29th IADC Meeting, Apr 11-14, 2011
Berlin, Germany

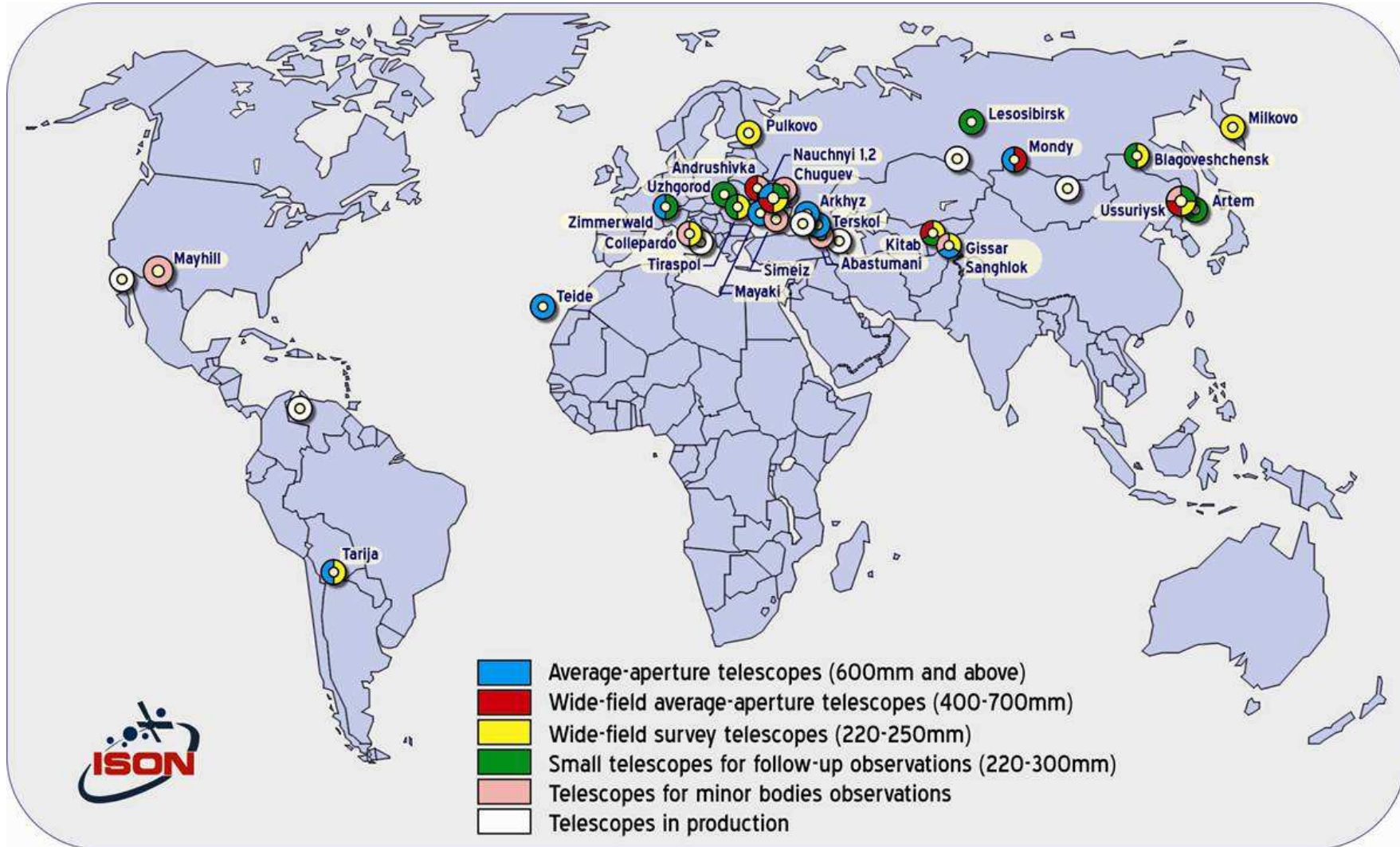# High area-to-mass GEO-like and HEO objects - updated results of research

