Near-Earth Asteroids as source of meteors

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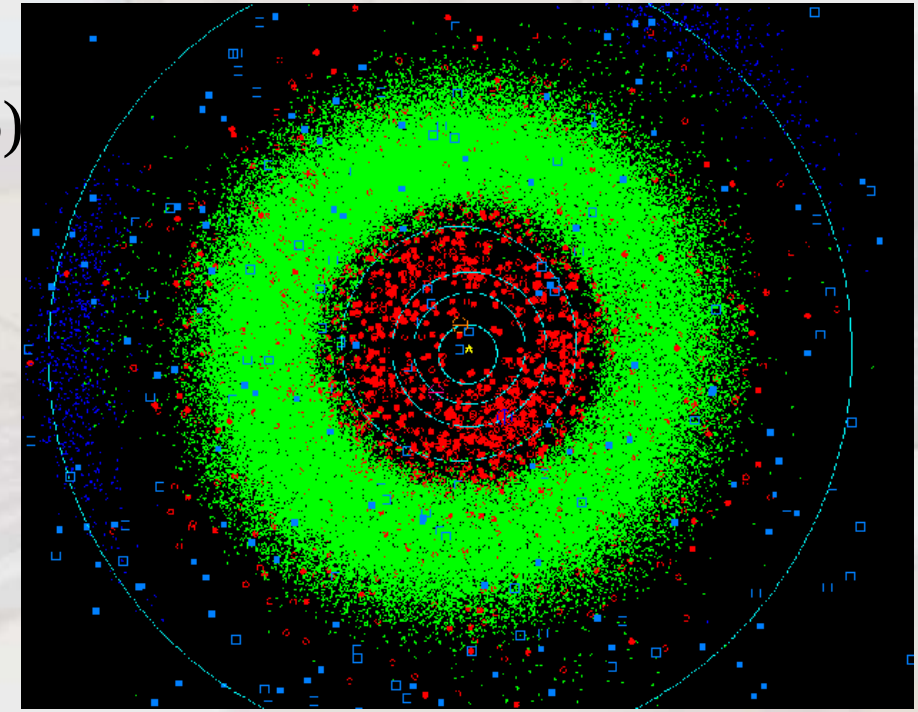
Solar System

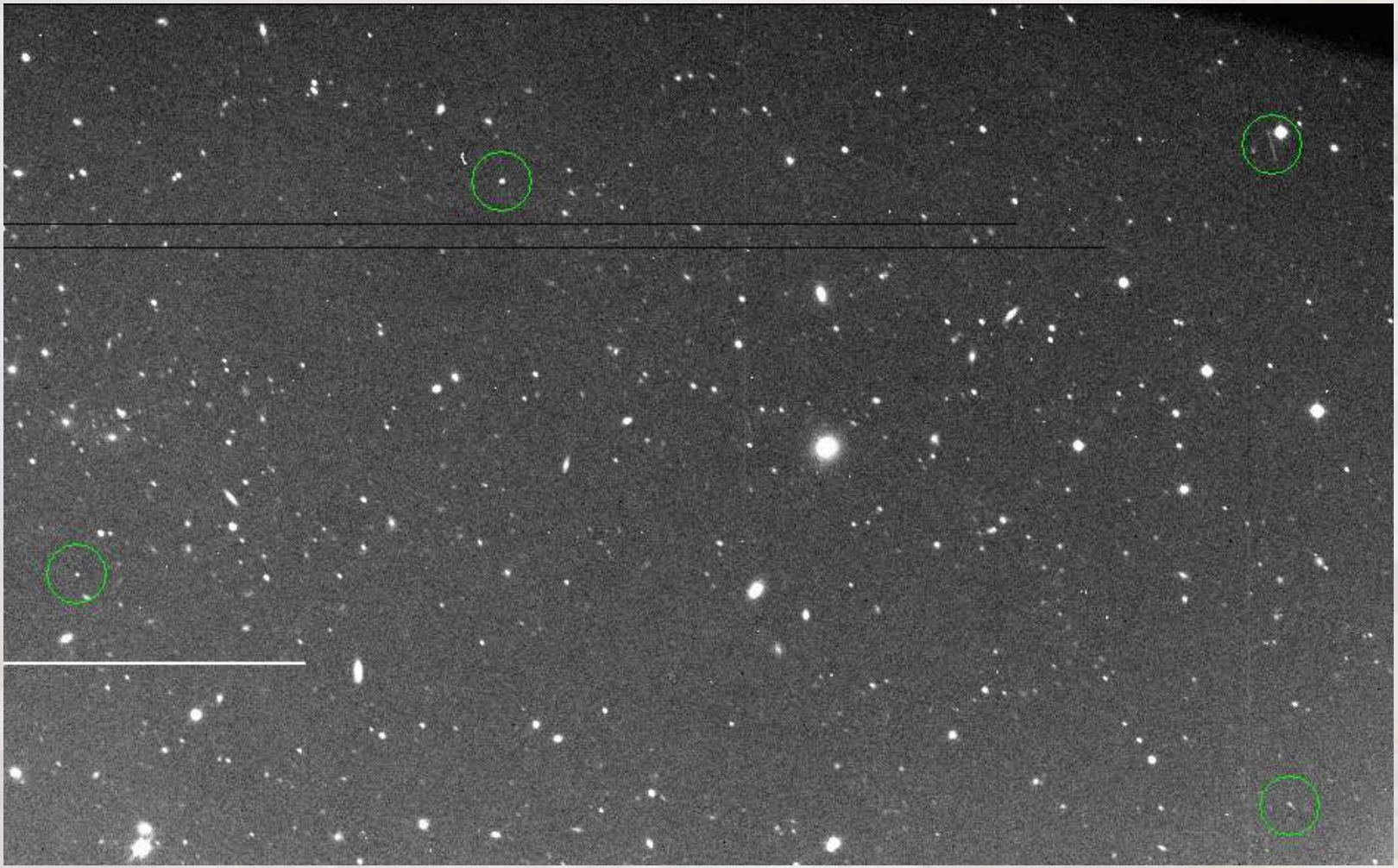
Mercure
Venus
Terre
Mars
Jupiter
Saturn
Uranus
Neptune
(cf UAI, Res 5, 2006)

Dwarf planets: Pluton, Cérès, …

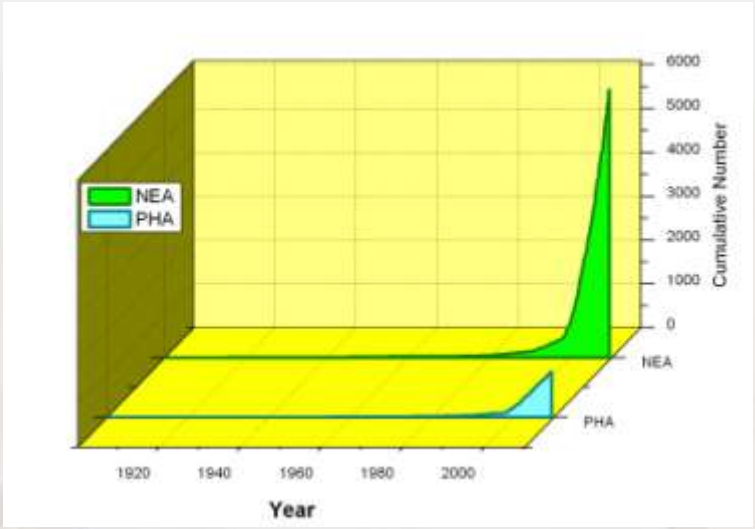


Asteroids & Near-Earth Objects…

ESO-La Silla MPG/WFI 2.2 m telescope (12 Mars 2008)

