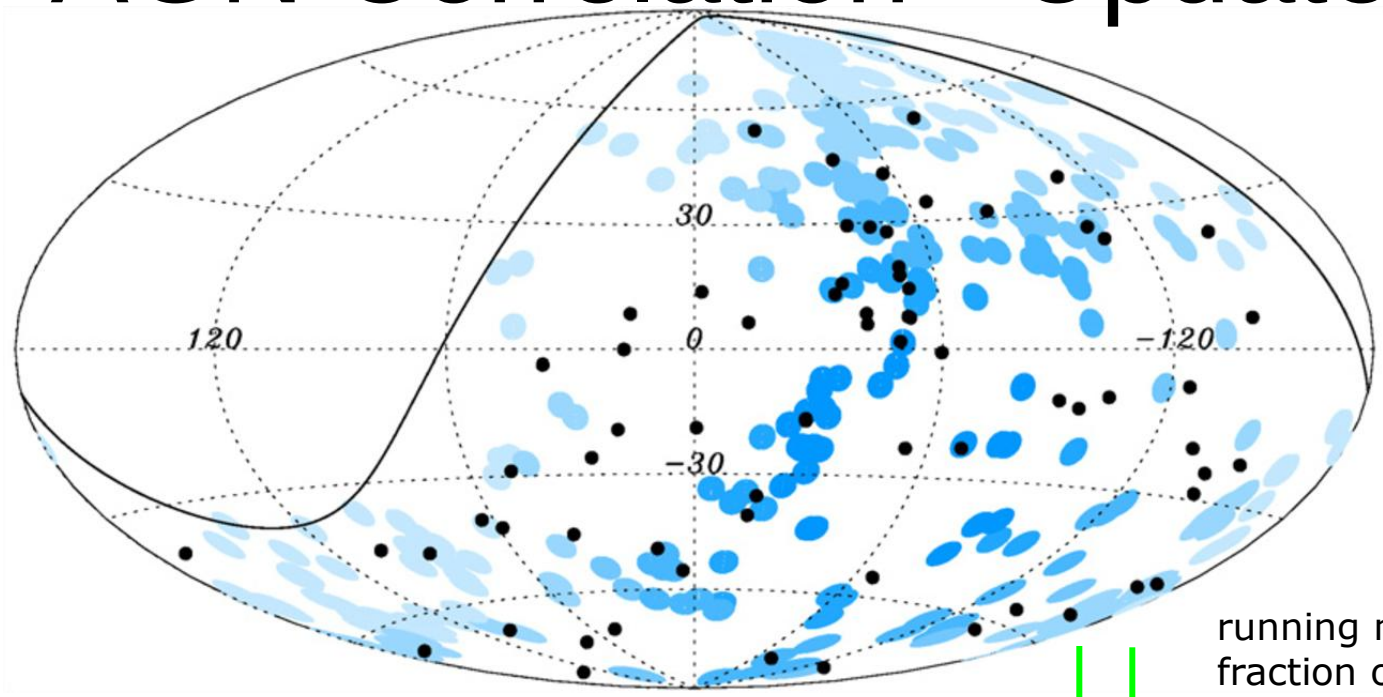


Auger, Science 318 (2007) 938

- VCV catalog of AGNs
- $E > 55$ EeV
- $z < 0.018$, $D < 75$ Mpc
- $\delta < 3.1°$

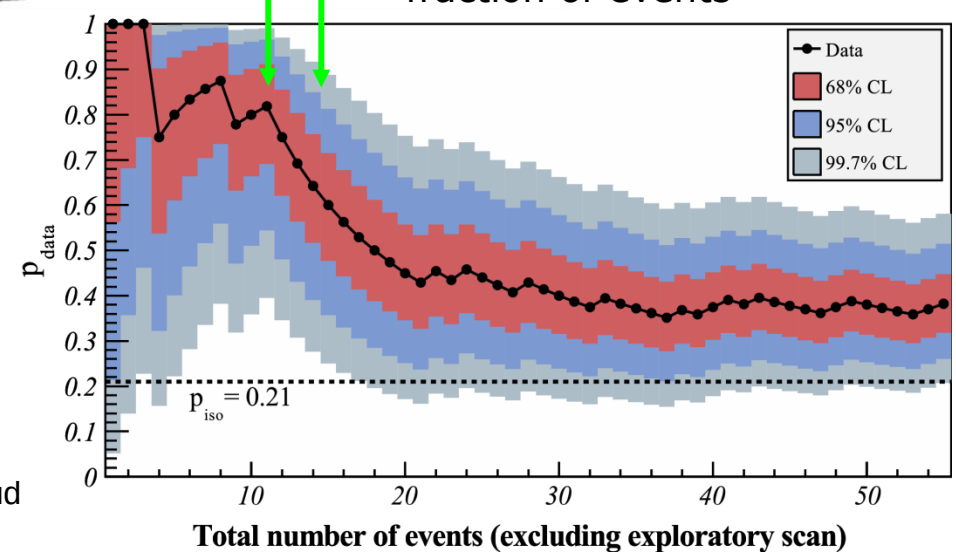
- exploratory scan: 9/14 correlate
- later sample: 9/13
- no correlation on northern sky
  HiRes, ApP 30 (2008) 175
- VCV biased, incomplete

