A.V. Shulga, N.A. Kulichenko, V.S. Vovk,
F.I. Bushuev, N.A. Kalyuzhny, Y.S. Kozyryev, Y.S. Sybiryakova,

Research meteor activity using over-horizon FM-broadcast transmitters

RI «Nikolaev Astronomical Observatory” (RI NAO), Nikolaev, Ukraine
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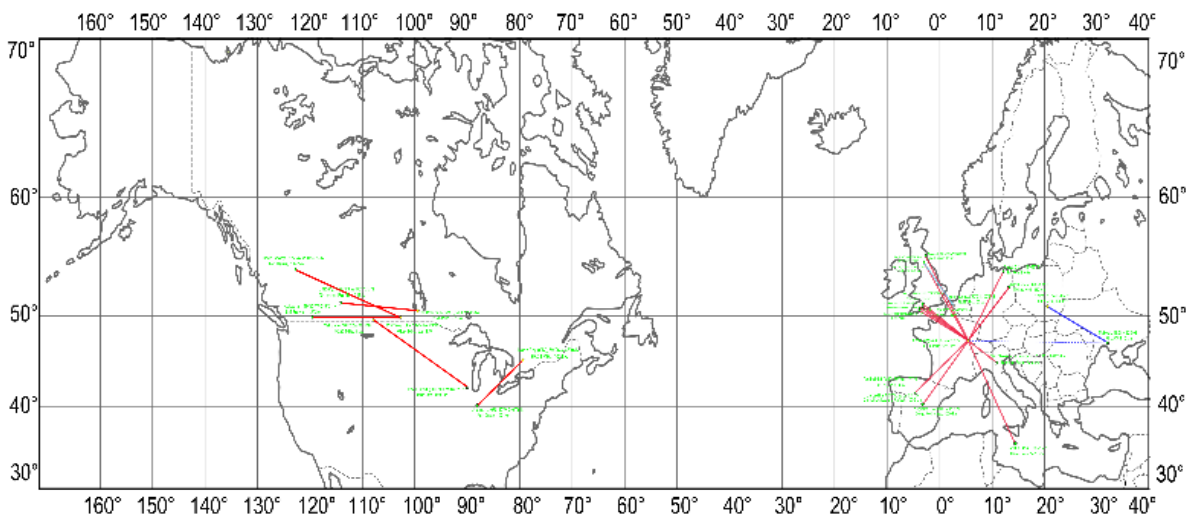
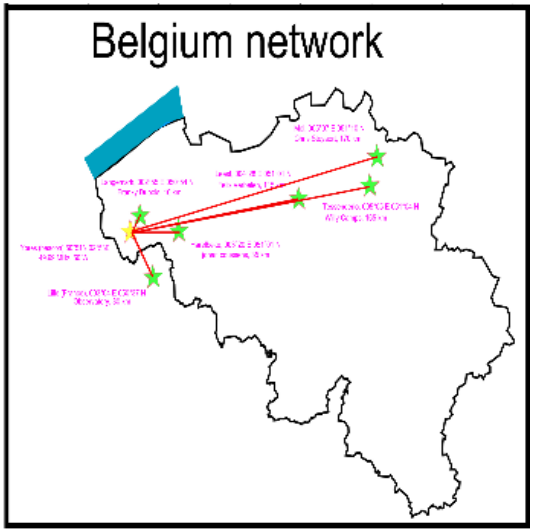
Purposes and tasks

1) daily statistics of meteor activity;
2) maximum and width of meteor showers;
3) identification of meteors with showers using velocity:
4) Asteroids approaching..

Operating observers: antennas locations; receiving equipment and transmitters (from Radio Meteor Observing Bulletin)





Receivers
ICOM IC-PCR1000
AITEC MRX-50
HRO MRX-50
HRO MRX-50
Yaseu FRG9600
Alinco DX70
Yaesu FT-817ND
Yaesu VR5000
Yupiteru MVT-7100

Antennas
Horizontal full wave loop
Dipole
Yagi-Uda 2-6 elements

Transmitter	Band, MHz	Power, kW	Observers
GRAVES Military Space Radar system, that is located near the town Broye-Aubigney-Montseugny. Coordinates: 47° 20′ 52.8″ N, 5° 30′ 54.36″ E.	143,05	767	13
Meteor Beacon, Ypres, Belgium. Coordinates: 50° 51′ 0″ N, 2° 53′ 0″ E	49,99	0,05	8
Several TV transmitters on the south of Canada. Coordinates: 102°41'W 49°49'N, 51°01'N 99°32'W, 79°26'W 46°04'N	60-70	100	6

Receive equipment

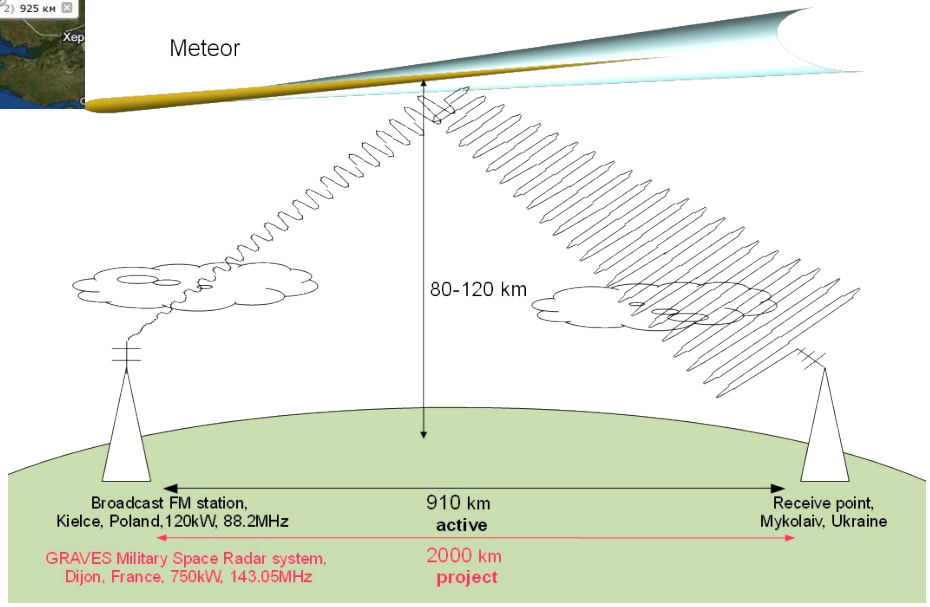
FM Receiver

PC Soundcard

Antenna

Antenna	FM Receiver	PC Soundcard
6 element Yagi-Uda antenna with amplification 13 dB	COMPRO TV/FM tuner	Intel N10/ICH 7 Family High Definition Audio Controller