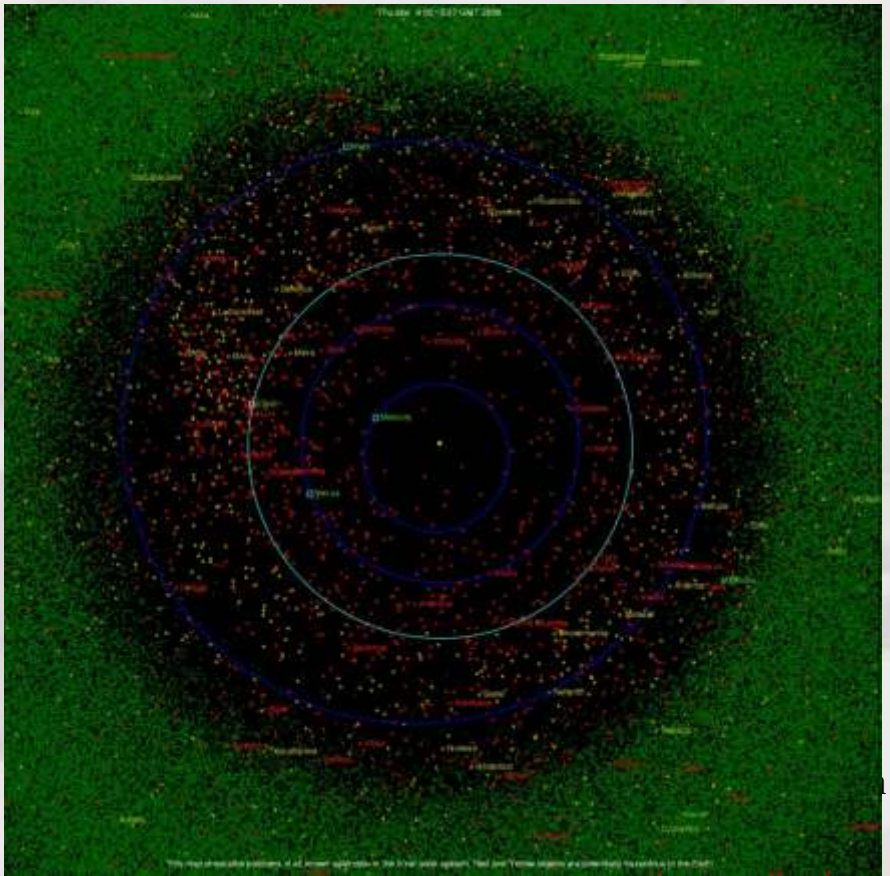


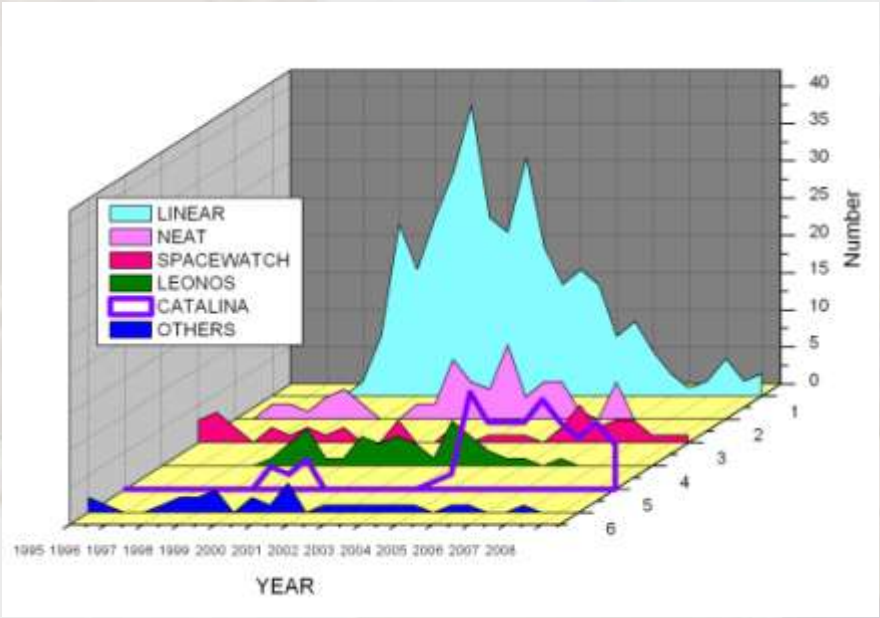
Credits:



Statistics (April 17, 2009):
NEA – 6,113 objects
PHA – 1,041 objects

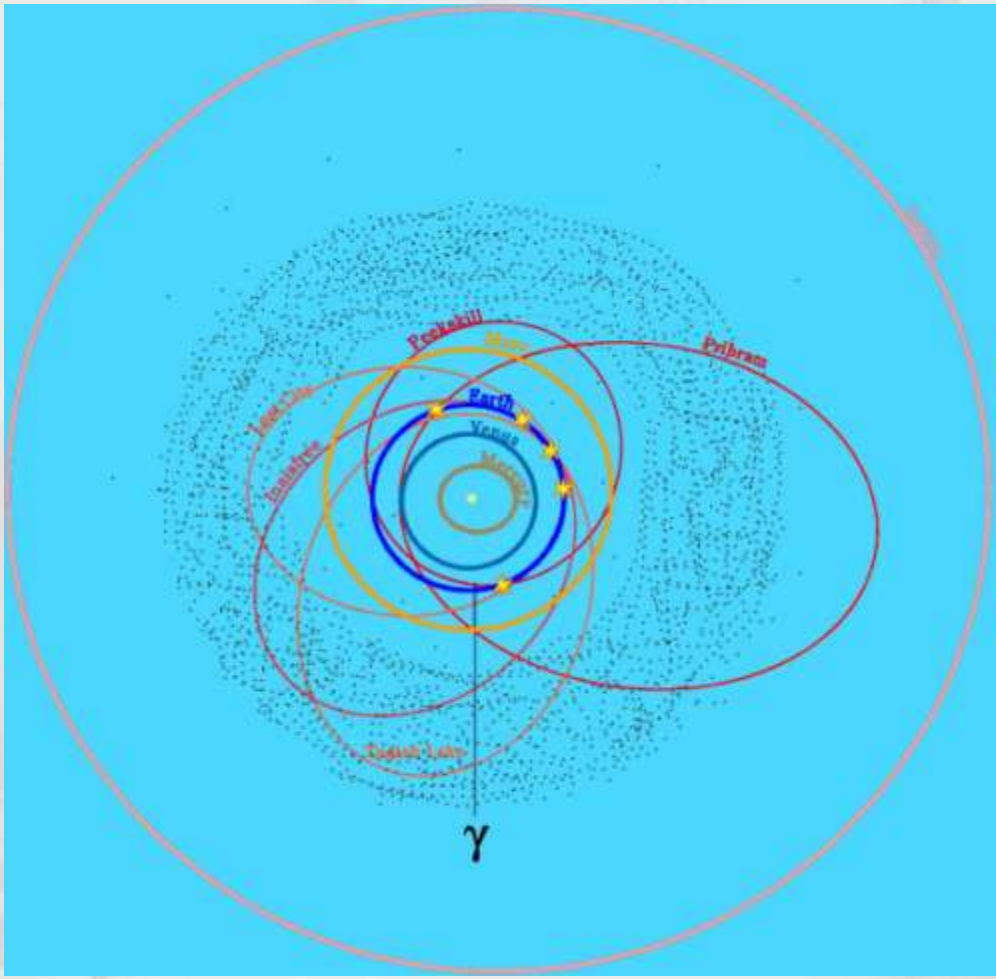
Discovery statistics for the Main Surveys of NEAs





Why asteroids during IMC?

- Origin of Meteorites?



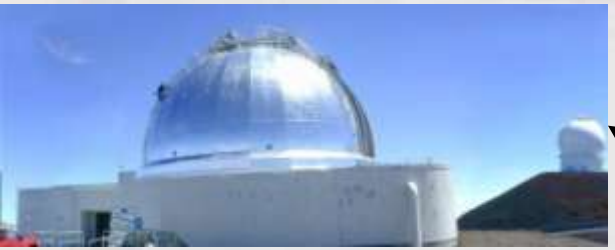
Courtesy: Mathieu Gounelle

Why asteroids during IMC?

- Physical properties of asteroids <=>constrains for meteoroids (meteors and meteorites)

Example: porosity

Spectroscopy of NEAs
(Visible & Near Infra-Red Regions)



SpeX 0.8-5.4 micron Medium-Resolution

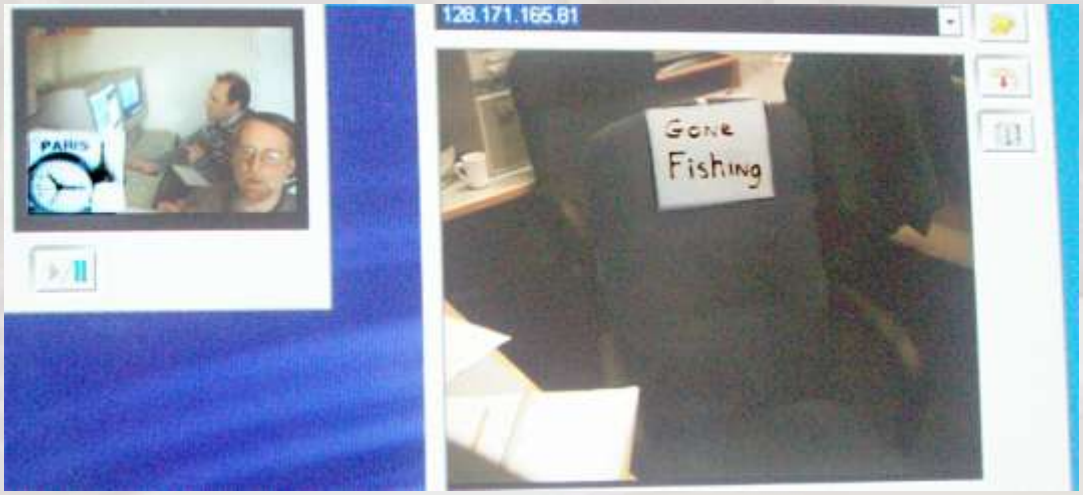
IRTF Middle-class telescope (aperture = 3 m)
Mauna Kea, Hawaii