AGN Correlation - Update



69 events

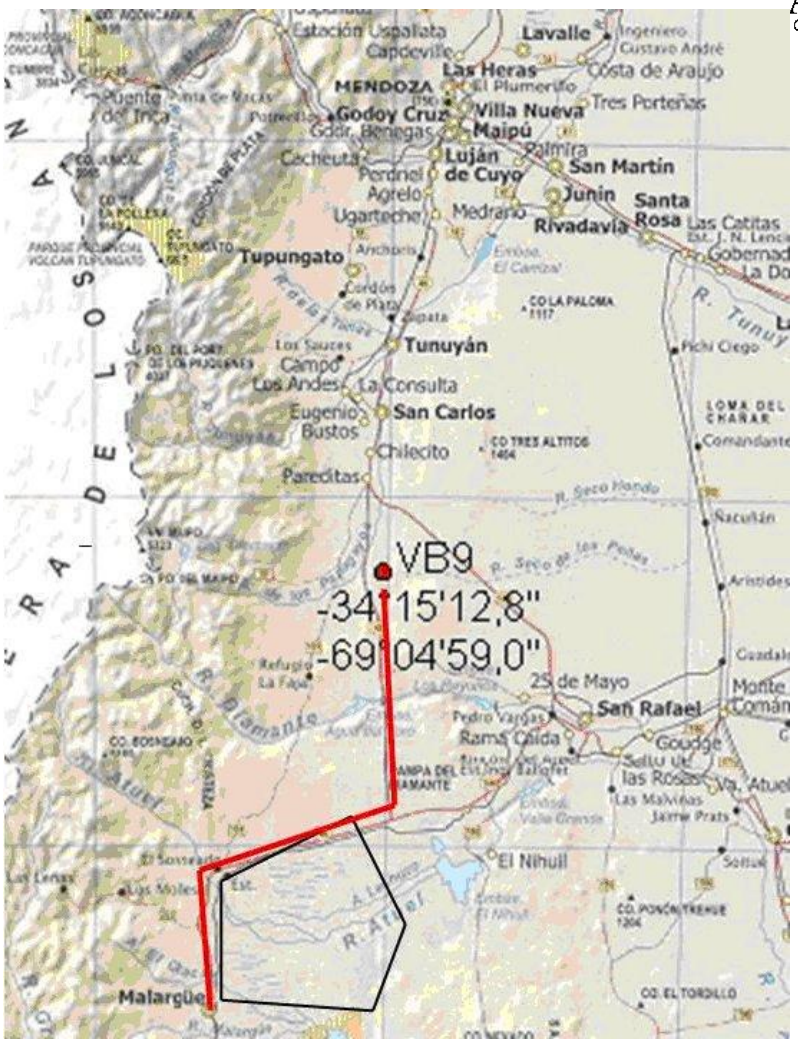
running most likely correlating fraction of events



- significance decreased
- still disfavors H0 of (isotropic) chance correlations
- other catalogs: 2MRS, Swift-BAT, HIPASS
- Centaurus A

Data taking

- Local Data Taking
  - Radio transfer from the tanks and telescopes to the Cdas main building (Malargüe)
  - Merged in Events
    - Root format
    - Immediate reconstruction of the event parameters
    - Streaming (Level 4 triggers): Hybrid, Gold Events
  - Copied to a data server for export
- Daily transfer to Lyon
  - 1 – 3.5 GB/day (no calibration)
  - Poor Pampa BW ~ 50KB/s
  - Auger Access project improves the line
  - Calibration data were send on a disk every 2 months



Simulations

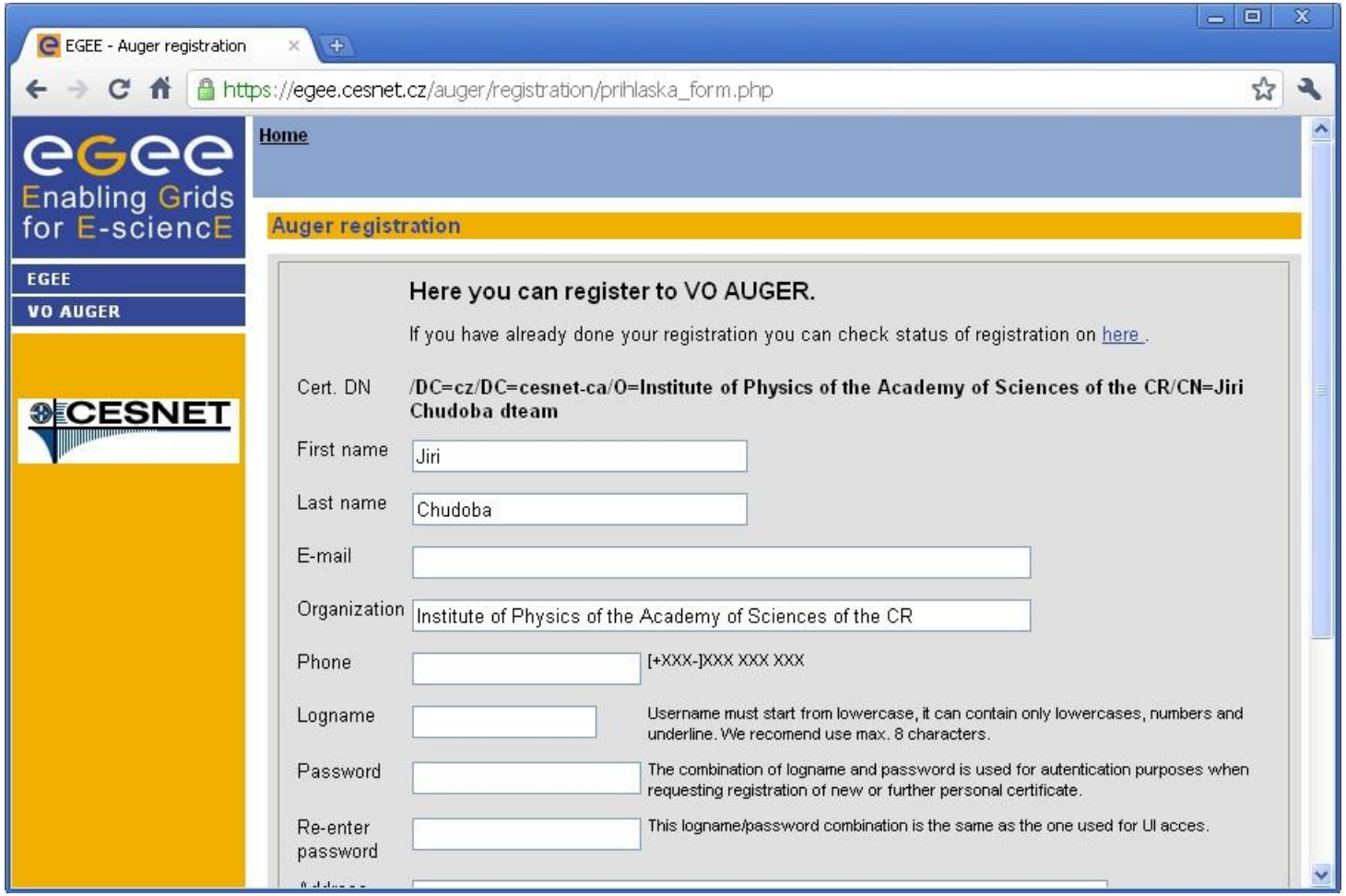
- CPU demanding
- Corsika, Aires programs
  - models: QGSJETII, Sibyll, EPOS, ...
  - chemical composition: proton, iron, photon, ...
- Parallelization: independent showers

