

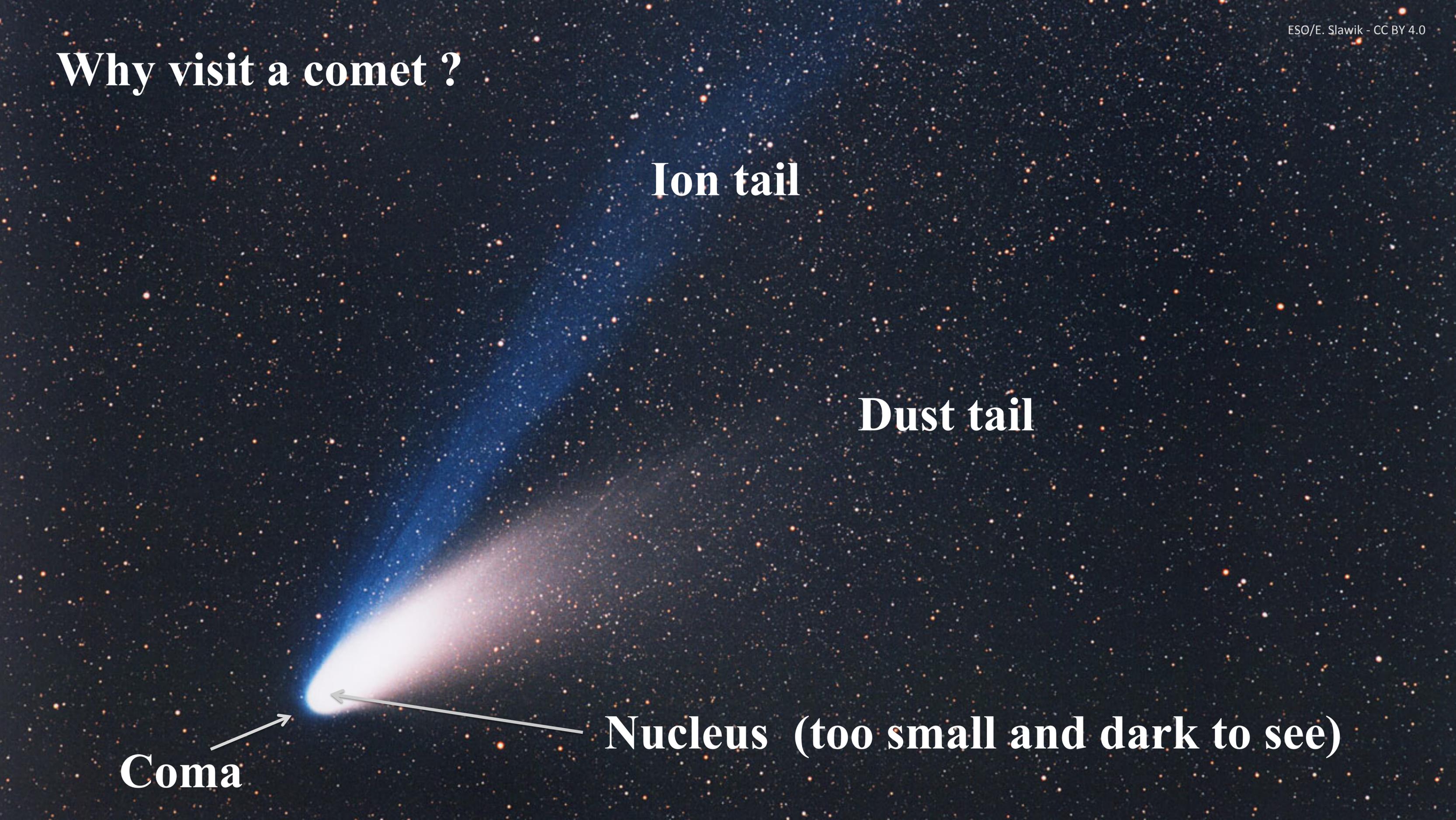
Why visit a comet ?

Ion tail

Dust tail

Coma

Nucleus (too small and dark to see)





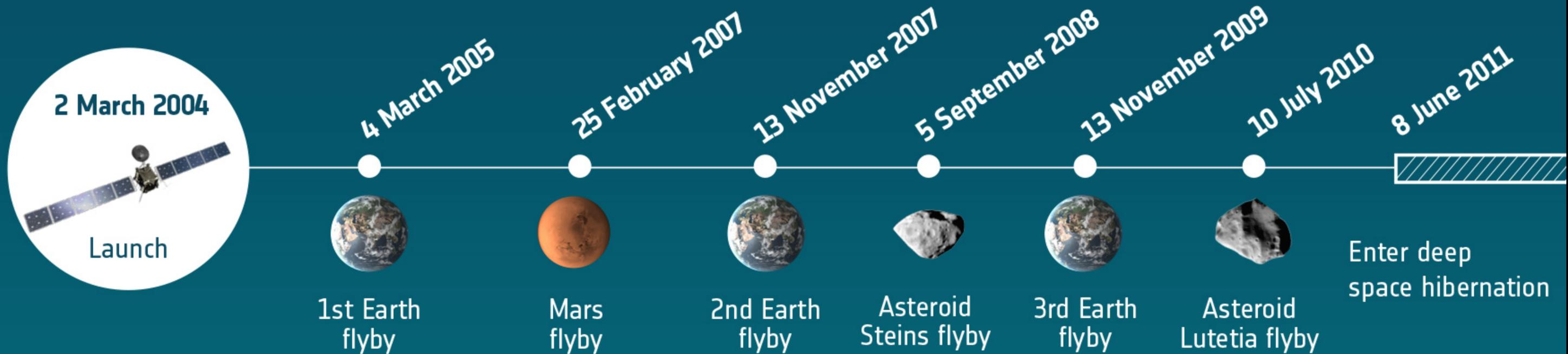
2003 Launch – Not possible
C/Wirtanen
Size 1.0 - 1.2 km