Methodology of observation



METEORS OBSERVATIONS IN RI NAO

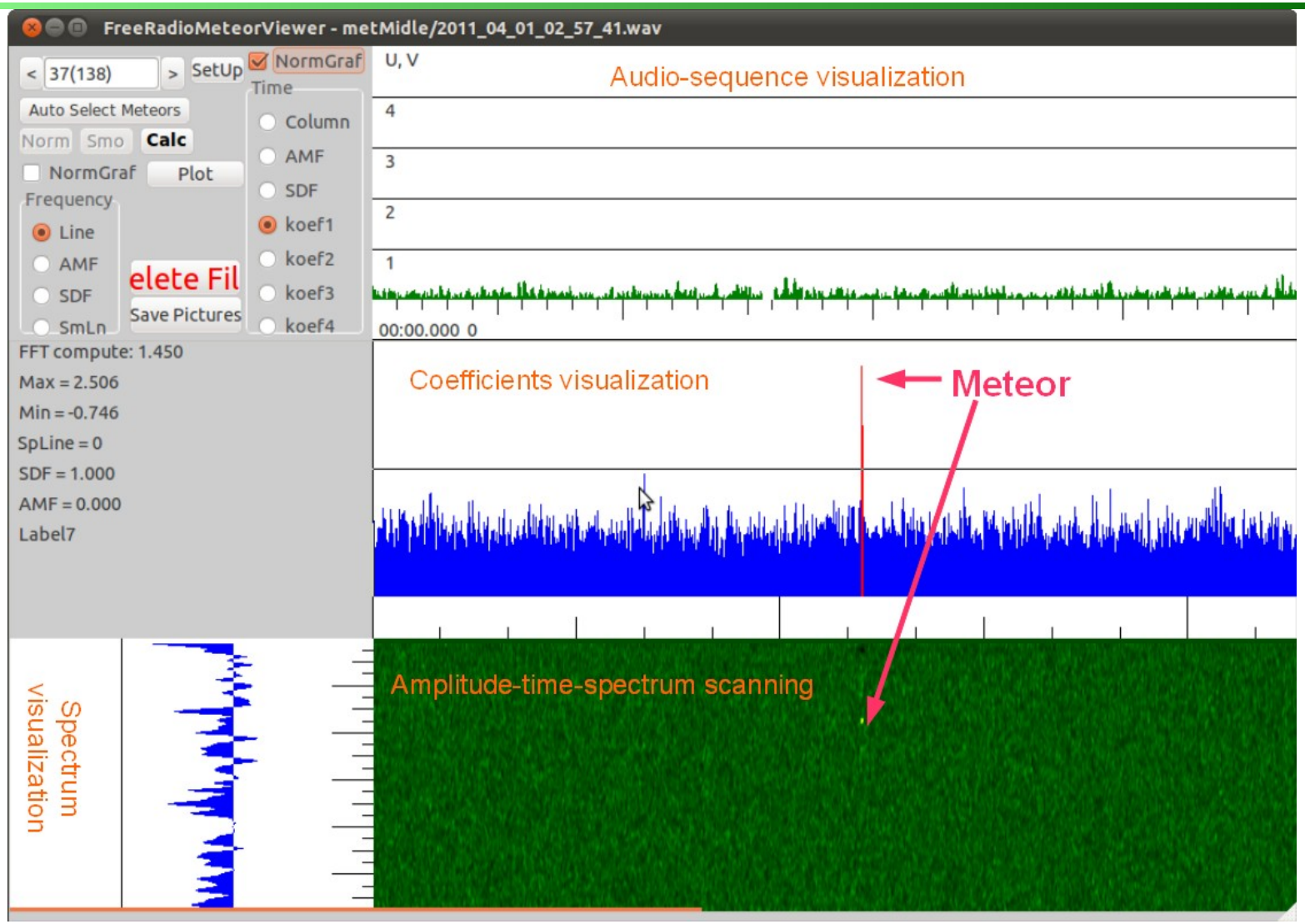
Observations stations

Observation station at (CASD “Lens”)

