The 2009 Perseids Maximum - Photographic Results

Przemyslaw Zoladek, Mariusz Wisniewski, Krzysztof Polakowski, Ewa Wala, Krzysztof Walczak, Radosaw Poleski

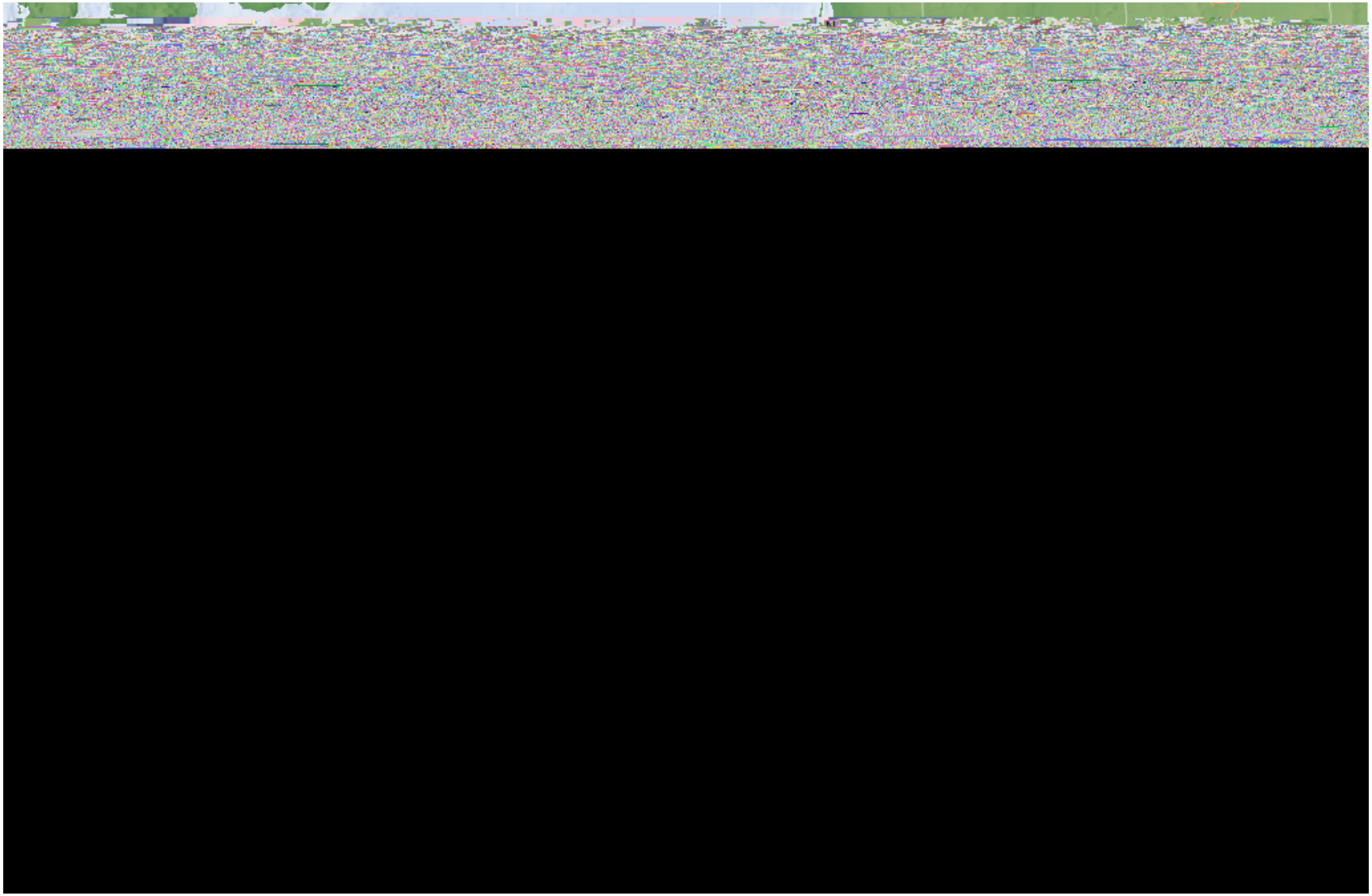
Pracownia Komet i Meteorow
Polish Fireball Network

September 11, 2009

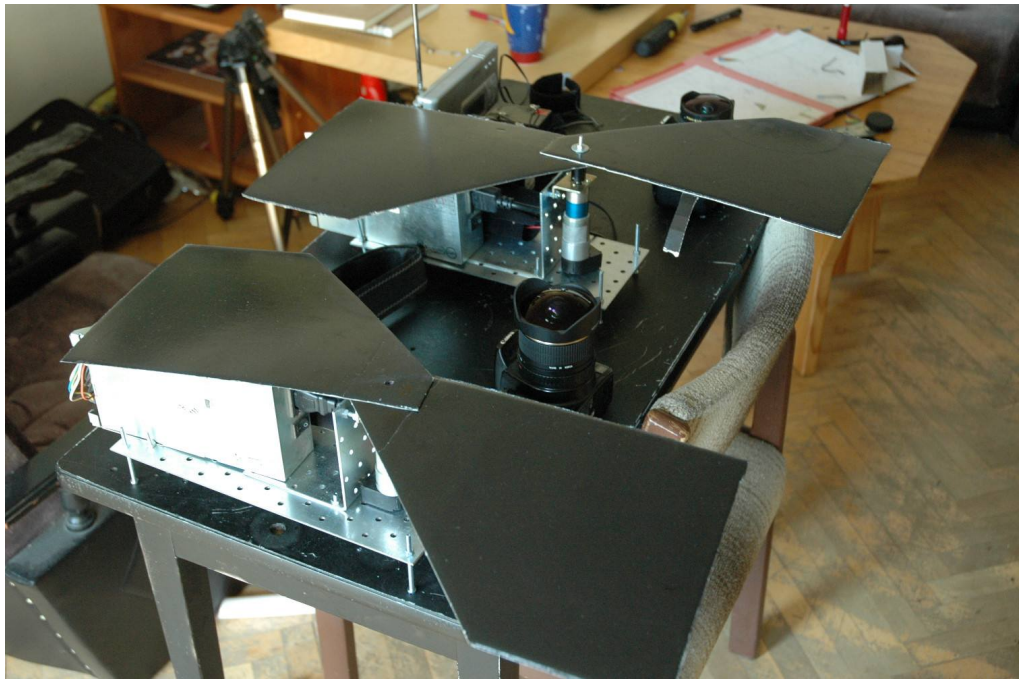
The Perseids Project 2009

10-16 August, 2009 Astronomical camp was held in Urzedow (Eastern part of Poland)

Locations



Equipment



Two simple rotating shutters

- Break Frequency 10.5Hz
- Large shutter blades, suitable for 8mm lenses
- 24V 1A dew heaters

Equipment

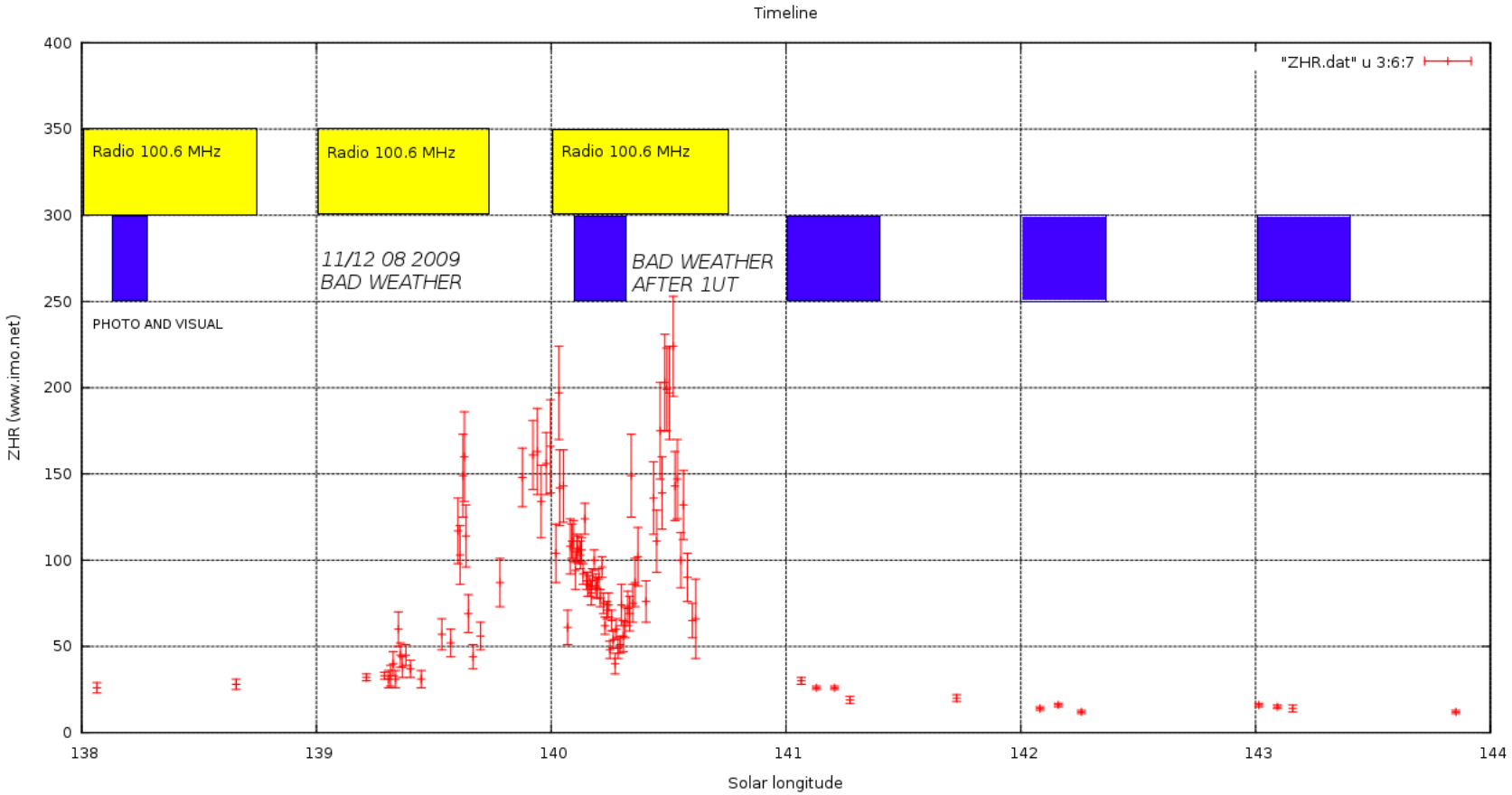
Samyang 3.5/8mm - new fisheye lens

- Focal length: 8mm
- Optical design: 7 groups / 11 elements
- Aperture: f/3.5
- FOV: 180 deg
- Price: 200 euro