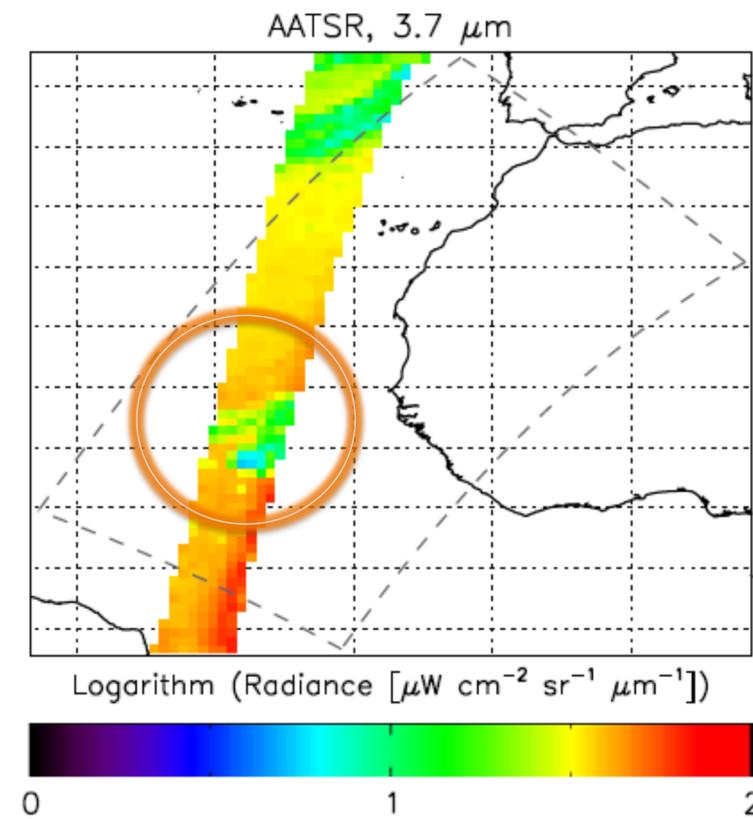
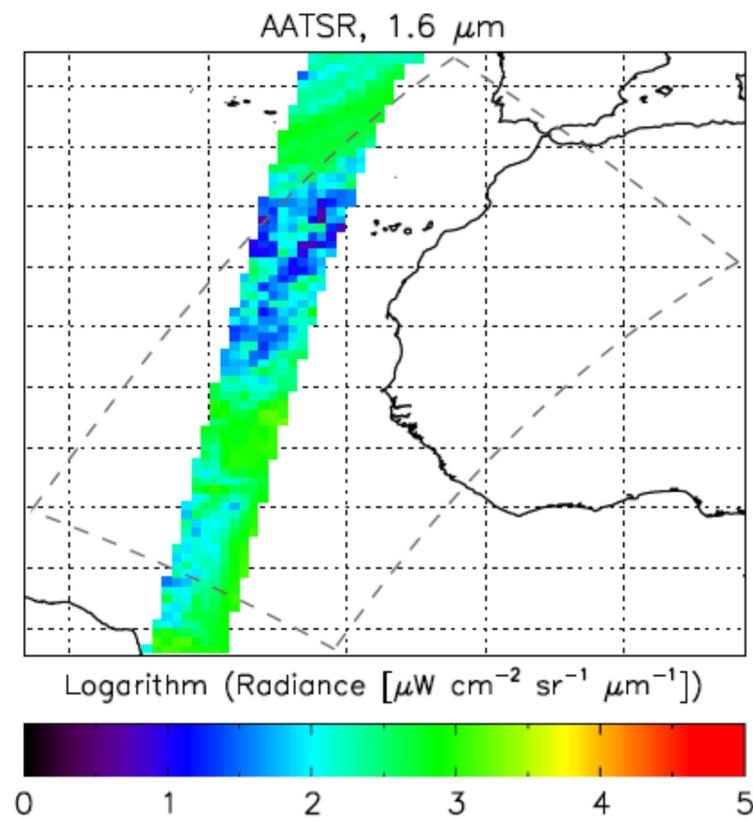
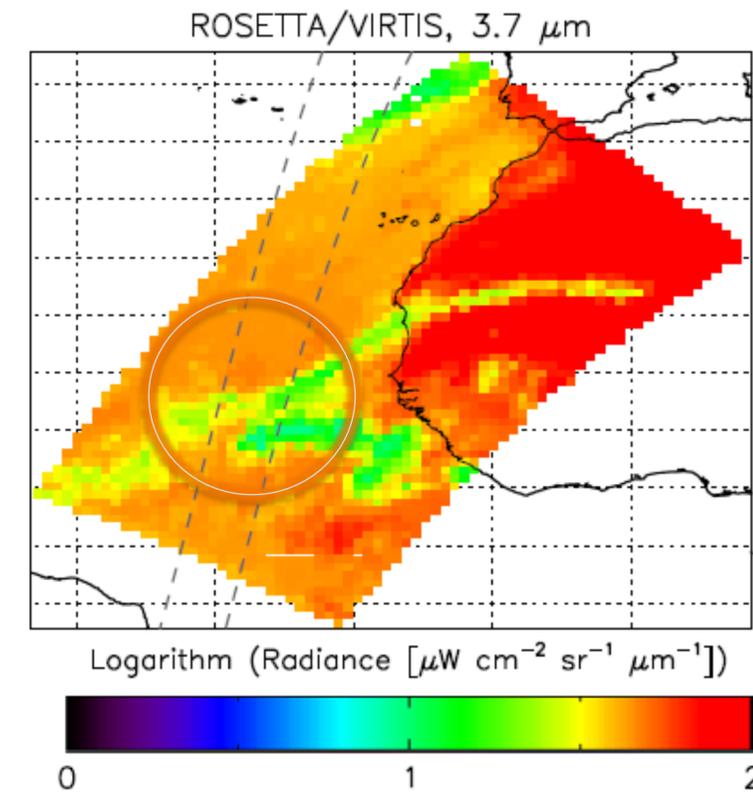
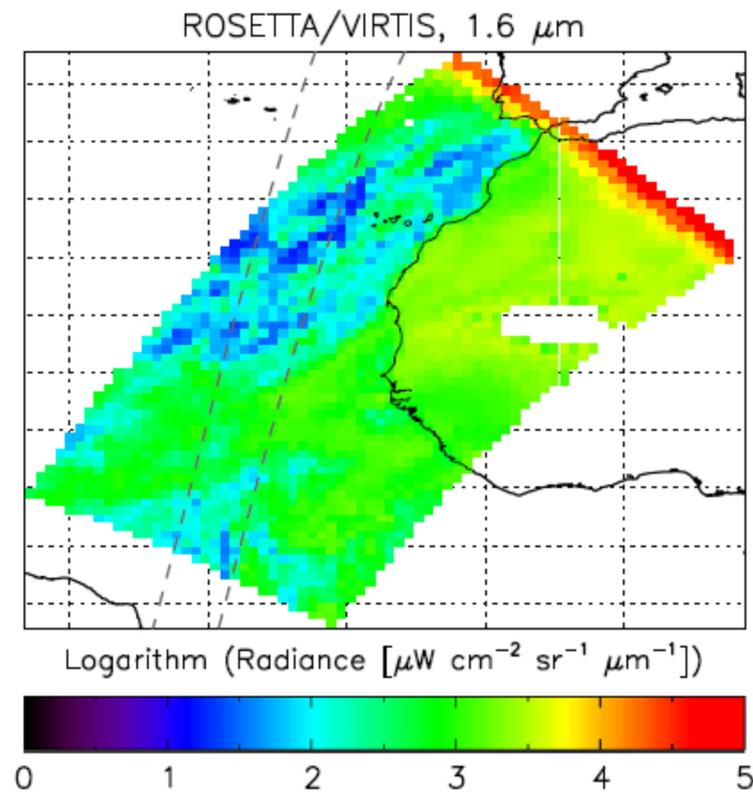


