

# Meteor observations in Russia

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# Team

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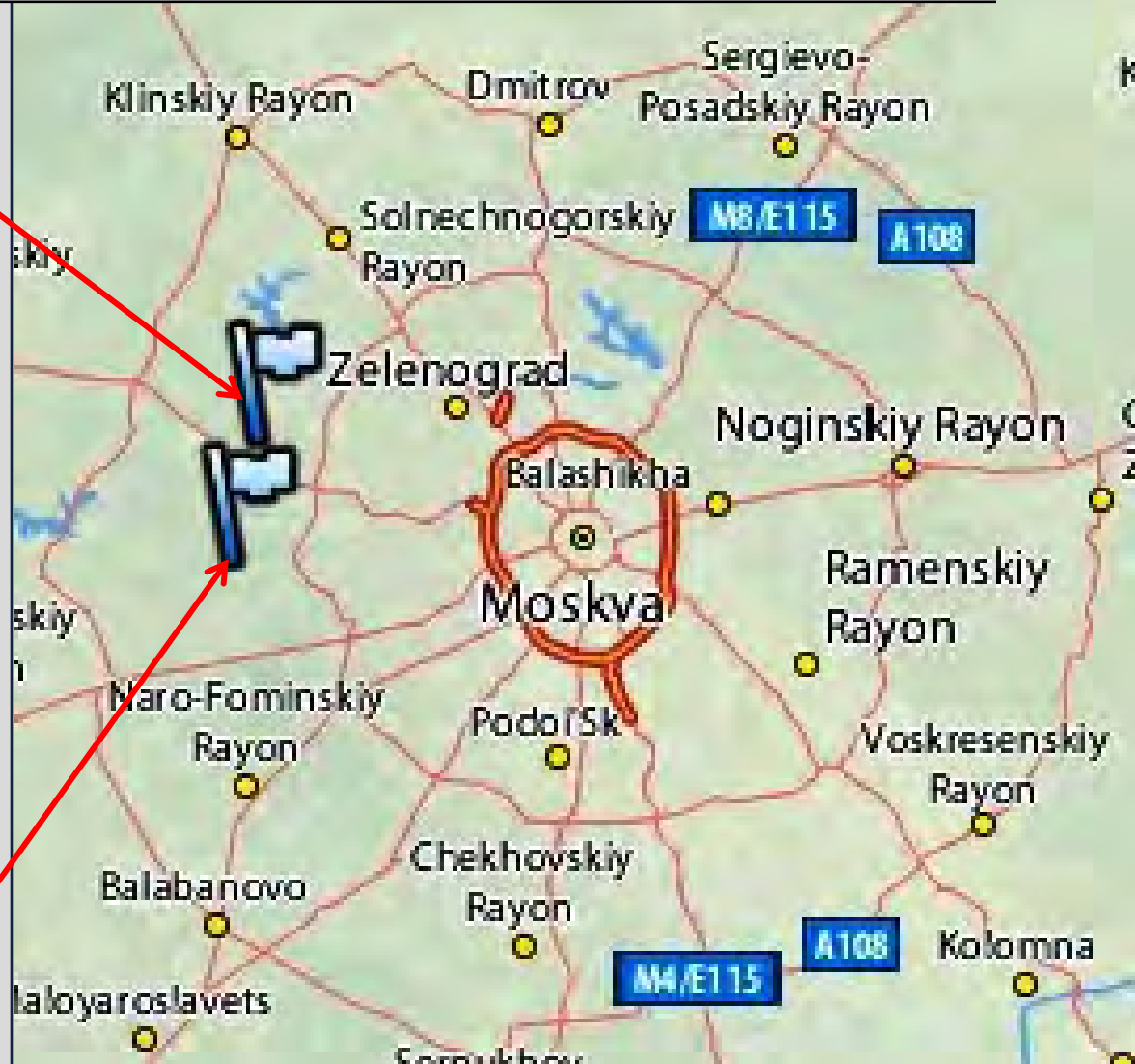
# Double – station meteor observations

Station	Latitude	Longitude	Altitude	System
ZO INASAN	55° 42.0' N	36° 46.2' E	192 M	PatrolCa
«ISTRA»	55° 52.2' N	36° 49.8' E	207 M	MobilCa

«Istra» station

$r = 20 \text{ km}$

Zvenigorodskaya observatory

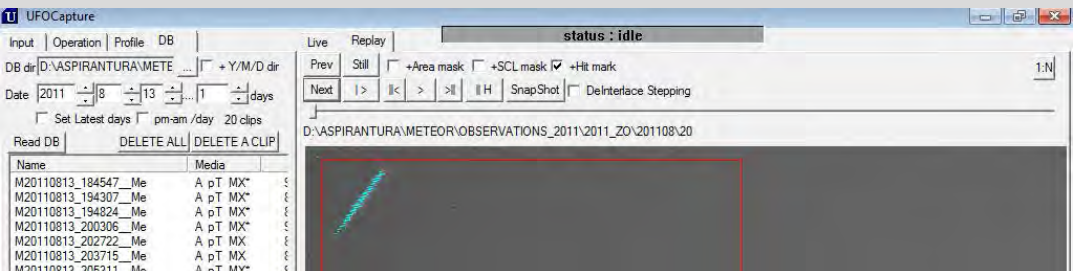


# PatrolCa (Patrol Camera)



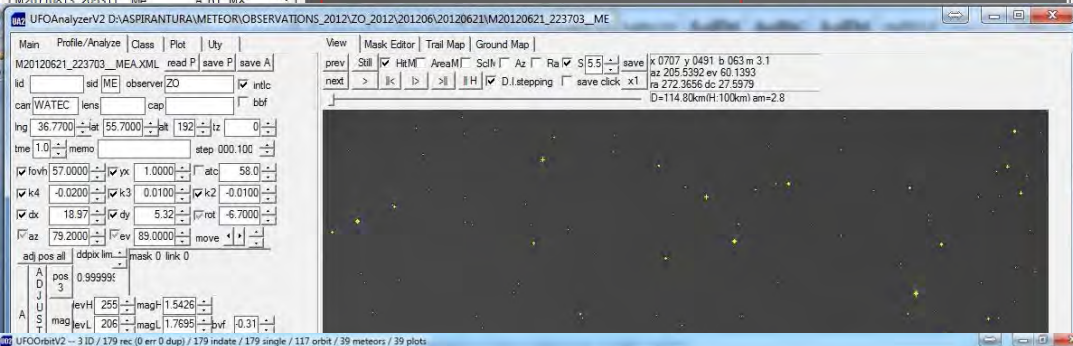
Type of CCD	CCD 1/2" Watec LCL-902H Ultimate
Size of CCD (pixel)	720×576
The field of view	50°×40°
The limiting magnitude of stars	+5 <sup>m</sup> ,5
The limiting magnitude of meteors	+4 <sup>m</sup>