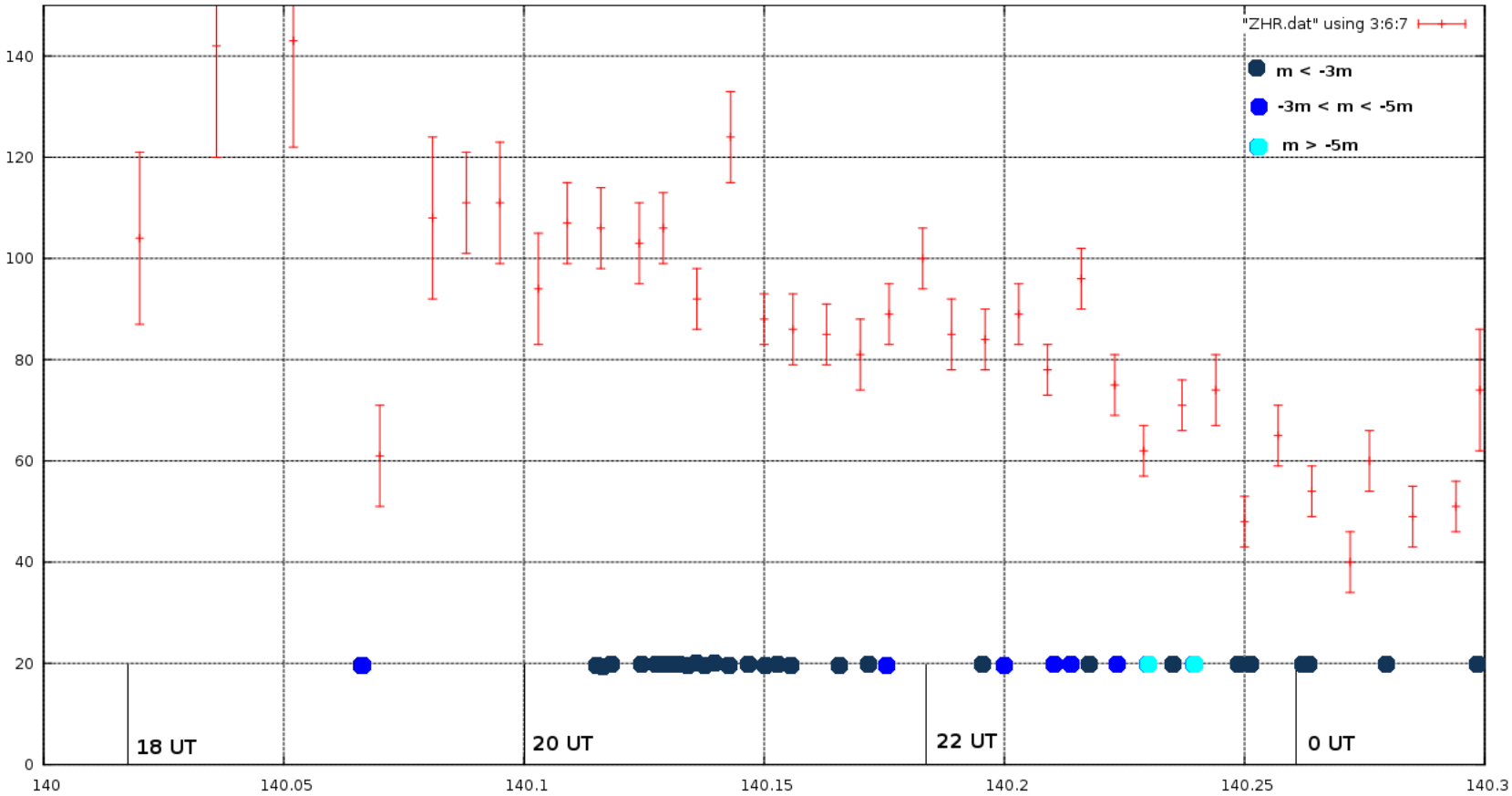
Equipment

Samyang 3.5/8mm - new fisheye lens

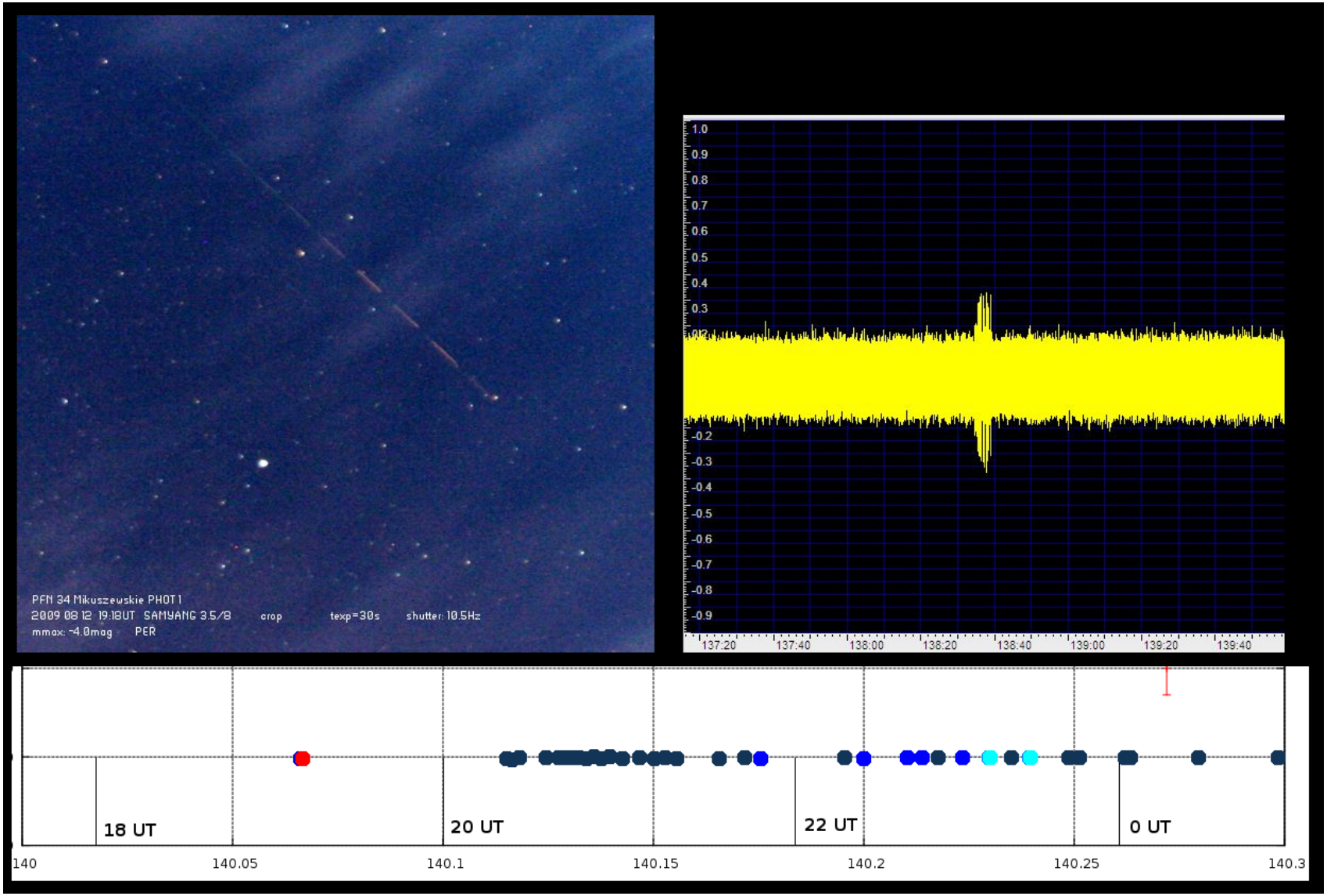
Timeline


Timeline
"ZHR.dat" u 3:6:7
Radio 100.6 MHz
Radio 100.6 MHz
Radio 100.6 MHz
11/12 08 2009
BAD WEATHER
BAD WEATHER
AFTER 1UT
PHOTO AND VISUAL
ZHR (www.imo.net)
Solar longitude
0
50
100
150
200
250
300
350
400
138
139
140
141
142
143
144

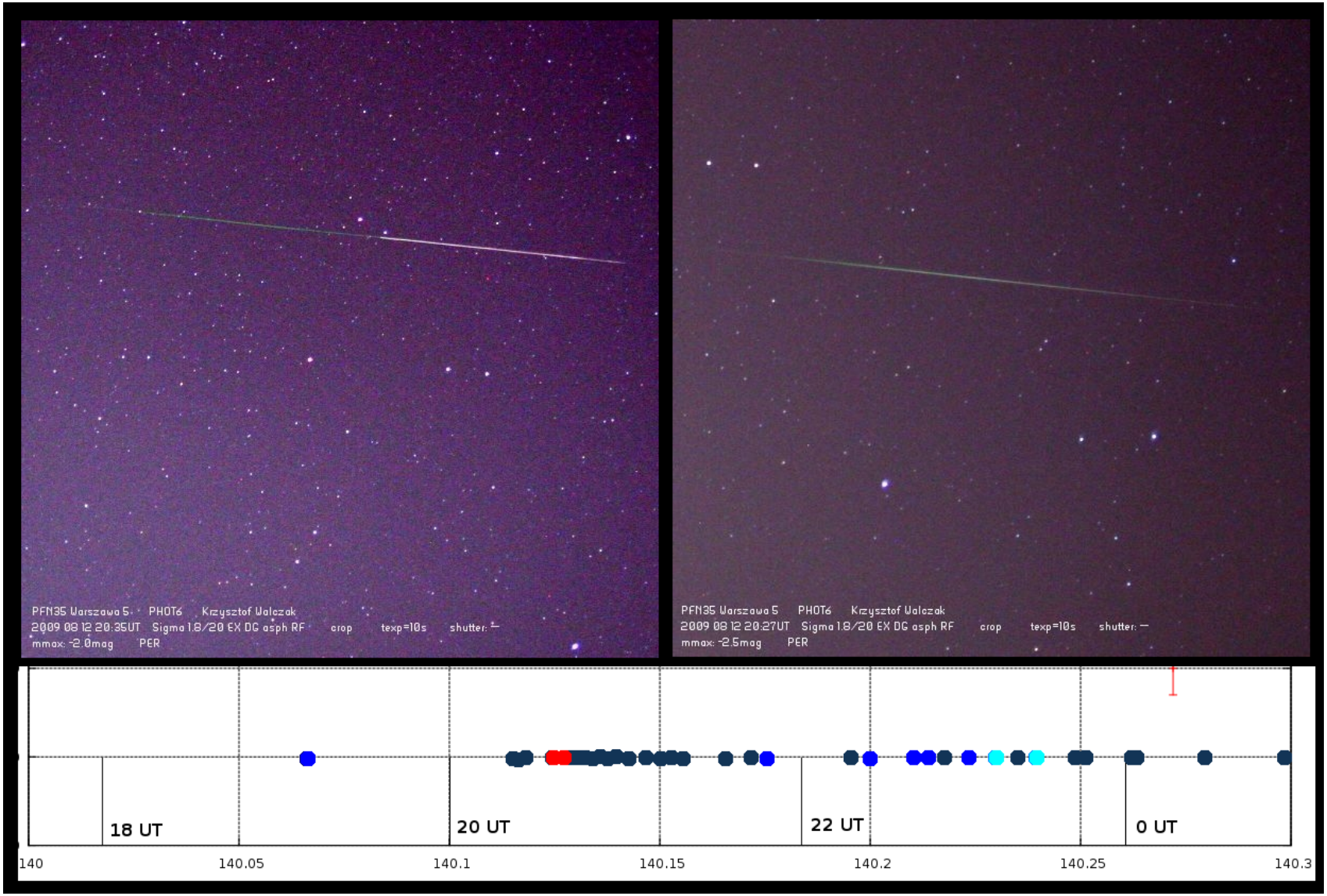
12/13 08 2009


"ZHR.dat" using 3:6:7
m < -3m
-3m < m < -5m
m > -5m
140
120
100
80
60
40
20
0
18 UT
20 UT
22 UT
0 UT
140
140.05
140.1
140.15
140.2
140.25
140.3