**Presentation of the Roscosmos delegation
to the IADC WG1**

Vladimir Agapov

KIAM RAS, Moscow, Russia
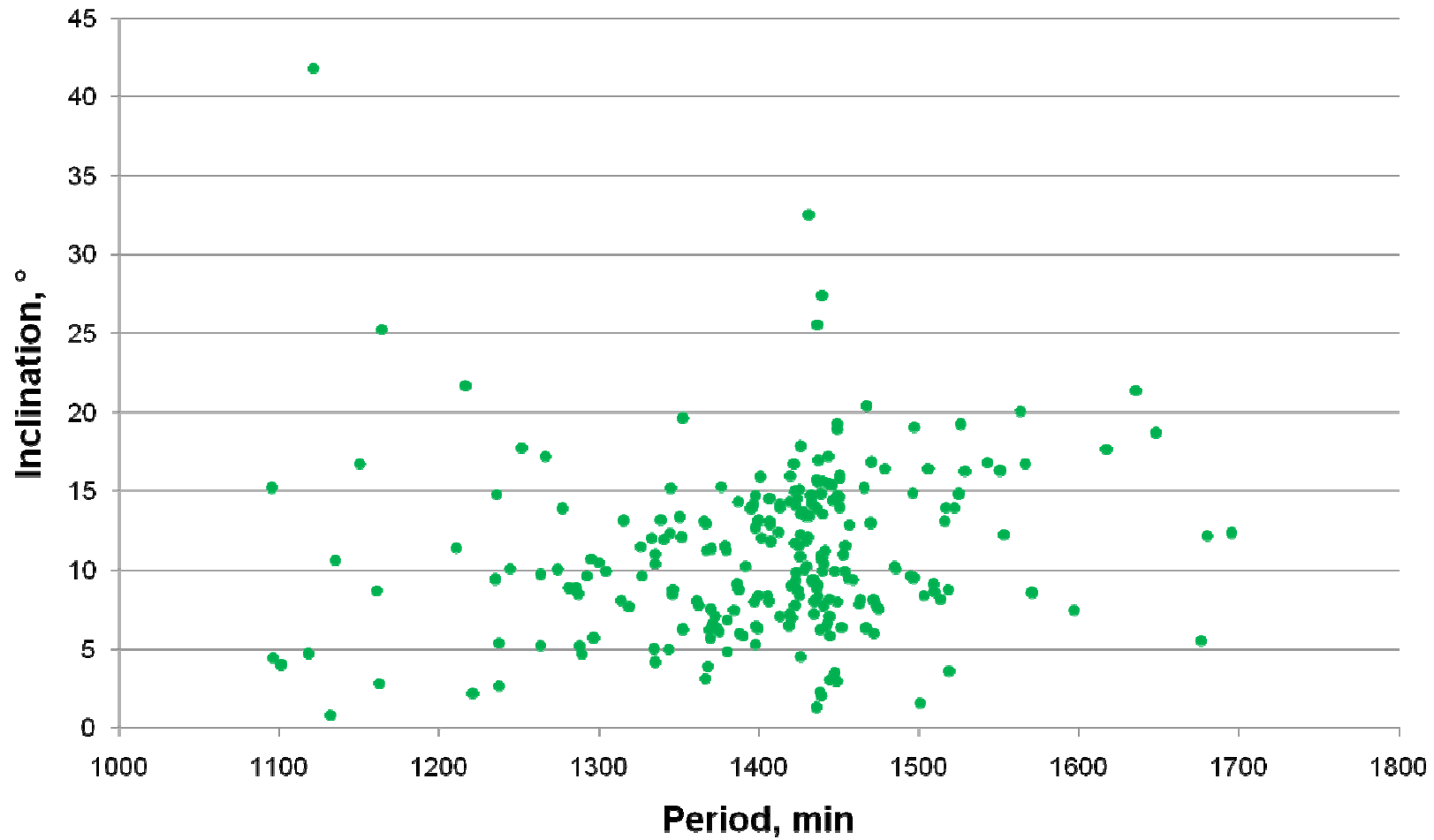
I S O N
International scientific optical network