# Observations



## UFOCapture

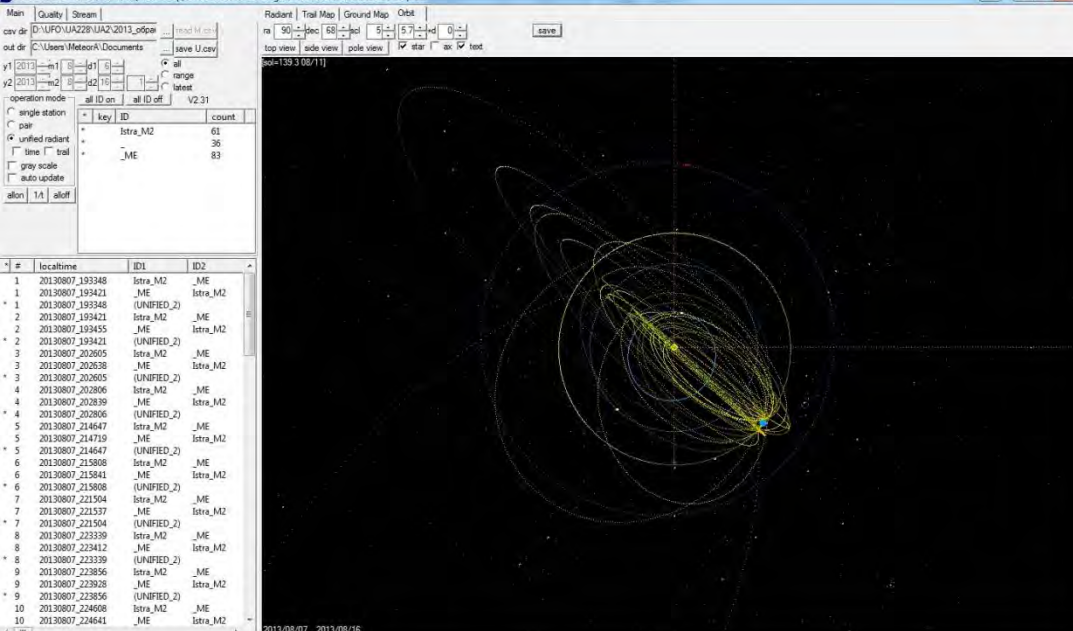
Meteors detection:  
\*. avi файлы



## UFOAnalyzer

Meteor coordinates:

$\alpha, \delta$  – celestial coordinates  
 $\omega$  – the angle velocity  
 $m$  – the magnitude  
 $l$  – the light of meteor track



## UFOOrbit

Orbit parameters:

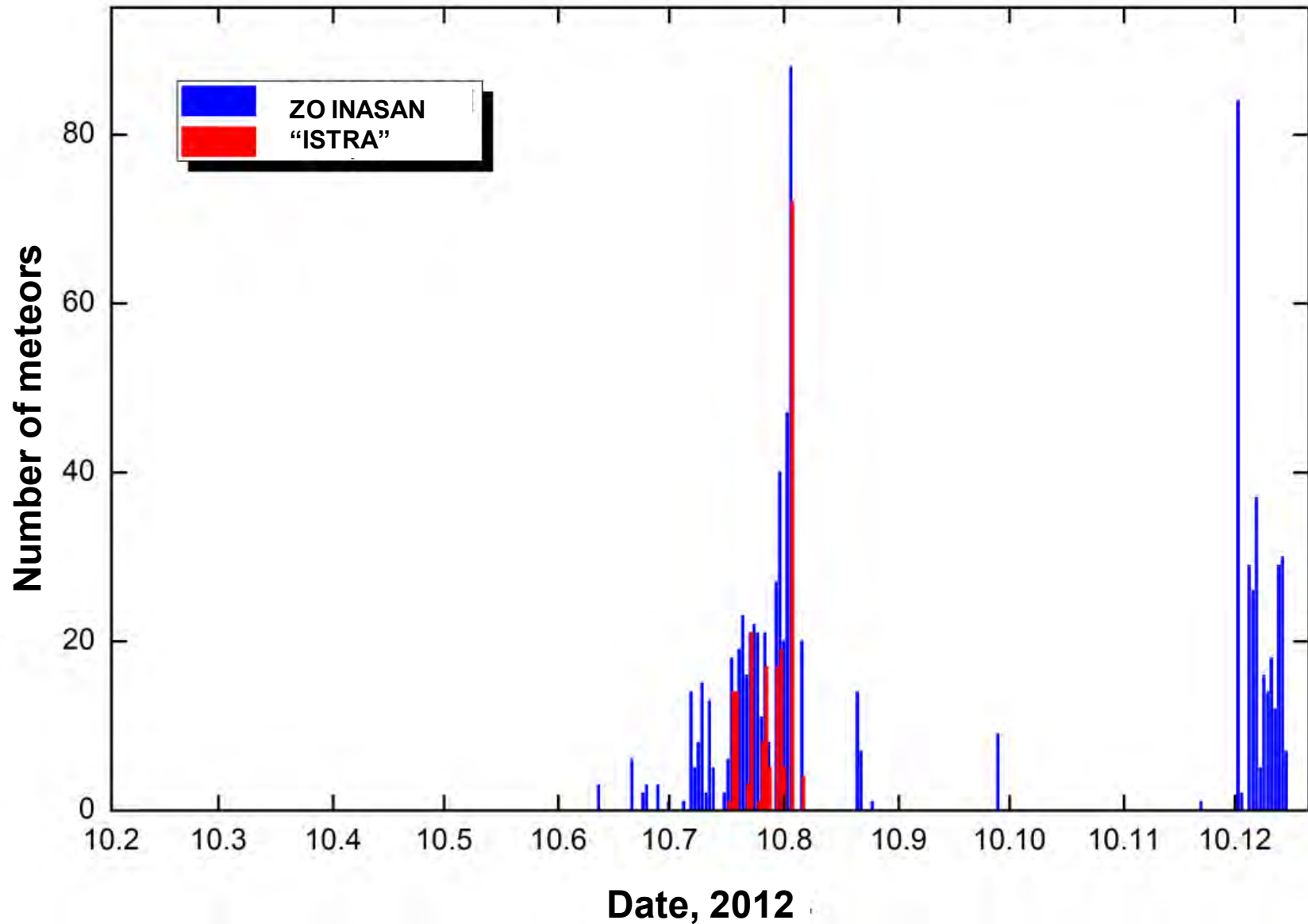
$a$  – Semi-major axis  
 $i$  – Inclination  
 $e$  - Eccentricity  
 $\omega$  – Argument of perihelion  
 $\Omega$  – Longitude of the ascending node