2004 Launch
C/Churyumov-Gerasimenko
Size 4.1 km

Rosetta Launch Photo: ESA

→ ROSETTA'S JOURNEY

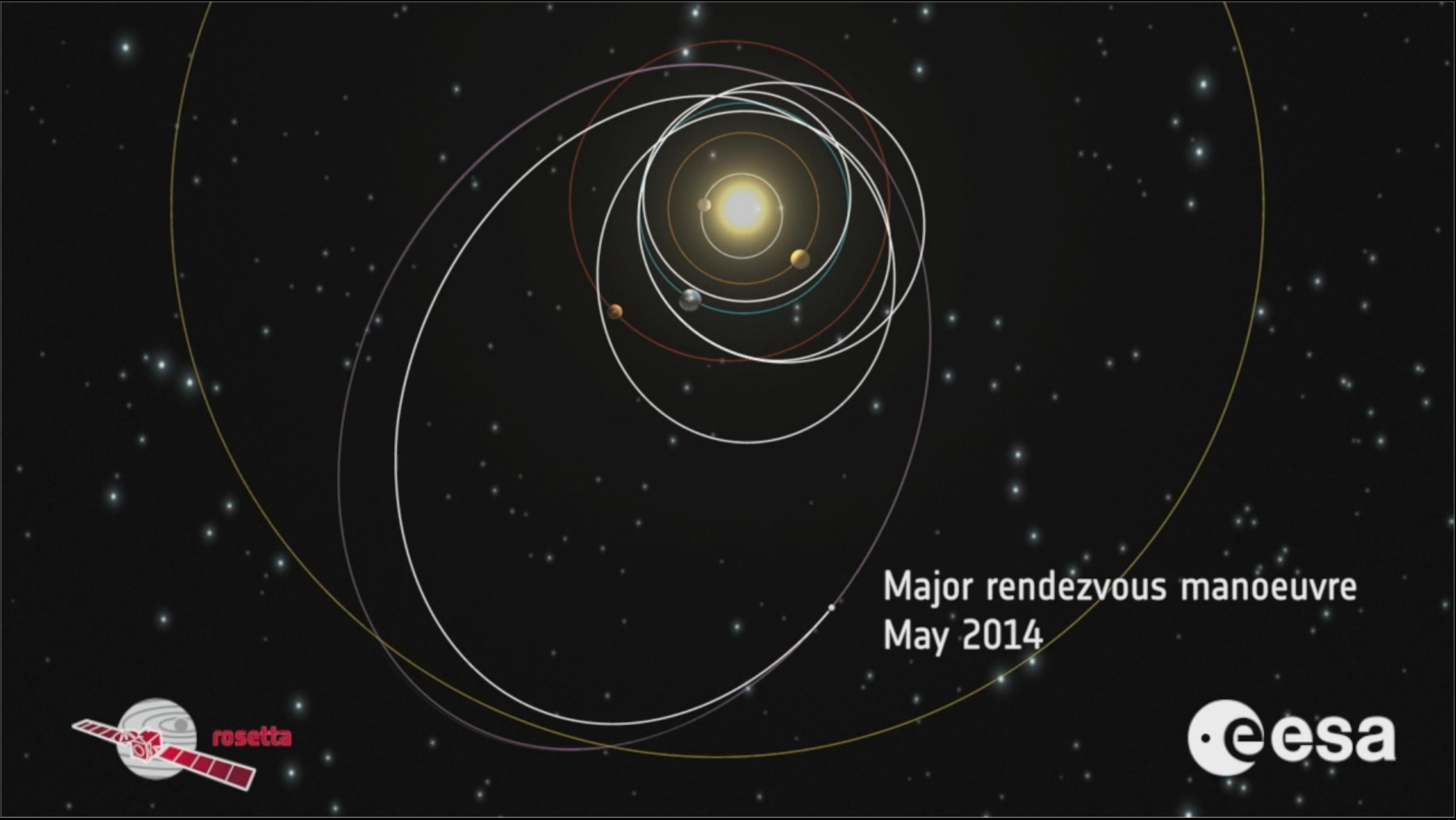




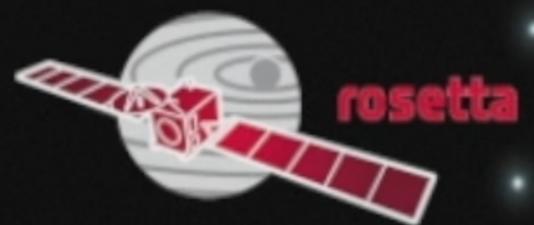
— Ocean — Desert — Vegetation — Cloud