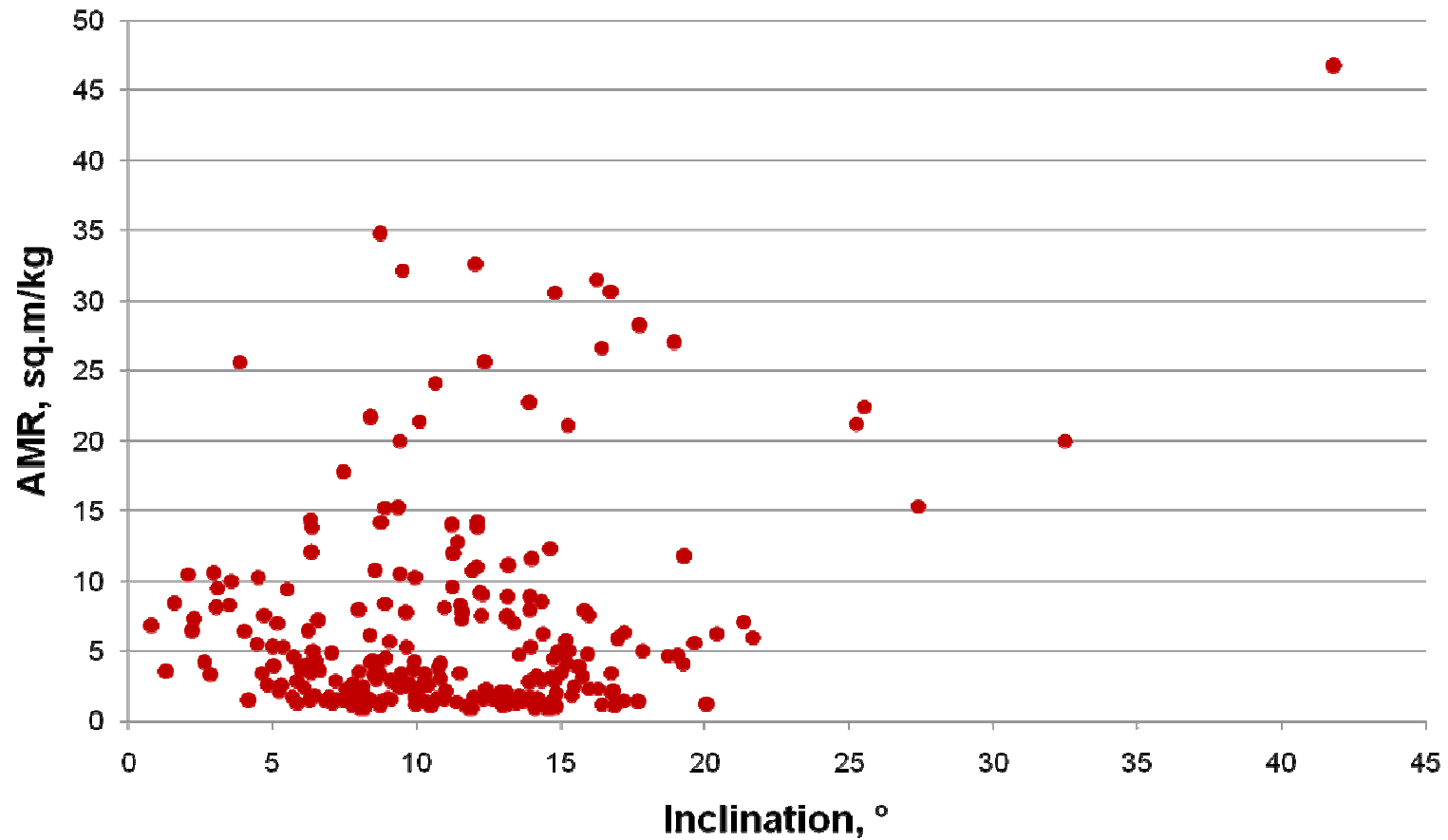# High AMR Objects

AMR > 0.9-1 sq.m/kg

KIAM database contains 247 GEO and GEO-like (of 1606 GEO in the KIAM database) and 23 HEO objects classified as High AMR ones