$\alpha R, \delta R$  – radiant coordinates

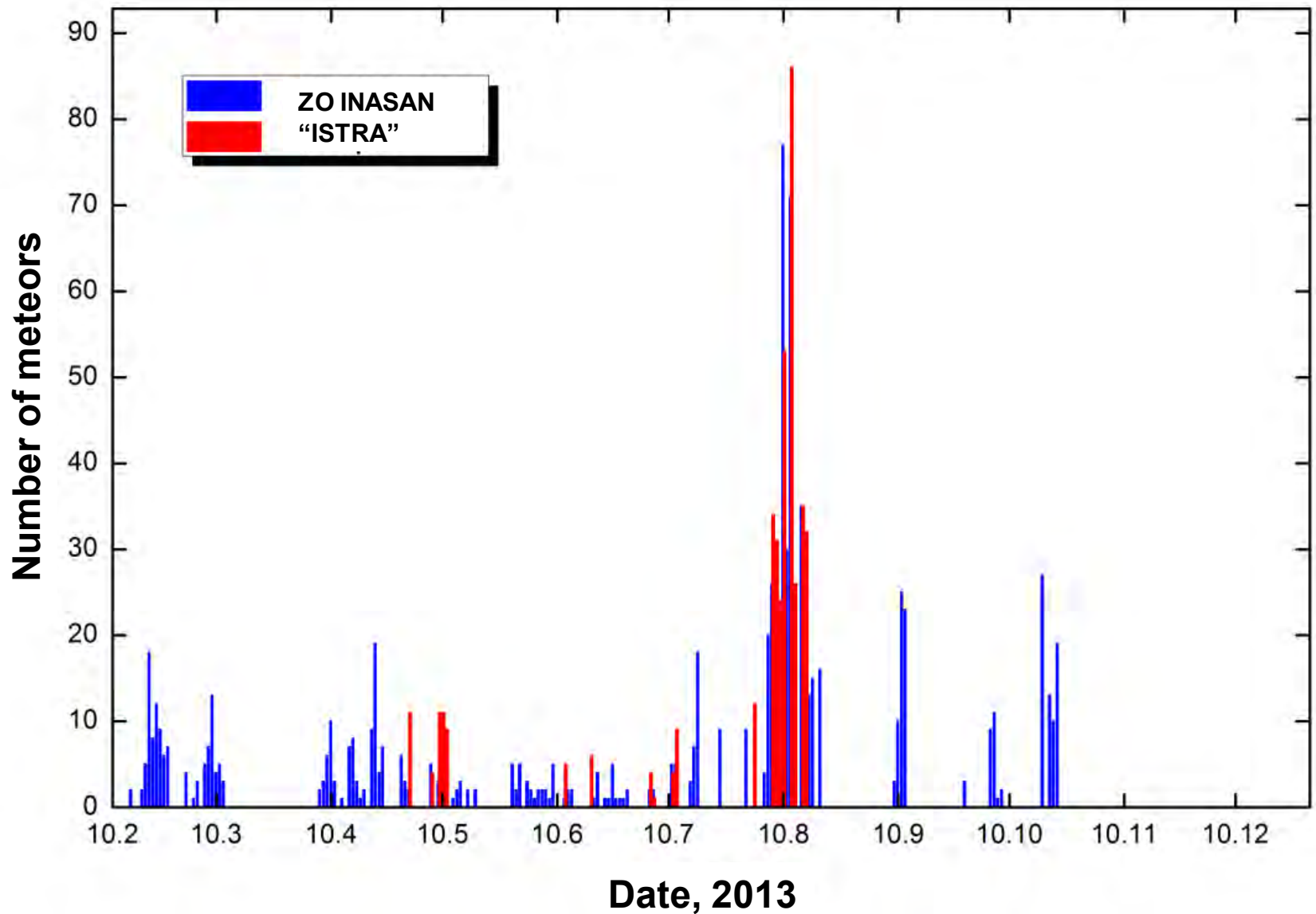
$V_g$  – geocentric velocity

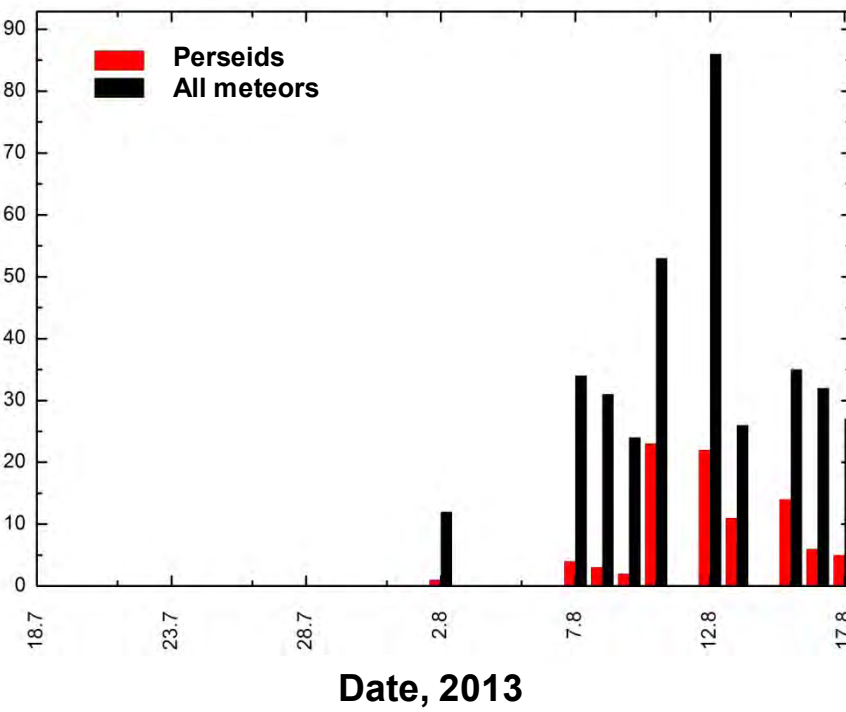
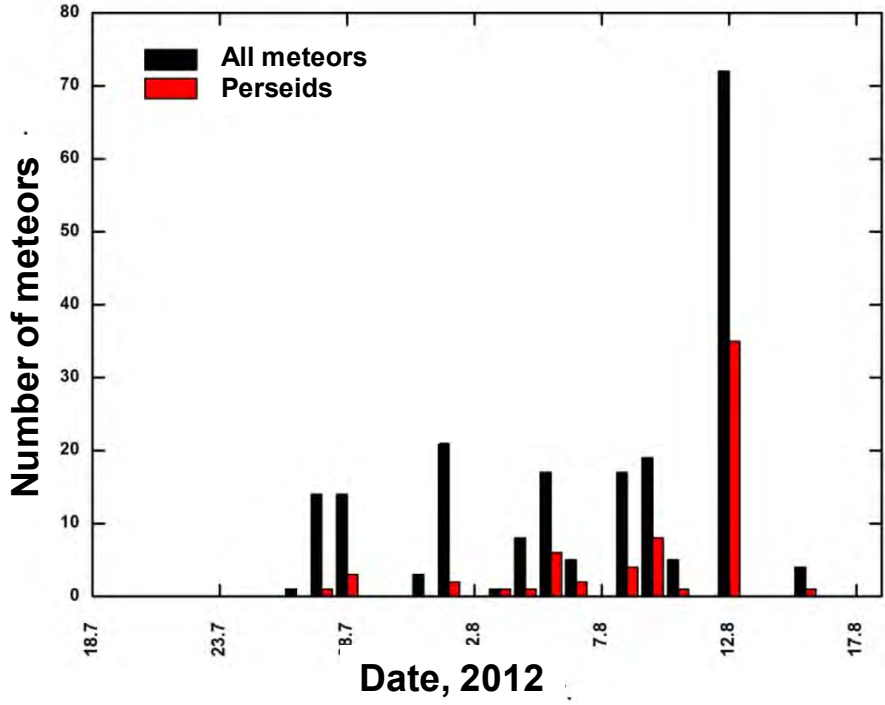
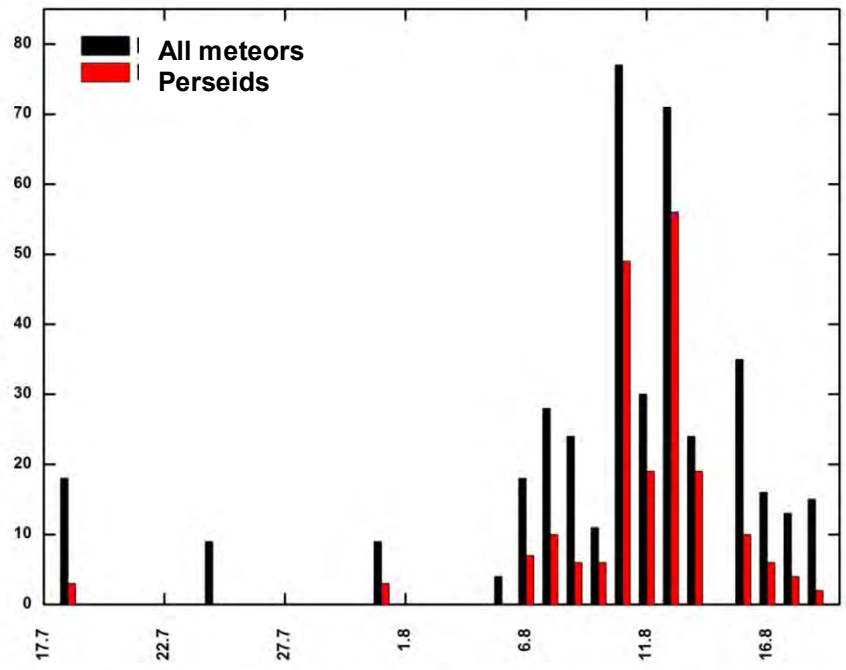
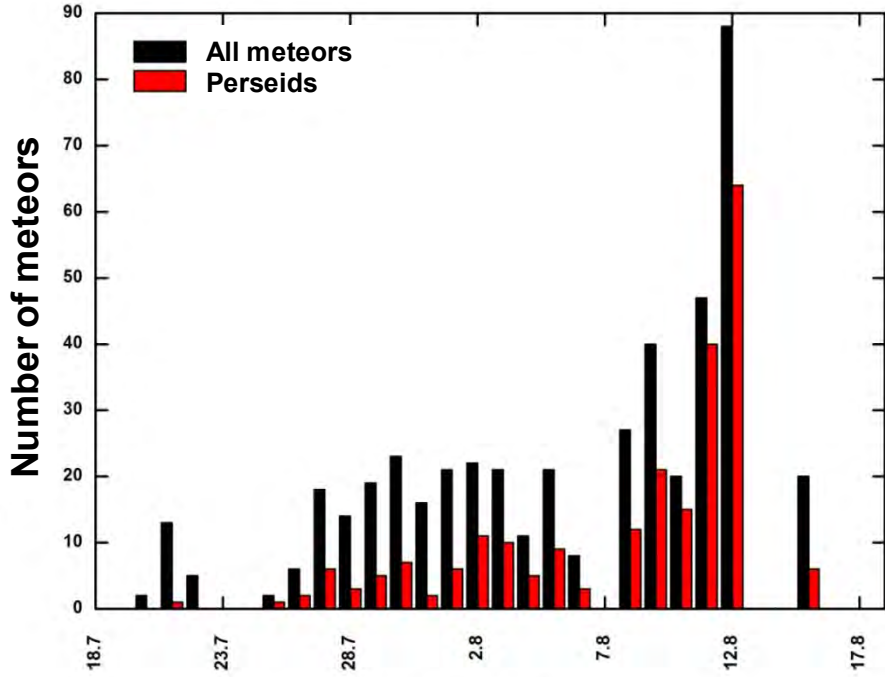
Associate with meteor shower