Observation station at RI MAO

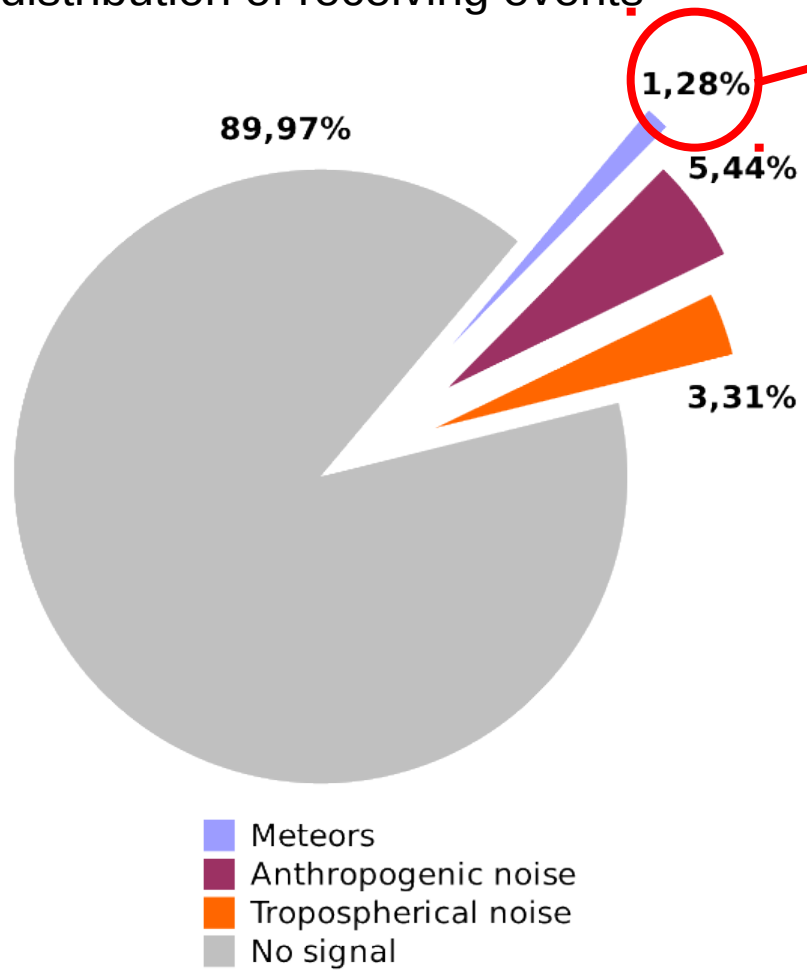
Observation station at RI AO ONU

Software for detecting meteors in radio band designed in RI NAO

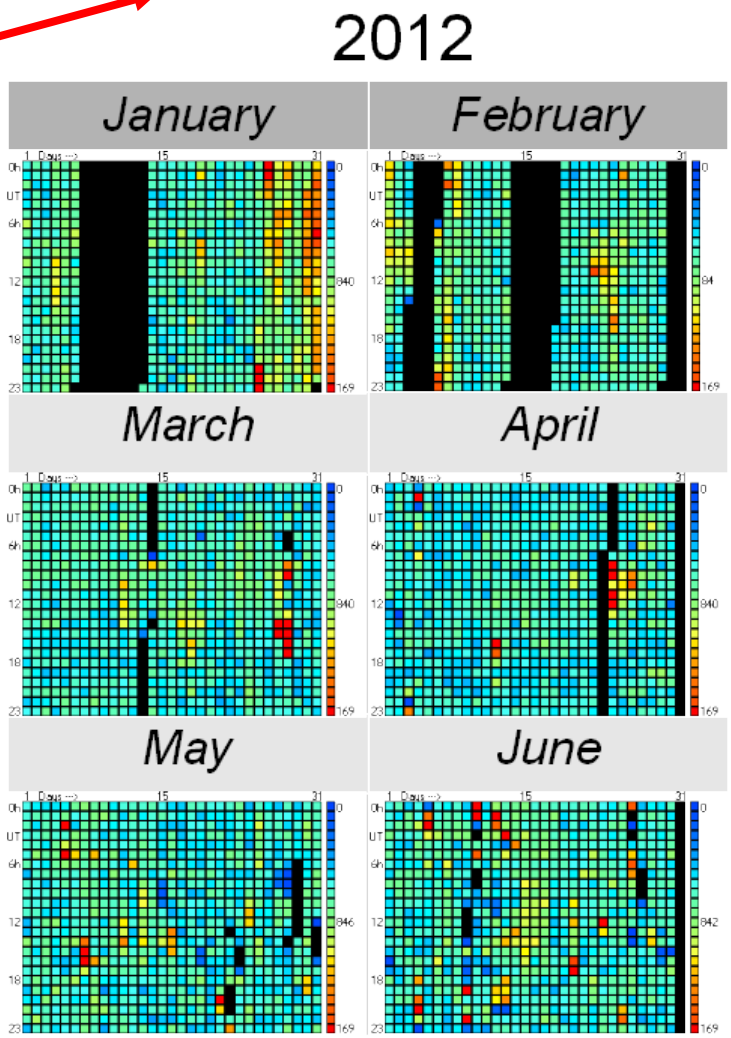


Results of observing meteors

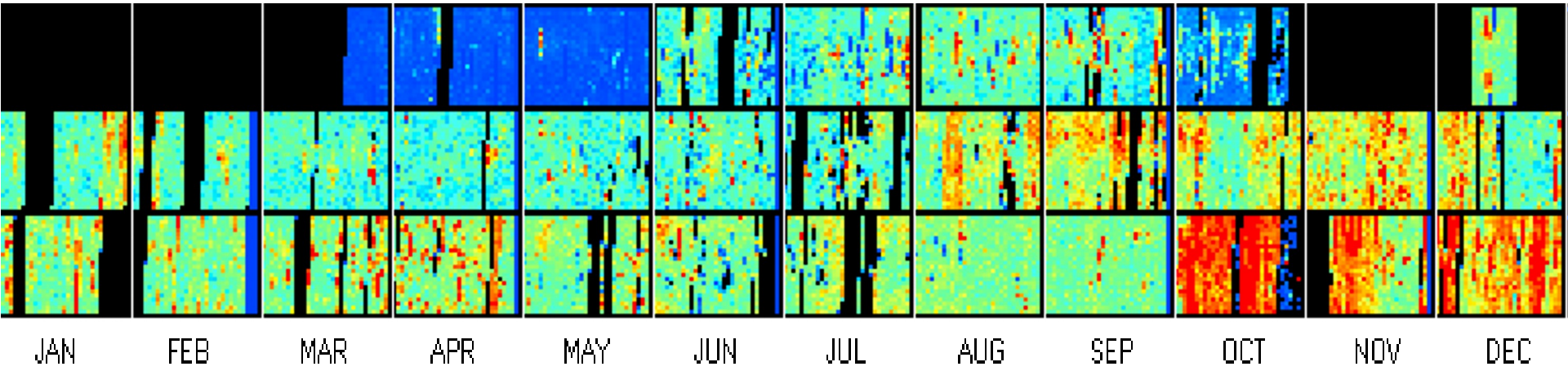
Time distribution of receiving events