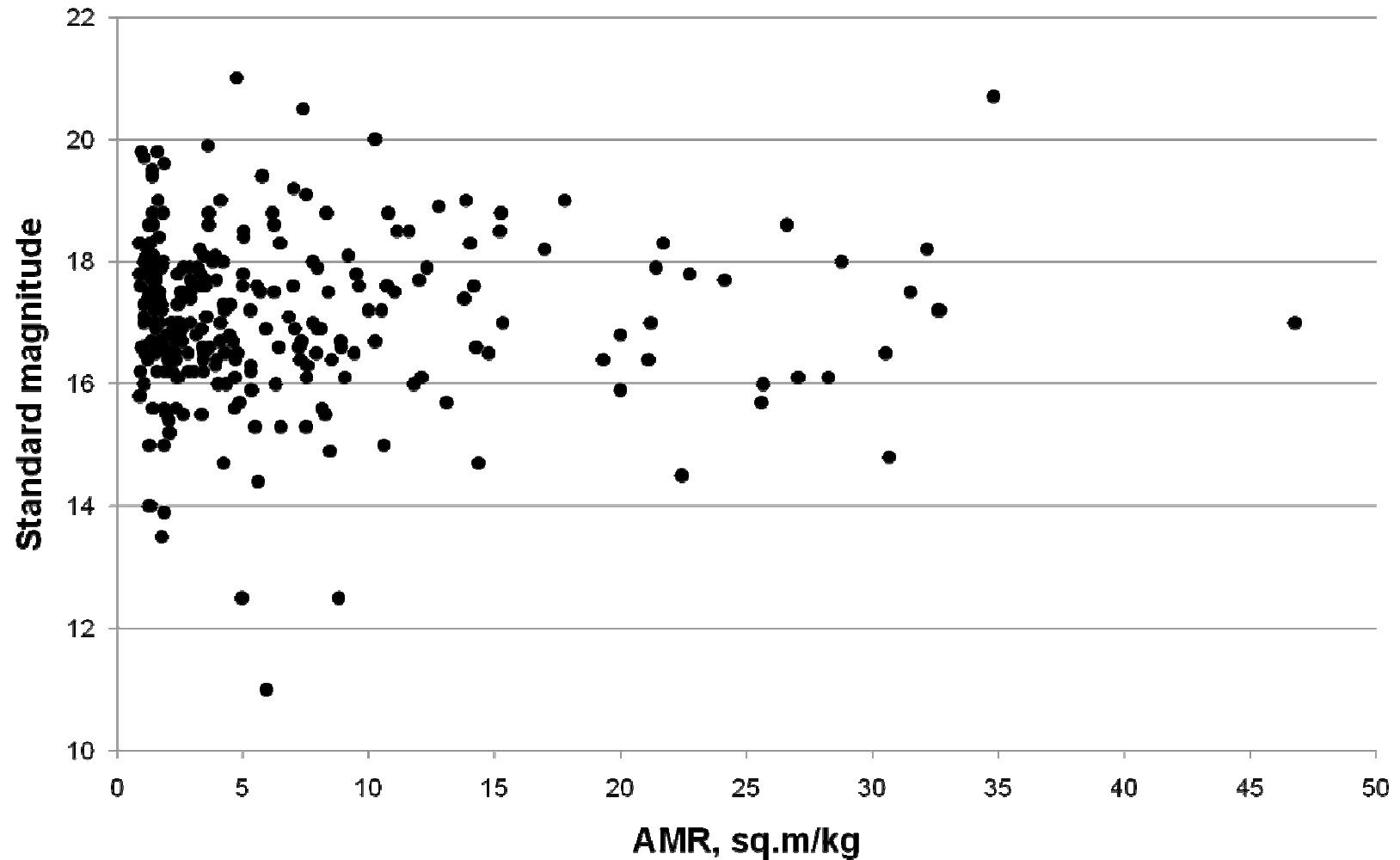Count includes only objects having more than 2 observation nights