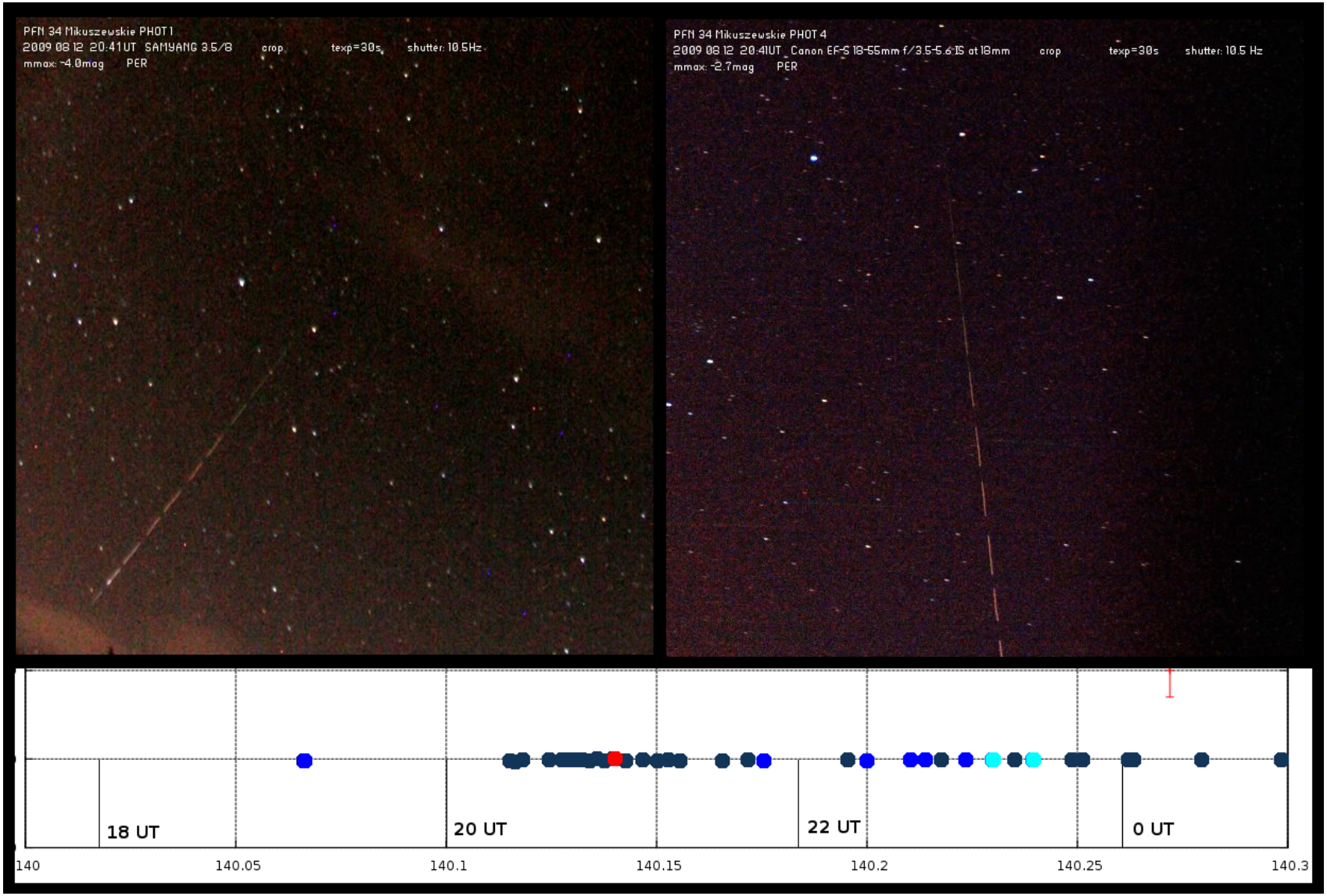
12/13 08 2009


PFN 34 Mikuszewskie PHOT1
2009 08 12 19:18UT SAMYANG 3.5/8 crop texp=30s shutter: 10.5Hz
mmax: -4.0mag PER
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
137:20
137:40
138:00
138:20
138:40
139:00
139:20
139:40
18 UT
20 UT
22 UT
0 UT
140
140.05
140.1
140.15
140.2
140.25
140.3

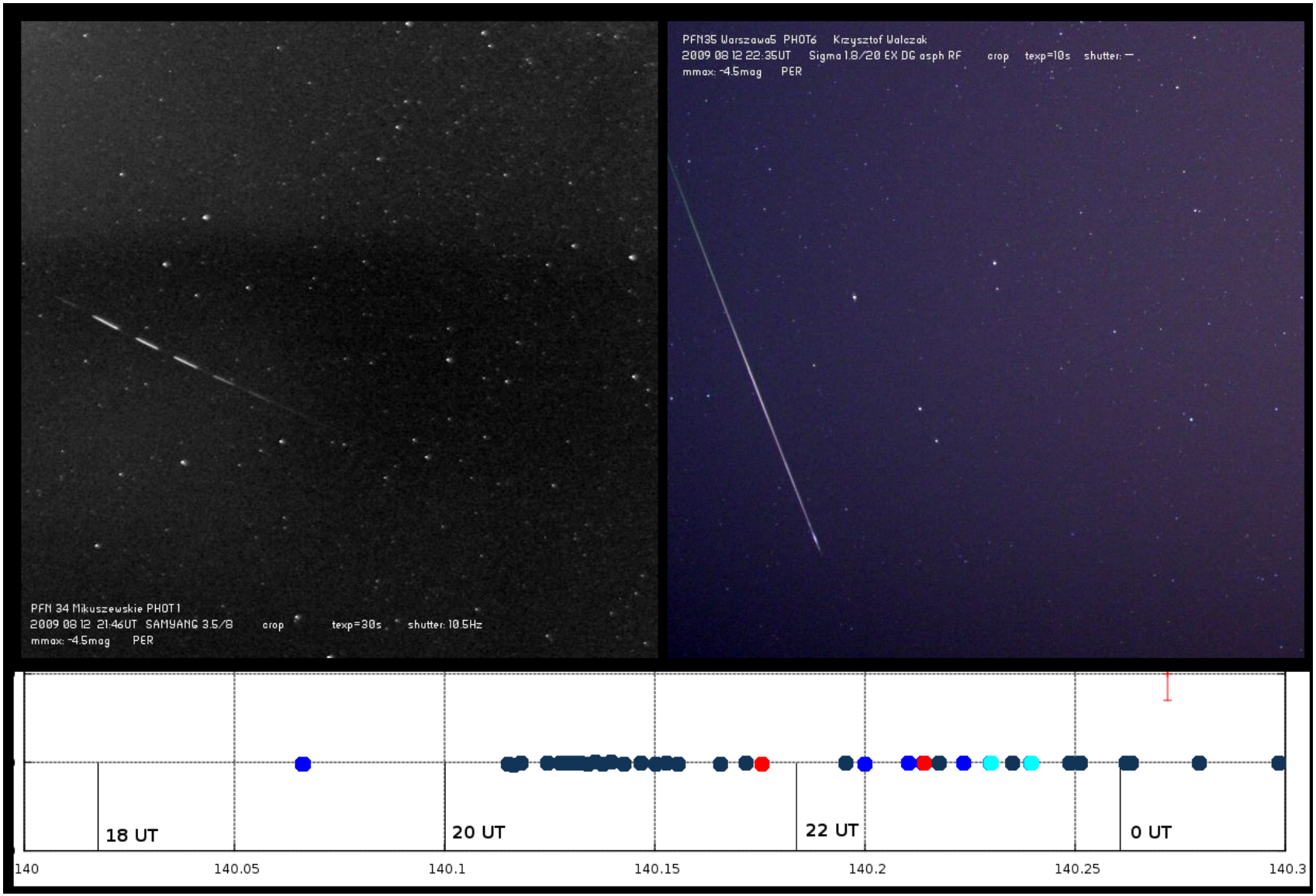
12/13 08 2009


PFN35 Warszawa 5 PHOT6 Krzysztof Walczak
2009 08 12 20:35UT Sigma 1.8/20 EX DG asph RF crop texp=10s shutter: —
mmax: -2.0mag PER
PFN35 Warszawa 5 PHOT6 Krzysztof Walczak
2009 08 12 20:27UT Sigma 1.8/20 EX DG asph RF crop texp=10s shutter: —
mmax: -2.5mag PER
18 UT
20 UT
22 UT
0 UT
140
140.05
140.1
140.15
140.2
140.25
140.3

