ASEC Monitors located at the high altitude research stations



Intellectual exploration system for the physical inference in High-energy astrophysics



http://crd.yerphi.am/Conferences/tepa2014









Type of registration

- Secondary cosmic ray fluxes
- Radio waves
- Electric fields
- Weather parameters
- Sky (clouds) monitoring



ASEC Stations



- Aragats Research Station
 - Mt. Aragats, 40°28'N, 44°10'E, 3200m a.s.l.
- NorAmberd Research Station
 - Mt. Aragats, 40°22'N, 44°15'E, 2000m a.s.l.
- Byurakan
 - Mt. Aragats, 40°22'N, 44°15'E, 1500m a.s.l.
- CRD headquarters
 - Yerevan, 40°22'N, 44°15'E, 1000m a.s.l.
- Sevan Lake
 - Sevan Lake, 40.619N, 45.028E, 1910m a.s.l.



Aragats Station Mt. Aragats, 40°28'N, 44°10'E, 3200m a.s.l.









Monitors at Aragats station

Alikhanyan National Science Laboratory (YerPhl)

Cosmic Ray Division

Name	Detector Type	Type of the Electronics	Type of Measurements	Number of Physical Channels	Number of Software Channels	Size of the Daily Data		
Armenia, Mt. Aragats, 40°28'N, 44°10'E, 3200m asl, Aragats Research Station								
ASNT	Scintillator	Log ADC , coincidences	Particles	8	68	182 MB		
MAKET	Scintillator	Log ADC, coincidences	Particles	16	154	49 MB		
AMMM	Scintillator	Counter	Particles	118	124	1.1 MB		
ArNM	NM-64	Counter with 3 dead times	Particles	24	60	1.3 MB		
SEVAN	Scintillator	Counter, coincidences	Particles	3	8	103 kB		
Cube	Scintillator	Log ADC, coincidences	Particles	8	46	2 GB		
STAND_SKL	Scintillator	Counter, coincidences	Particles	4	8	103 kB		
Stand_3cm	Scintillator	Log ADC, coincidences	Particles	4	18	31 MB		
Nal	Scintillator	Log ADC, coincidences	Particles	6	29	26 MB		
STAND	Scintillator	Counter, coincidences	Particles	5	8	103 kB		
Lemi-417	Fluxgate		Magnetic field	2	10	7.7 MB		





Monitors at Aragats station

Alikhanyan National Science Laboratory (YerPhl)

Cosmic Ray Division

Name	Detector Type	Type of the Electronics	Type of Measurements	Number of Physical Channels	Number of Software Channels	Size of the Daily Data		
Armenia, Mt. Aragats, 40°28'N, 44°10'E, 3200m asl, Aragats Research Station								
Boltec EFM-100 (MAKET)	Field mill		Electric filed	1	2	2.85 MB		
Boltec EFM-100 (GAMMA)	Field mill		Electric filed	1	2	2.85 MB		
Boltec EFM-100 (Meteo)	Field mill		Electric filed	1	2	2.85 MB		
Boltec StormTracker	Direction-finding antenna		Lightings	1	16	Depends on weather		
Out-Door IP camera	Sensor: CMOS (1280 x 1024)		Clouds	1	1	Depends on weather		
AllSkyCam	Sensor: Color 1/3" Sony Super HAD CCD II		Clouds	1	1	Depends on weather		
Weather Station			Weather	1	36	748kB		





Aragats high altitude

research station



- Total number of monitors at station 20
- Number of physical channels 208.
- Number of software channels 592.
- Type of measurements Cosmic ray fluxes, Geomagnetic field, Electrical field, Lightning types and distances, Weather parameters.
- Type of Detectors Organic and inorganic scintillatiors (Plastic, CsI and NaI crystals), Geiger and Proportional counters, Fluxgate, Electrical field mills, Direction-finding antenna, other sensors.





Aragats high altitude

research station



Measured parameters of the Cosmic ray fluxes:

- Electrons and muons with energy thresholds 2,4,7,9,12,15,18,25,35,100 MeV.
- High energy muons with energy > 5GeV; > 250MeV.
- Gamma Rays.
- Thermal and MeV neutrons.
- Extensive Air shower corresponding to primary energies 100-200 TeV.
- Horizontal muons within acceptance of 0 +/- 0.5 degree.
- Histograms of energy deposits.
- Event selection according to chosen triggering conditions; possibility to change scale of time series from 1 second to 1 minute.





Aragats Station







Nor-Amberd Station

Mt. Aragats, 40°22'N, 44°15'E, 2000m a.s.l.













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Monitors at Nor-Amberd

station

2



Cosmic Ray Division	Monitors at Nor-Amber							
Alikhanyan National Science Laboratory (YerPhl)								
Name	Detector Type	Type of the Electronics	Type of Measurements	Number of Physical Channels	Number of Software Channels	Size of the Daily Data		
Armenia, Mt. A	ragats, 40°22'N	<mark>l, 44°15'E, 2000m</mark> as	l, Nor-Amberd	Research St	ation			
NANM	NM-64	Counter with 3 dead times	Particles	24	60	1.3 MB		
NAMMM1	Scintillator	Log ADC, coincidences	Particles	12	134	37 MB		
NAMMM2	Scintillator	Log ADC, coincidences	Particles	12	134	37 MB		
SEVAN	Scintillator	Counter, coincidences	Particles	3	8	558 kB		
Boltec EFM-100	Field mill		Electric filed	1	2	2.85 MB		
Boltec StormTracker	Direction-finding antenna		Lightings	1	16	Depends		
Lemi-018	Fluxgate		Magnetic field	1	5	4.7 MB		
Weather Station			Weather	1	36	748kB		
Armenia, Mt. Aragats, 40°22'N, 44°15'E, 1500m asl, Burakan								
AllSkyCam	Sensor: Color 1/3" Sony Super HAD CCD II		Clouds	1	1	Depends on weather		
3 x Out-Door camera	PAL		Clouds	1	1	Depends on weath <u>er</u>		

ALIKHANYAN National Laboratory







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Nor-Amberd Station

- Total number of monitors at station 9.
- Number of physical channels 59.
- Number of software channels 384.
- Type of measurements Cosmic ray fluxes, Geomagnetic field, Electrical field, Lightning types and distances, Weather parameters.
- Type of Detectors Scintillations, Proportional and Geiger counters, Fluxgate, Electrical field mill, Direction-finding antenna, other sensors.





Nor-Amberd Station



- Electrons and muons with energy threshold 10, 15 MeV.
- Muons with energy > 350MeV; 12 angular bins of the arriving muons
- Gamma rays.
- Thermal and MeV neutrons.
- 1-minute histograms of energy deposits.
- Flexible system of different event selection according to chosen triggering conditions; possibility to change scale of time series from 1 second to 1 minute





Amberd Castle







CRD headquarters

Alikhanyan National Science Laboratory (YerPhl)

















Monitors at Yerevan





Name	Detector Type	Type of the Electronics	Type of Measureme nts	Number of Physical Channels	Number of Software Channels	Size of the Daily Data		
Armenia, Yerevan, 40°22'N, 44°15'E, 1000m asl, Cosmic Ray Division								
Cube_3cm	Scintillator	Log ADC, coincidences	Particles	8	46	2 GB		
SEVAN	Scintillator	Counter, coincidences	Particles	3	8	103 kB		
Boltec EFM-100	Field mill		Electric filed	1	2	2.85 MB		
Weather Station			Weather	1	36	748kB		
Boltec StormTracker	Direction-finding antenna		Lightings	1	16	Depends		