# Meteor observations 2012



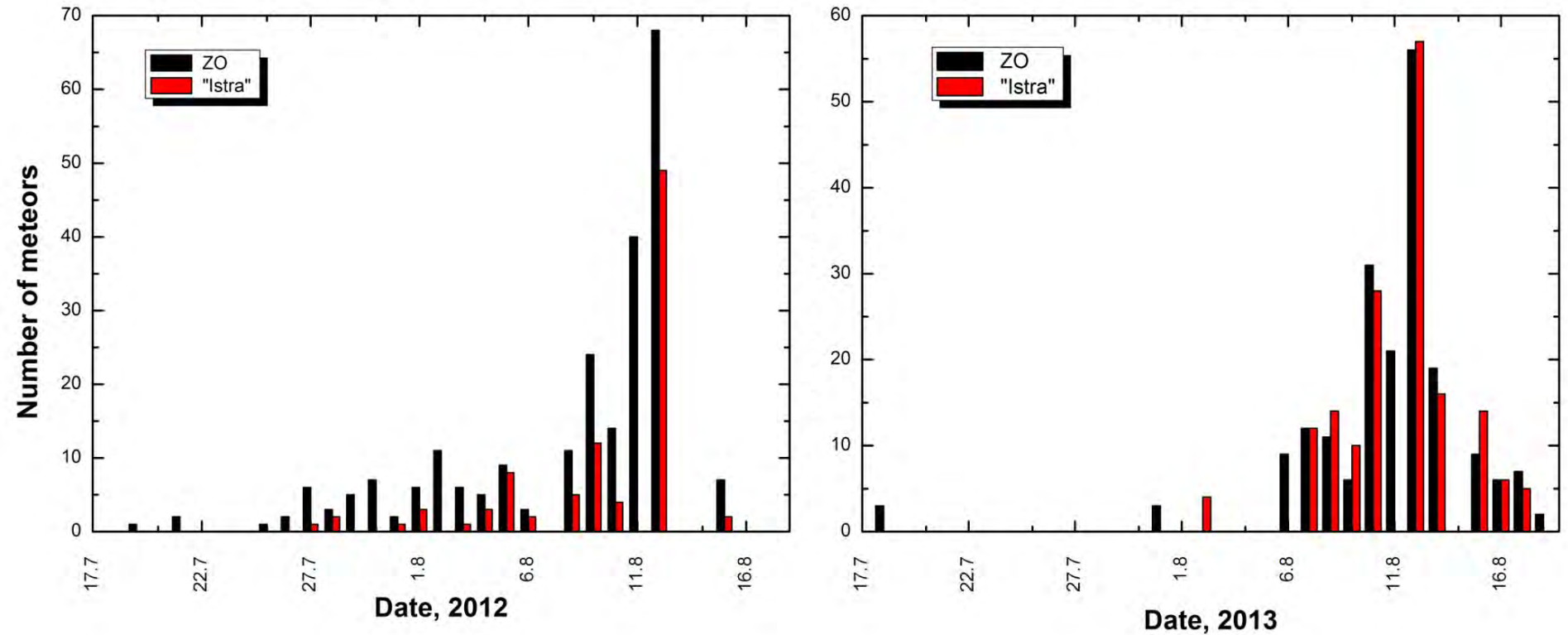
# Meteor observations 2013





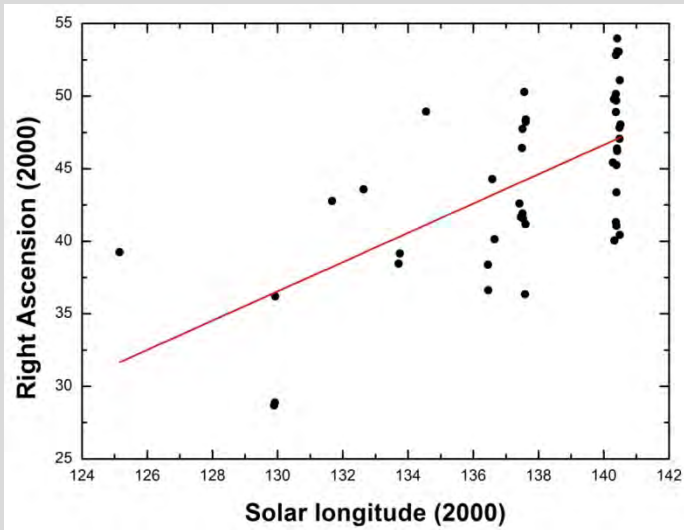


# PERSEIDS 2012-2013

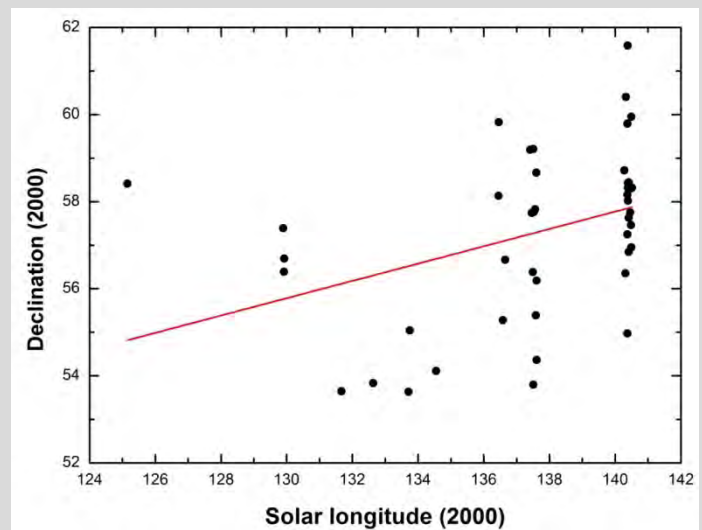


	ZO INASAN		«ISTRA»	
18 July - 24 August	2012	2013	2012	2013
Total time (h)	119.3	131.3	42	54.75
Number of meteors	495	396	200	347
Number of Perseids	233	195	93	166
Number of Perseids in %	47	49	46.5	47.8