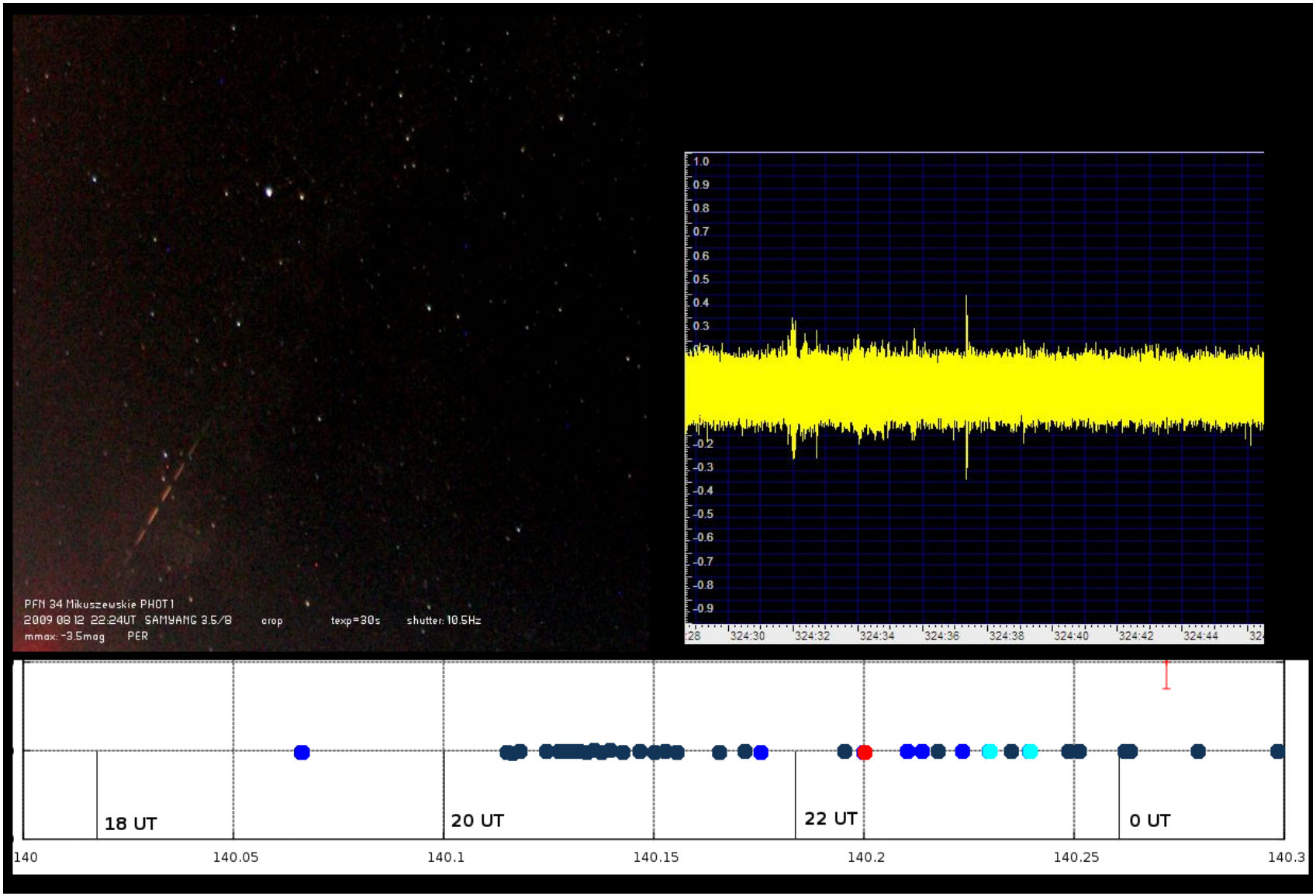
12/13 08 2009


PFN 34 Mikuszewskie PHOT 1
2009 08 12 20:41 UT SAMYANG 3.5/8 crop texp=30s shutter: 10.5Hz
mmax: -4.0mag PER
PFN 34 Mikuszewskie PHOT 4
2009 08 12 20:41UT Canon EF-S 18-55mm f/3.5-5.6 IS at 18mm crop texp=30s shutter: 10.5 Hz
mmax: -2.7mag PER
18 UT
20 UT
22 UT
0 UT
140
140.05
140.1
140.15
140.2
140.25
140.3

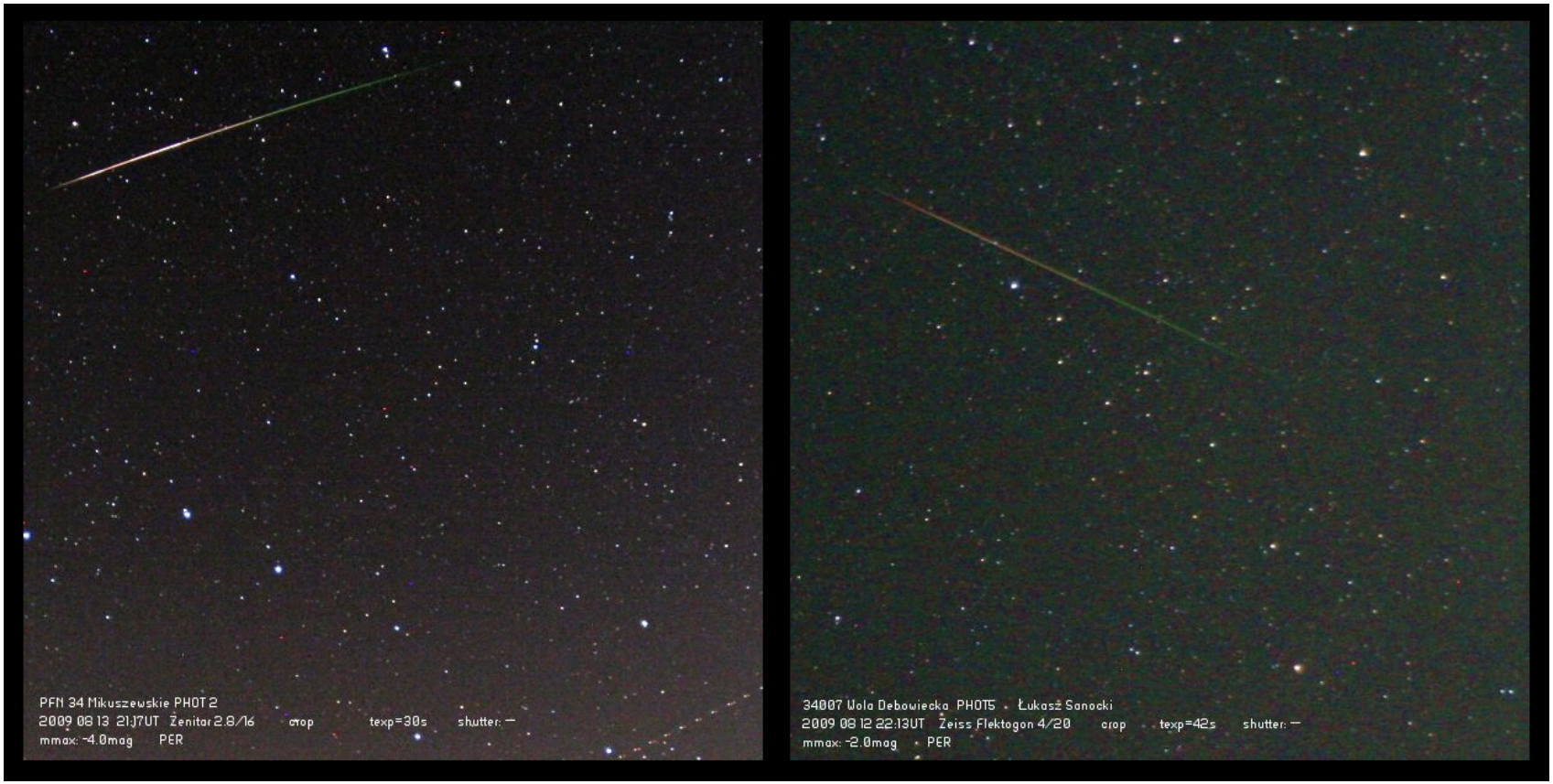
12/13 08 2009


PFN 34 Mikuszewskie PHOT1
2009 08 12 21:46UT SAMYANG 3.5/8 crop texp=30s shutter: 10.5Hz
mmax: -4.5mag PER
PFN35 Warszawa5 PHOT6 Krzysztof Walczak
2009 08 12 22:35UT Sigma 1.8/20 EX DG asph RF crop texp=10s shutter: —
mmax: -4.5mag PER
18 UT
20 UT
22 UT
0 UT
140
140.05
140.1
140.15
140.2
140.25
140.3

12/13 08 2009


PFN 34 Mikuszewskie PHOT1
2009 08 12 22:24UT SAMYANG 3.5/8 crop texp=30s shutter: 10.5Hz
mmax: -3.5mag PER
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
324:30
324:32
324:34
324:36
324:38
324:40
324:42
324:44
18 UT
20 UT
22 UT
0 UT
140
140.05
140.1
140.15
140.2
140.25
140.3

13/14 08 2009


PFN 34 Mikuszewskie PHOT 2
2009 08 13 21:17UT Zenitar 2.8/16 crop texp=30s shutter: –
mmax: -4.0mag PER
34007 Wola Debowiecka PHOT5 • Łukasz Sanocki
2009 08 12 22:13UT Zeiss Flektogon 4/20 crop texp=42s shutter: –
mmax: -2.0mag • PER

13/14 08 2009


PFN34 Mikuszewskie PHOT 2
2009 08 13 23:42UT Zenitar 2.8/16 crop texp=30s shutter: —
mmax: -3.5mag PER
PFN01 Ostrowik PHOT7 Radosław Poleski
2009 08 14 00:12UT Sigma 17-70 at 2.8 crop texp=30s shutter: —
mmax: -5.0mag PER

14/15 08 2009

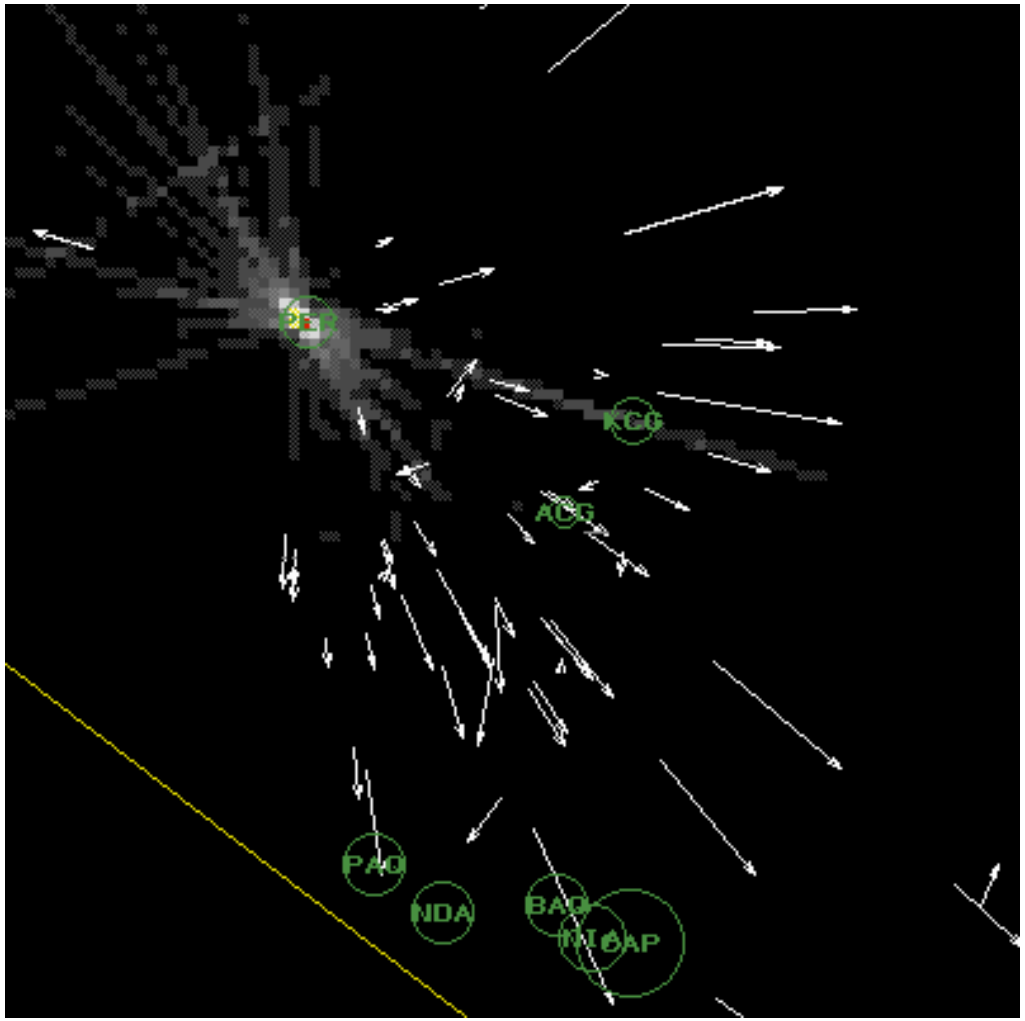

PFN 34 Mikuszewskie PHOT1
2009 08 14 20:29UT SAMYANG 3.5/8 crop texp=30s shutter: —
mmax: -4.0mag SIA
PFN 34 Mikuszewskie PHOT1
2009 08 14 23:43UT SAMYANG 3.5/8 crop texp=30s shutter: —
mmax: -3.0 mag CAP

15/16 08 2009


34007 Vola Debowiecka PHOT5 Łukasz Sanocki
2009 08 15 22:50UT Zeiss Flektogon 4/20 crop texp=30s shutter: —
mmax: -1.5mag PER
PFN 34 Mikuszewskie PHOT1
2009 08 15 23:30UT SAMYANG 3.5/8 crop texp=30s shutter: —
mmax: -6.0 mag PER