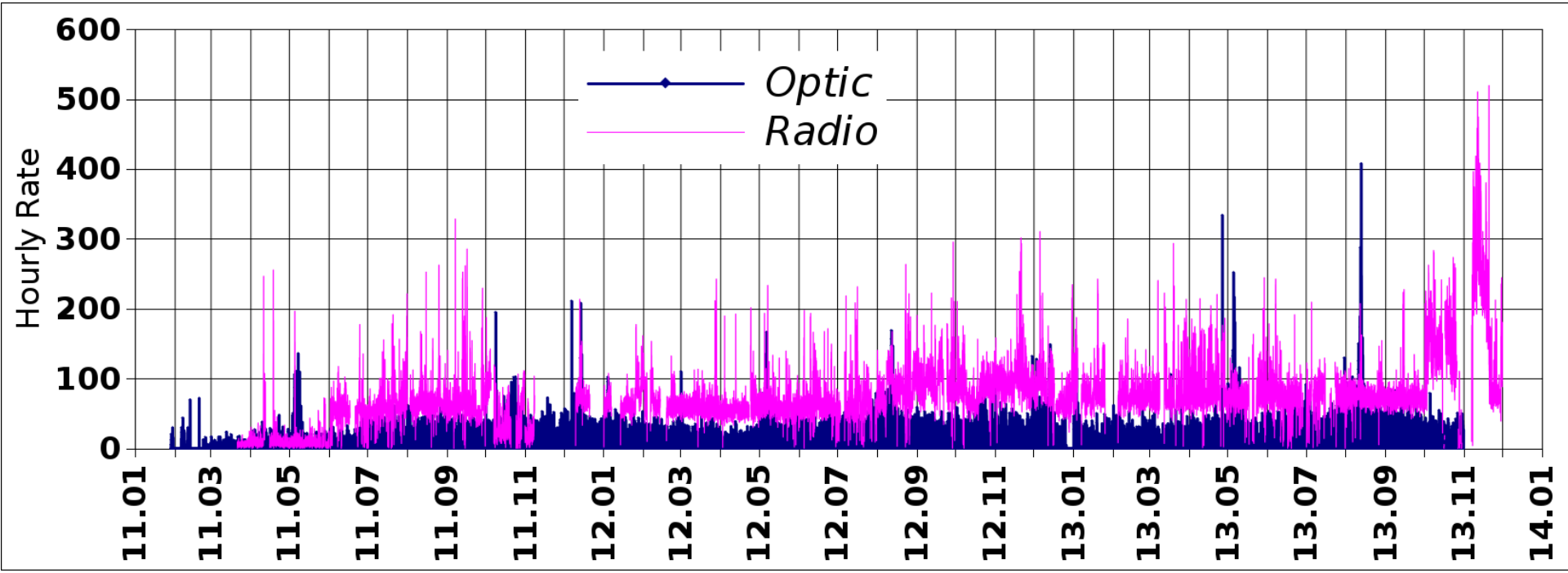


Hourly statistics of meteors

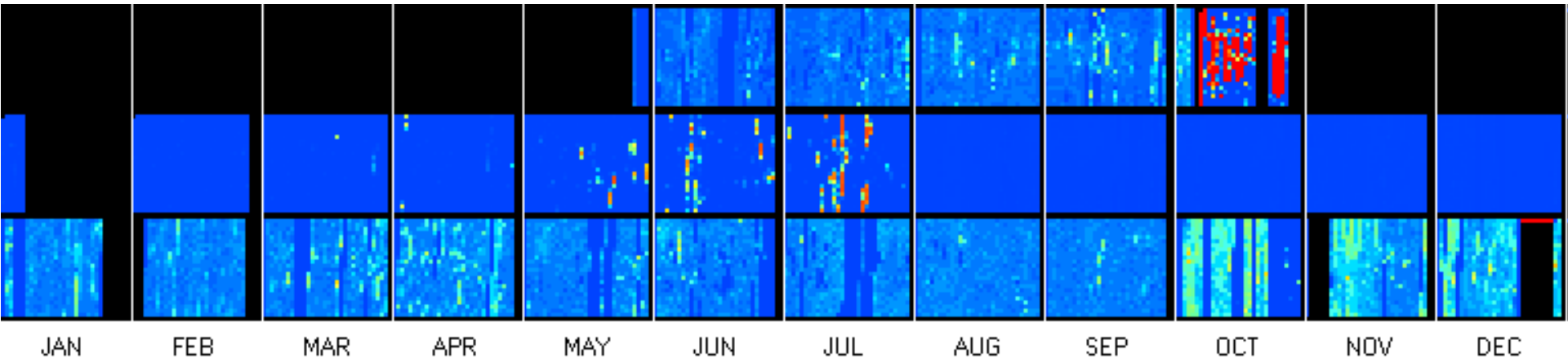


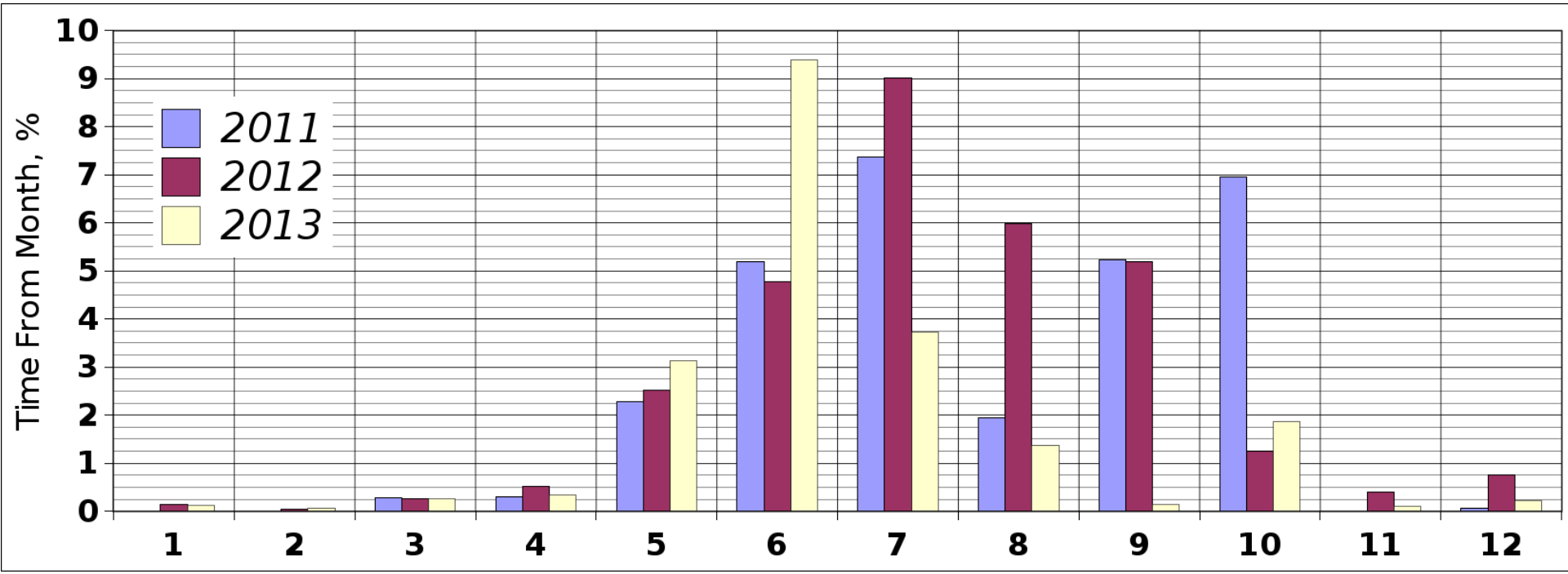
Meteors Hourly Whole Data



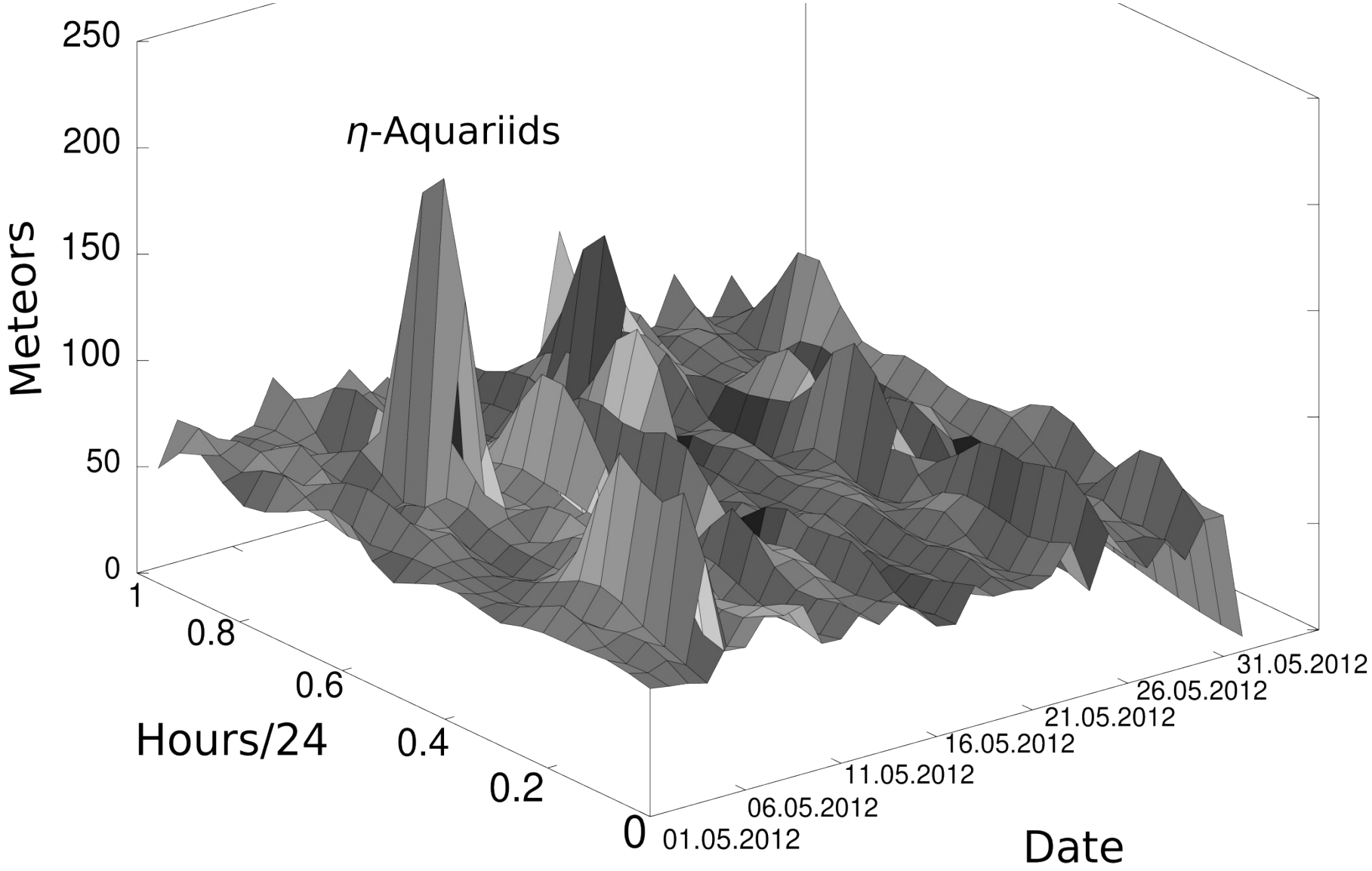


Tropospheric Noise Whole Data

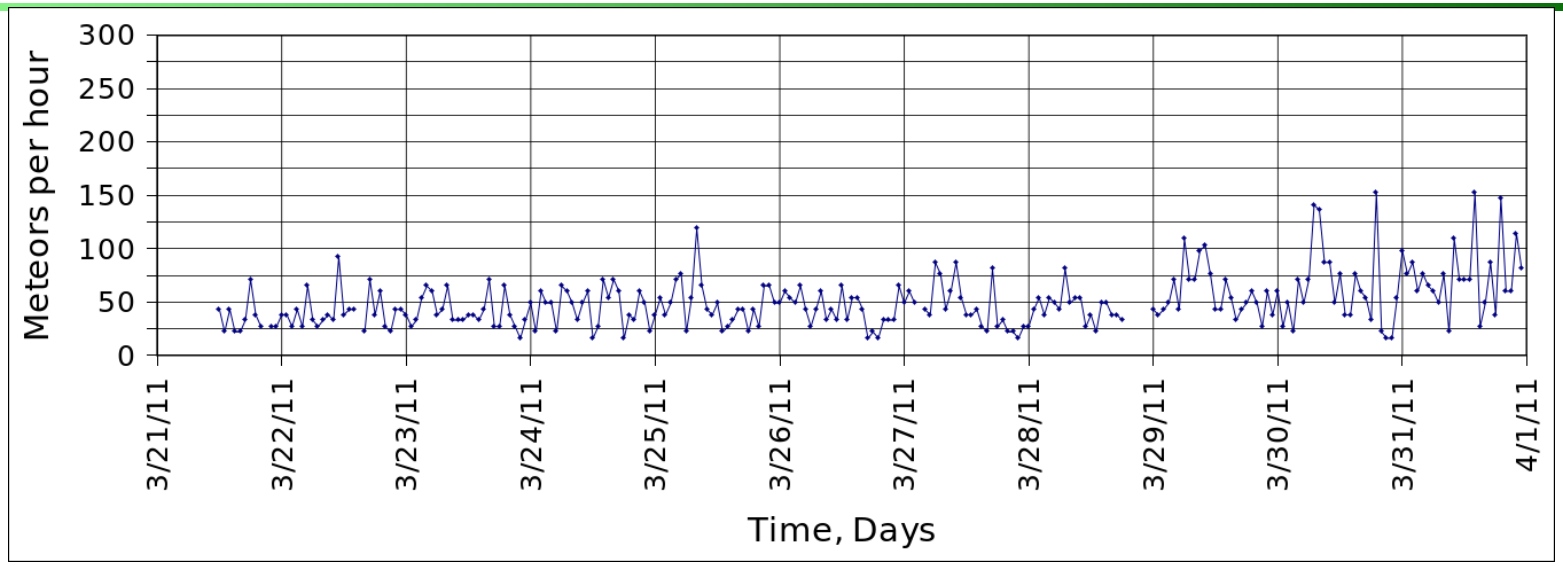


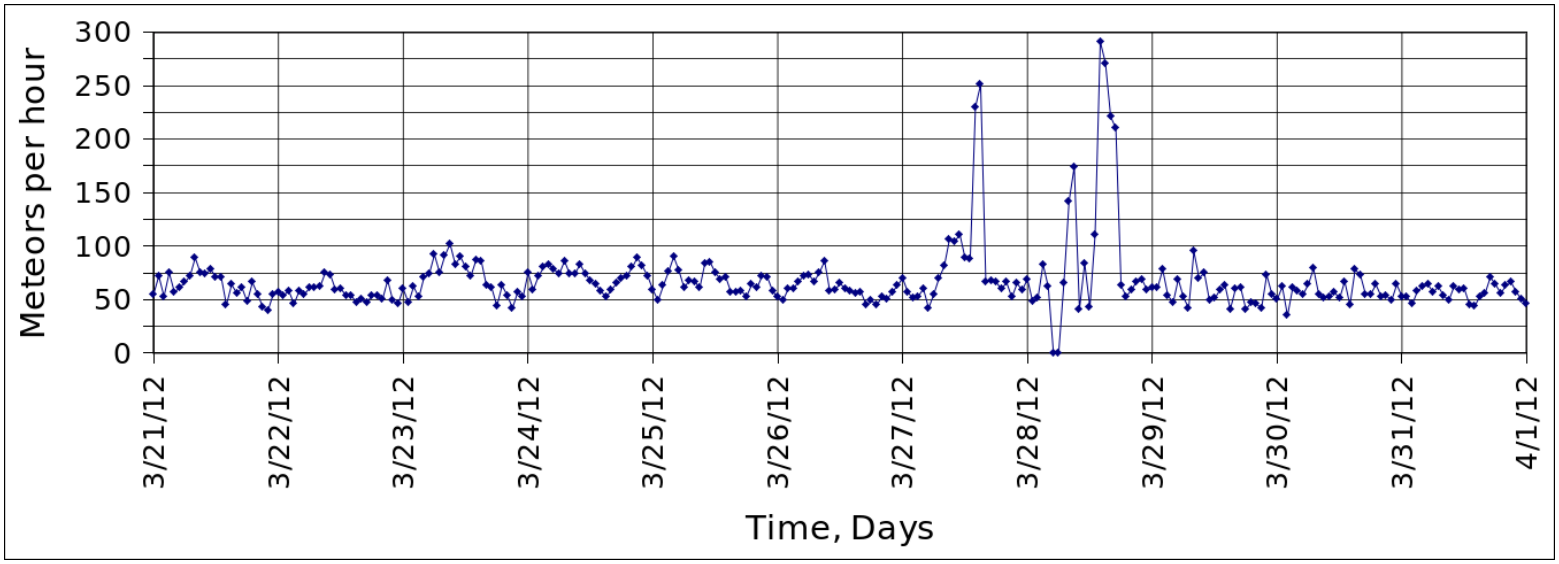