# Perseid radiant drift



2012



2012

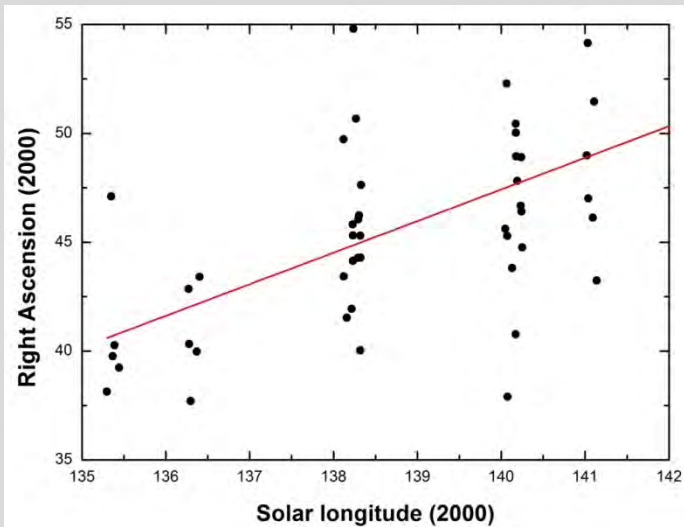
2013

$$\alpha = 1.01 \lambda - 94.7^\circ \quad (r^2 = 0.387)$$

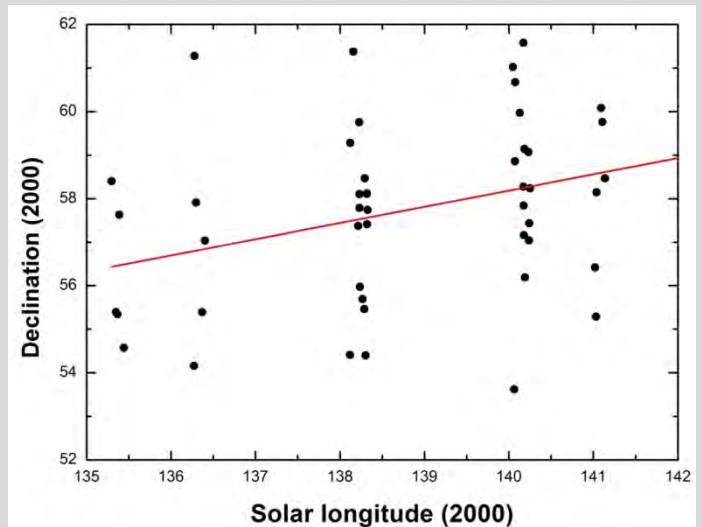
$$\delta = 0.20 \lambda + 29.9^\circ \quad (r^2 = 0.127)$$

$$\alpha = 1.45 \lambda - 155.9^\circ \quad (r^2 = 0.371)$$

$$\delta = 0.37 \lambda + 6.1^\circ \quad (r^2 = 0.126)$$



2013



# Perseid orbits

	$\lambda_{\odot}$ (°)	RA (°)	DEC (°)	Vg (km)
ZO- «Istra» (2012 г.)	140.3 – 140.5	47.57	+58.26	59.09
ZO- «Istra» (2013 г.)	140.0 – 140.2	48.4	+57.85	59.5
<b>IAU MDC [1]</b>	140.19	48.33	+57.96	59.38
<b>IMO [2]</b>	140.0—140.1	48	+58	59

	a (a.e.)	q (a.e.)	e	$\omega$ (°)	$\Omega$ (°)	i (°)
ZO- «Istra» (2012 г.)	37.17	0.94	0.92	148.38	140.41	112.70
ZO- «Istra» (2013 г.)	22.22	0.94	0.91	148.98	139.14	112.95
<b>IAU MDC [3]</b>	71.4	0.953	-	151.3	140.19	113.22
<b>IAU MDC [4]</b>	24.0	0.949	0.960	150.4	139.7	113.0
<b>109P/Swift-Tuttle</b>	26.32	0.958	0.963	-	-	113.43

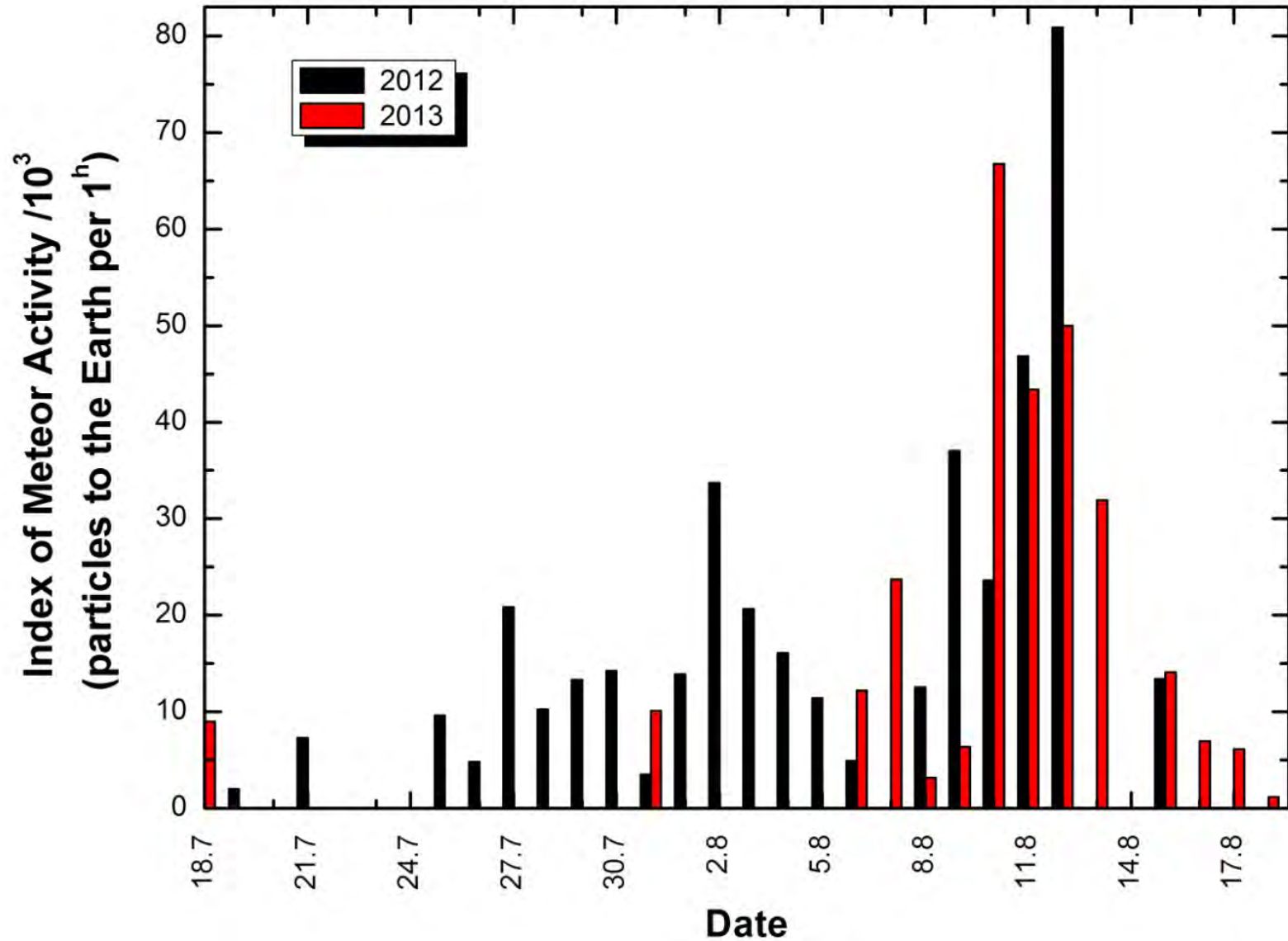
[1] The IAU Meteor Data Center (MDC), [www.astro.amu.edu.pl/~jopek/MDC2007/](http://www.astro.amu.edu.pl/~jopek/MDC2007/)