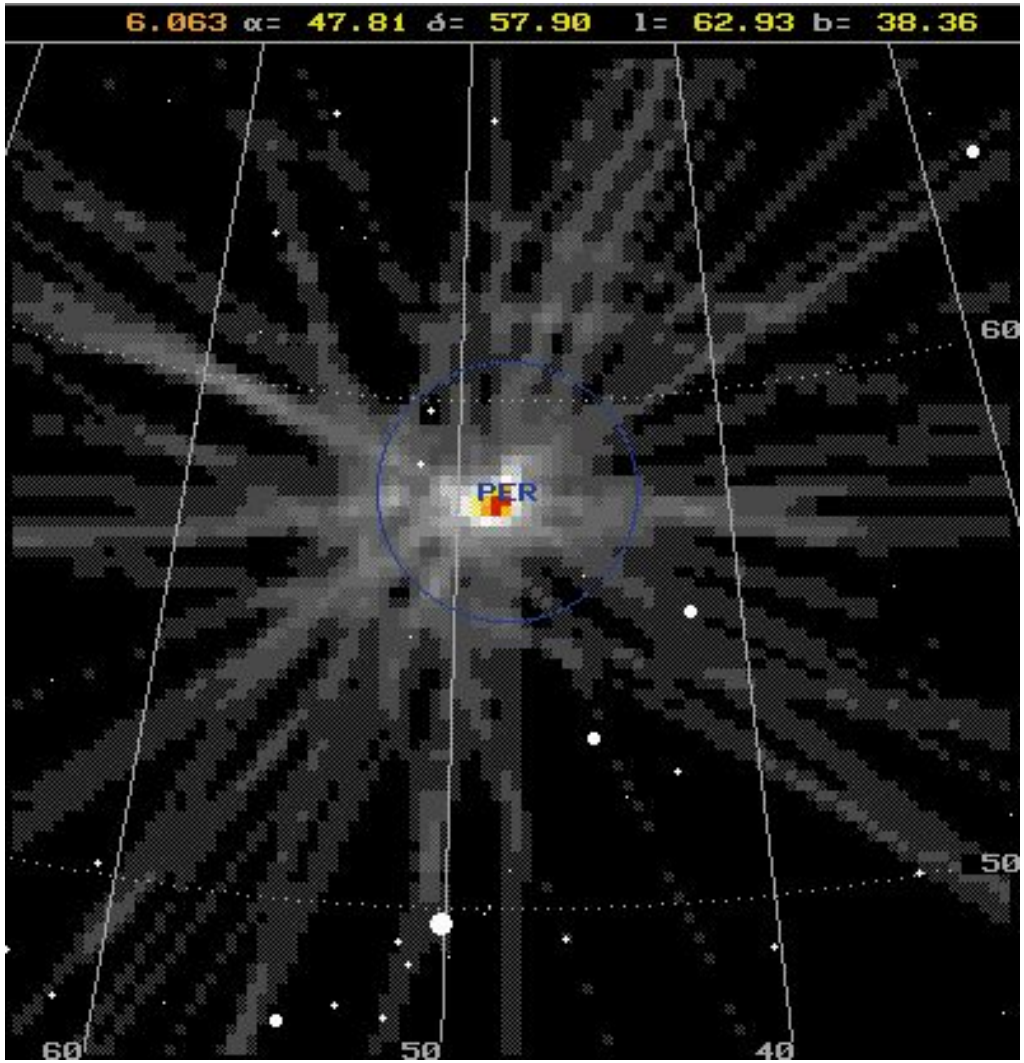
The photographic radiant

Pixel size = 2°



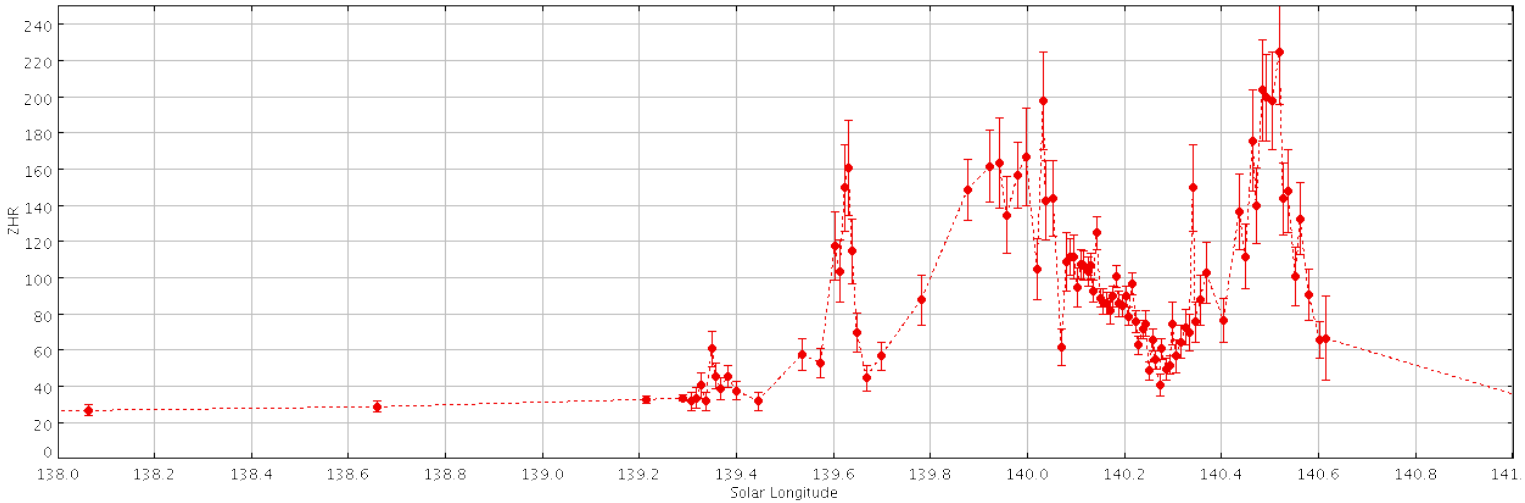
The photographic radiant

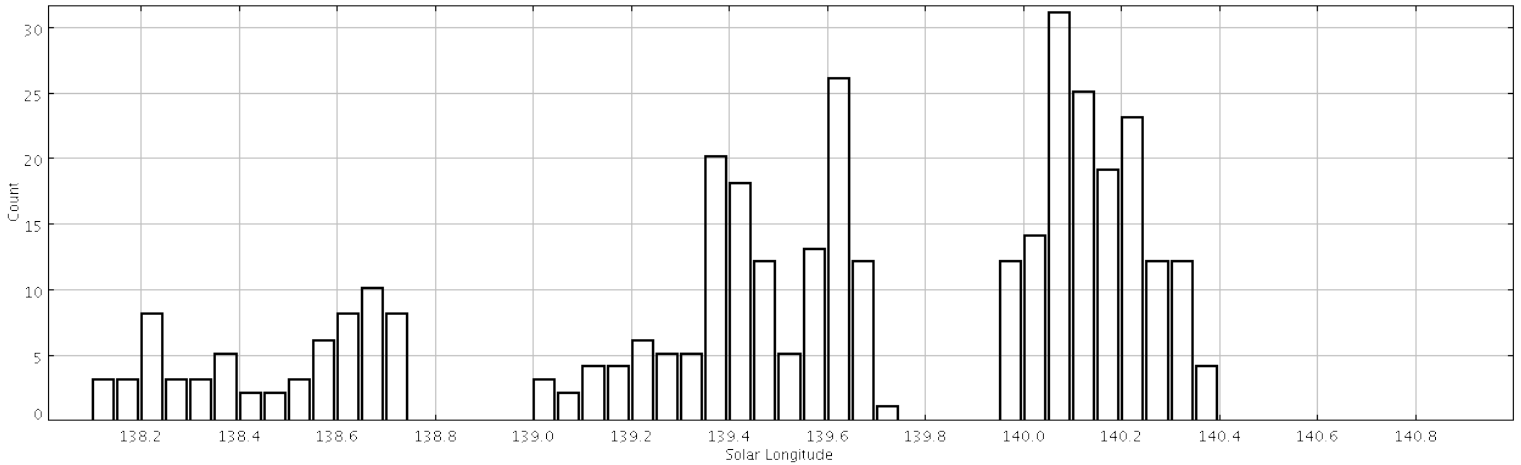
$\alpha = 48.7^\circ$ $\delta = 58.6^\circ$ $\lambda\odot = 141.0^\circ$ Pixel size $= 0.3^\circ$