→ Do it on the GRID

VO auger

- VO auger in the EGEE grid established in June 2006 by Prague group in cooperation with CESNET (Czech EGEE partner, now NGI_CZ)
- **Main aim: shower simulations**
- About 60 users
- Registration via custom portal
  - Each member gets an account on the default UI ui1.egee.cesnet.cz
- We manage central services: LFC, VOMS
- Additional servers: WMS, LB, SE, CE on several sites

Registration



VO auger support

- GGUS VO support unit auger
- RT at CESNET auger@cesnet.cz
  - Prague team handles tickets in both cases

	koubat@fzu.cz	- 7 měsíců	- 7 měsíců	- 7 měsíců	
25949	**problem s voms serverem** Jiri.Chudoba@cern.ch	vyřešený - 7 měsíců	auger - 7 měsíců	kundratj - 7 měsíců	0
25963	**Reset password** mdserrano@ugr.es	vyřešený - 7 měsíců	auger	koubat - 6 měsíců	0
26402	**High load on ui1.egee.cesnet.cz caused by your Auger production scripts** kundratj@fzu.cz	vyřešený - 5 měsíců	auger - 5 měsíců	kundratj - 3 měsíců	0
26403	**treti testovaci ticket, opet prosim ignorovat** kundratj@fzu.cz	vyřešený - 5 měsíců	auger	kundratj - 5 měsíců	0
26755	Fwd: New certificate for voms server voms1.egee.cesnet.cz - auger, voce, vo.metacentrum.cz fsilva@cbpf.br	vyřešený - 4 měsíců	auger - 3 měsíců	koubat - 3 měsíců	0
26953	**SSH problem**	vyřešený	auger	koubat	0

Bulk production

- MC simulations jobs are run by a **dedicated team**
  - started in Prague (J. Schovancova, J. Chudoba, P. Necesal, M. Nyklicek), last year moved to Granada team lead by Julio Lozano Bahilo
- Individual users may use the same resources
  - discussions about priorities
  - space tokens reserved for production on some sites
- Production progress: dashboard
  - http://auger.farm.particle.cz/auger_dashboard/
  - developed by Prague team (J. Schovancova)
  - now also used by CTA

PIERRE AUGER

[Home | Shower download | Dashboard | Recent jobs | Resubmit | Sites | Scripts | Shifter zone | About... | Log

Pierre Auger Observatory

Home

Get showers

Miscellaneous

Production Dashboard for the Pierre Auger Observatory

Welcome to the homepage of the Grid production dashboard.

CORSIKA production

- CORSIKA shower browser
- CORSIKA dashboard
- CORSIKA jobs todo
- CORSIKA libraries decriptions

OFFLINE production

- OFFLINE shower browser
- OFFLINE dashboard
- OFFLINE jobs todo

Other information

- Virtual Organisation AUGER
- Computing resources
- Script downloads

Shifter zone

- Recent jobs
- Jobs to resubmit
- Dashboard Admin

[Home | Shower download | Dashboard | Recent jobs | Resubmit | Sites | Scripts | Shifter zone | About... | Log out]

Pierre Auger Observatory

Home

Get showers

Miscellaneous

Get list of CORSIKA showers

Select SHOWER parameters

LIBRARY

Photon::PhotonLib_gr22
Photon::Photon_gr40
Photon::Photon_gr41
Proton::epos_gr03
Proton::epos_gr07
Proton::epos_gr08
Proton::QGSjetII_gr20
Proton::epos_gr26
Proton::epos_gr30
Proton::epos_gr34
Proton::epos_gr36
Proton::epos_gr38

ENERGY

en17.000
en17.250
en17.500
en17.750
en18.000
en18.250
en18.500
en18.750
en19.000
en19.250
en19.500
en19.750

ZENITH ANGLE

th0.000
th0.65
th18.000
th26.000
th32.000
th38.000
th41.000
th45.000
th49.000
th53.000
th57.000
th60.000