→ ROSETTA'S JOURNEY

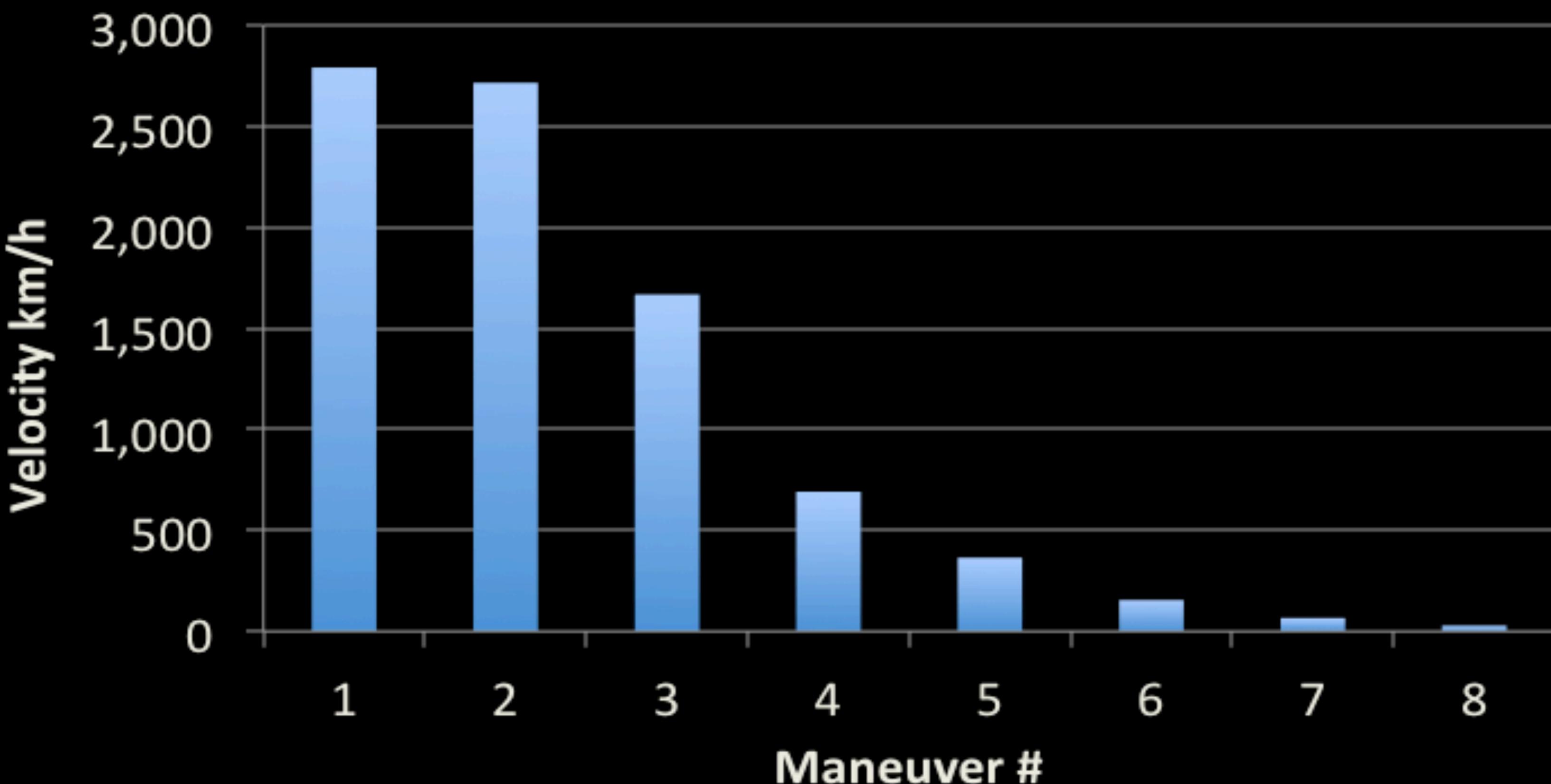




Major rendezvous manoeuvre
May 2014



Rosetta excess velocity



Doppler data at end of maneuver

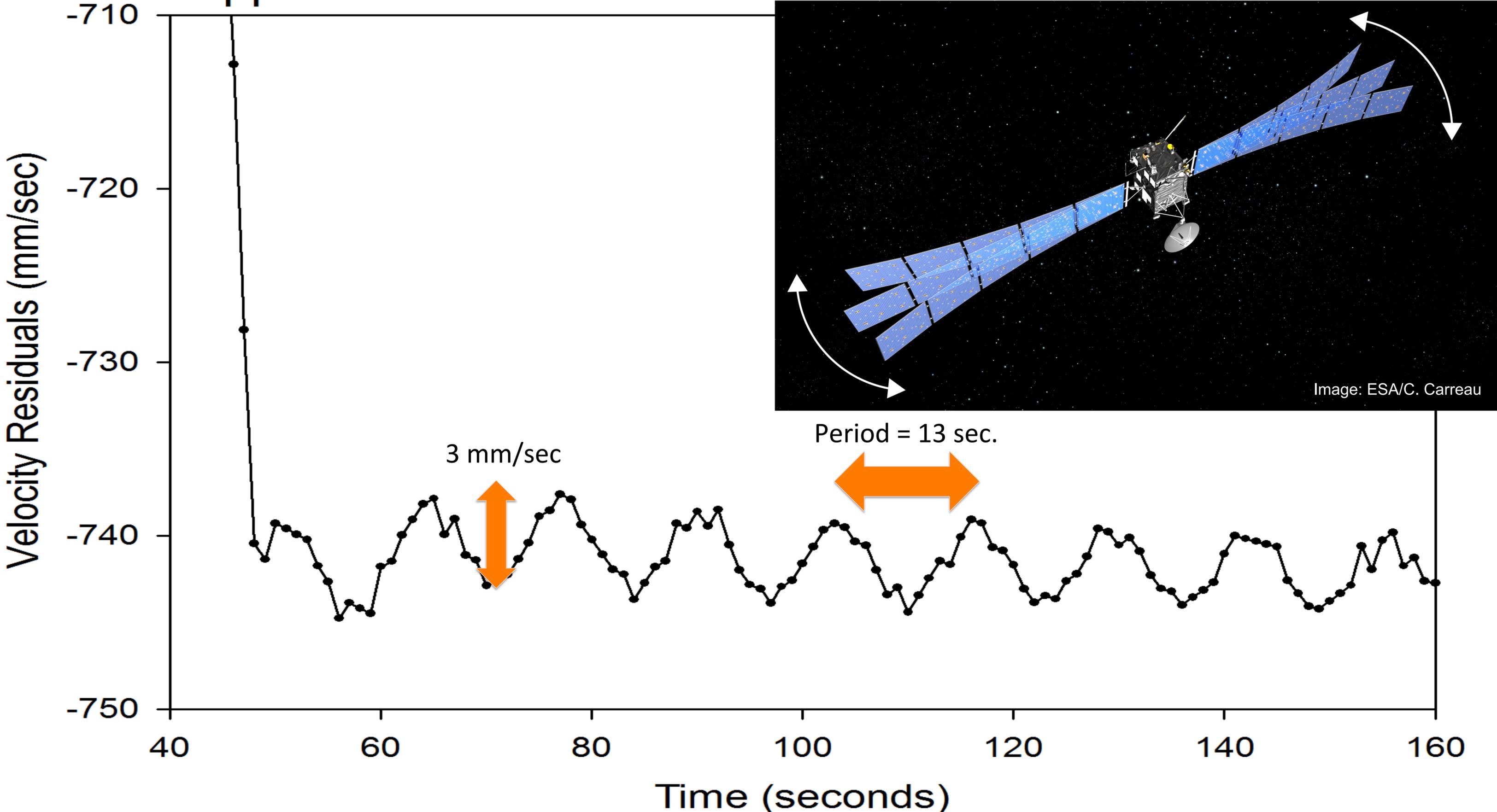