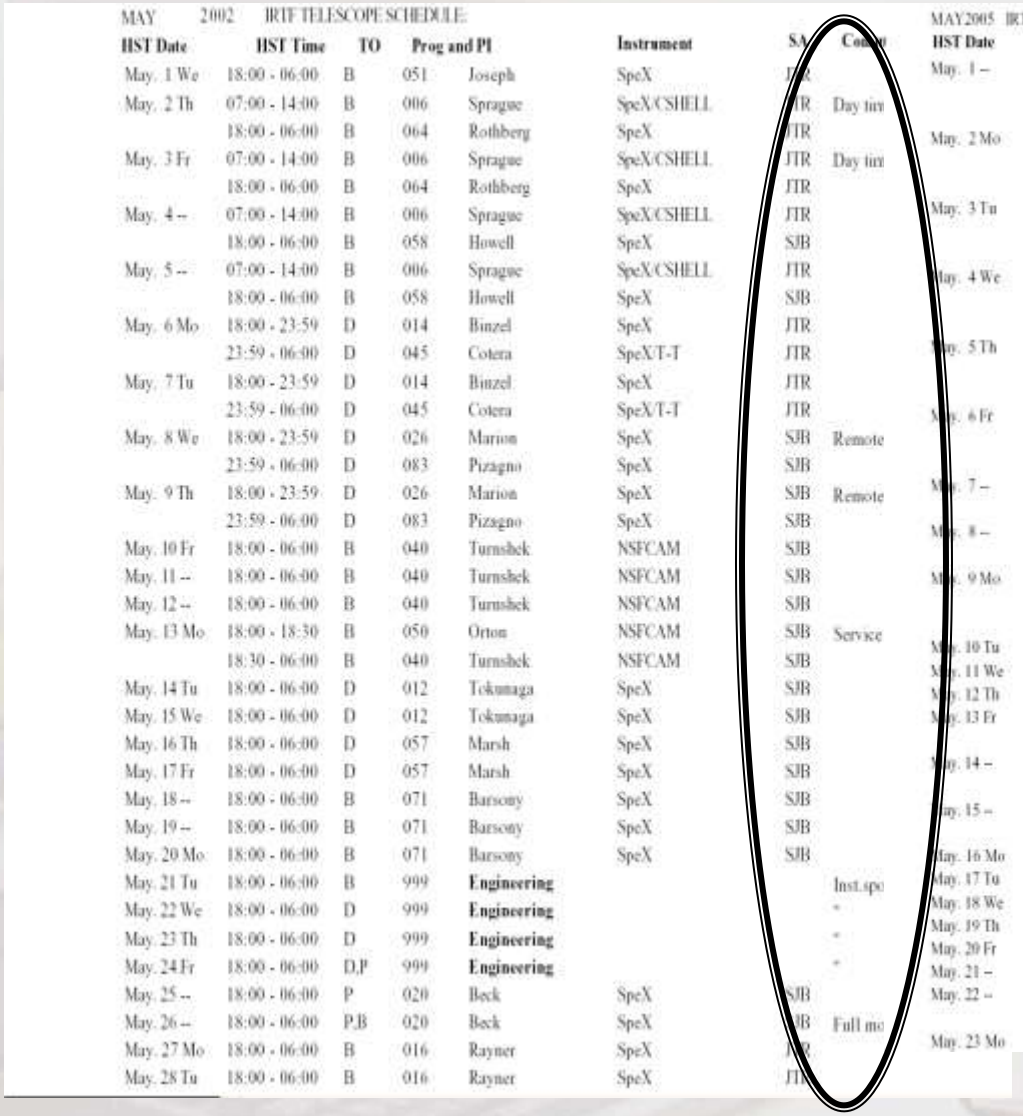
Infrastructure:

- Two(One) PC's (Linux OS)
- Polycom conference system
- Three regular internet connections
- Telephone (backup)
- Connections via ssh or vnc tunnels

CODAM
Centre d'Observation à Distance en Astronomie à Meudon

MOVIE, DAYLIGHT RUN FROM MEUDON





MAY 2002 IRTF TELESCOPE SCHEDULE:

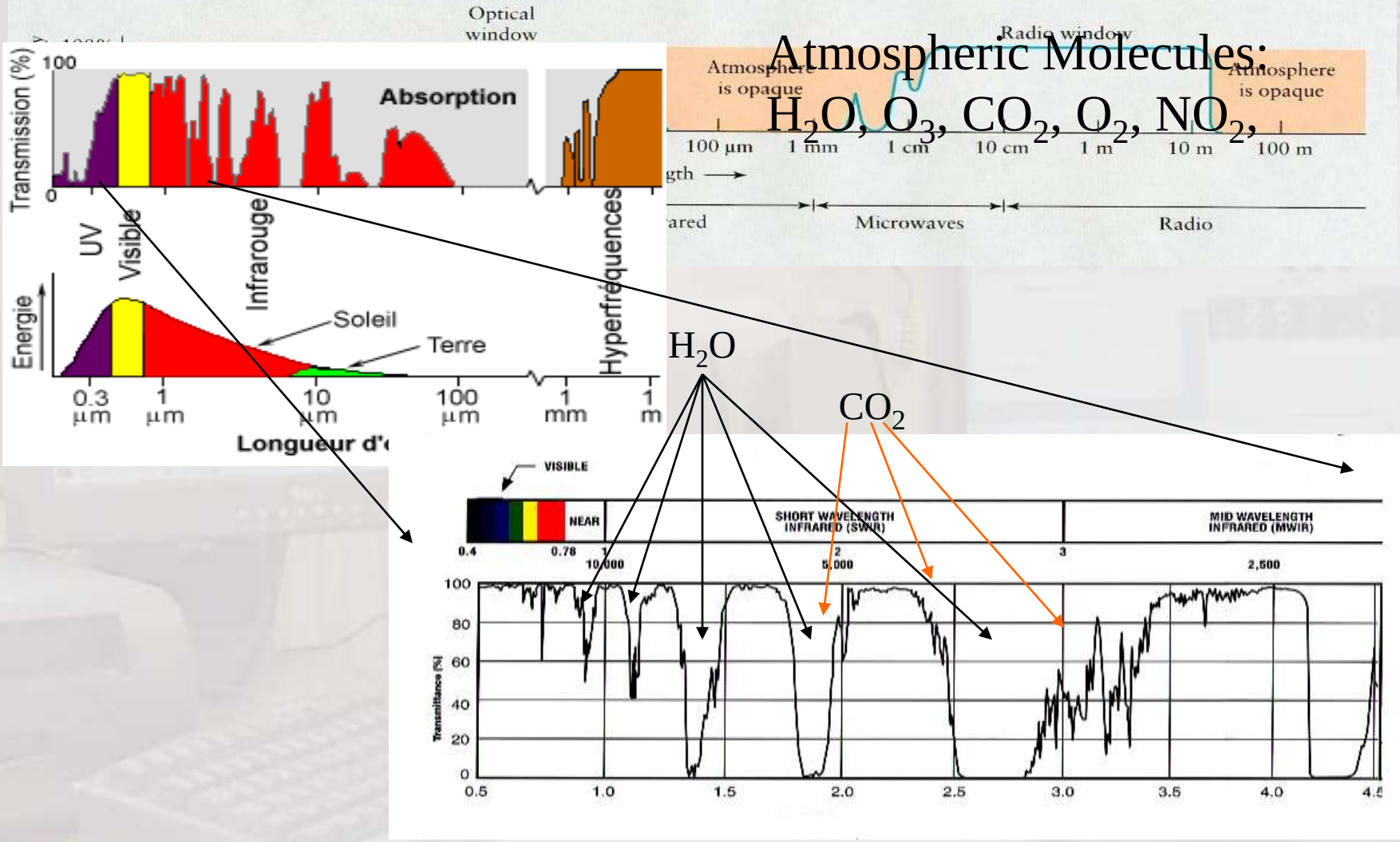
HST Date	HST Time	TO	Prog and PI		Instrument	SA	Comm
May. 1 We	18:00 - 06:00	B	051	Joseph	SpeX	JTR	
May. 2 Th	07:00 - 14:00	B	006	Sprague	SpeX/CSHELL	JTR	Day tim
	18:00 - 06:00	B	064	Rothberg	SpeX	JTR	
May. 3 Fr	07:00 - 14:00	B	006	Sprague	SpeX/CSHELL	JTR	Day tim
	18:00 - 06:00	B	064	Rothberg	SpeX	JTR	
May. 4 --	07:00 - 14:00	B	006	Sprague	SpeX/CSHELL	JTR	
	18:00 - 06:00	B	058	Howell	SpeX	SJB	
May. 5 --	07:00 - 14:00	B	006	Sprague	SpeX/CSHELL	JTR	
	18:00 - 06:00	B	058	Howell	SpeX	SJB	
May. 6 Mo	18:00 - 23:59	D	014	Binzel	SpeX	JTR	
	23:59 - 06:00	D	045	Cotera	SpeX/T-T	JTR	
May. 7 Tu	18:00 - 23:59	D	014	Binzel	SpeX	JTR	
	23:59 - 06:00	D	045	Cotera	SpeX/T-T	JTR	
May. 8 We	18:00 - 23:59	D	026	Marion	SpeX	SJB	Remote
	23:59 - 06:00	D	083	Pizagno	SpeX	SJB	
May. 9 Th	18:00 - 23:59	D	026	Marion	SpeX	SJB	Remote
	23:59 - 06:00	D	083	Pizagno	SpeX	SJB	
May. 10 Fr	18:00 - 06:00	B	040	Turnshek	NSFCAM	SJB	
May. 11 --	18:00 - 06:00	B	040	Turnshek	NSFCAM	SJB	
May. 12 --	18:00 - 06:00	B	040	Turnshek	NSFCAM	SJB	
May. 13 Mo	18:00 - 18:30	B	050	Orton	NSFCAM	SJB	Service
	18:30 - 06:00	B	040	Turnshek	NSFCAM	SJB	
May. 14 Tu	18:00 - 06:00	D	012	Tokunaga	SpeX	SJB	
May. 15 We	18:00 - 06:00	D	012	Tokunaga	SpeX	SJB	
May. 16 Th	18:00 - 06:00	D	057	Marsh	SpeX	SJB	
May. 17 Fr	18:00 - 06:00	D	057	Marsh	SpeX	SJB	
May. 18 --	18:00 - 06:00	B	071	Barsony	SpeX	SJB	
May. 19 --	18:00 - 06:00	B	071	Barsony	SpeX	SJB	
May. 20 Mo	18:00 - 06:00	B	071	Barsony	SpeX	SJB	
May. 21 Tu	18:00 - 06:00	B	999	**Engineering**			Inst.spe
May. 22 We	18:00 - 06:00	D	999	**Engineering**			"
May. 23 Th	18:00 - 06:00	D	999	**Engineering**			"
May. 24 Fr	18:00 - 06:00	D,P	999	**Engineering**			"
May. 25 --	18:00 - 06:00	P	020	Beck	SpeX	SJB	
May. 26 --	18:00 - 06:00	P,B	020	Beck	SpeX	SJB	Full mo
May. 27 Mo	18:00 - 06:00	B	016	Rayner	SpeX	JTR	
May. 28 Tu	18:00 - 06:00	B	016	Rayner	SpeX	JTR	