en17.500: Energy of primary particle is $\log_{10}(E/eV)=17.5$

th60.000: Zenith angle of primary particle is theta = 60 degrees

Select file to list

logs
long
part
small

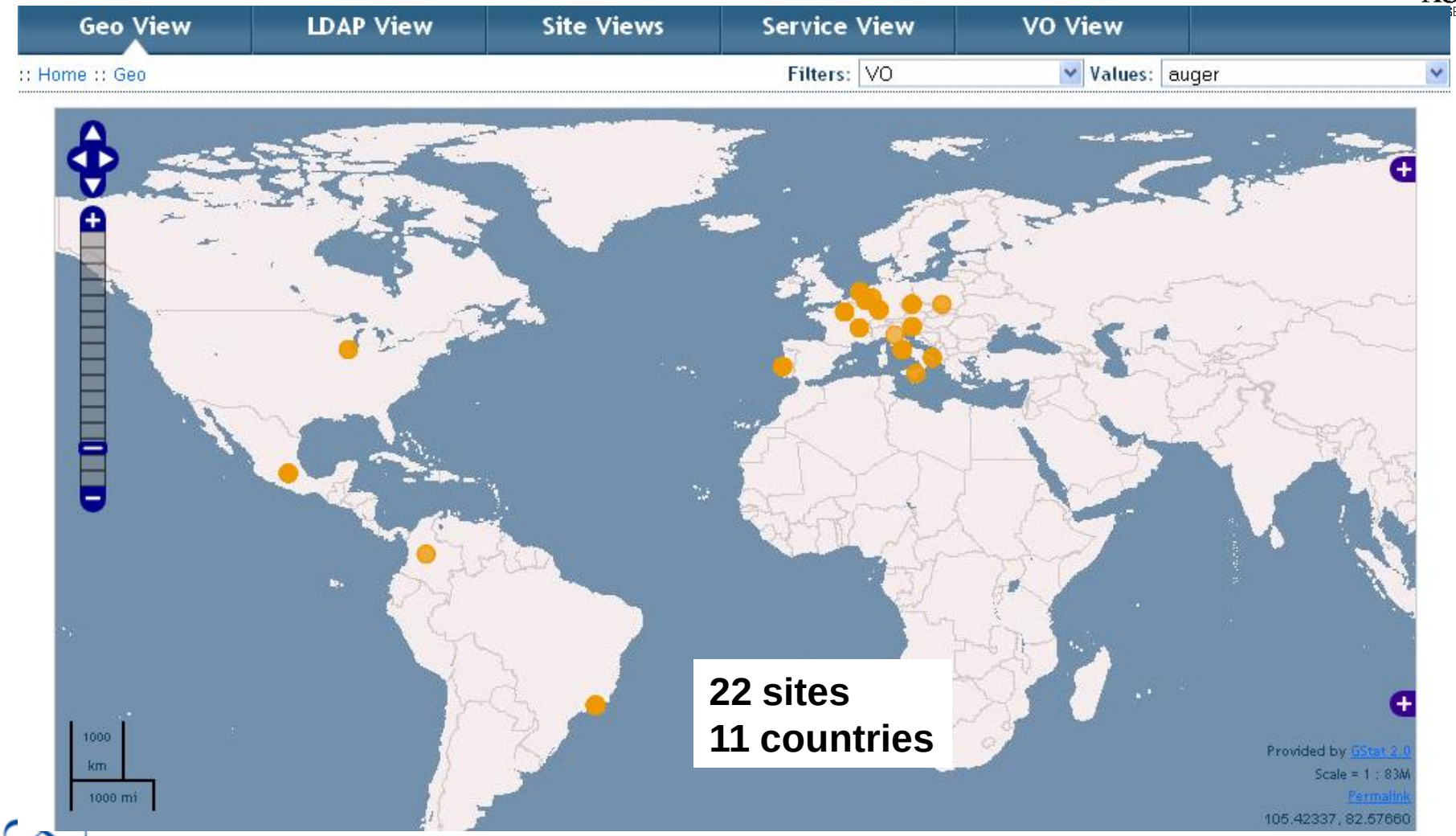
Small files: .info, .input, .lst, .tab, .md5.sum
Logs: .job.out, .job.err

Get the LFN list!

Additional info

N.B.: Select properties of showers you wish to study. A list of LFN will be downloaded.
N.B.: Note, that the LFN list will be saved in a file of your choice. The full LFN set filesize can be of the order of 10 MiB!
N.B.: Note, that since January 24th 2009 the .long file is tarred inside .small.tar file.

Sites supporting the VO auger



Statistics from the GSTAT server

PIERRE AUGER OBSERVATORY

Geo View | LDAP View | Site Views | Service View | VO View

:: Home :: VO

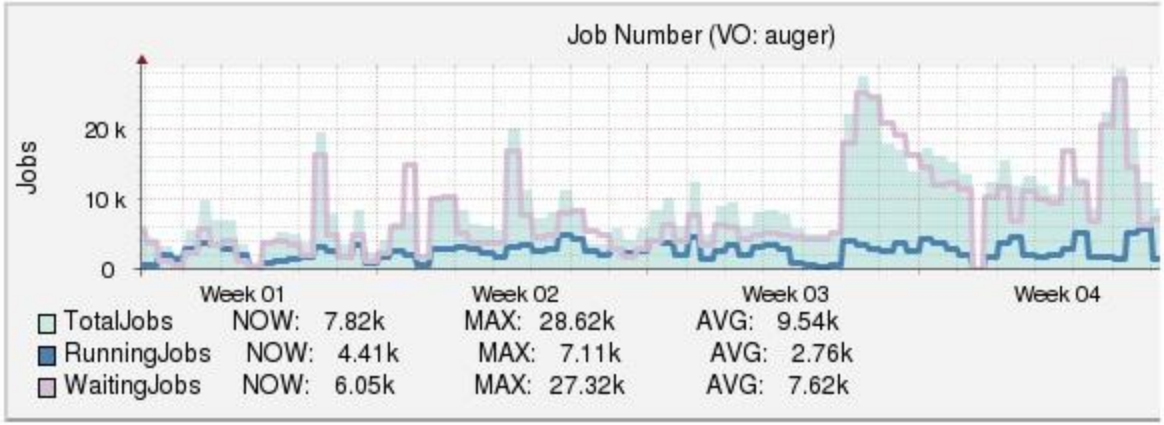
Go to another VO: auger

VO Resource Allocation and Usage

- auger
  - Grid Jobs
    - CBPF
    - CEFET-RJ
    - FNAL_FERMIGRID
    - FZK-LCG2
    - GRIF
    - GRISU-ENEA-GRID
    - ICN-UNAM
    - IN2P3-CC
    - INFN-CATANIA
    - INFN-LECCE
    - INFN-T1
    - LIP-Lisbon
    - NCG-INGRID-PT
    - NIKHEF-ELPROD
    - RWTH-Aachen
    - SiGNET
    - UFRJ-IF
    - UNIANDES
    - USCMS-FNAL-WC1
    - prague_cesnet_lcg2
    - praguelcg2
    - wuppertalprod
  - Online Storage
  - Nearline Storage