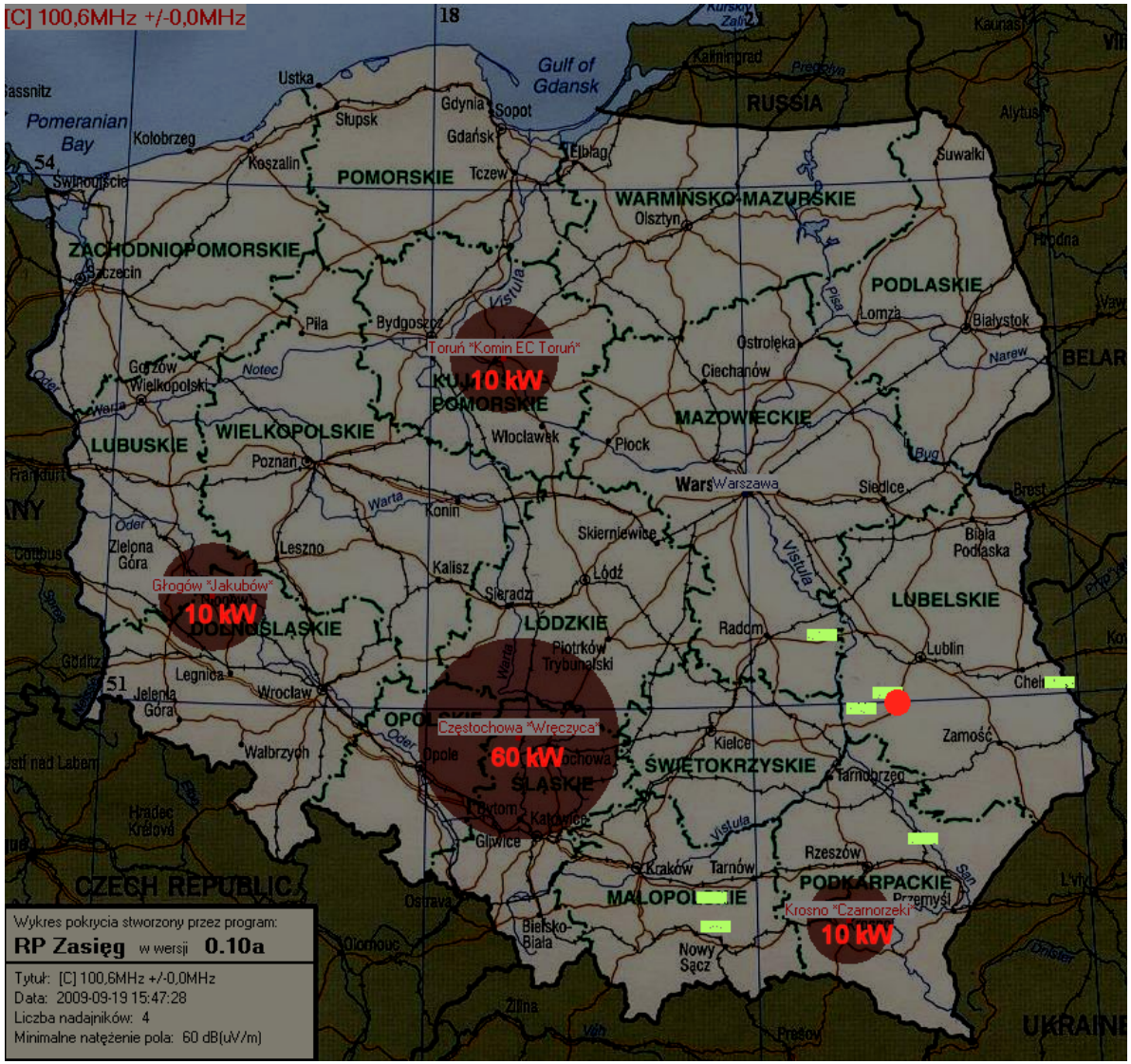
Radio results

13 08 2009 20:34 UT





Radio echoes identified with photo

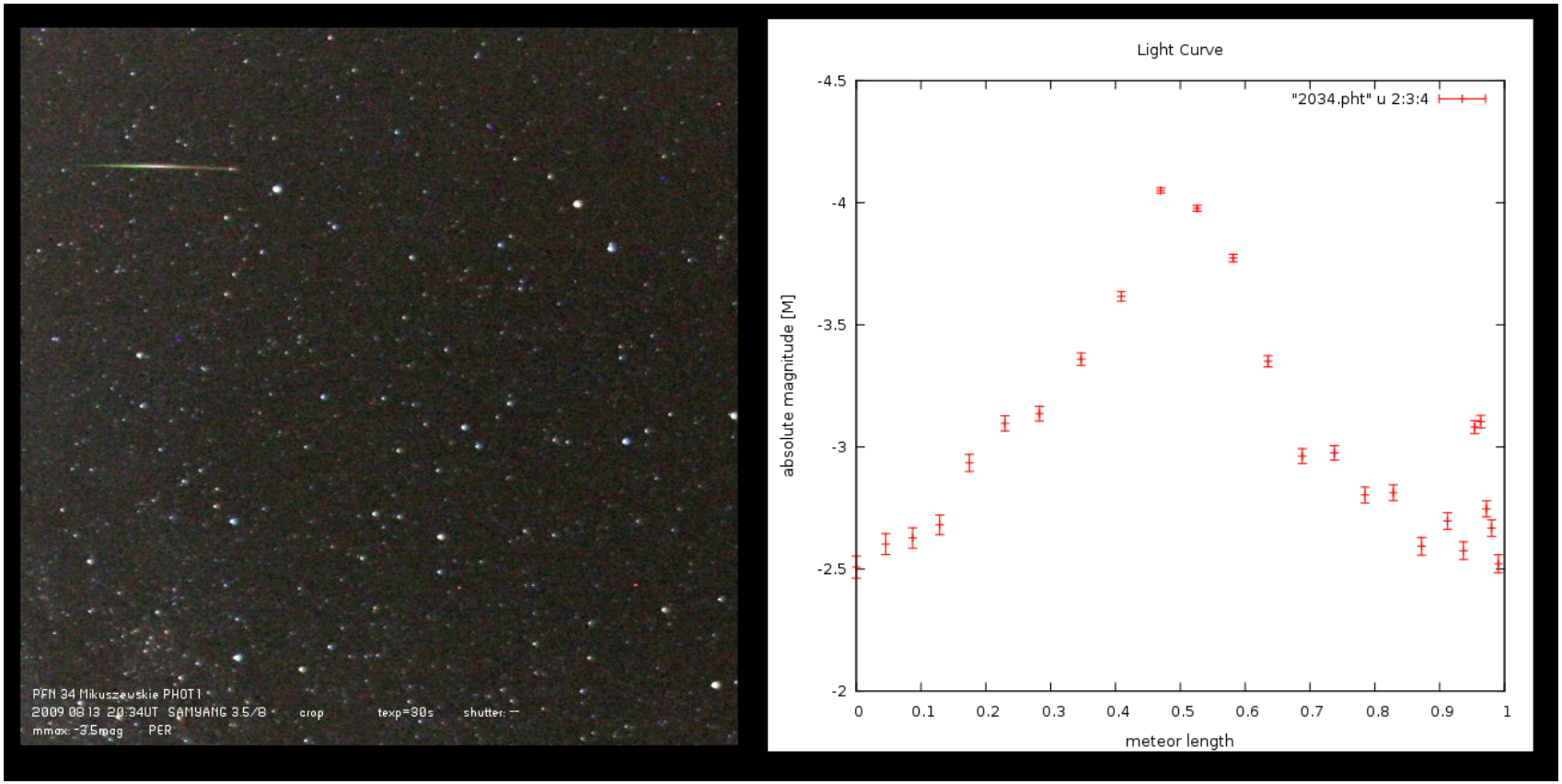


Double station meteors

13 08 2009 20:34 UT

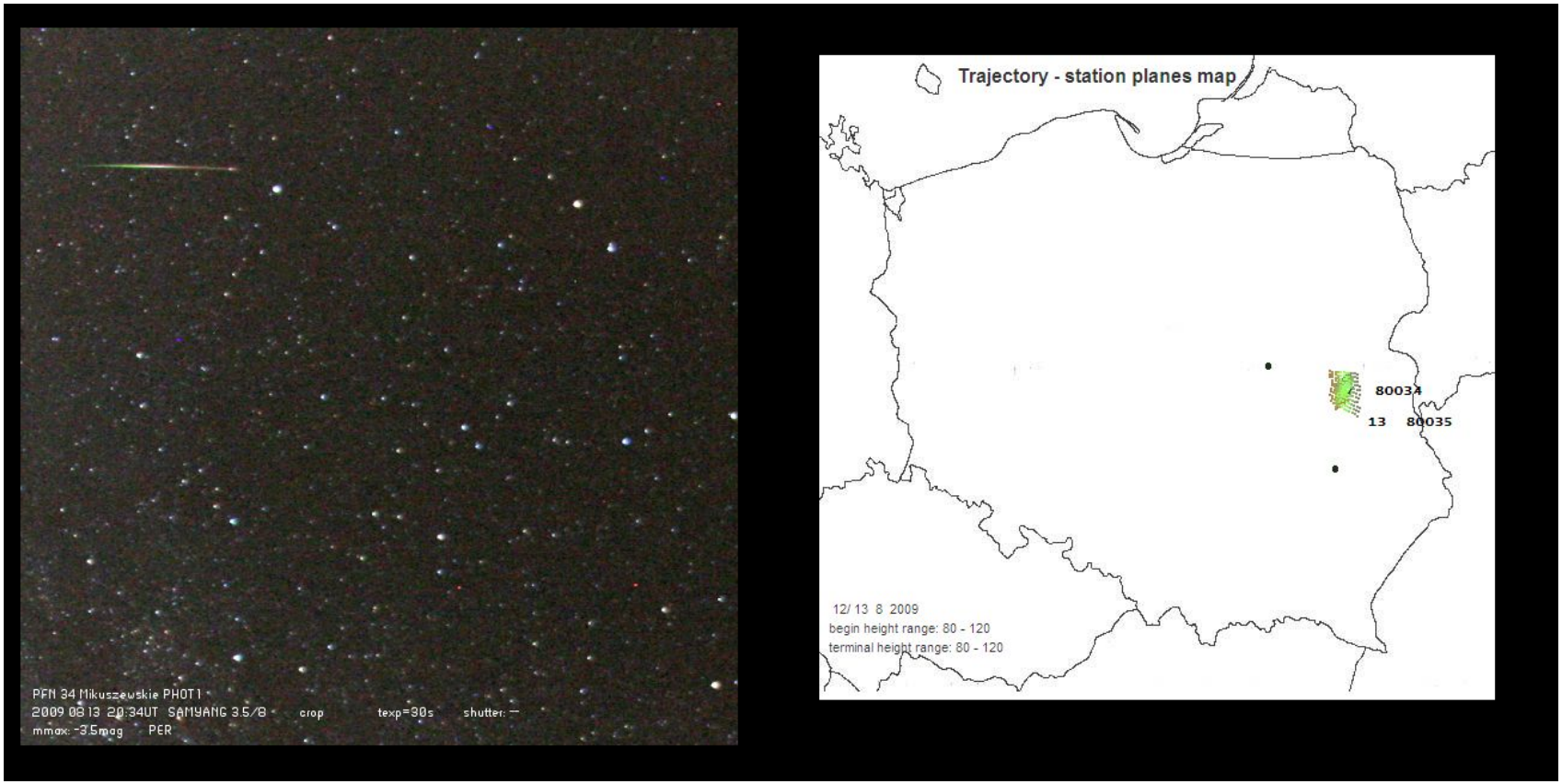
Double station meteors

13 08 2009 20:34 UT - photometry



Double station meteors

13 08 2009 20:34 UT - Intersection geometry (QAB = 87°)