[2] International Meteor Organization, [www.imo.net](http://www.imo.net)

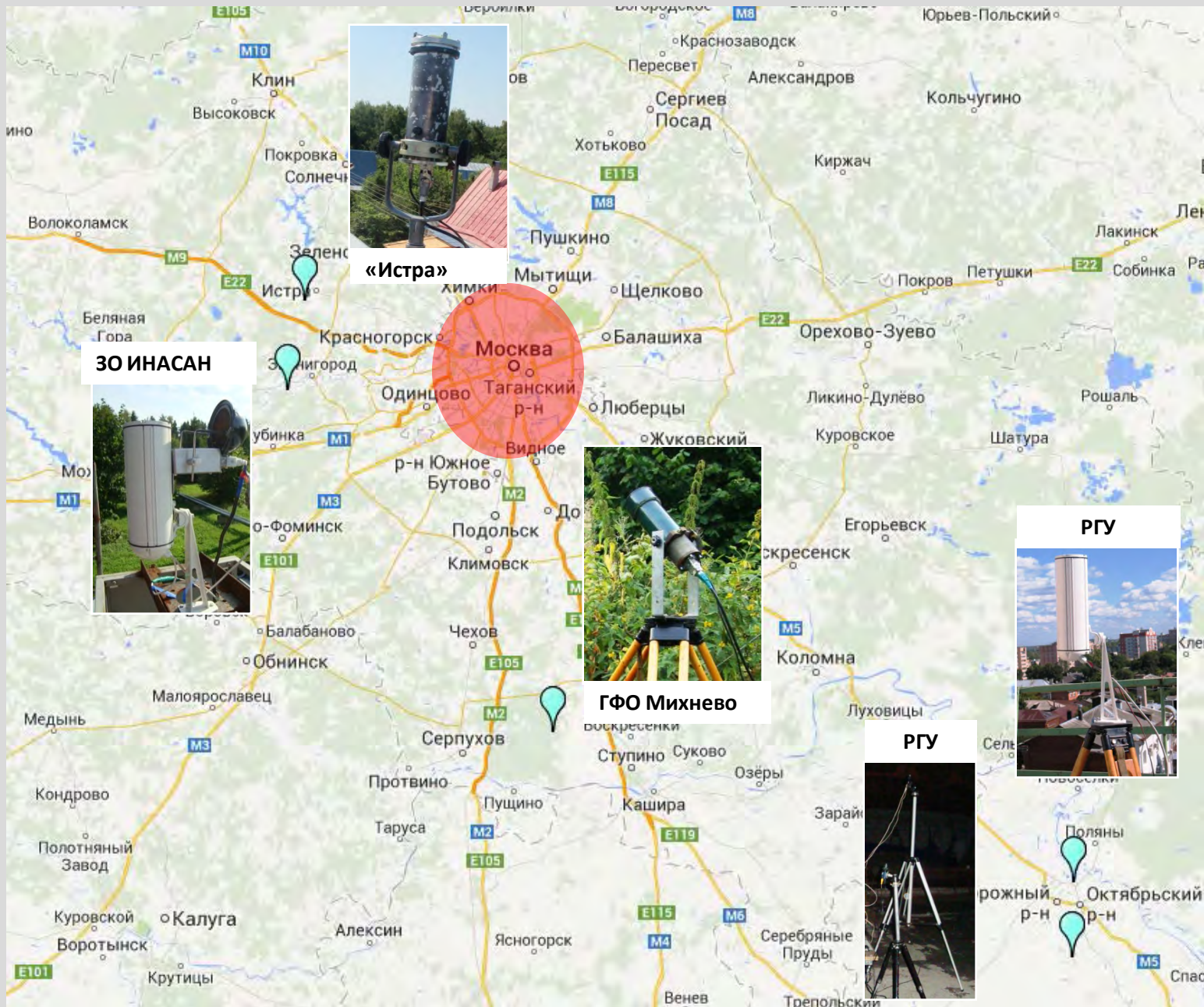
[3] Kresák, L. and Porubcan, V., The dispersion of meteors in meteor streams. I. The size of the radiant areas, Bulletin of the Astronomical Institute of Czechoslovakia, vol. 21, p.153, 970