Image: ESA/C. Carreau

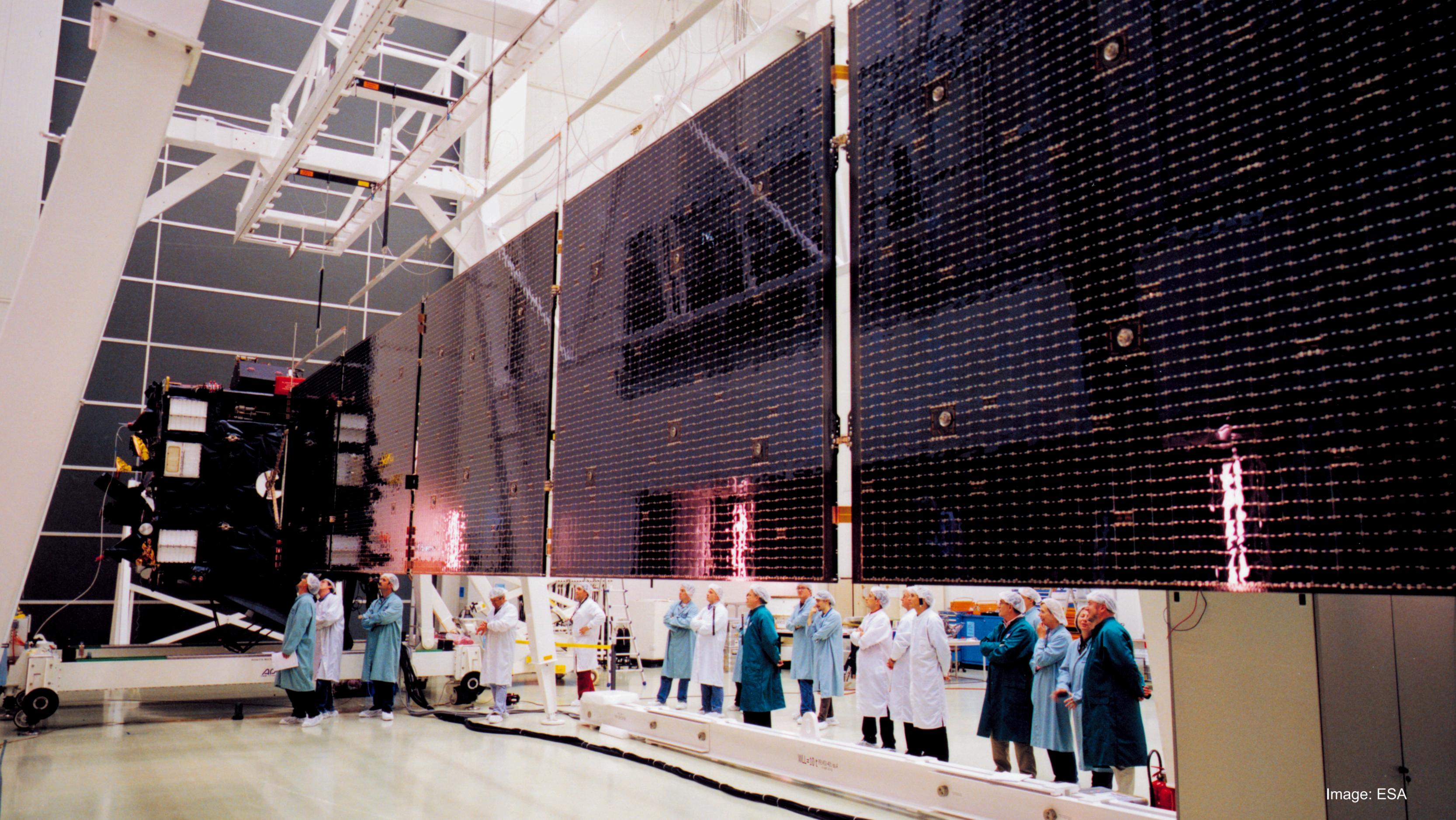
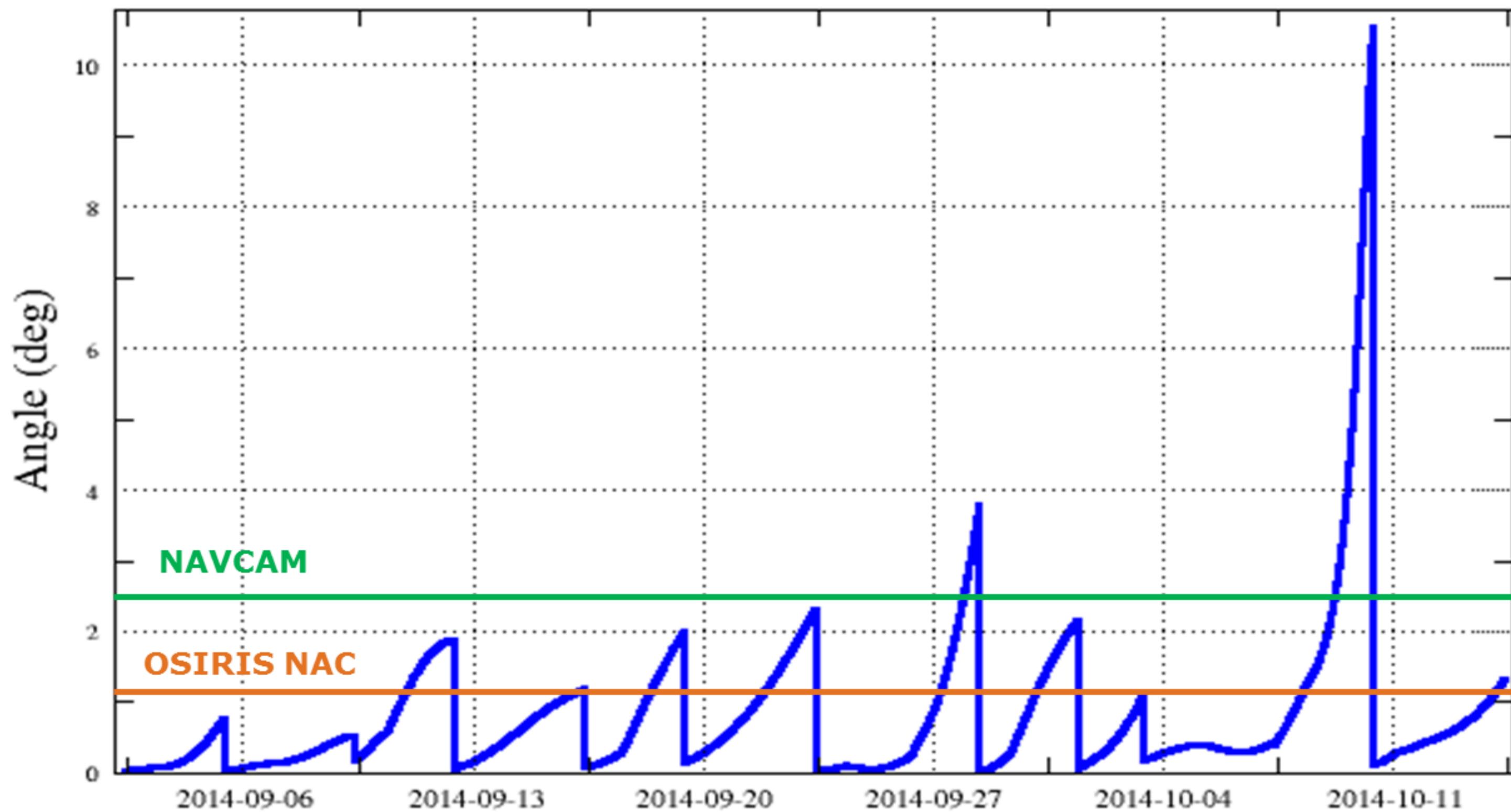
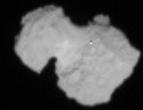
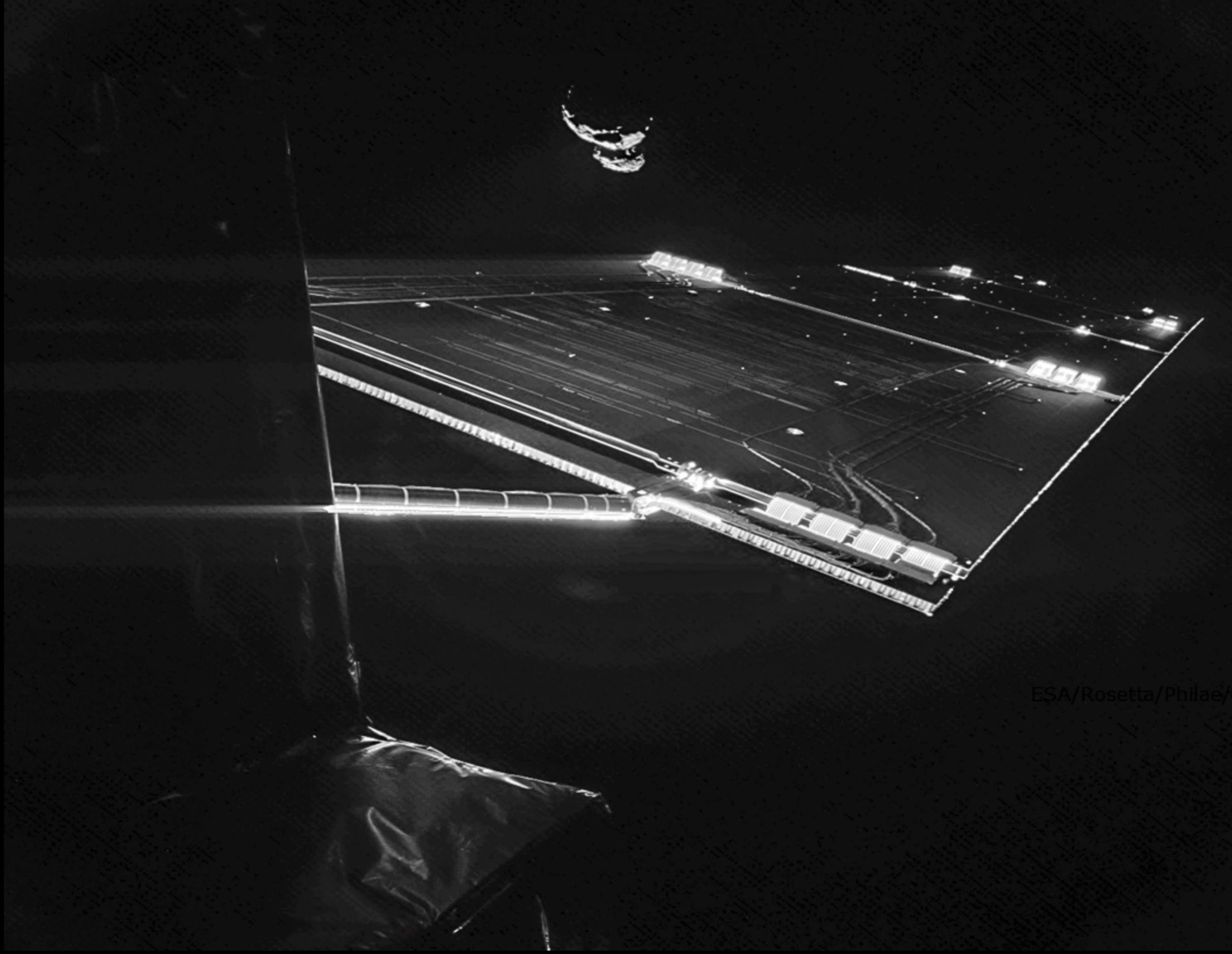