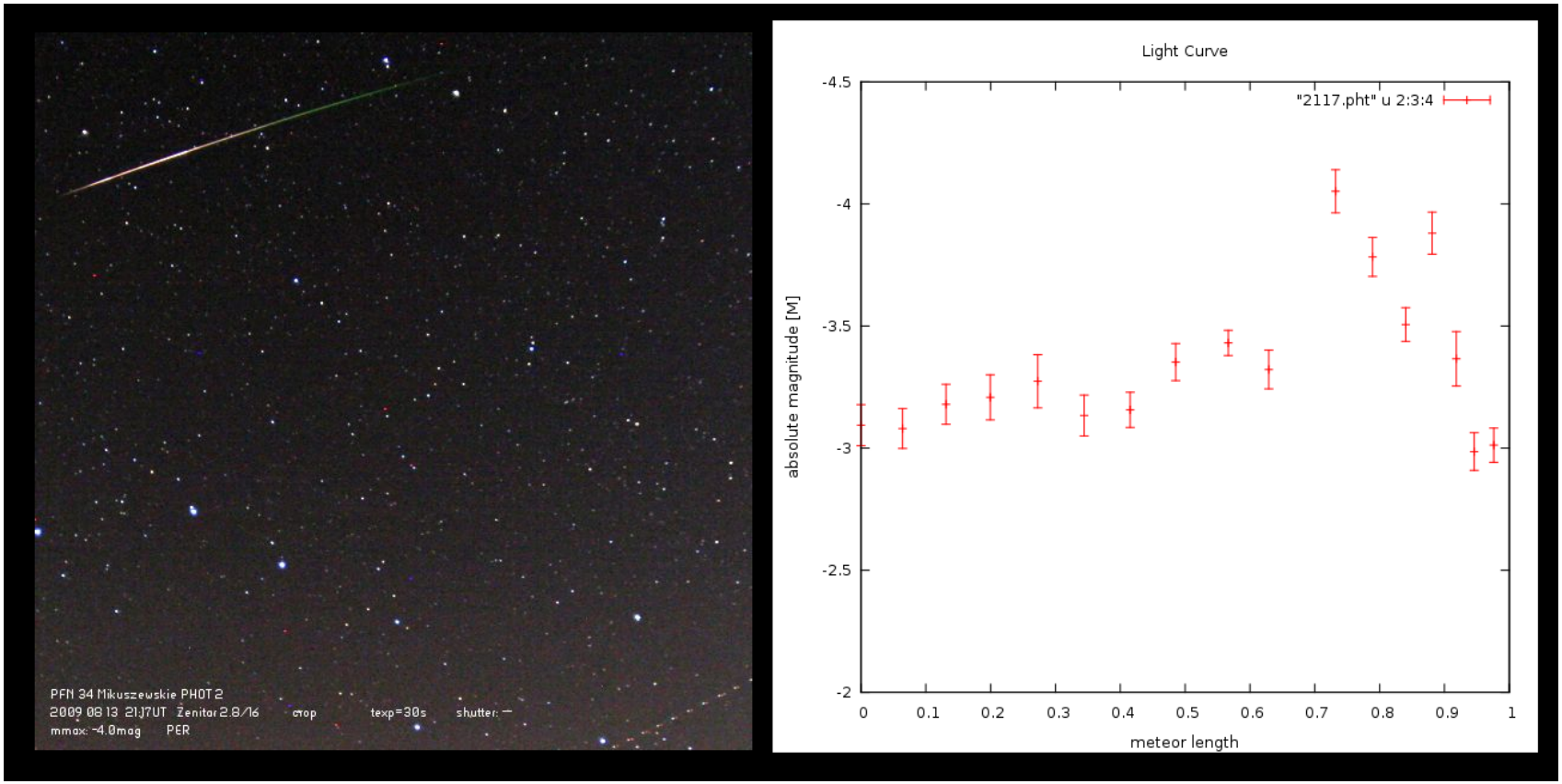


Double station meteors

13 08 2009 21:17 UT

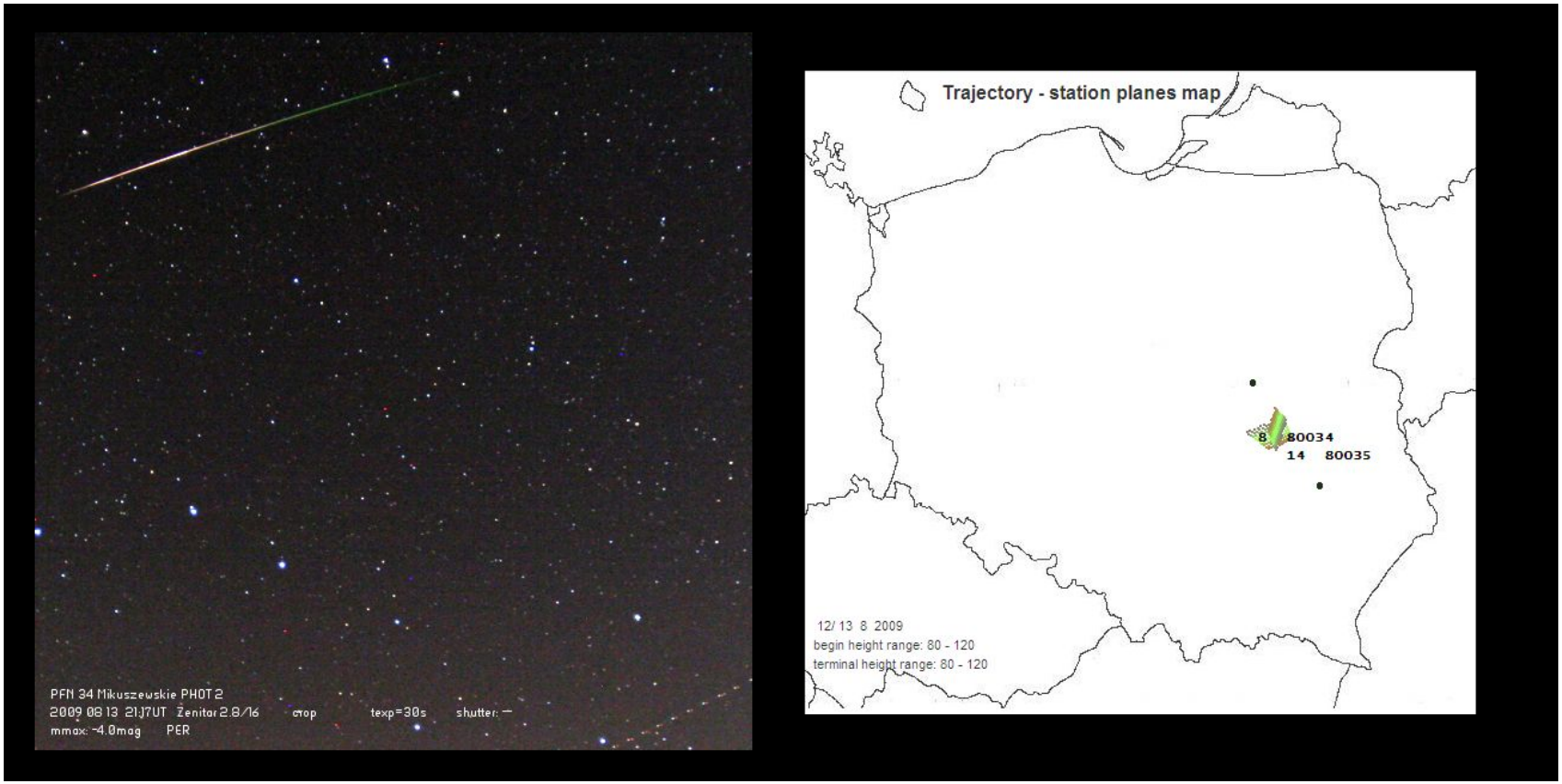
Double station meteors

13 08 2009 21:17 UT - photometry



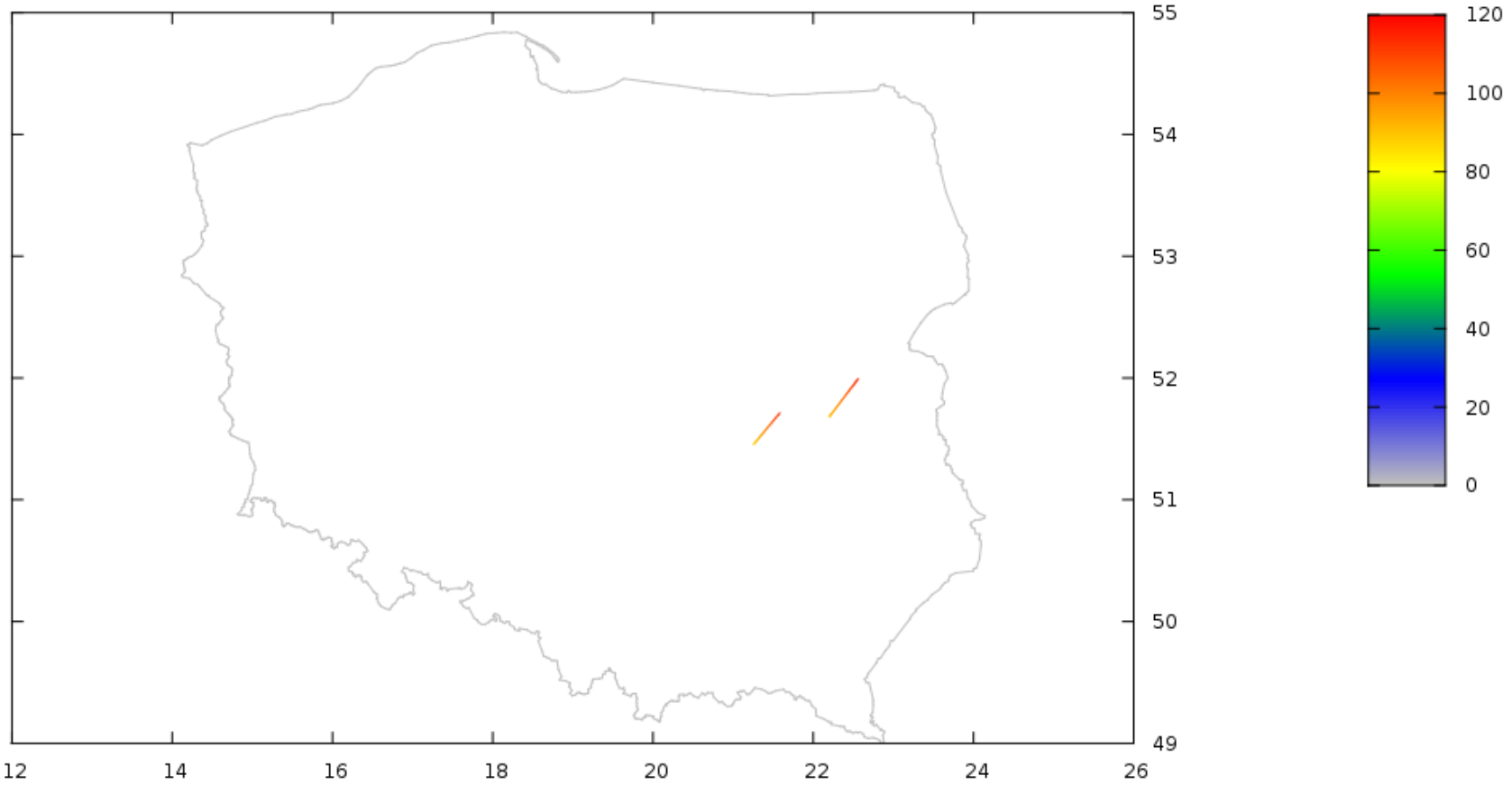
Double station meteors

13 08 2009 21:17 UT - Intersection geometry (QAB = 78°)