Viewing Statistics or Graphs

Hourly | Daily | Weekly | Monthly | Yearly



Statistics from the EGI portal

PIERRE AUGER OBSERVATORY

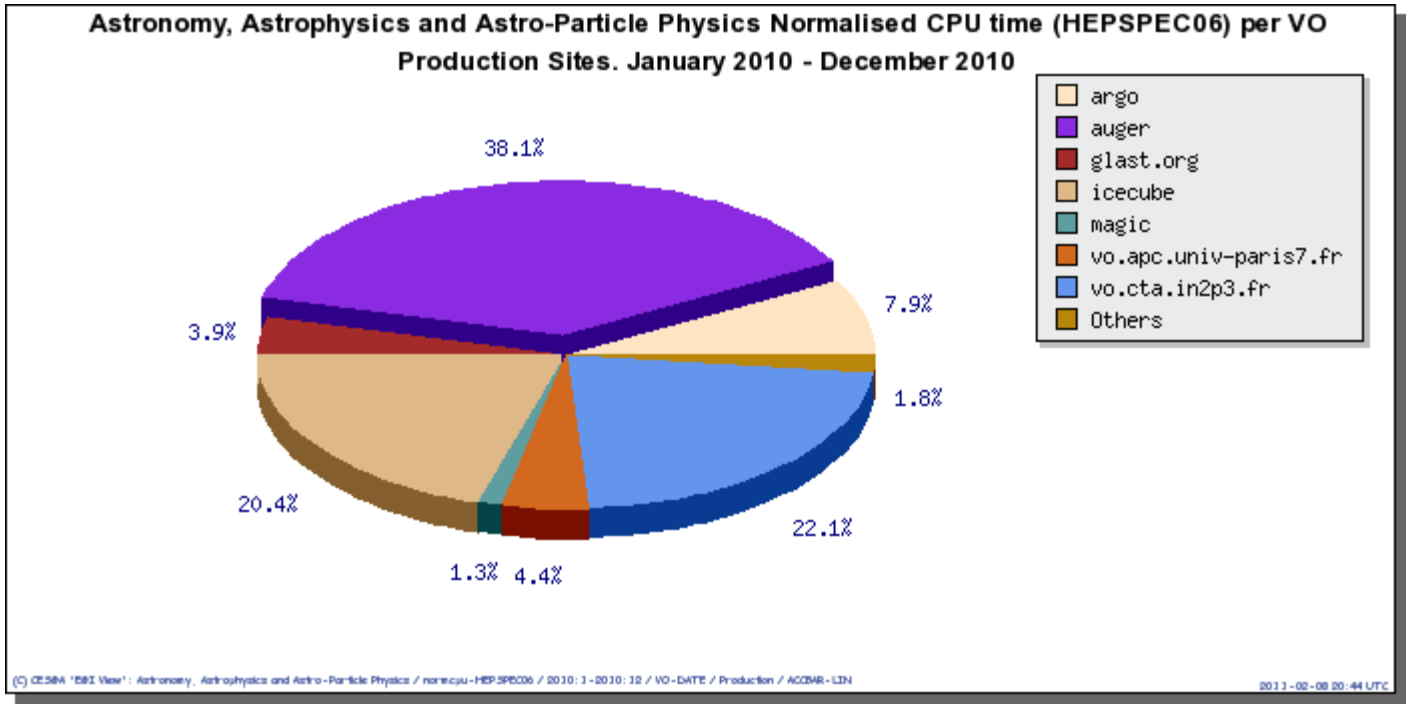
COUNTRY Normalised CPU time (HEPSPEC06) by VO and DATE.

TOP10 VOs. December 2010 - January 2011.

The following table shows the distribution of Normalised CPU time (HEPSPEC06) grouped by VO and DATE (only information about **TOP 10 -ordered by CPU time- VOs** is returned).

Normalised CPU time [units HEPSPEC06.Hours] by VO and DATE				
VO	Dec 10	Jan 11	Total	%
alice	29,940,356	48,876,588	78,816,944	5.46%
atlas	443,893,372	408,467,700	852,361,072	59.07%
auger	7,466,356	4,926,392	12,392,748	0.86%
biomed	2,899,776	3,933,468	6,833,244	0.47%
cms	142,245,440	174,605,352	316,850,792	21.96%
dzero	6,084,156	5,146,672	11,230,828	0.78%
hone	1,546,292	4,252,848	5,799,140	0.40%
ilc	6,611,008	4,715,388	11,326,396	0.78%
lhcb	39,659,828	99,373,988	139,033,816	9.64%
theophys	4,734,448	3,538,672	8,273,120	0.57%
Total	685,081,032	757,837,068	1,442,918,100	
Percentage	47.48%	52.52%		