Image: ESA

Pointing error (Sep - Oct)

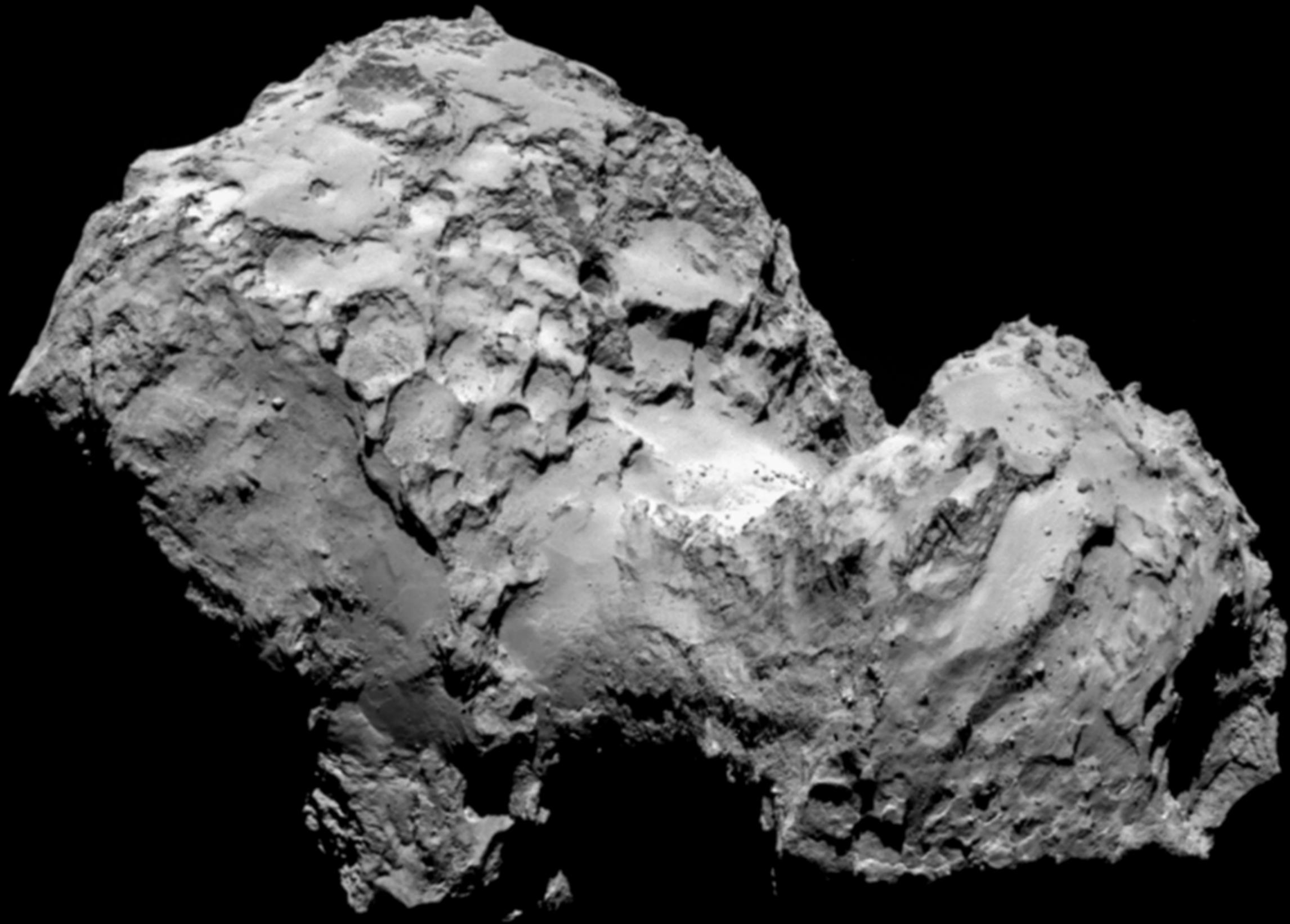


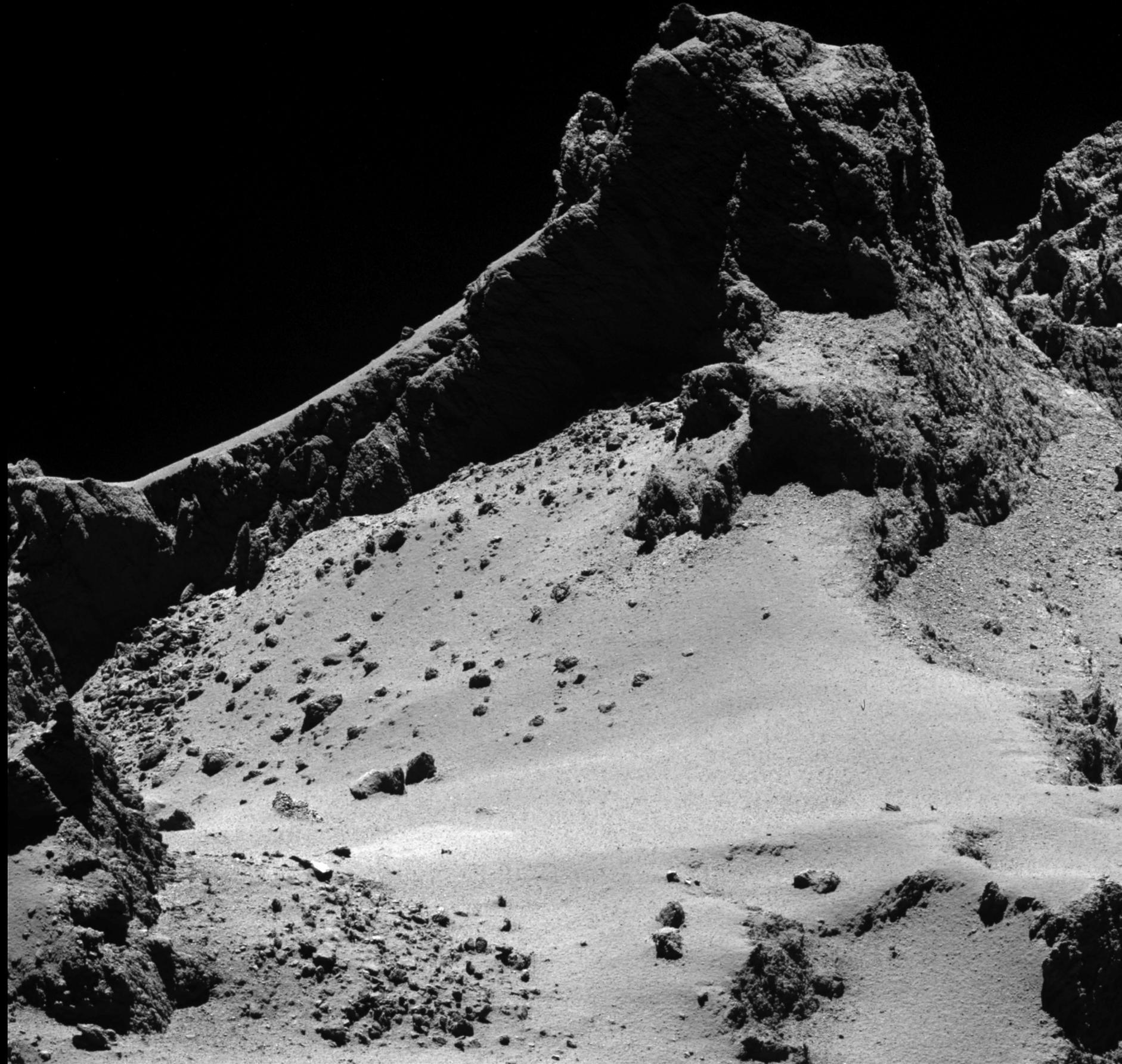


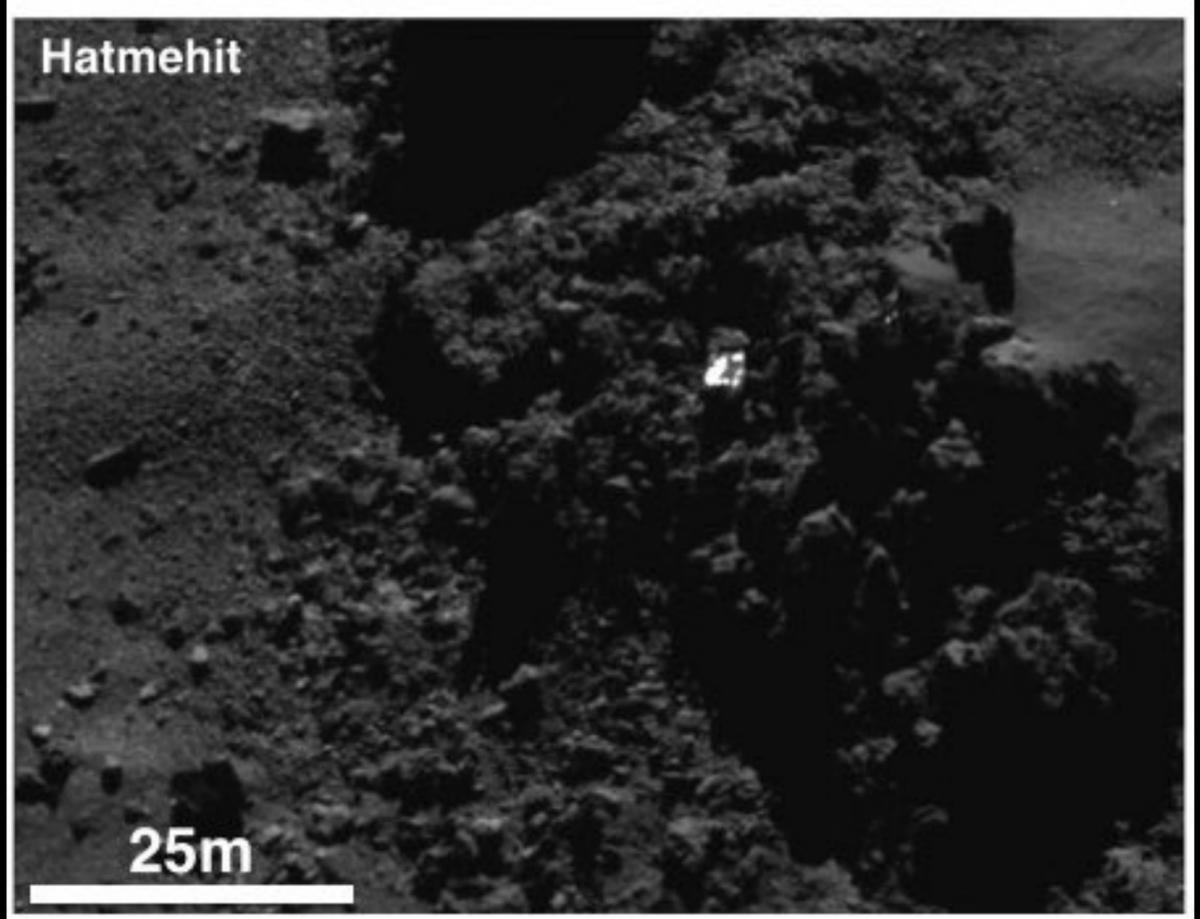
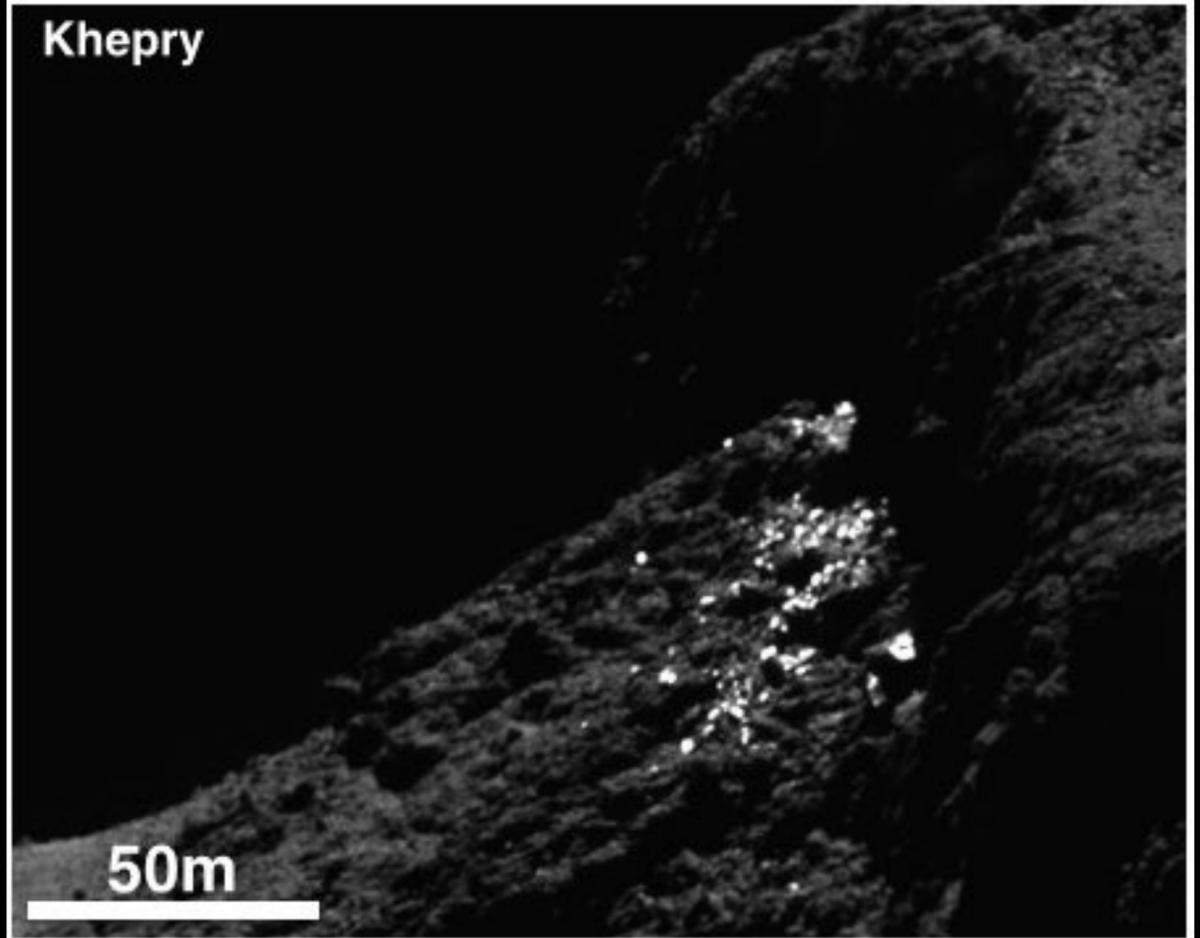