Shepard interpolation of meteor data



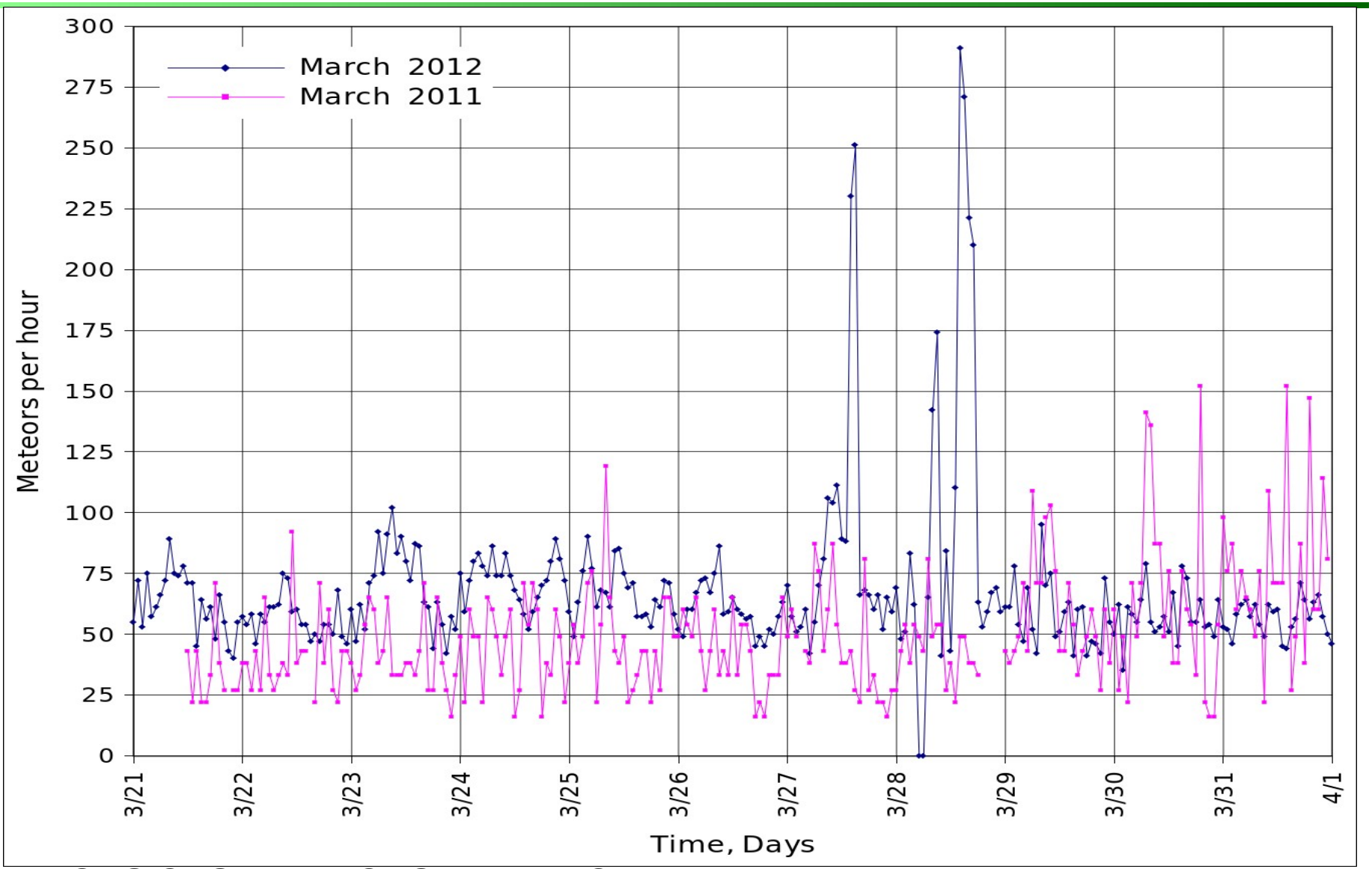
Asteroid 2012 FS35 approaching



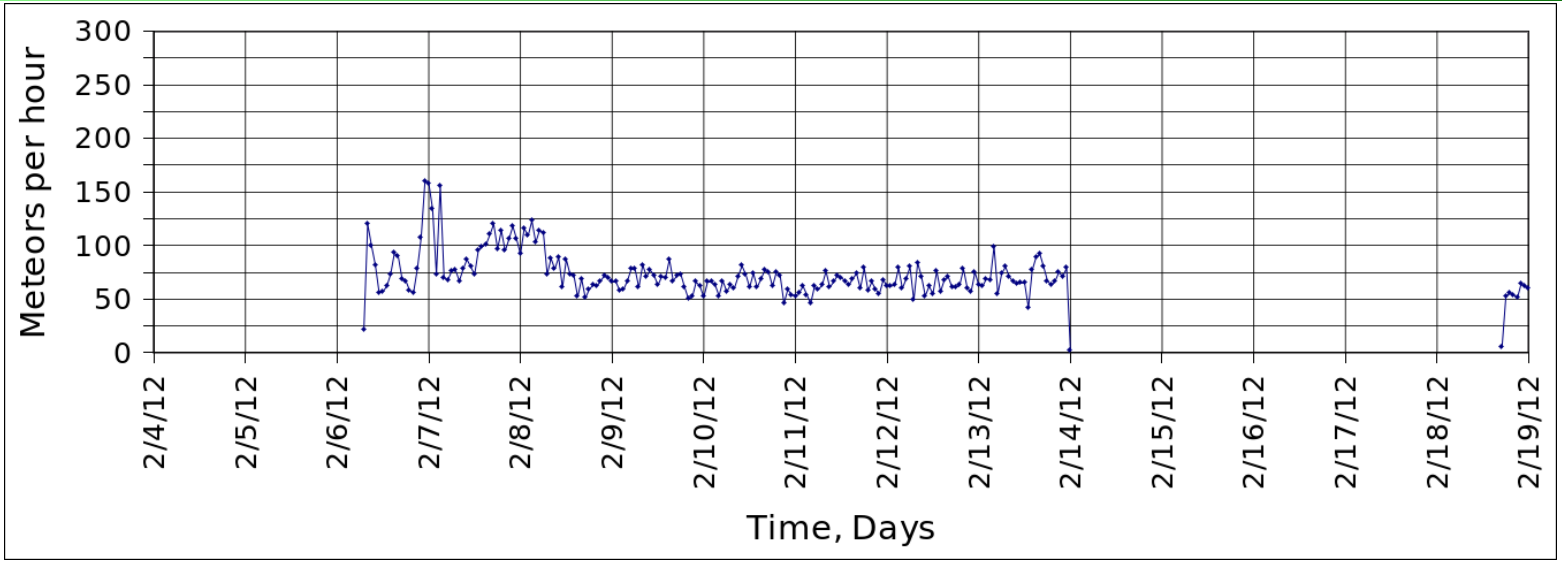


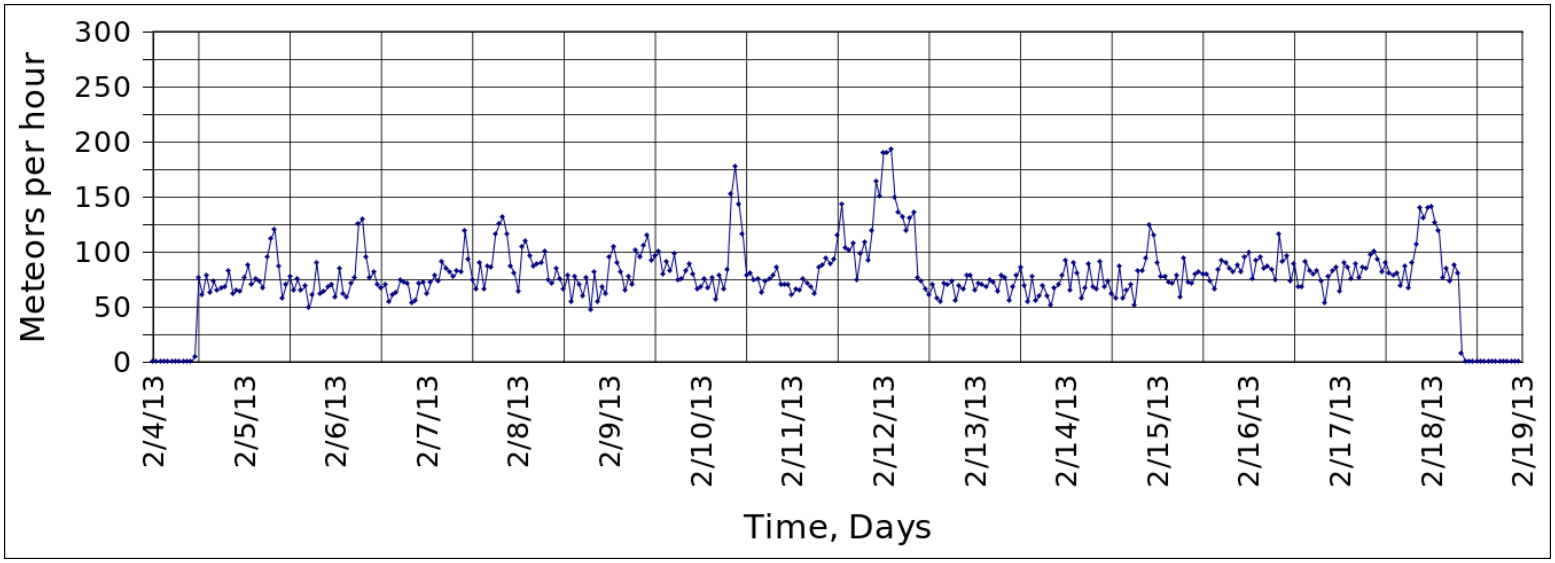
METEORS OBSERVATIONS IN RI NAO

Asteroid 2012 FS35 approaching



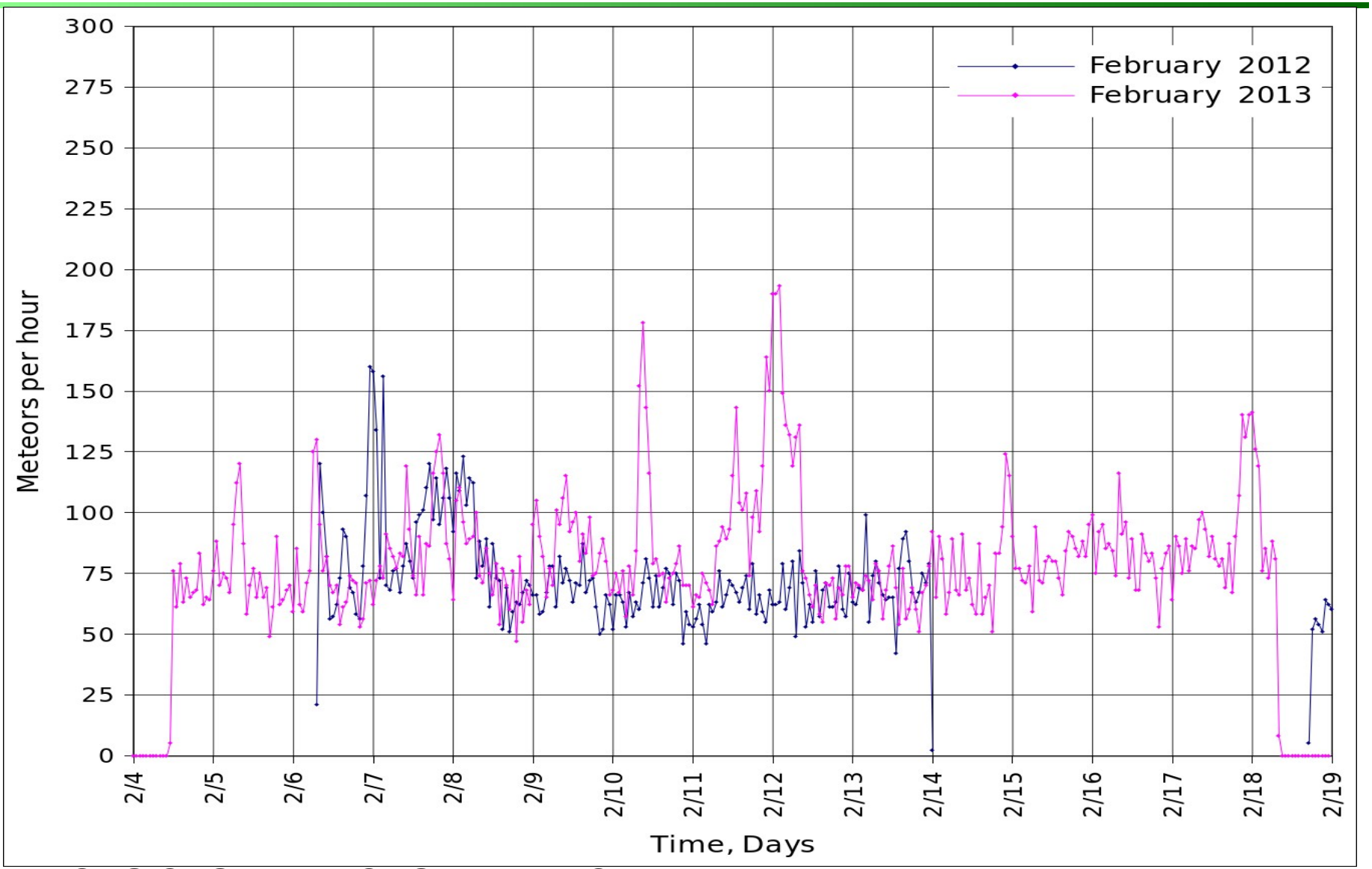