Statistics from the EGI portal



Statistics from the EGI portal

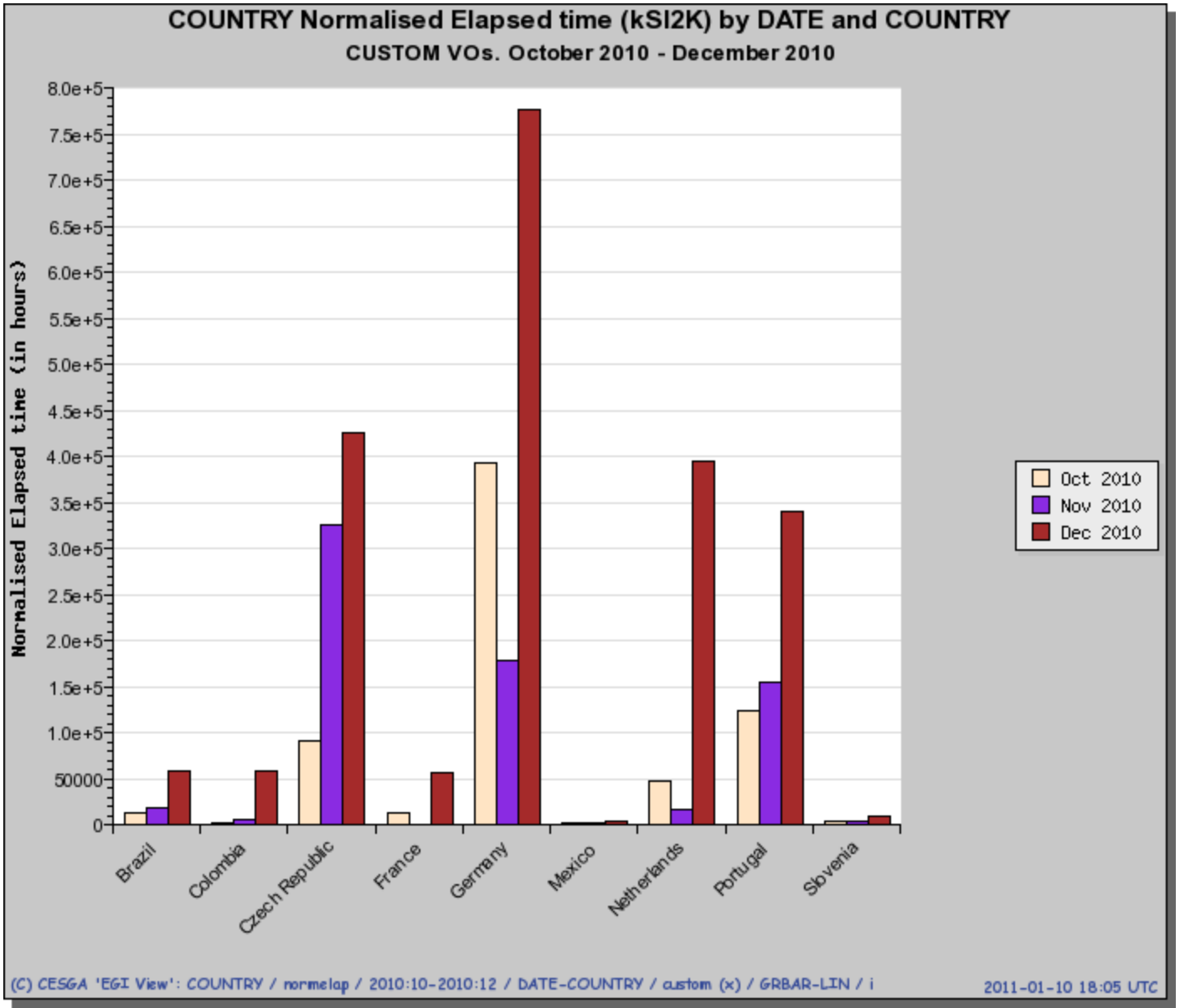
VO auger (ALL Groups and Roles) Group information.

January 2011 - January 2011.

The following table shows the Usage of the Top 10 Groups ordered by Total number of jobs.

Top 10 Groups ordered by Total number of jobs														
Group/Role		Jobs		CPU time		Norm. CPU time		WCT		Norm. WCT		CPU Efficiency	Avg. CPU time	Avg. WCT
#	ID	#	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	%	Hrs	Hrs
1	/auger/Role=Production	126,100	75.3%	362,045	65.8%	819,699	66.6%	539,655	71.4%	1,132,193	71.0%	67.1	2.87	4.28
2	/auger/Role=NULL	41,279	24.7%	188,285	34.2%	411,892	33.4%	216,467	28.6%	462,679	29.0%	87.0	4.56	5.24
3	/auger/Role=SoftwareManager	56	0.0%	2	0.0%	4	0.0%	5	0.0%	11	0.0%	40.0	0.04	0.09
4														
5														
6														
7														
8														
9														
10														
Total		167,435		550,332		1,231,595		756,127		1,594,883		72.8	3.29	4.52

Statistics from the EGI portal

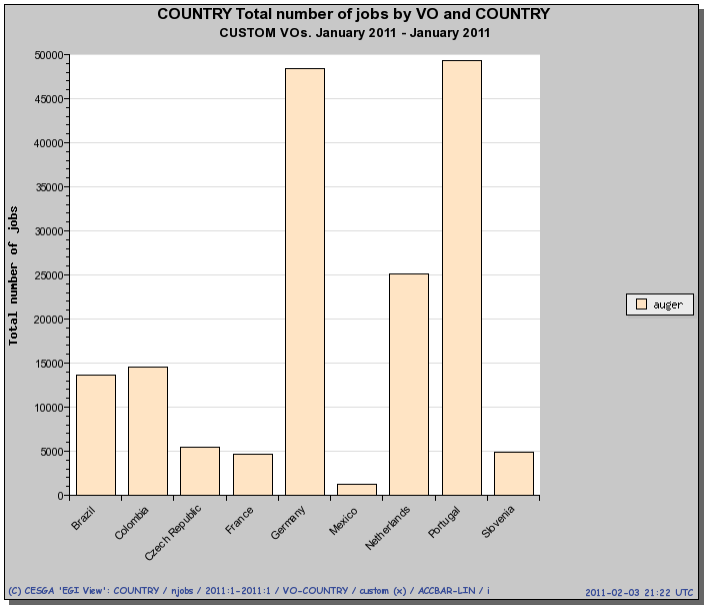


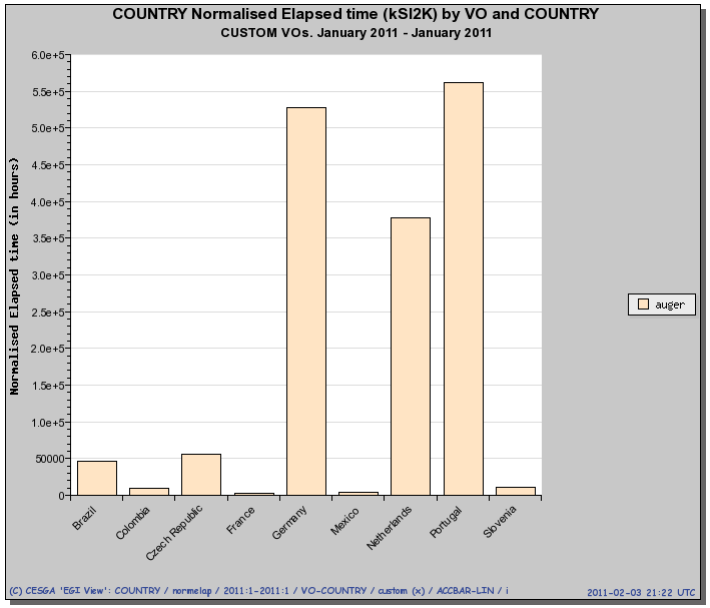
Statistics from egi portal

CUSTOM VOs. January 2011 - January 2011.