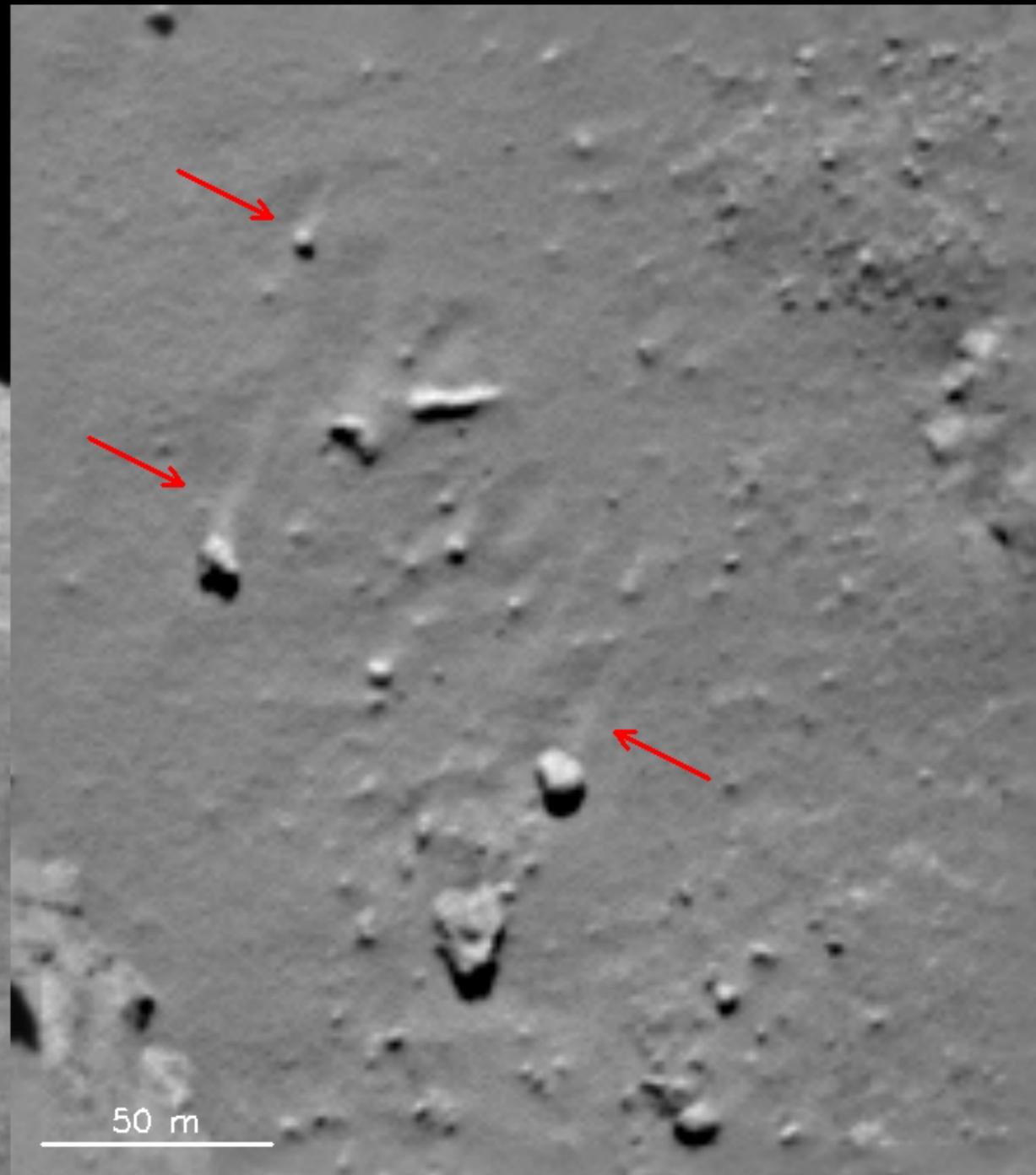
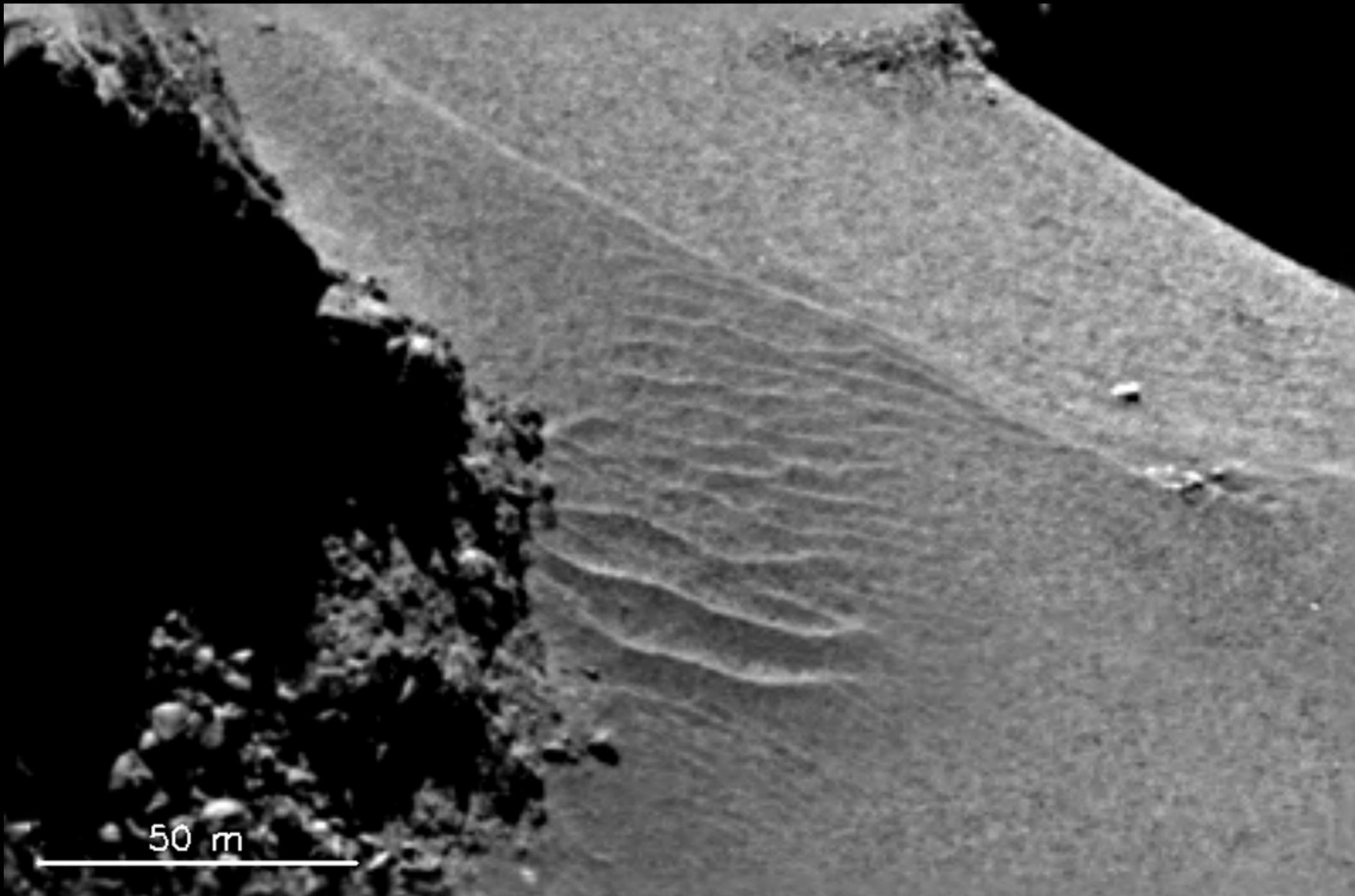
ESA/Rosetta/Philae/CIVA