[4] Dutch Meteor Society, 2001

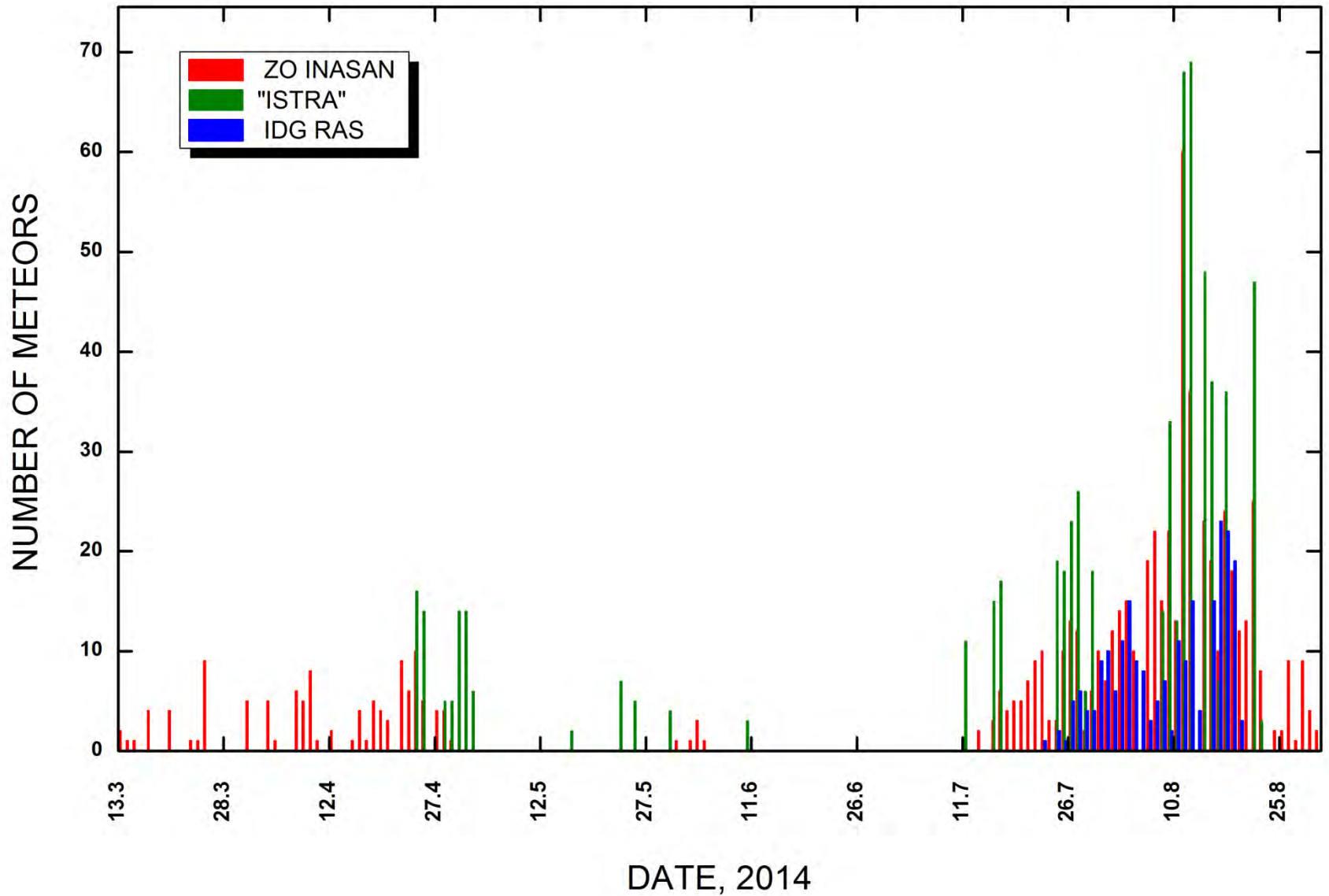
# Index of Meteor Activity



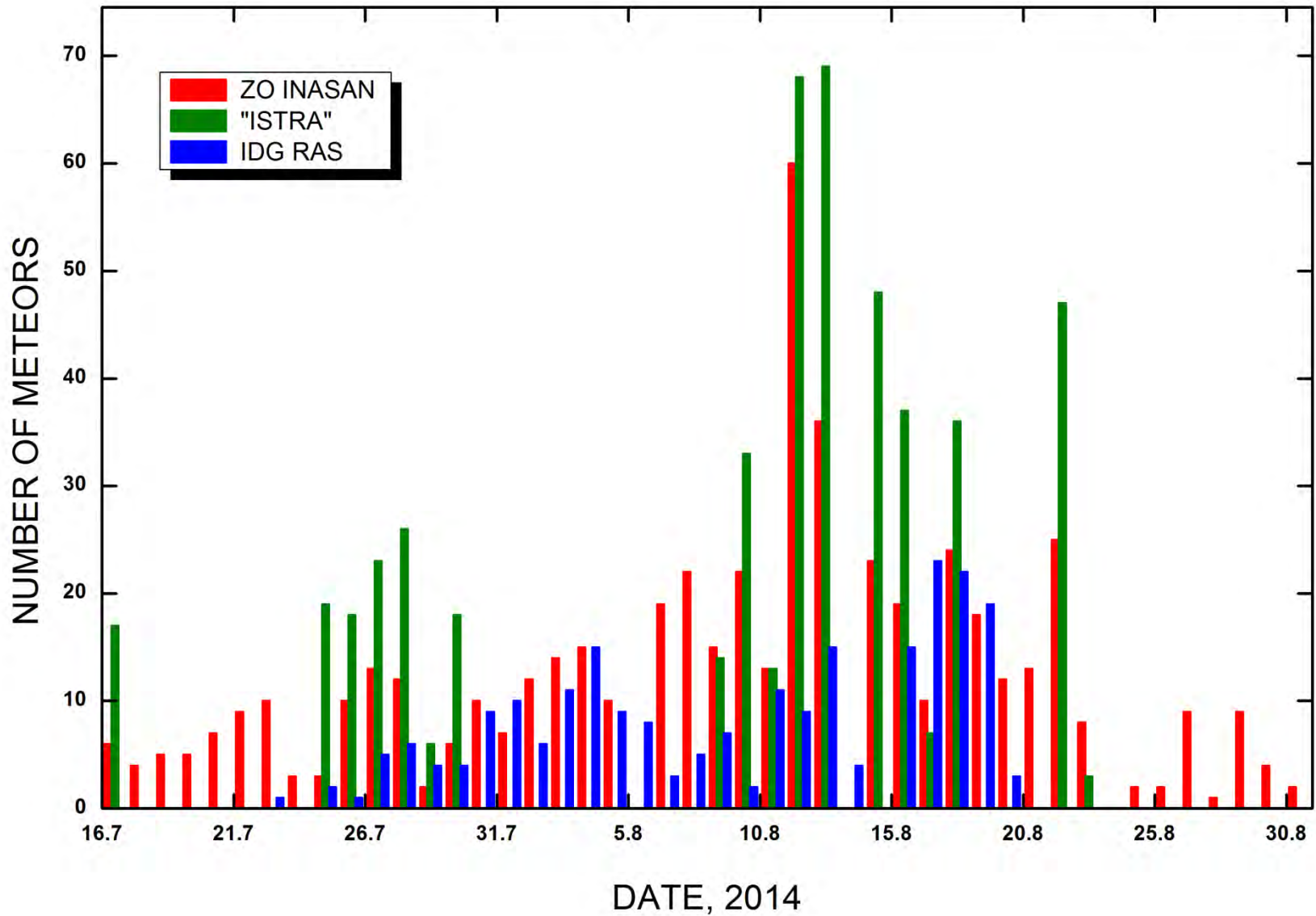
# Meteor stations



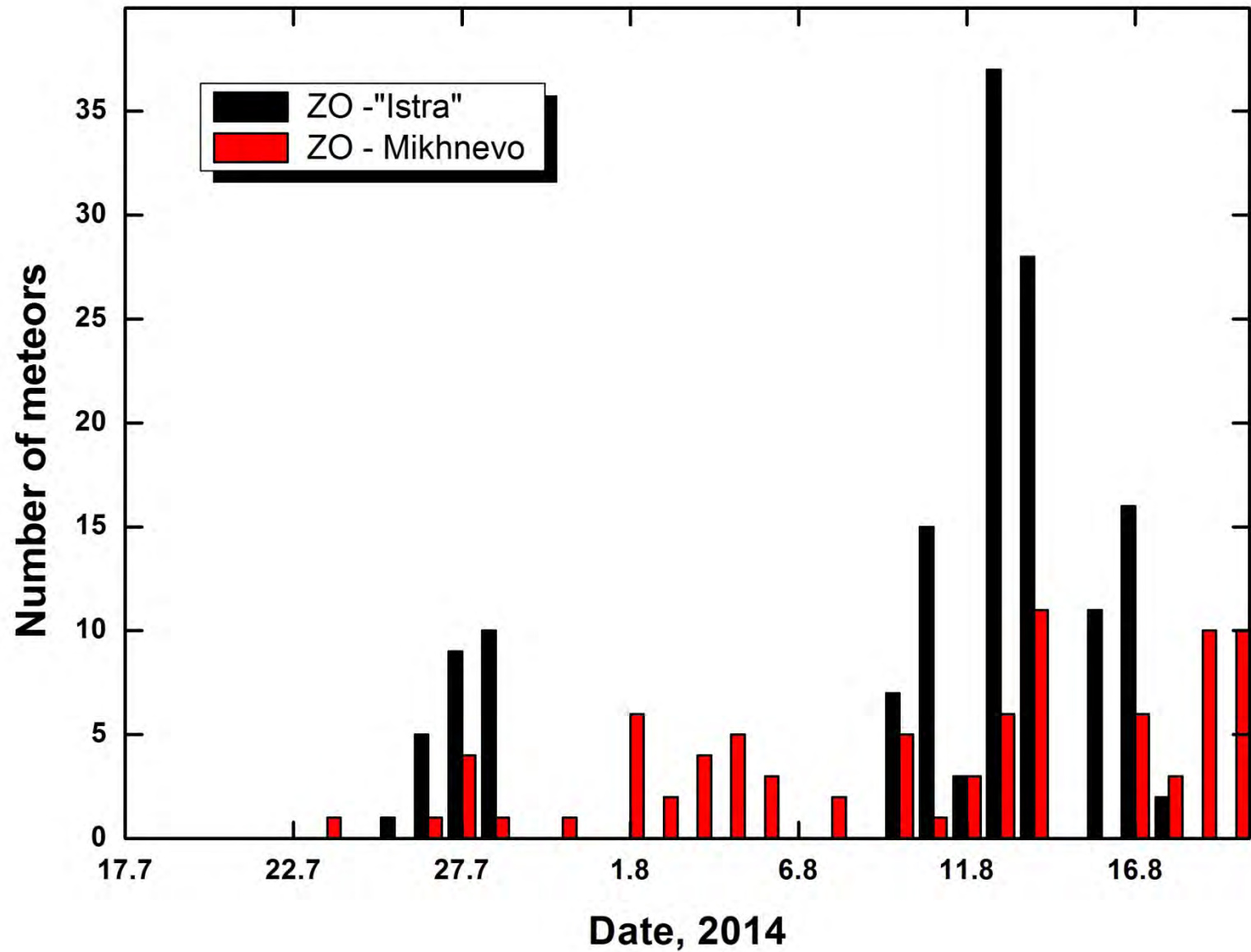
# Meteor observations 2014



# Meteor observations 2014

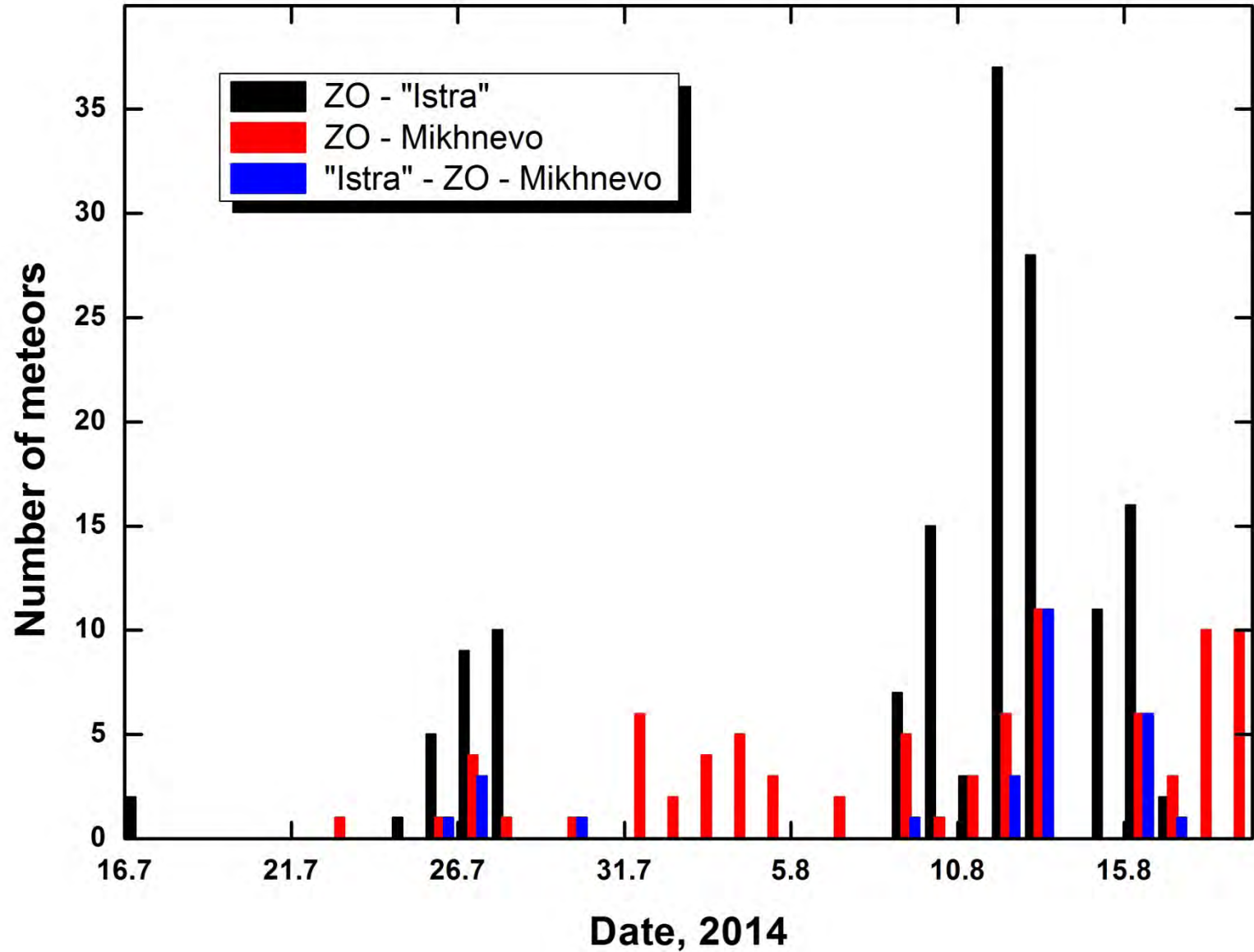