The following table shows the distribution of Total number of jobs grouped by VO and COUNTRY (only information about the **selected VOs** is returned).

Total number of jobs run by VO and COUNTRY											
VO	Brazil	Colombia	Czech Republic	France	Germany	Mexico	Netherlands	Portugal	Slovenia	Total	%
auger	13,664	14,594	5,511	4,688	48,435	1,221	25,068	49,329	4,925	167,435	100.00%
Total	13,664	14,594	5,511	4,688	48,435	1,221	25,068	49,329	4,925	167,435	
Percentage	8.16%	8.72%	3.29%	2.80%	28.93%	0.73%	14.97%	29.46%	2.94%		





VO auger - site requirements

- standard gLite installation
  - correctly published values in the BDII
  - correct mapping of roles
- queues at least 48 hours long (CPU time)
  - longer time is needed for some jobs
- sw installation area – not requiered
  - but can be used and speeds up job startup
- good network connection
- local storage - preferable

Data in CC IN2P3 and on the Grid

Real data: total: 568 000 files, 10 TB

large files: 18 680, 4.4 TB (small files stay on SRB disks)

Simulations: total: 1 590 000 files, 21 TB

large files: 74 000, 19 TB

host	size_TB
dcache.ijs.si	2
dpm.cyf-kr.edu.pl	11
dpm1.egee.cesnet.cz	1
golias100.farm.particle.cz	10
grid-se.physik.uni-wuppertal.de	1
grid-srm.physik.rwth-aachen.de	6
grid05.lal.in2p3.fr	5
gridka-dCache.fzk.de	27
polgrid4.in2p3.fr	12
srm01.lip.pt	1

Some issues - production

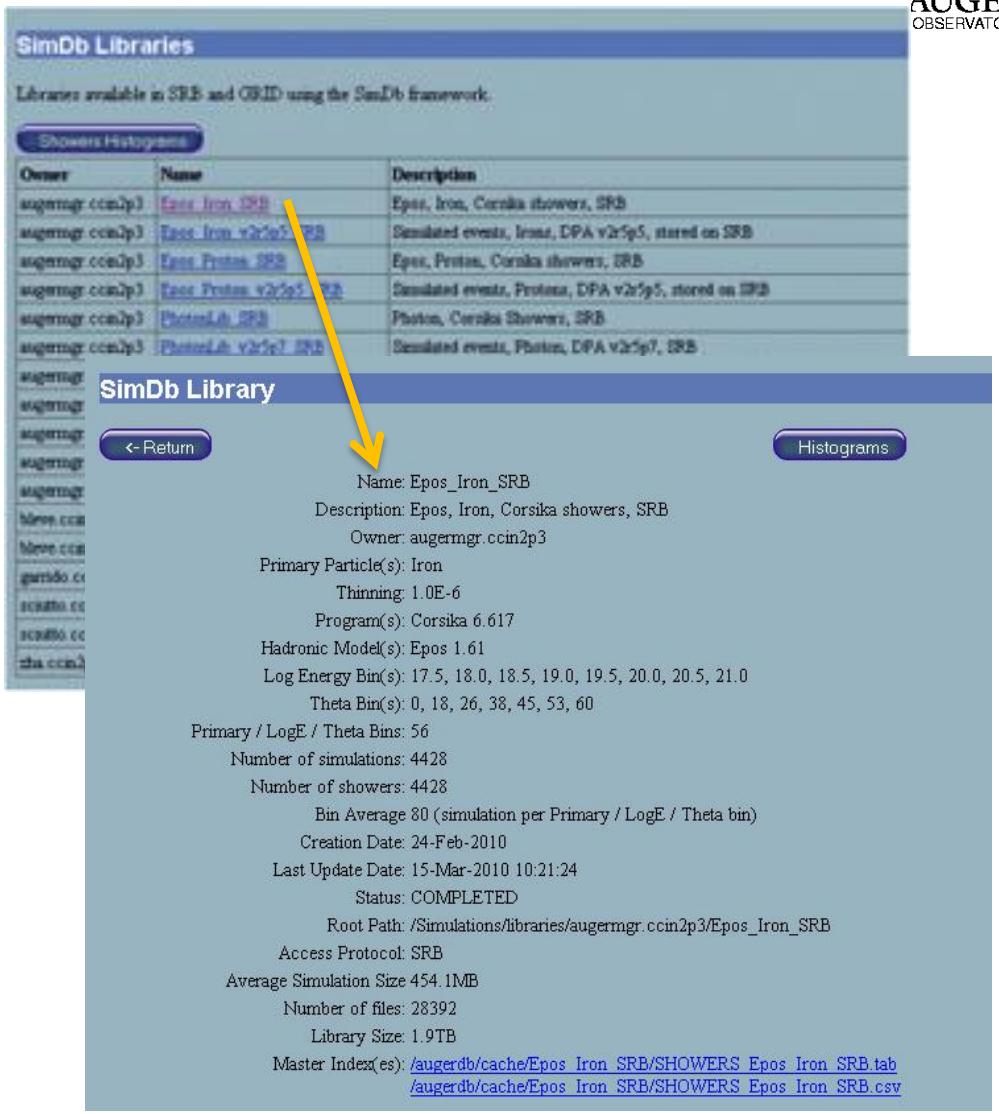
- Production
  - Offline software installation not straightforward
  - Data management (lost files, ownership [DN changes])
  - **Manpower needed to follow the productions and perform quality checking**
- Sites
  - Stability
  - Setup – publishing queue parameters, role mapping, sw area