MAY 2005 IRTF TELESCOPE SCHEDULE:

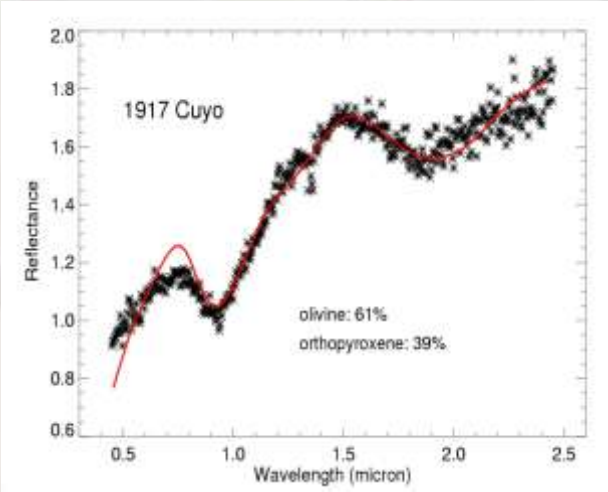
HST Date	HST Time		TO	Remote	Prog and PI		Instrument	SA	Comment
May. 1 --	08:00	13:00	E		063	Sprague	MIRSI	EVT	
	15:00	21:00	E,B		004	Orton	MIRSI/NSFCAM2	EVT	
	21:00	06:00	B	X	077	Sykes	MIRSI	SJB	X-ofc
May. 2 Mo	08:00	13:00	E		063	Sprague	MIRSI	EVT	
	15:00	21:00	E,B		004	Orton	MIRSI/NSFCAM2	EVT	
	21:00	06:00	B	X	077	Sykes	MIRSI	SJB	X-ofc
May. 3 Tu	08:00	13:00	E		063	Sprague	MIRSI	EVT	
	15:00	21:00	E,D		004	Orton	MIRSI/NSFCAM2	EVT	
	21:00	06:00	D	X	077	Sykes	MIRSI	SJB	X-ofc
May. 4 We	08:00	13:00	E		063	Sprague	MIRSI	EVT	
	15:00	21:00	E,D		004	Orton	MIRSI/NSFCAM2	EVT	
	21:00	06:00	D	X	003	Tedesco	MIRSI	SJB	X-ofc
May. 5 Th	08:00	13:00	E		063	Sprague	MIRSI	EVT	
	18:00	22:00	D		089	Yanamandra-Fisher	MIRSI/SpeX	EVT	
	22:00	06:00	D	x	003	Tedesco	MIRSI	SJB	X-ofc
May. 6 Fr	08:00	13:00	E		063	Sprague	MIRSI	EVT	
	18:00	22:00	D		089	Yanamandra-Fisher	MIRSI/SpeX	EVT	
	22:00	06:00	D	X	003	Tedesco	MIRSI	SJB	X-ofc
May. 7 --	18:00	23:59	B	X	044	Mueller	MIRSI	SJB	X-ofc
	23:59	06:00	B	X	003	Tedesco	MIRSI	SJB	X-ofc
May. 8 --	18:00	23:59	B	X	044	Mueller	MIRSI	SJB	X-ofc
	23:59	06:00	B	X	067	Grundy	SpeX	SJB	X-ofc
May. 9 Mo	18:00	21:00	B	X	013	Binzel	SpeX	SJB	X-ofc
	21:00	22:00	B	X	069	Rathbun	SpeX	SJB	X-ofc
	22:00	06:00	B	X	013	Binzel	SpeX	SJB	X-ofc
May. 10 Tu	18:00	06:00	B	X	047	Thomas	SpeX	SJB	X-ofc
May. 11 We	18:00	06:00	D		019	Kilic	NSFCAM2	EVT	1st night
May. 12 Th	18:00	06:00	D		019	Kilic	NSFCAM2	EVT	
May. 13 Fr	18:00	22:00	D		032	Rodriguez	MIRSI	EVT	
	22:00	06:00	D		019	Kilic	NSFCAM2	EVT	
May. 14 --	18:00	22:00	D		032	Rodriguez	MIRSI	EVT	
	22:00	06:00	D		019	Kilic	NSFCAM2	EVT	
May. 15 --	18:00	22:00	B		032	Rodriguez	MIRSI	EVT	
	22:00	06:00	B		019	Kilic	NSFCAM2	EVT	
May. 16 Mo	18:00	06:00	B	X	012	Vemazza	SpeX	JTR	X-ofc
May. 17 Tu	18:00	06:00	B		999	**Engineering**	AO/NSFCAM2	EVT	
May. 18 We	18:00	06:00	B,P		999	**Engineering**	AO/NSFCAM2	EVT	
May. 19 Th	18:00	06:00	P	X	020	Leggett	NSFCAM2/SpeX	EVT	X-Hilo
May. 20 Fr	18:00	06:00	P	X	020	Leggett	NSFCAM2/SpeX	EVT	X-Hilo
May. 21 --	18:00	06:00	P,D	X	020	Leggett	NSFCAM2/SpeX	EVT	X-hilo
May. 22 --	13:00	22:00	E,D		004	Orton	MIRSI/NSFCAM2	EVT	
	22:00	06:00	D	X	067	Grundy	SpeX	SJB	X-ofc
May. 23 Mo	13:00	22:00	E,D		004	Orton	MIRSI/NSFCAM2	EVT	