# Double-station observations

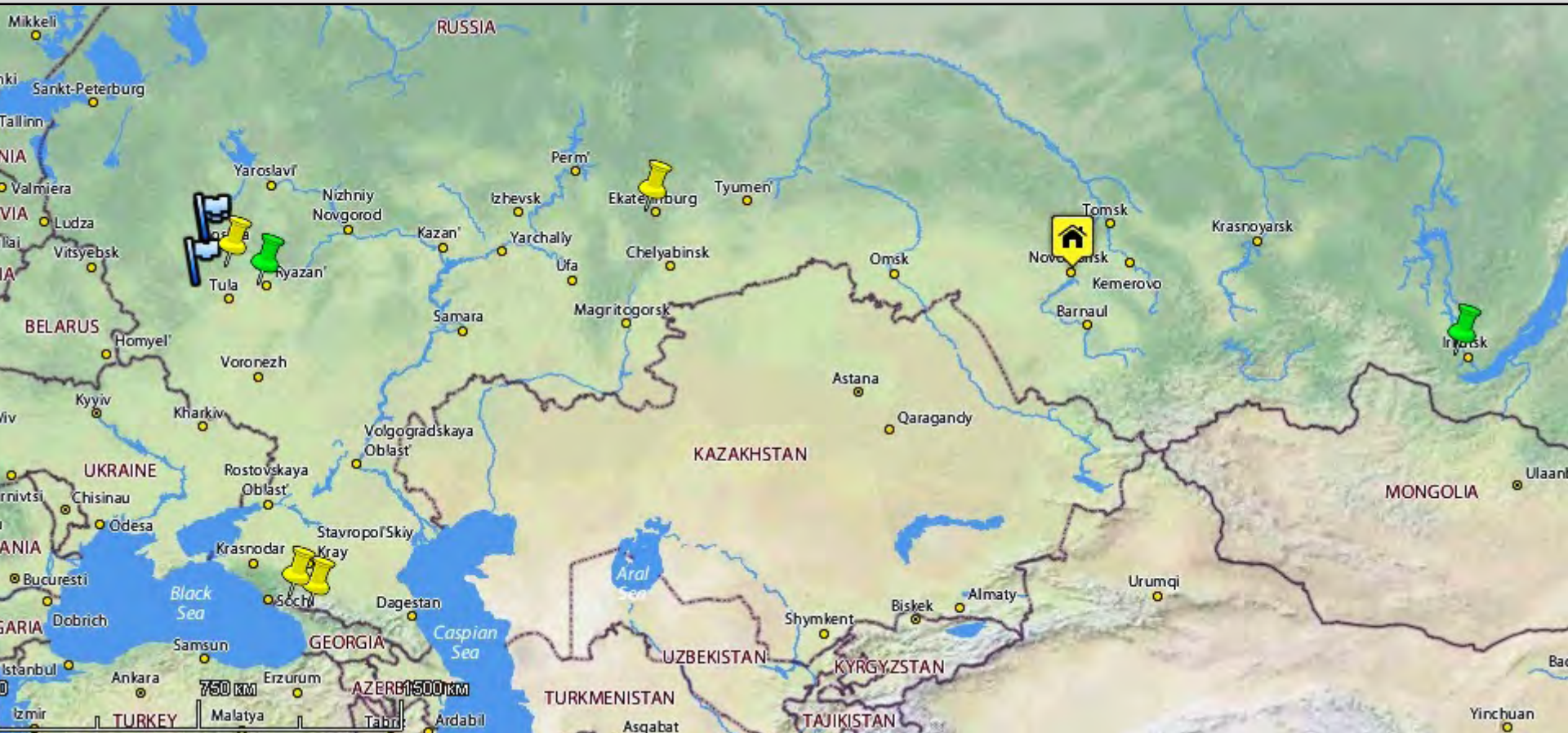




# Double-station observations



# Russian meteor observations



# Acknowledgments

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**Thank you!**