Distribution of High AMR objects by period and inclination

Distribution of High AMR objects by inclination and AMR value
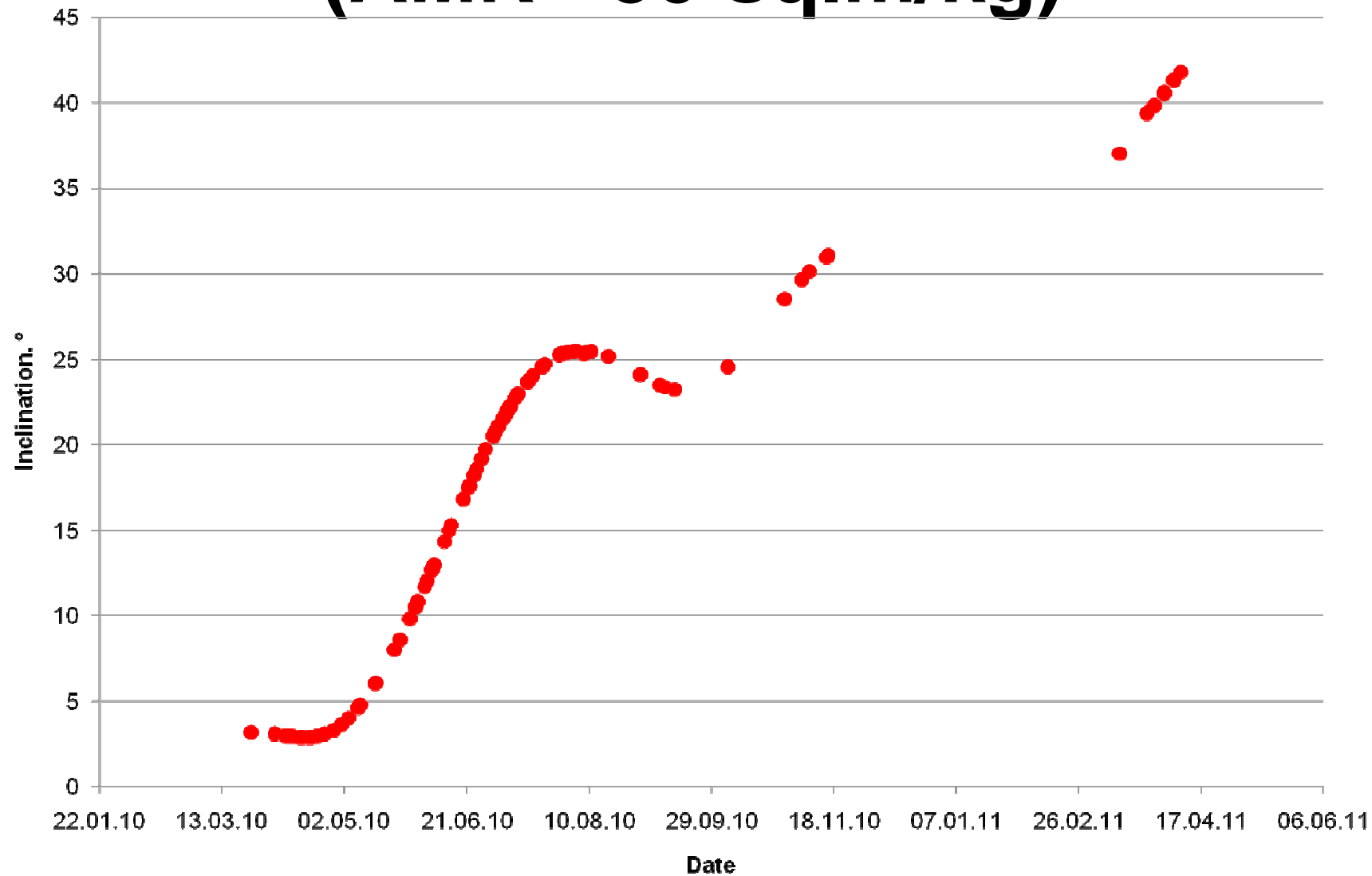
Distribution of High AMR objects
by AMR value and standard magnitude