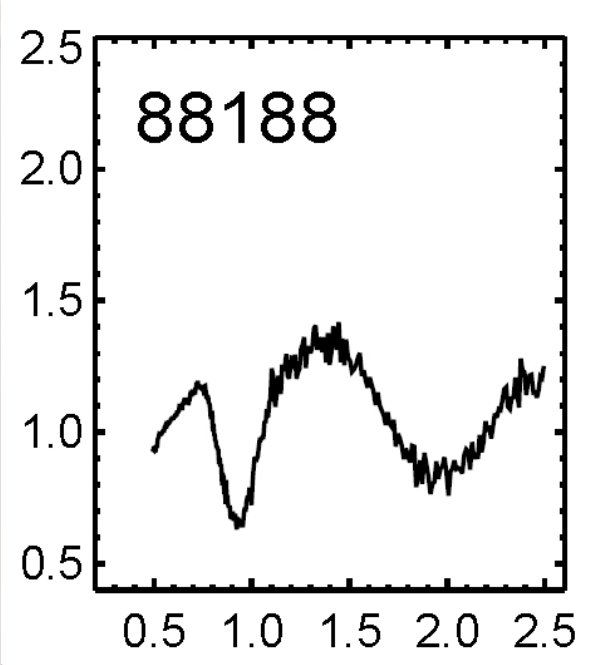
SPECTROSCOPY

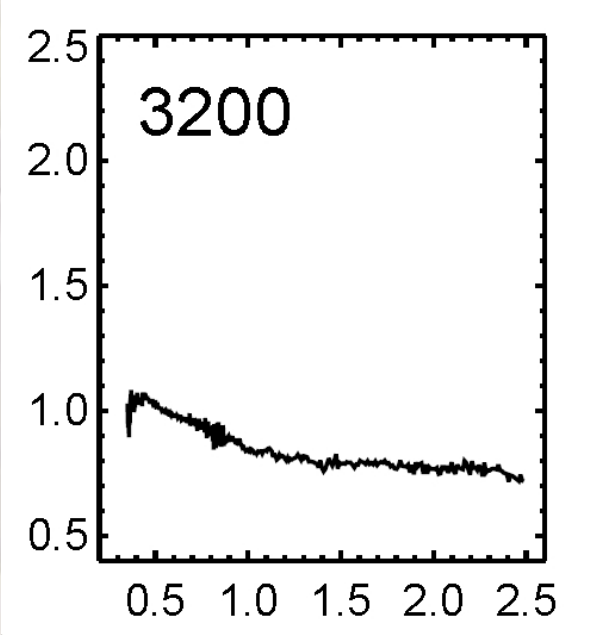
ATMOSPHERIC TRANSPARENCY

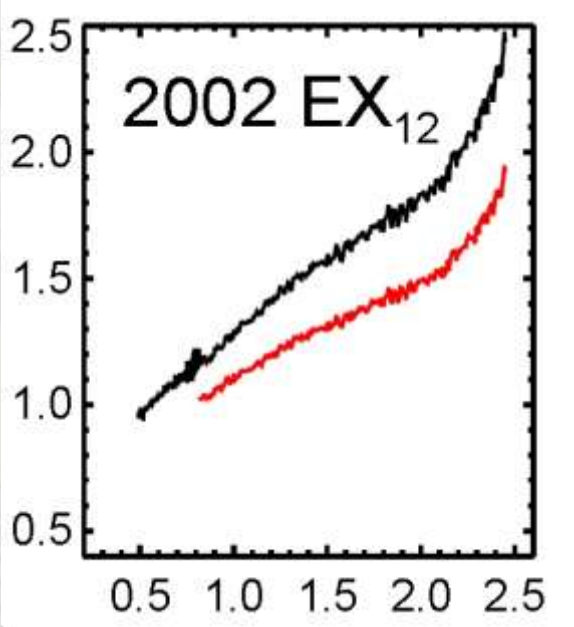


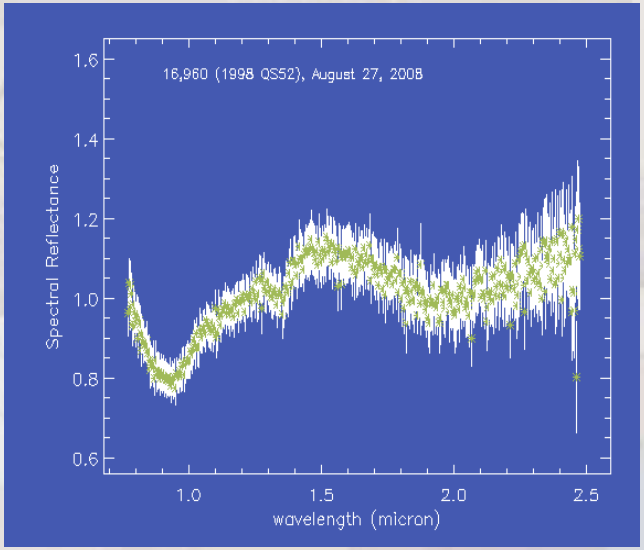
NEOs spectra- Exemples



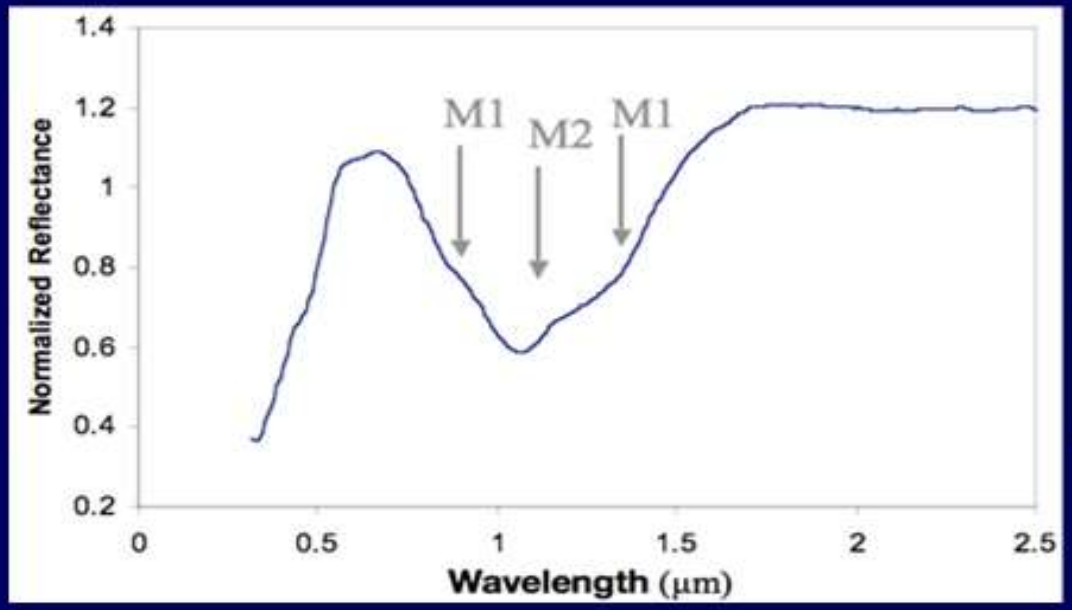






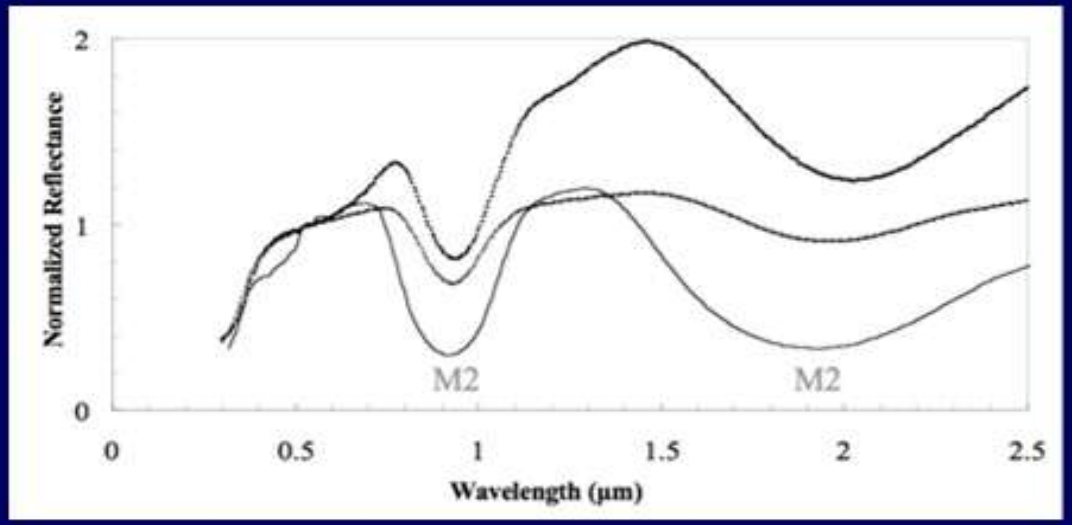


What is a Cosmochemical element ?