Asteroid 2012 DA14 approaching





METEORS OBSERVATIONS IN RI NAO

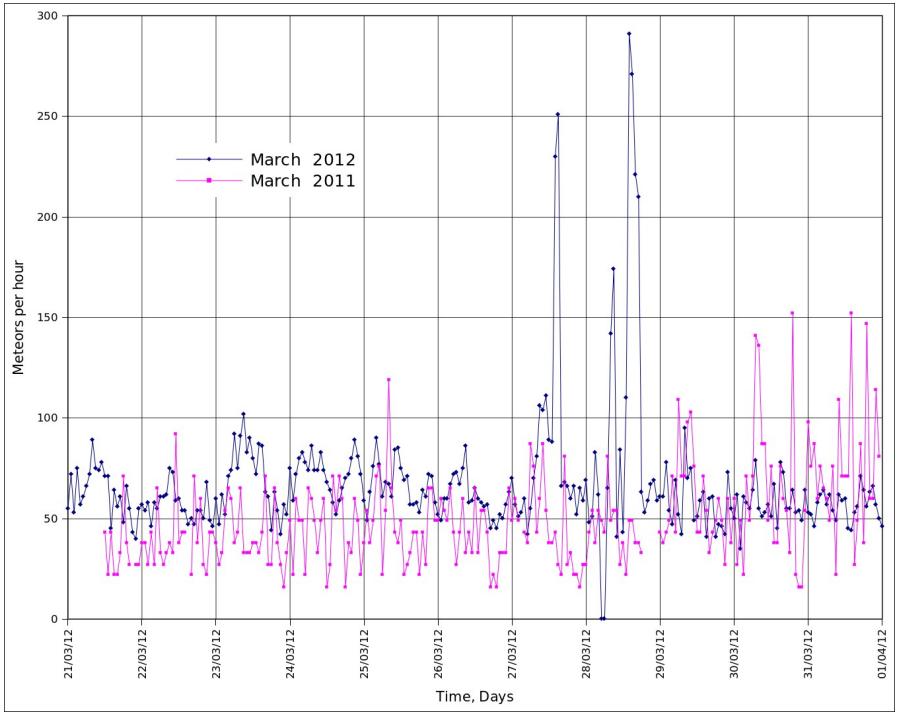
Asteroid 2012 DA14 approaching



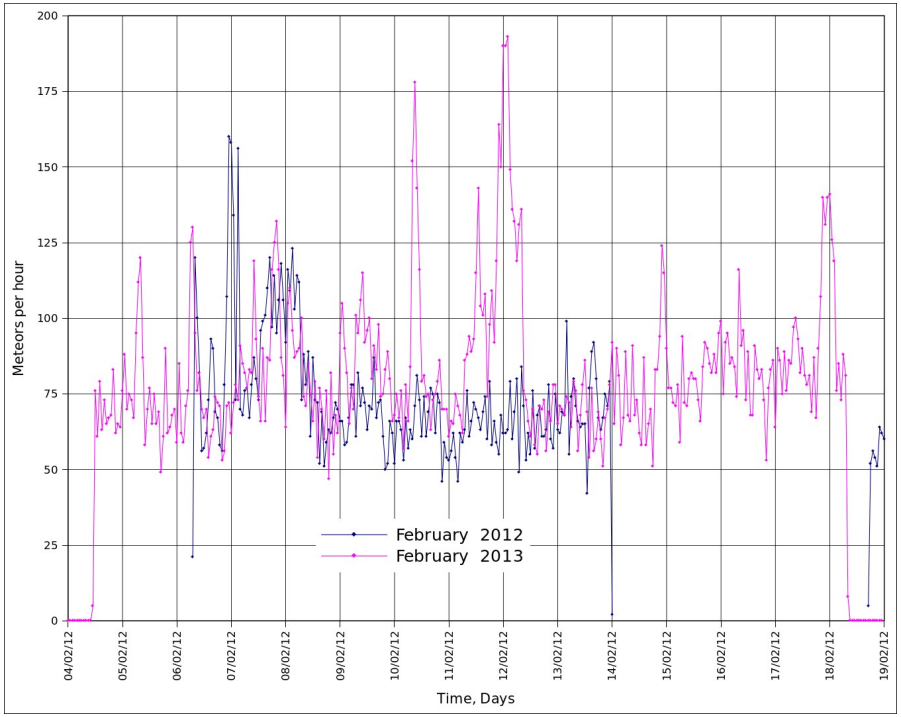
METEORS OBSERVATIONS IN RI NAO

Comparative distribution of meteor phenomenons

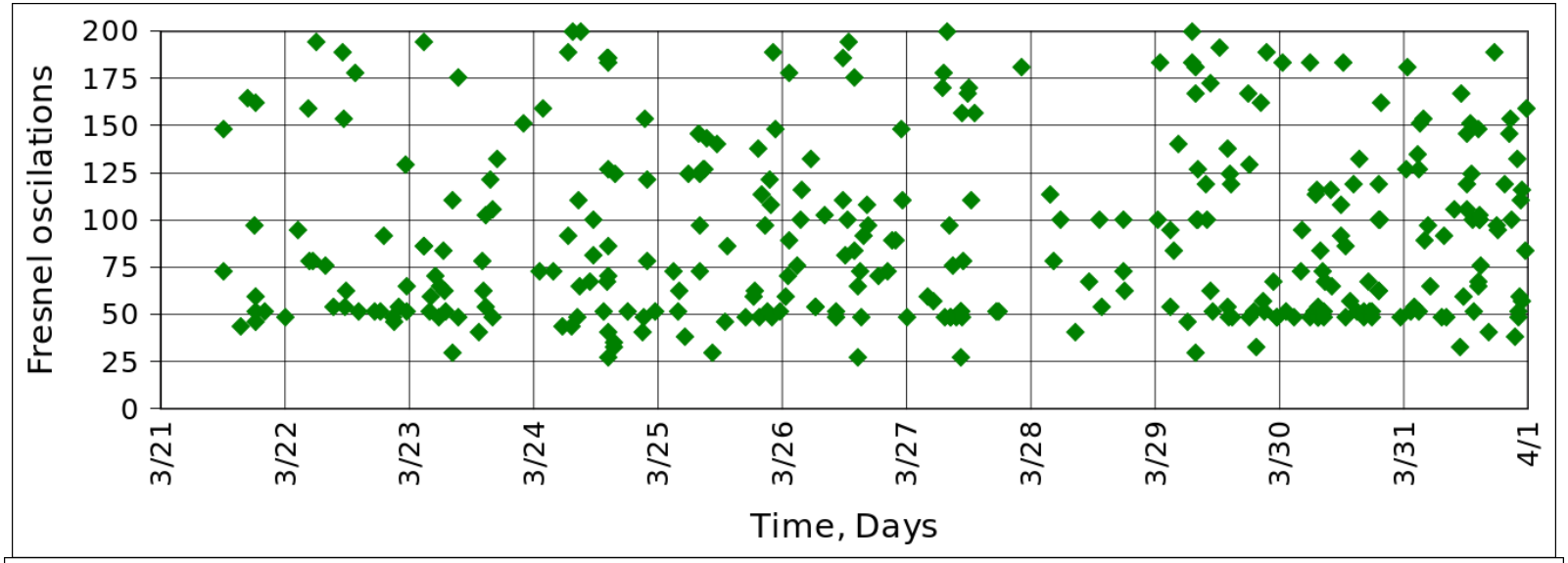
Asteroid 2012 FS35 approaching