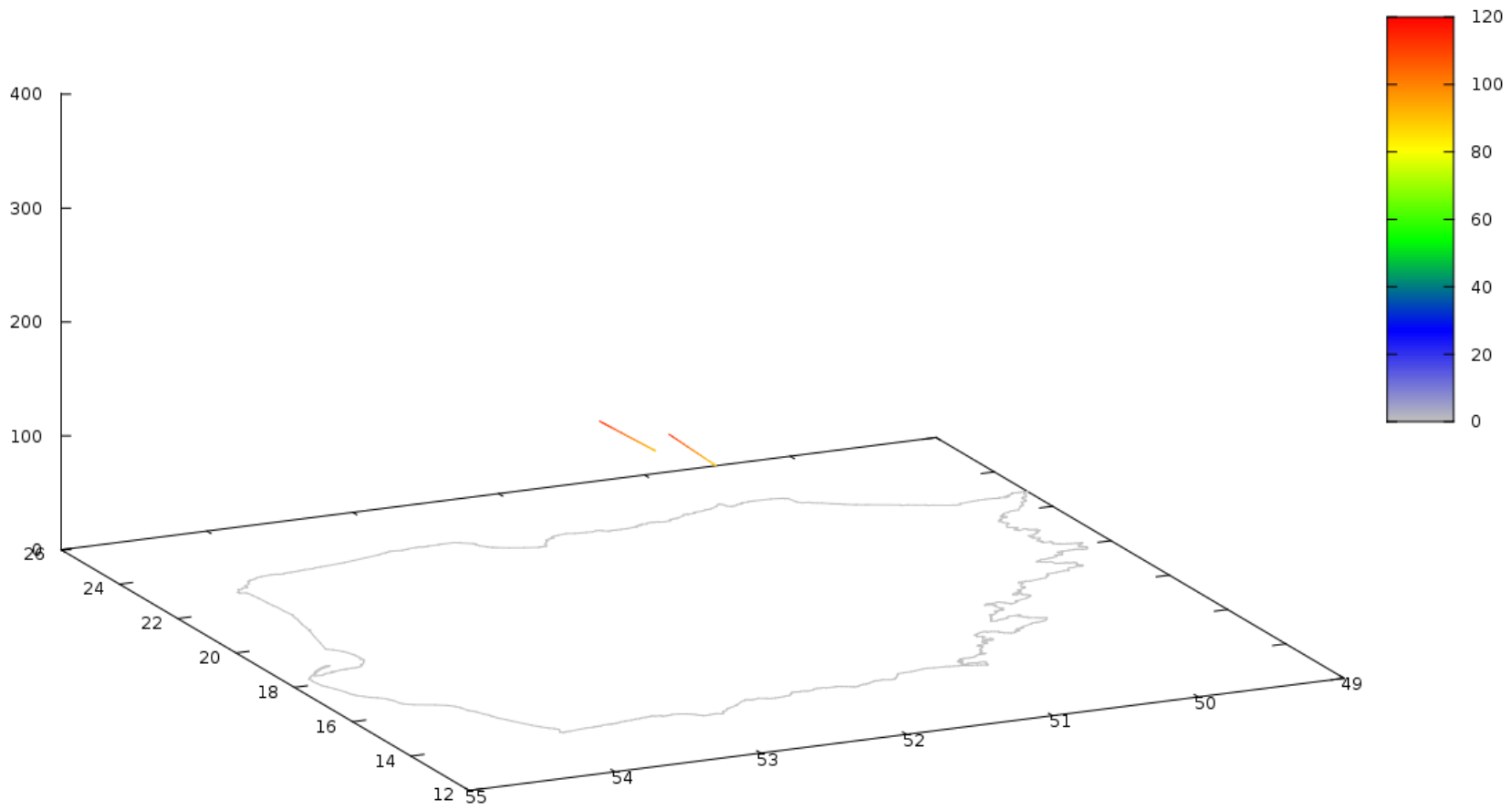
Double station meteors

Both trajectories

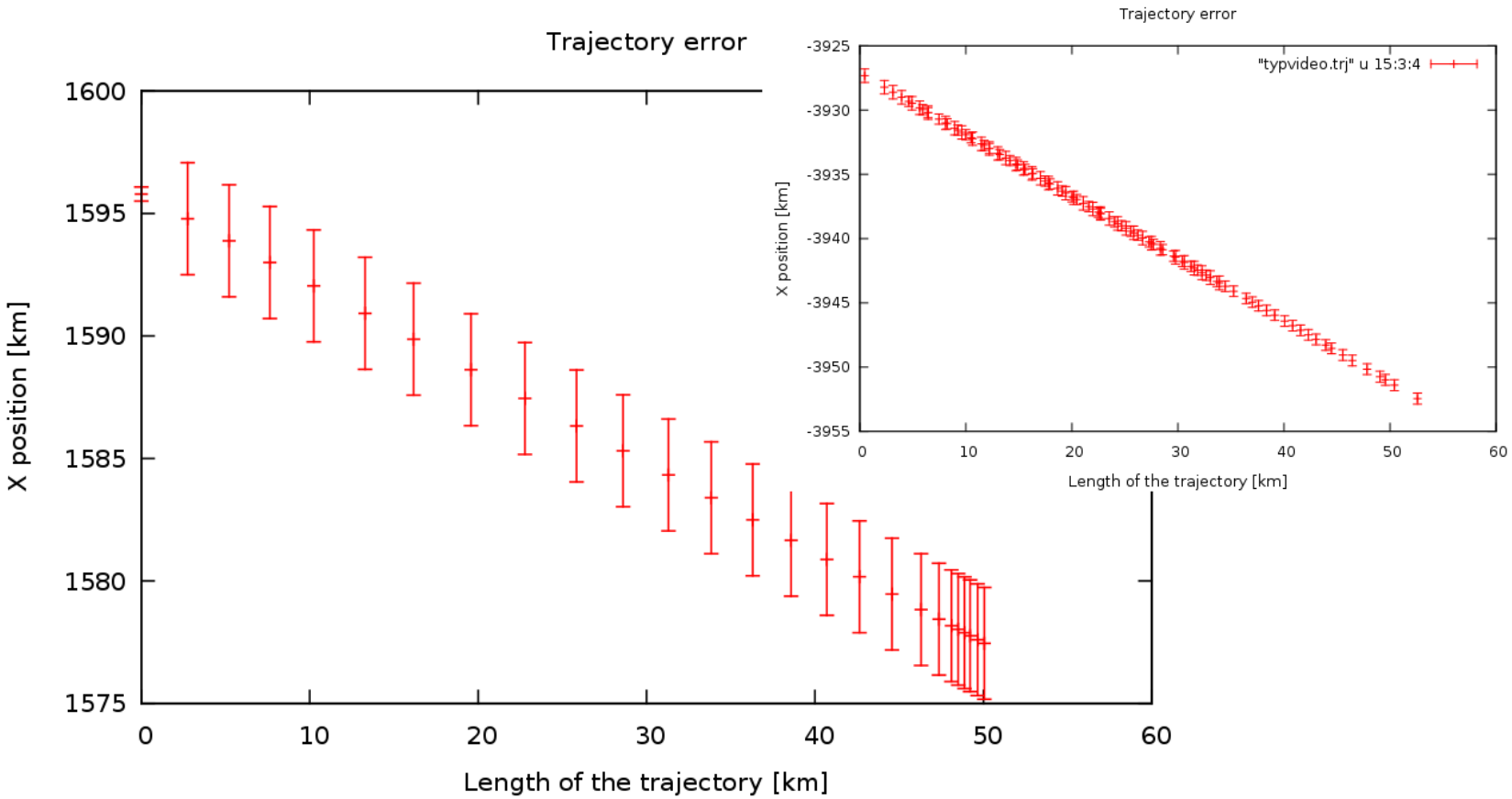


Double station meteors

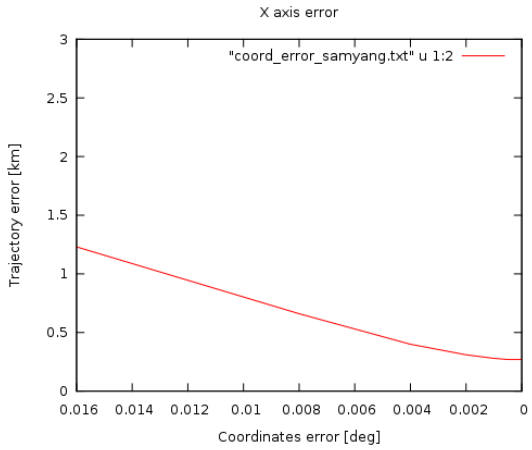
Both trajectories

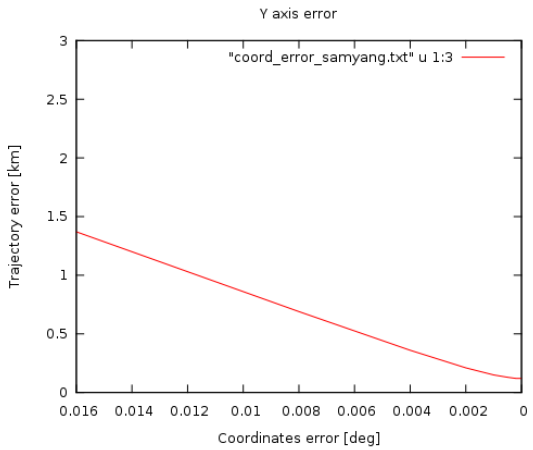


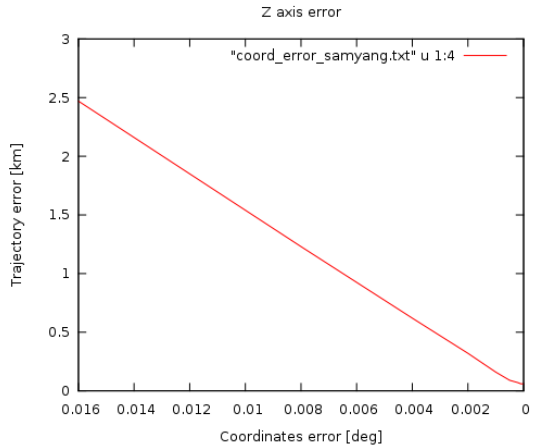
Trajectory errors analysis



Trajectory errors analysis

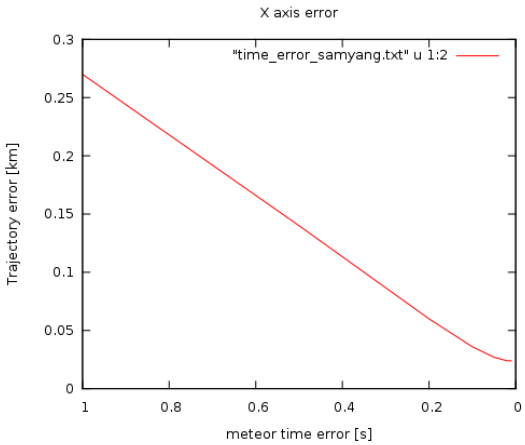


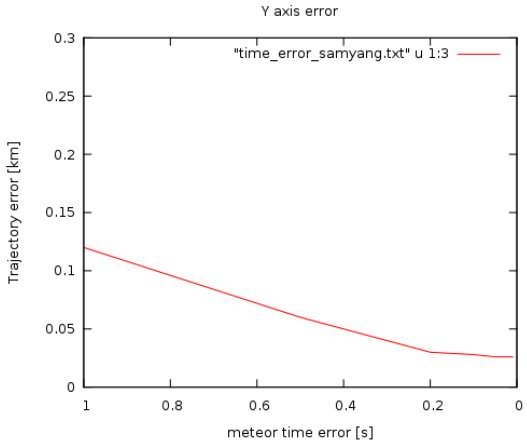


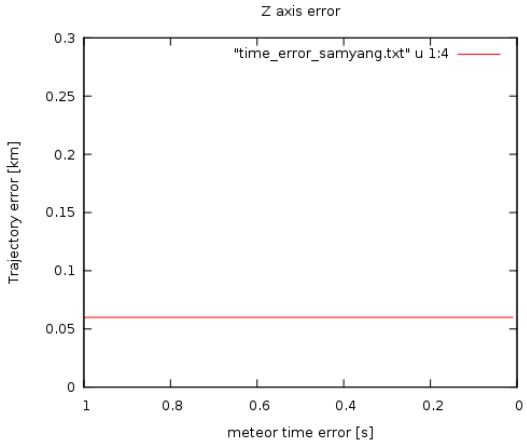


Trajectory errors analysis

Trajectory errors analysis







Conclusions

- 69 meteors was photographed during four consecutive nights
- The radiant is very compact and located at $\alpha = 48.7^\circ$ $\delta = 58.6^\circ$ ($\lambda\odot = 141.0^\circ$)
- An additional peak (detected mostly by radio) is clearly visible at solar longitude 139.35°
- Precission of the photogphic trajectories is mostly dependent on the stations coordinates accuracy and is depentent on the accuracy of time. It cannot be neglected. Astrometric errors plays a secondary role.

The next astronomical camp..