Olivine

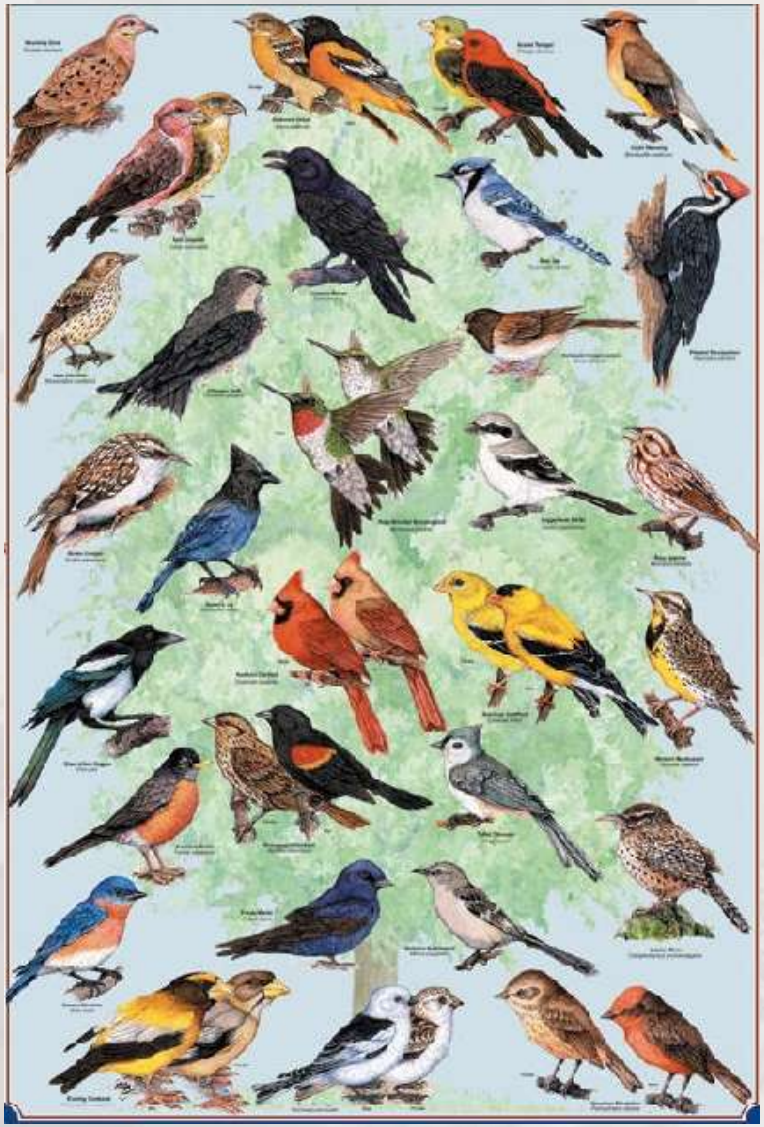
$(Mg, Fe)_2SiO_4$



Pyroxene

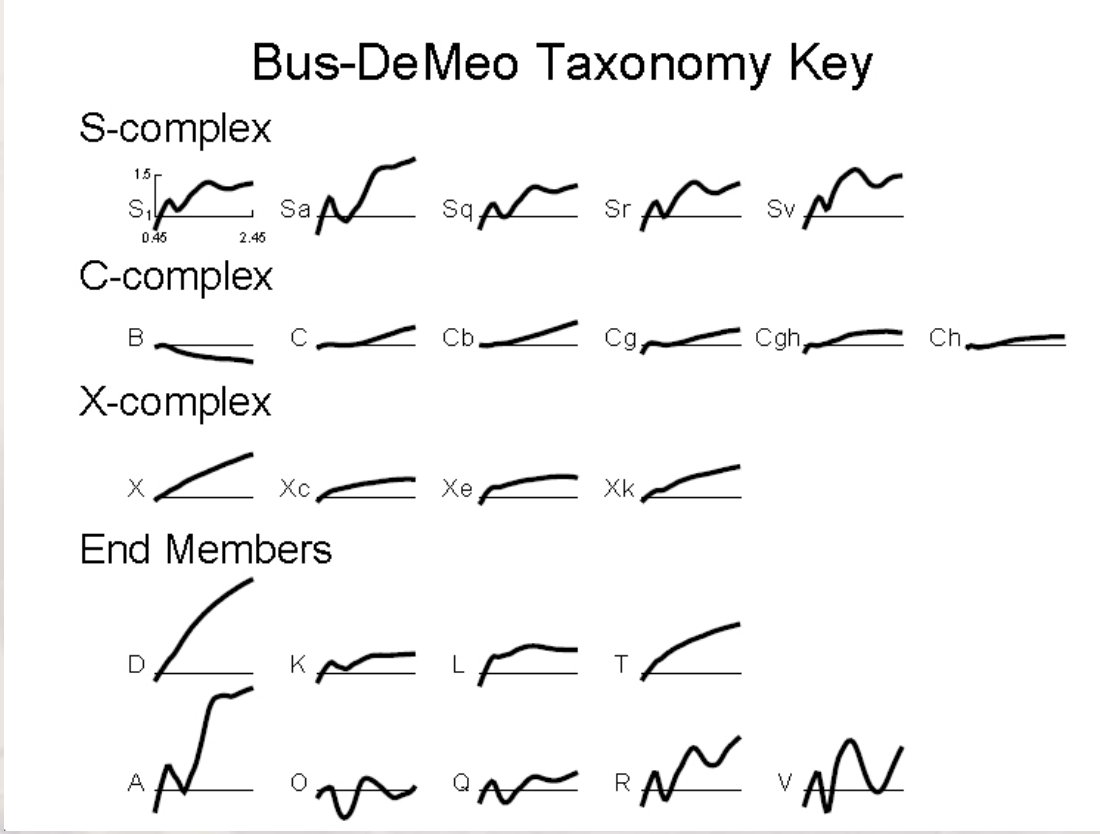
$(Mg, Fe)_2Si_2O_6$

Classification des oiseaux



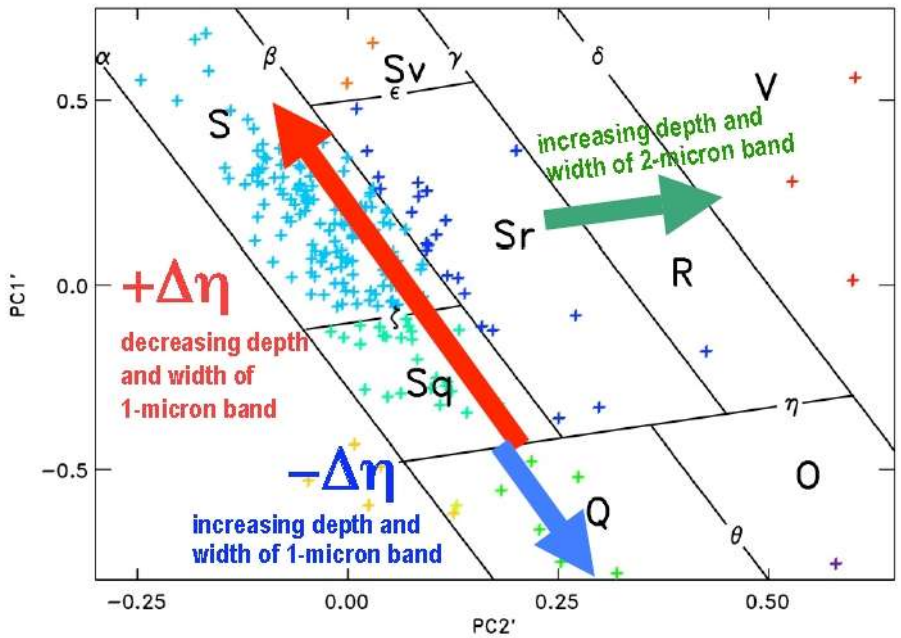
Classification des astéroïdes

Spectre du visible et de l'infrarouge proche

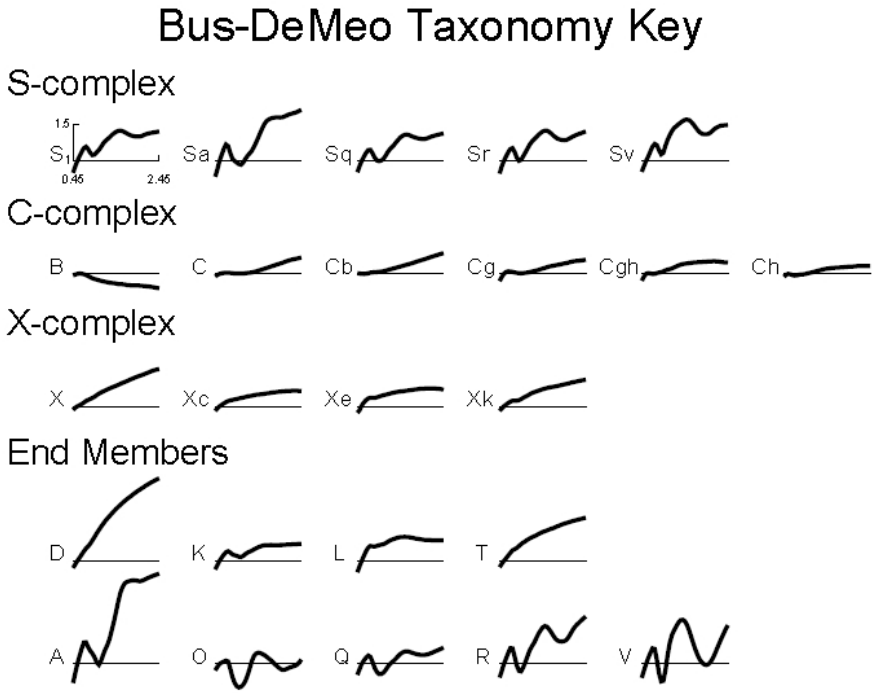


DeMeo et al, Icarus, 2009

Établir l'ADN des astéroïdes par le biais de la planétologie comparée!