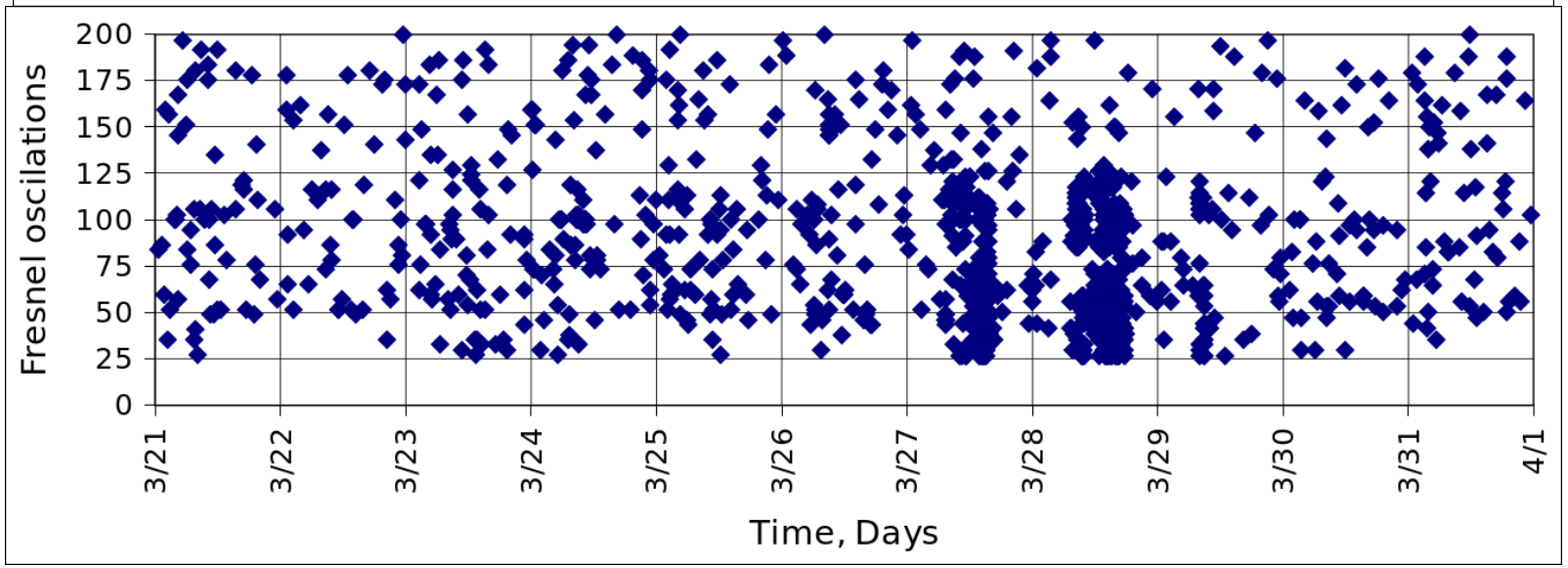


Asteroid 2012 DA14 approaching

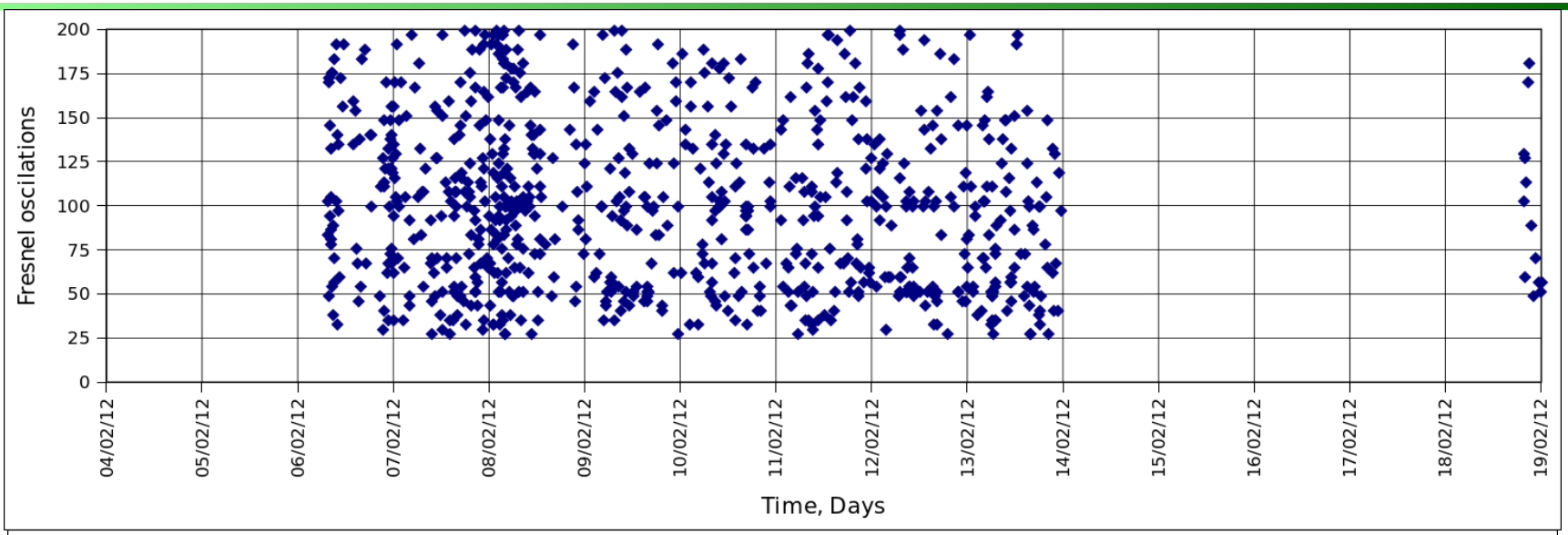


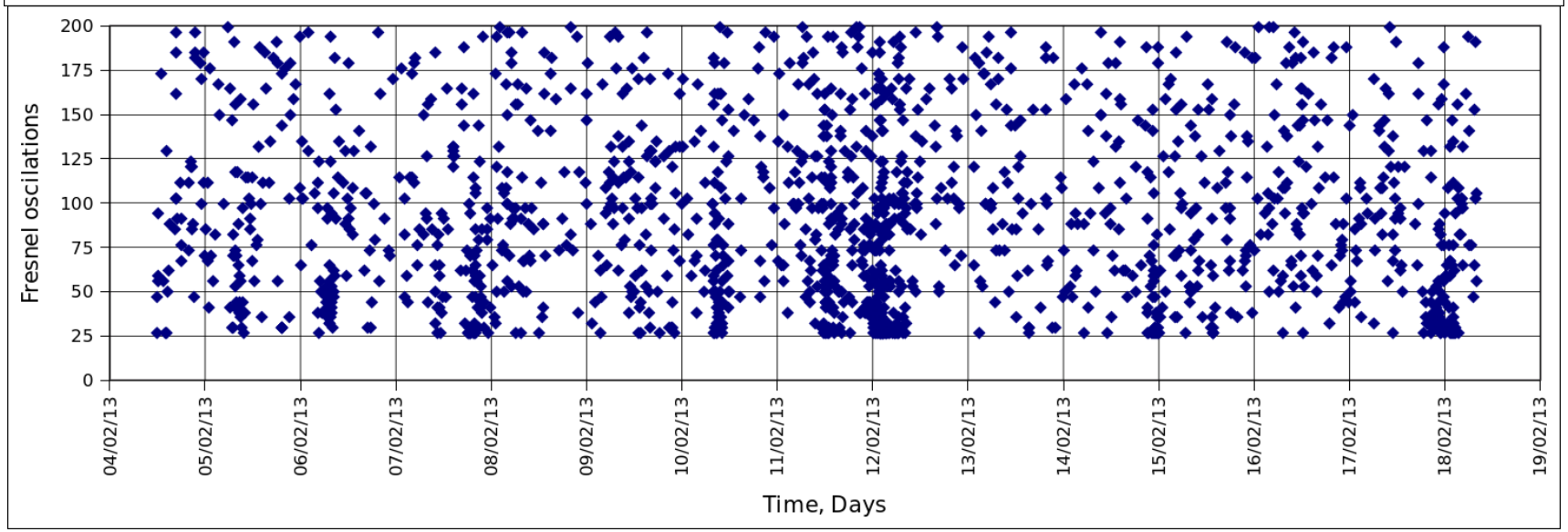
Statistic of Fresnel frequency peaks (2012 FS35)





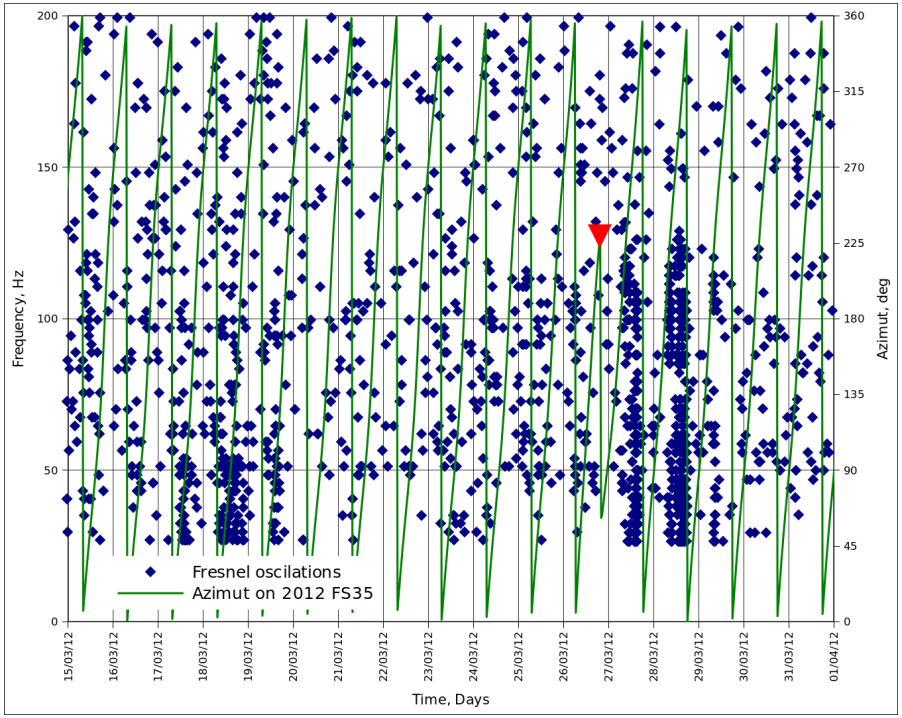
Statistic of Fresnel frequency peaks (2012 DA14)