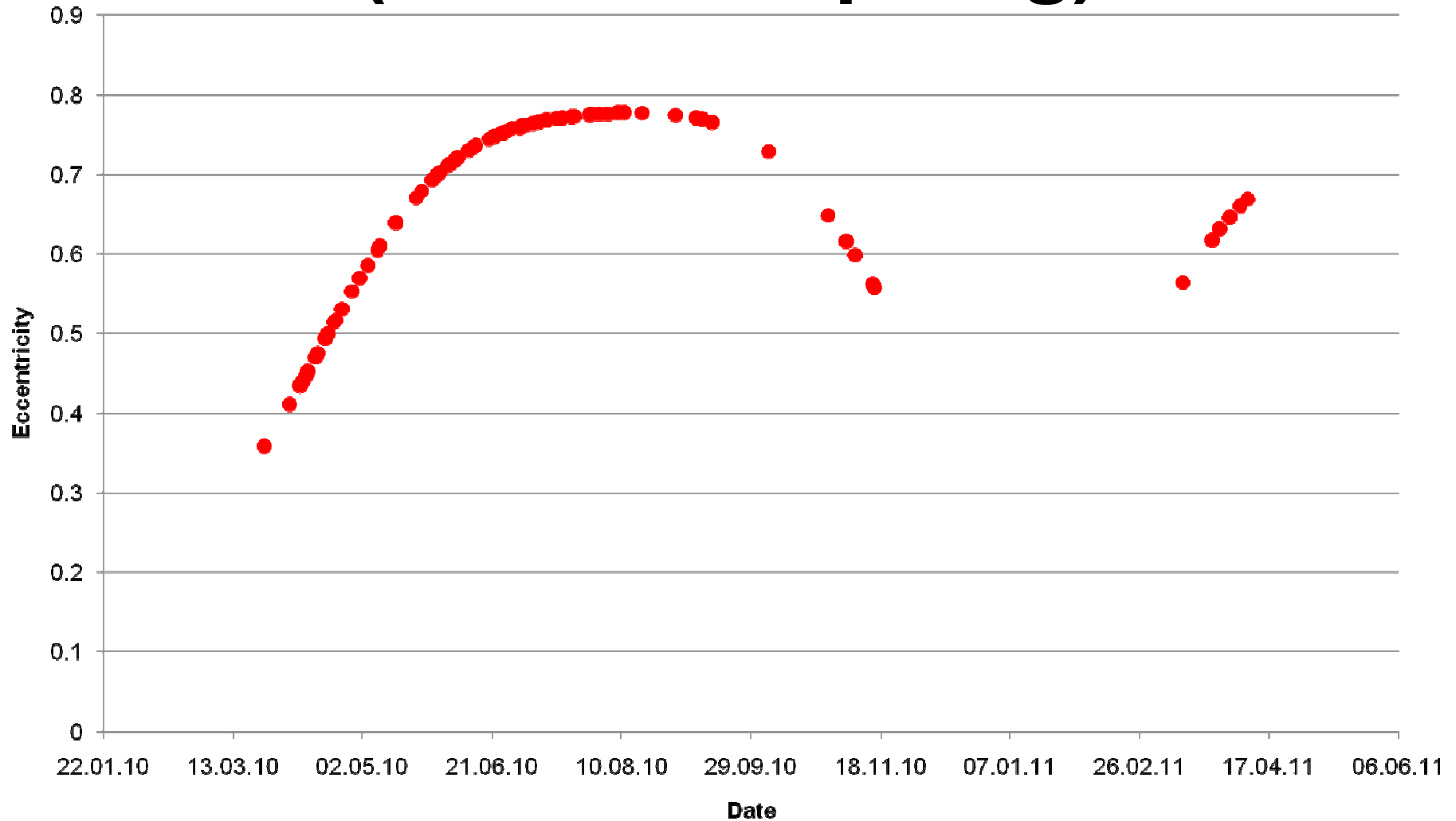# 90200 period evolution (AMR ~50 sq.m/kg)