Statistique => (V+NIR data)

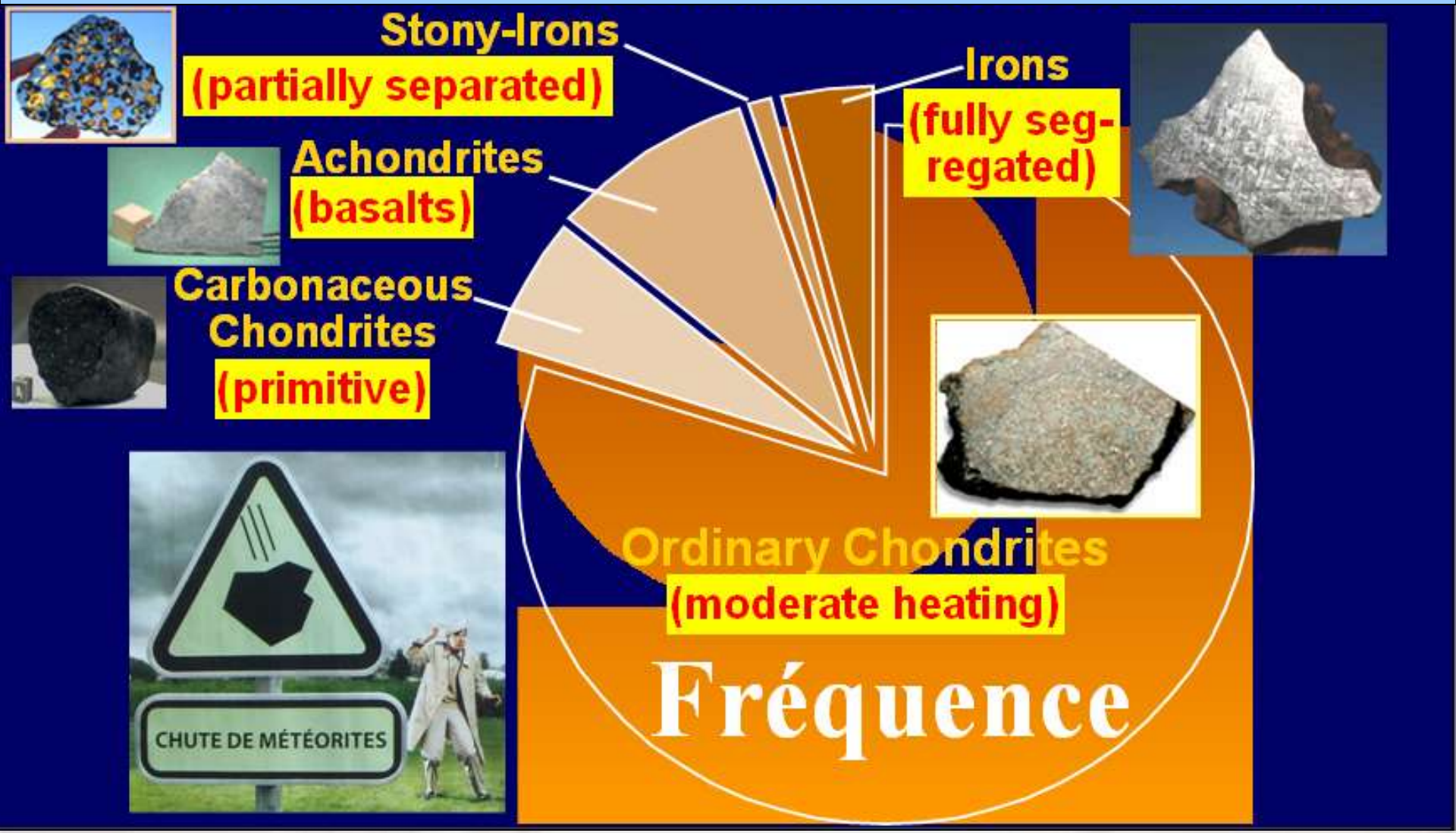


DeMeo et al Icarus 2009

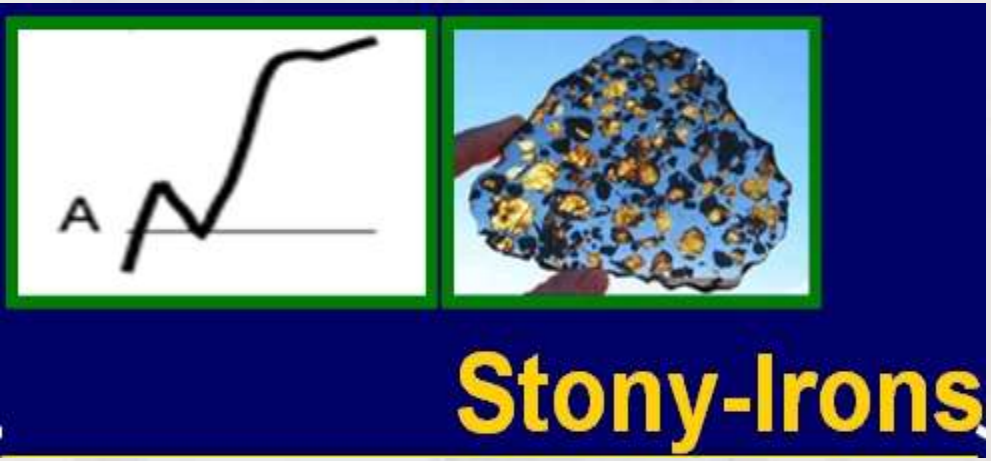
⇒Taxonomie

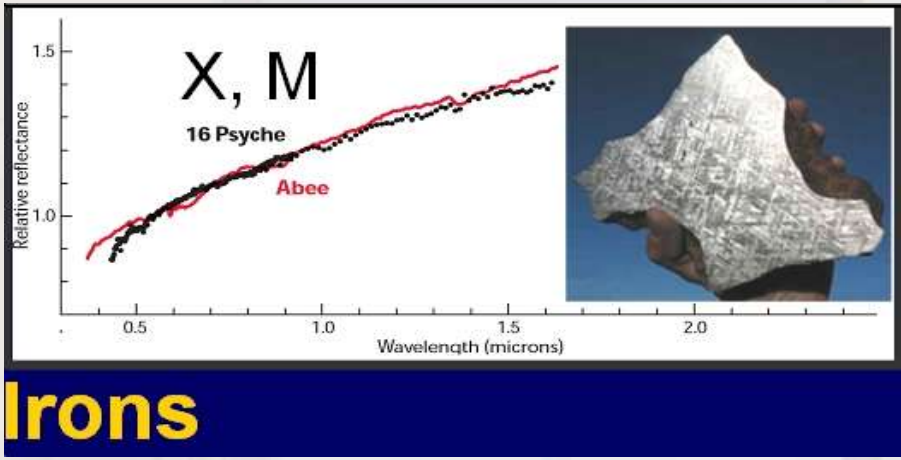
(The alphabet of asteroids)

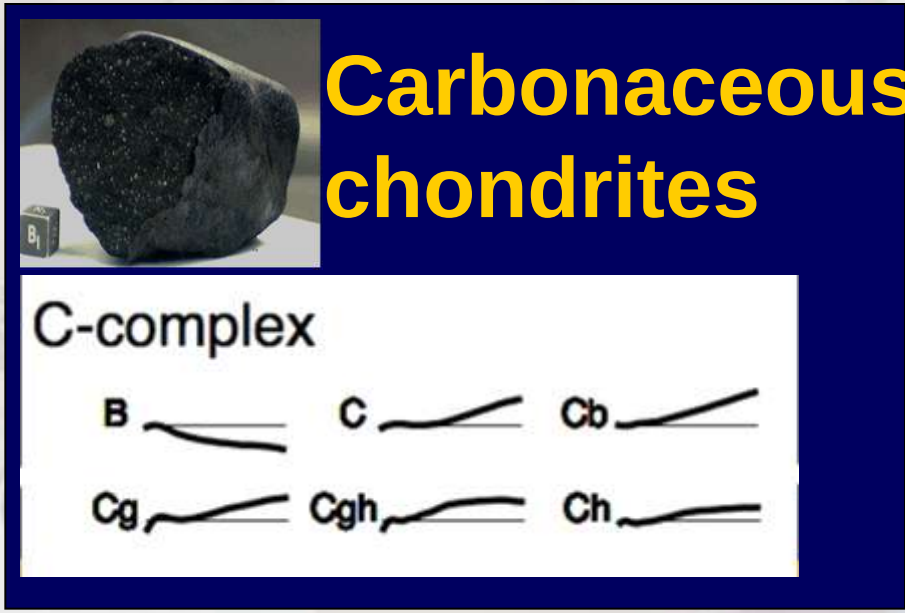
Link between asteroids and meteorites (meteors)?