Some issues - users

- Usage issues
  - Difficulties in accessing the files
    - **Need of a Grid certificate**
    - *Complexity of the commands to check and get the files*
- Work around
  - Mirror files from Grid to SRB

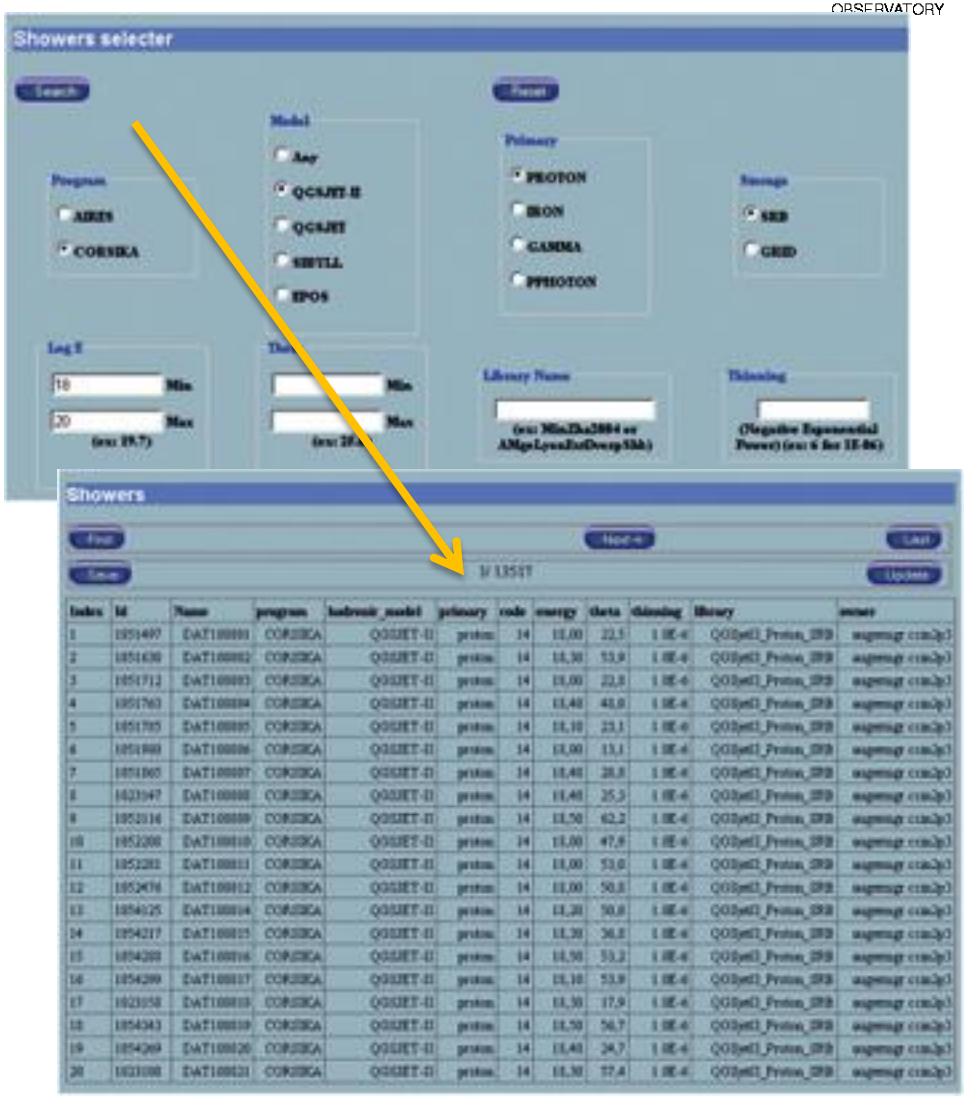
Simulation Library Pages

- List of the Libraries
  - Details of the simulation libraries
    - Number of simulations
    - Program and Model
    - Date
    - Location
  - Loaded from the database
  - Updated every 2 hours
- Implementation
  - AugerDb core
  - Java, JSP, Struts



Simulation Search Pages

- Searches by simulation parameters from the database
  - Simulation Program
  - High Energy Model
  - Energy
  - Primary
  - Angles
- Support for shower simulations and simulated events
- Selection between Grid Simulations or SRB Mirrors



Thanks and Credits

Thanks to organizers for inviting me to such inspiring workshop

The production team from University of Grenada:
Julio Lozano Bahilo, Gines Rubio, Maria Dolores Serrano
-Universidad de Granada

SimDB development: Jean-Noel Albert, LAL Paris

Main dashboard developer: Jaroslava Schovancova, FZU Prague

CESNET, Czech NGI

I reused parts of presentation from these colleagues:
Jean-Noel Albert, Darko Veberič, Francois Montanet

Backup slides

Sites vs country

- 22 sites from 11 countries:
  - BR: CBPF
  - BR: CEFET-RJ
  - US: FNAL_FERMIGRID
  - DE: FZK-LCG2
  - FR: GRIF
  - IT: GRISU-ENEA-GRID
  - MX: ICN-UNAM
  - FR: IN2P3-CC
  - IT: INFN-CATANIA
  - IT: INFN-LECCE
  - IT: INFN-T1
  - PT: LIP-Lisbon
  - PT: NCG-INGRID-PT
  - NL: NIKHEF-ELPROD
  - DE: RWTH-Aachen
  - SI: SiGNET
  - BR: UFRJ-IF
  - CL: UNIANDES
  - US: USCMS-FNAL-WC1
  - CZ: prague_cesnet_lcg2
  - CZ: praguelcg2
  - DE: wuppertalprod