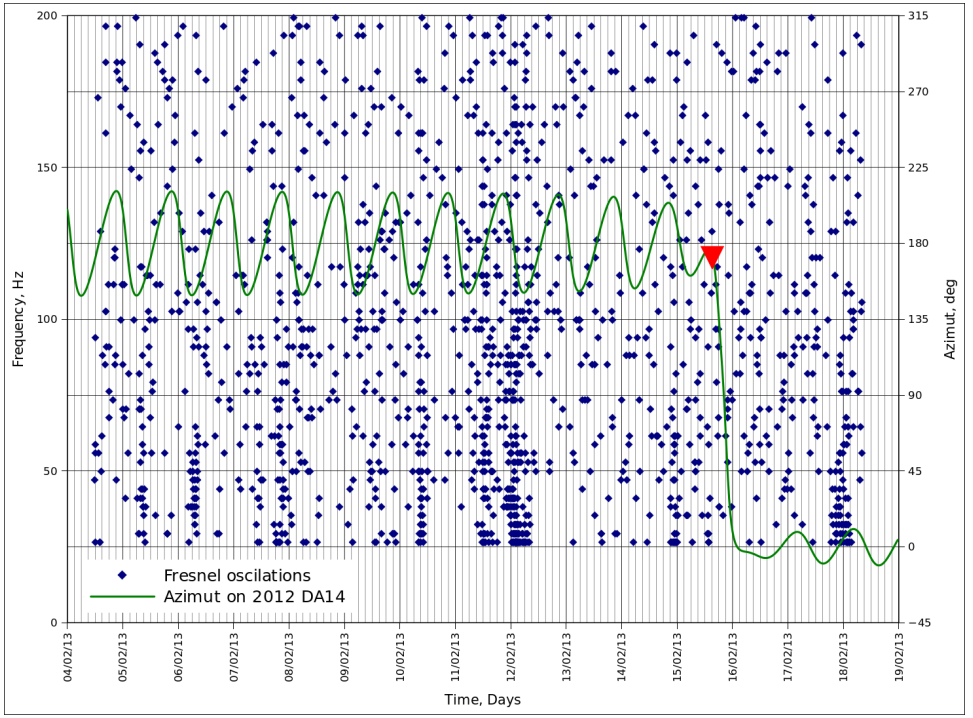


Statistic of Fresnel frequency peaks

Asteroid 2012 FS35 approaching



Asteroid 2012 DA14 approaching



Conclusions

- Every month numbers of meteors is ≈ 70000;
- average number registered meteor events per hour – 60;
- inner accuracy of meteors registration – 15 meteors per hour.

Thank you!