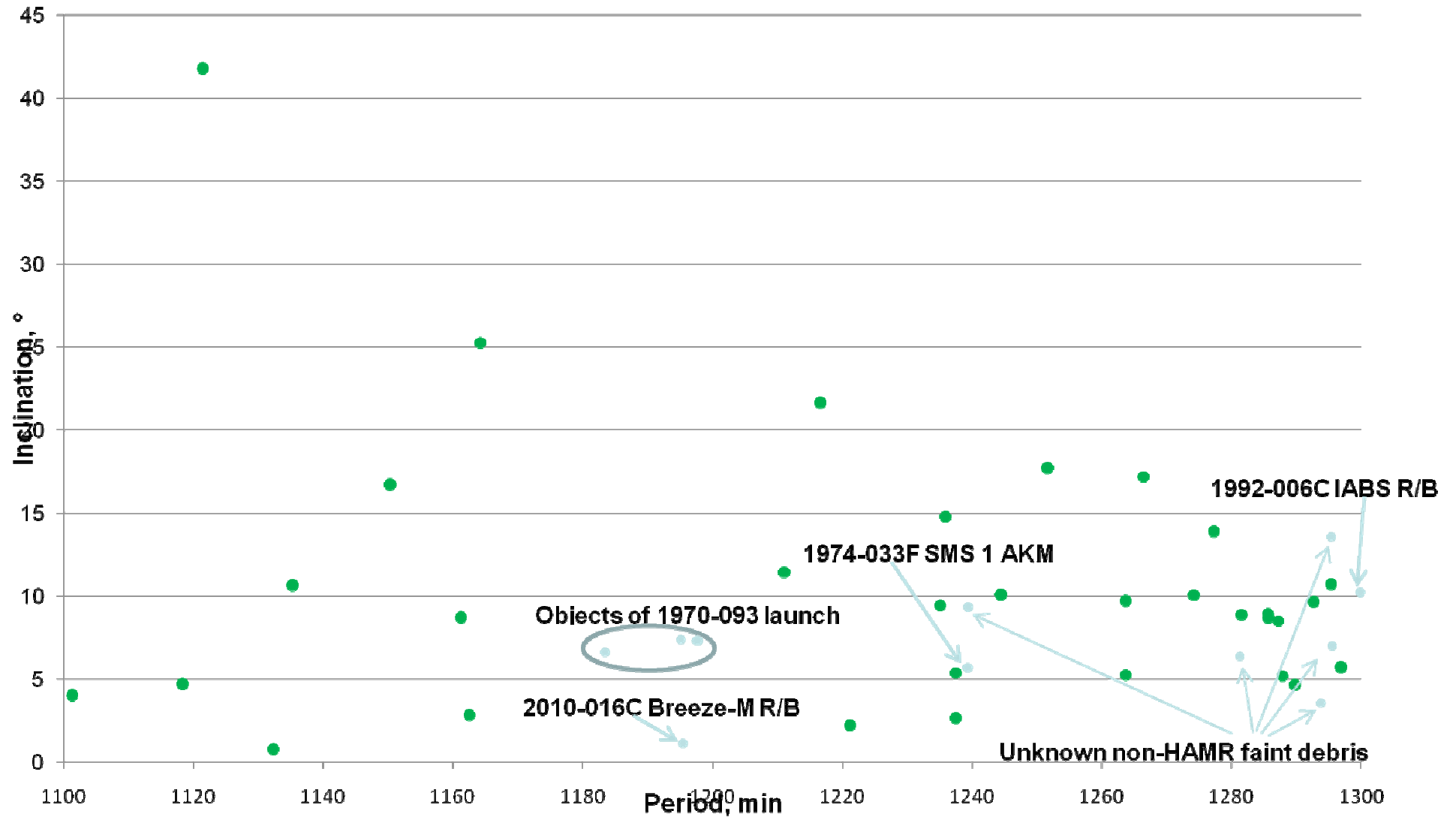# 90200 inclination evolution (AMR ~50 sq.m/kg)

90200 eccentricity evolution (AMR ~50 sq.m/kg)

Probable sources of HAMR???

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International designation	Object name	Owner	Period, min	Inclination, deg	Eccentricity	Hp, km	Ha, km	Comment
1993 031002	ARASENE	FR	1012.39	4.51	0.2838	17547	36504	Spacecraft
2004 050002	DELTA 4 R/B	US	1044.60	12.84	0.2521	19132	36327	Anomaly launch, Liquid motor
1983 026003	IUS R/B(2) (TDRS 1)	US	1089.48	3.20	0.1908	22005	35393	Anomaly launch, SRM
1996 013001	POLAR	US	1109.01	83.62	0.6201	7123	51157	Spacecraft
2000 072002	AMSAT OSCAR 40	GER	1146.52	7.64	0.7943	1100	58864	Spacecraft
1970 093003	DSP F1 SUNSHADE COVER	US	1195.10	7.36	0.1213	26405	35453	Operational debris
2010 016002	BREEZE-M R/B	RU	1195.42	1.10	0.0728	28220	33655	Nominal launch, Liquid motor
1970 093002	TITAN 3C TRANSTAGE R/B	US	1197.59	7.32	0.1316	26066	35899	Anomaly launch, Liquid motor
1970 093001	OPS 5960 (DSP F1)	US	1197.74	7.32	0.1309	26096	35875	Spacecraft
1974 033006	SMS 1 AKM	US	1239.29	5.69	0.0264	30835	32853	Nominal launch, SRM
1992 006003	IABS R/B	US	1299.74	10.21	0.0646	30528	35628	Anomaly launch, Liquid motor