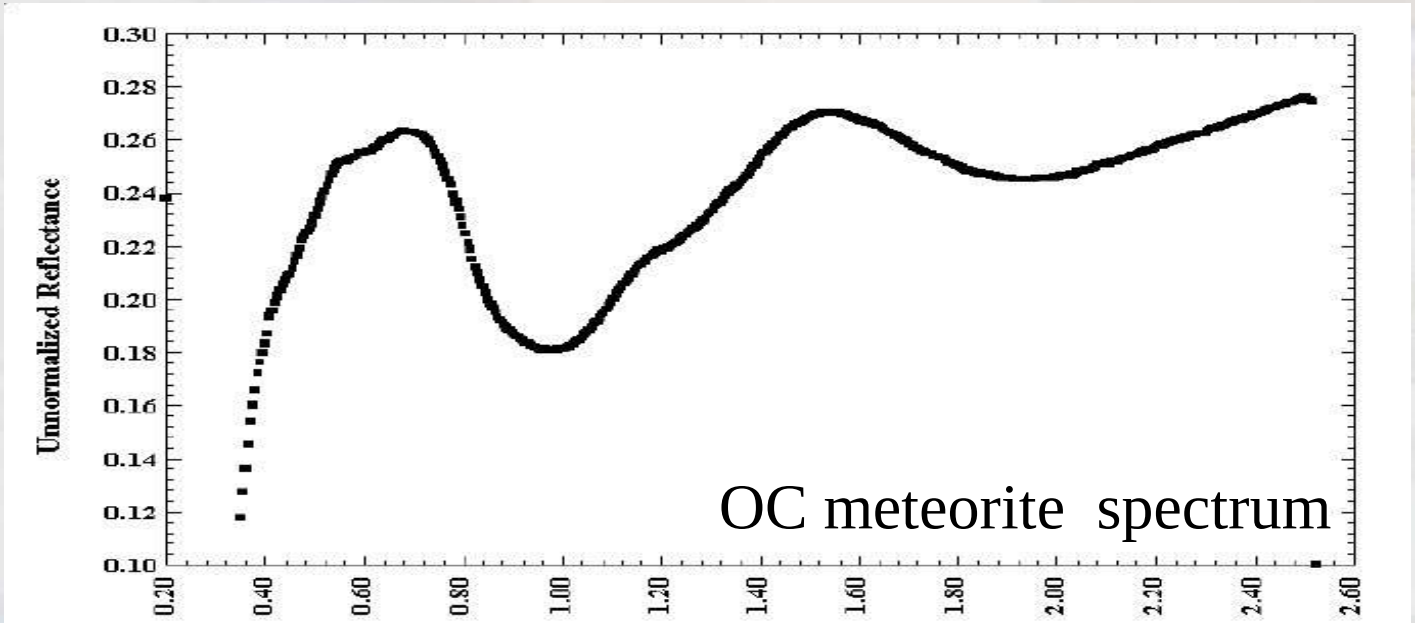
Good Fit for some of classes







Is the spectroscopy of meteors a good/real chalange?

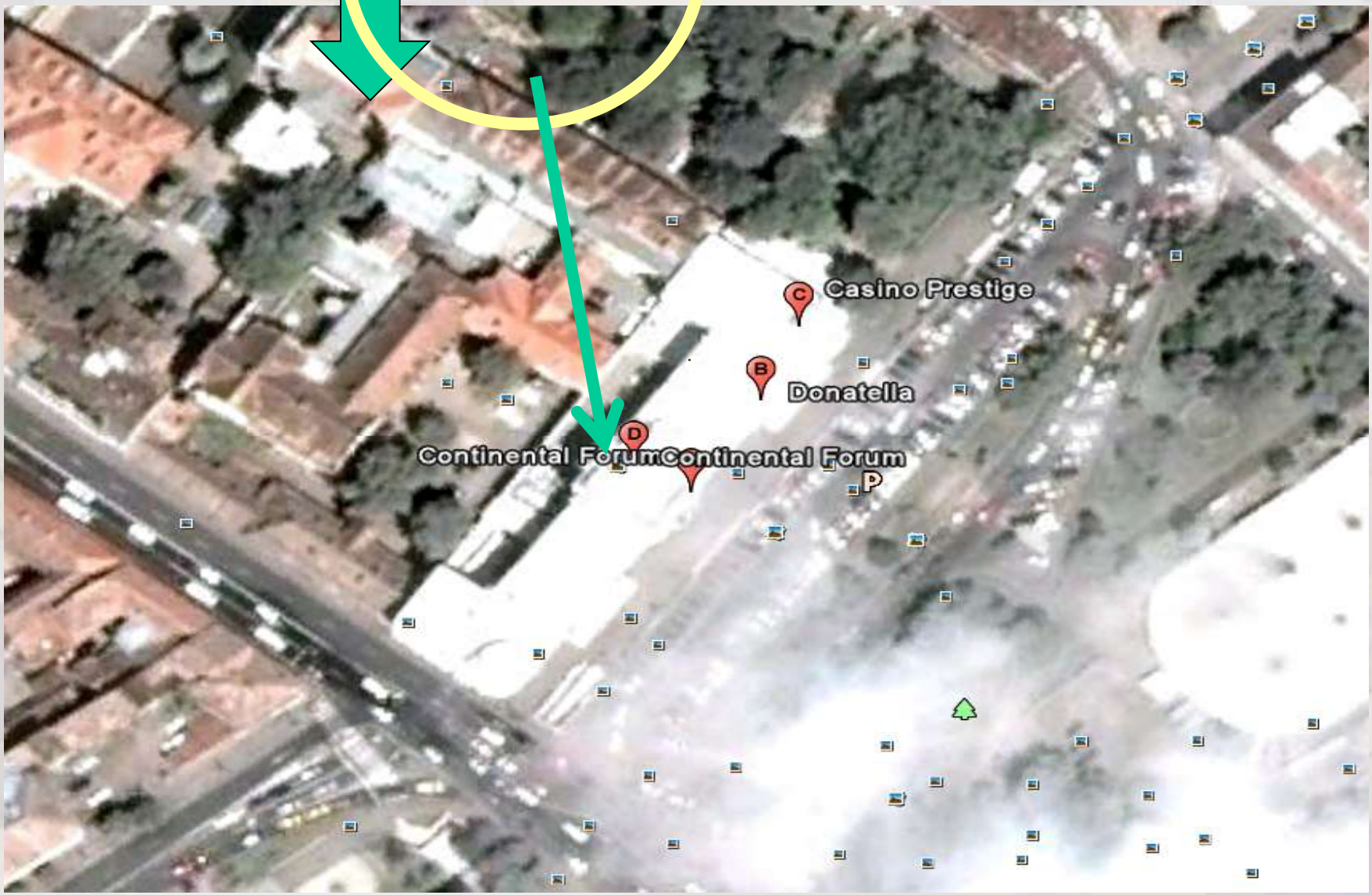


Yes, especially for CC composition!

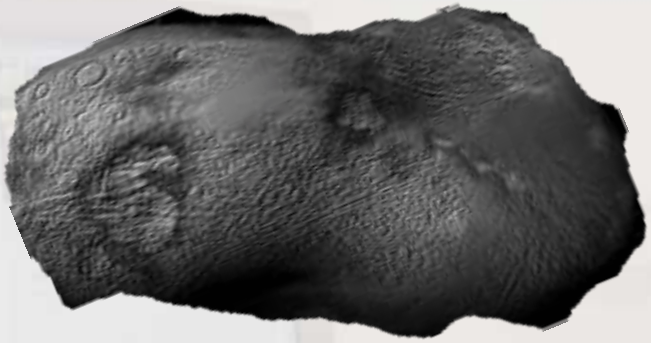
Conclusions

- Meteorites offer laboratory measurements for mineralogical modeling of asteroids
- Friable/fluffy meteorites are rare/inexistent
- Spectroscopy of meteors may bring new observational data concerning the chemical structure of meteoroids

SIBIU


You are here
Casino Prestige
Donatella
Continental Forum
Continental Forum
P

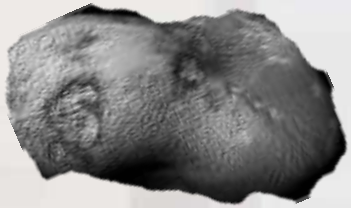
50 m



2009 DD45 (low albedo)

SIBIU

20 m (S-type asteroid)



2009 DD45 (real size)

SIBIU