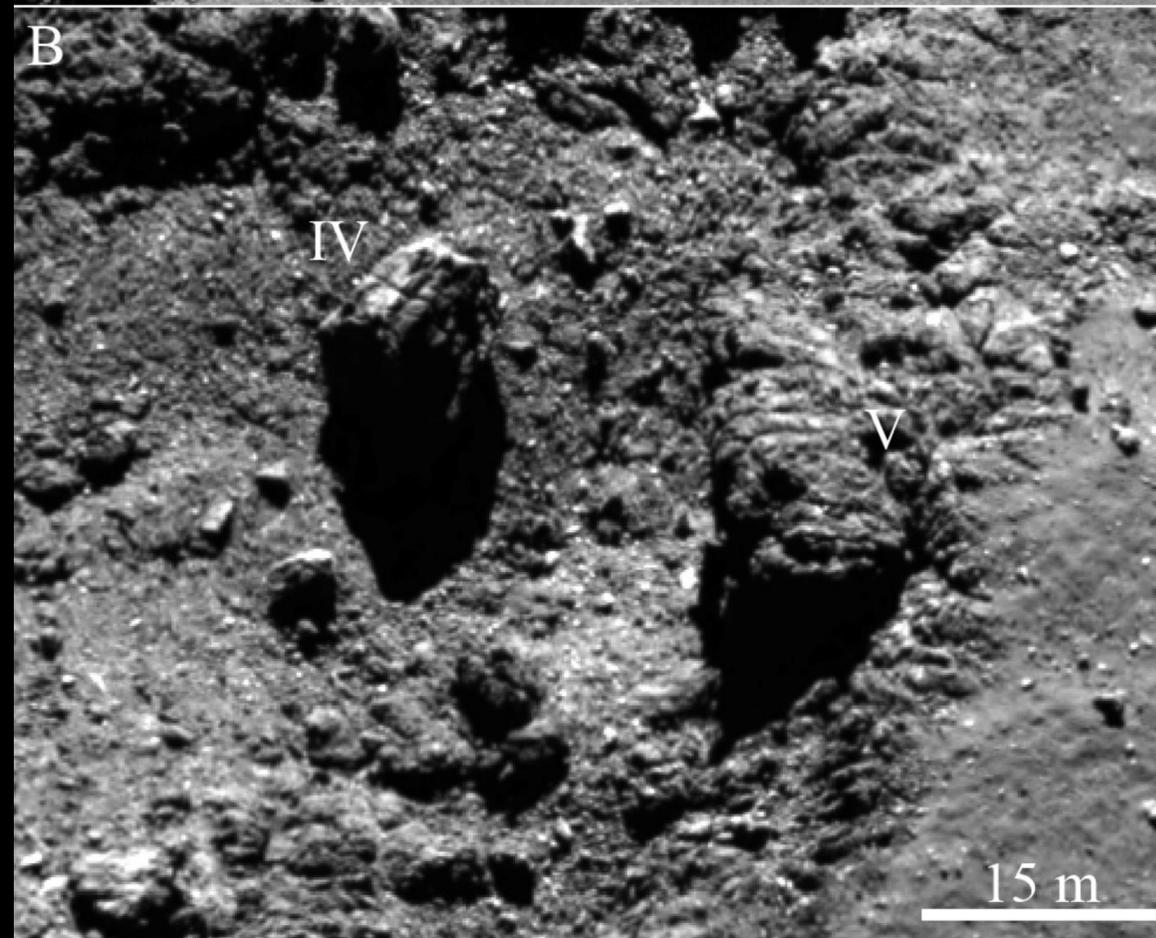
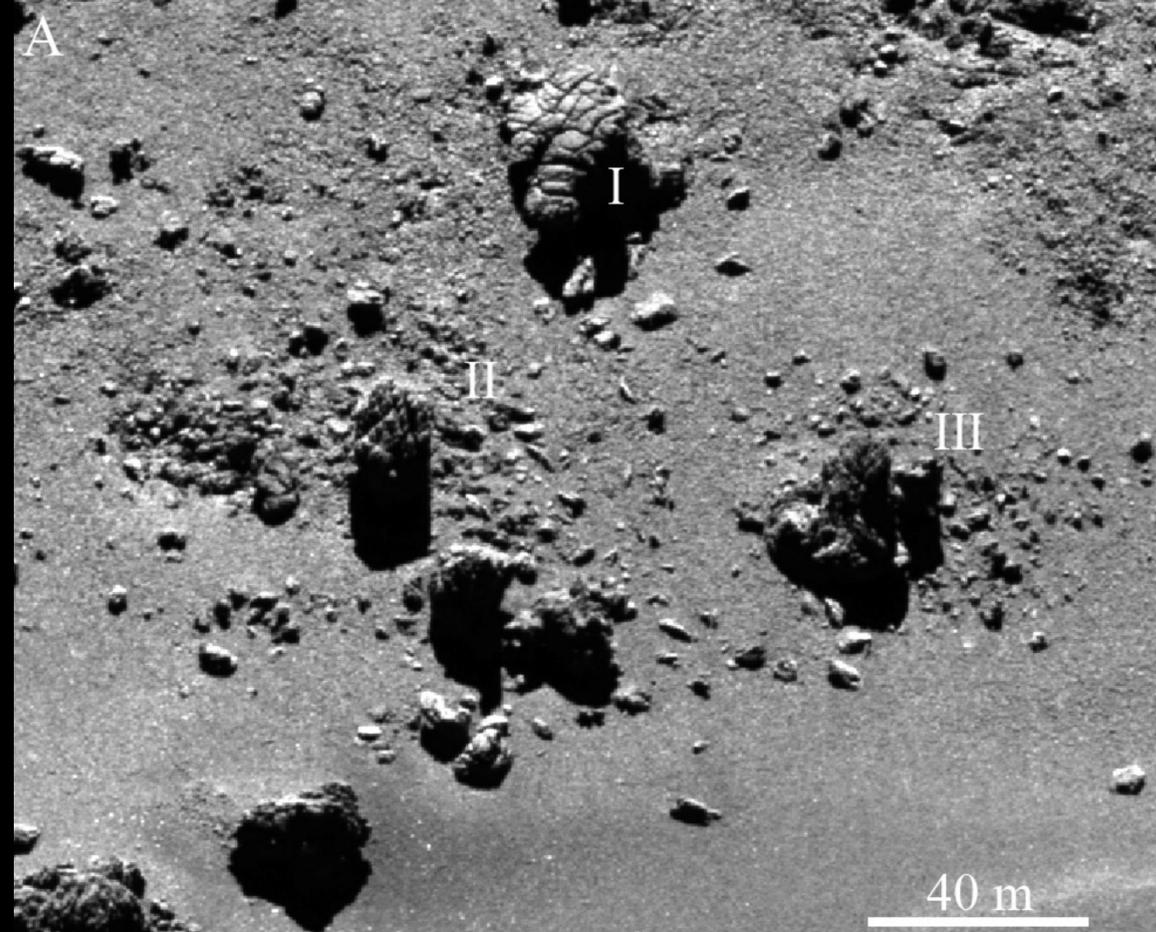
ESA/Rosetta/Philae/CIVA

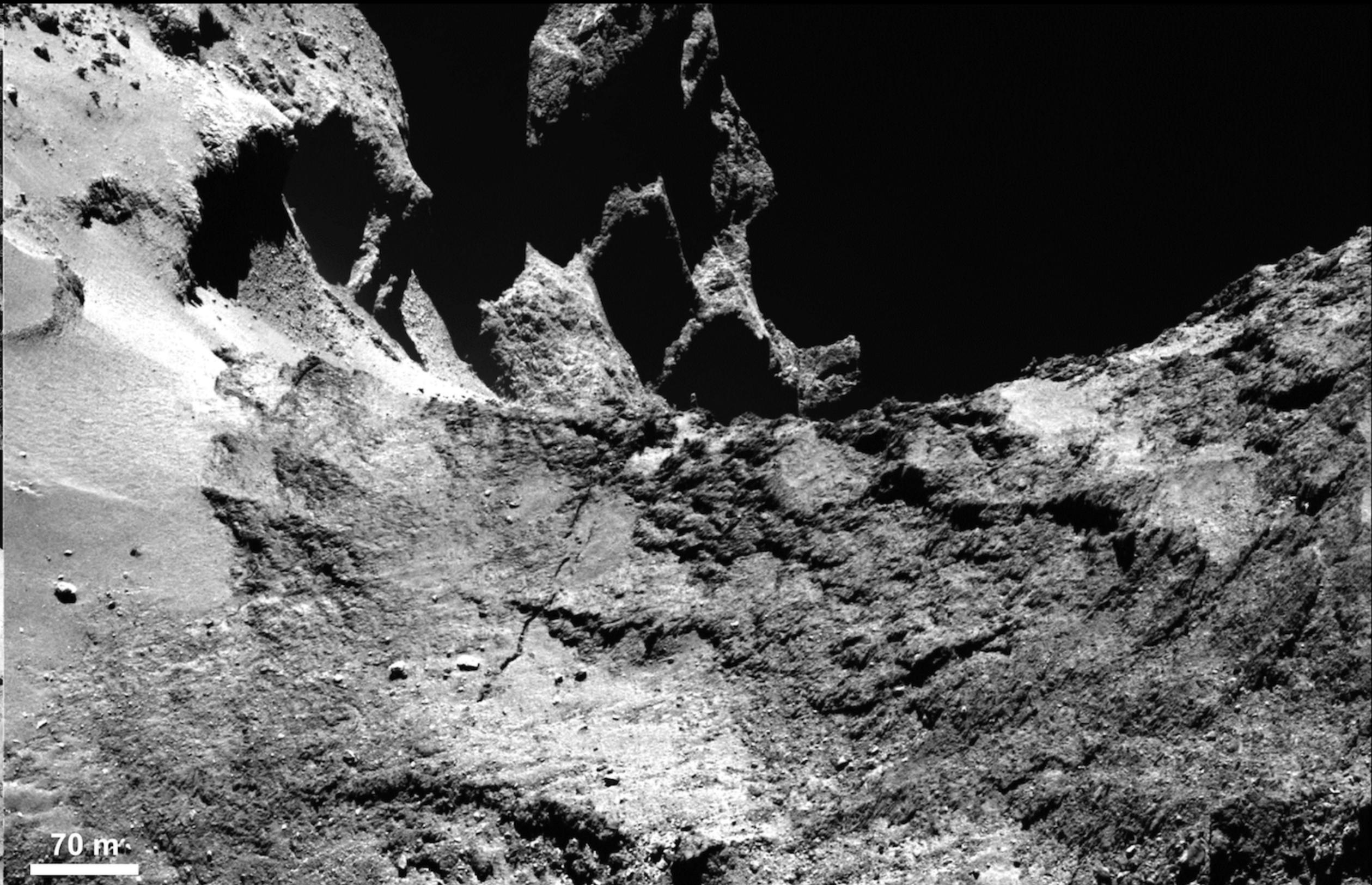
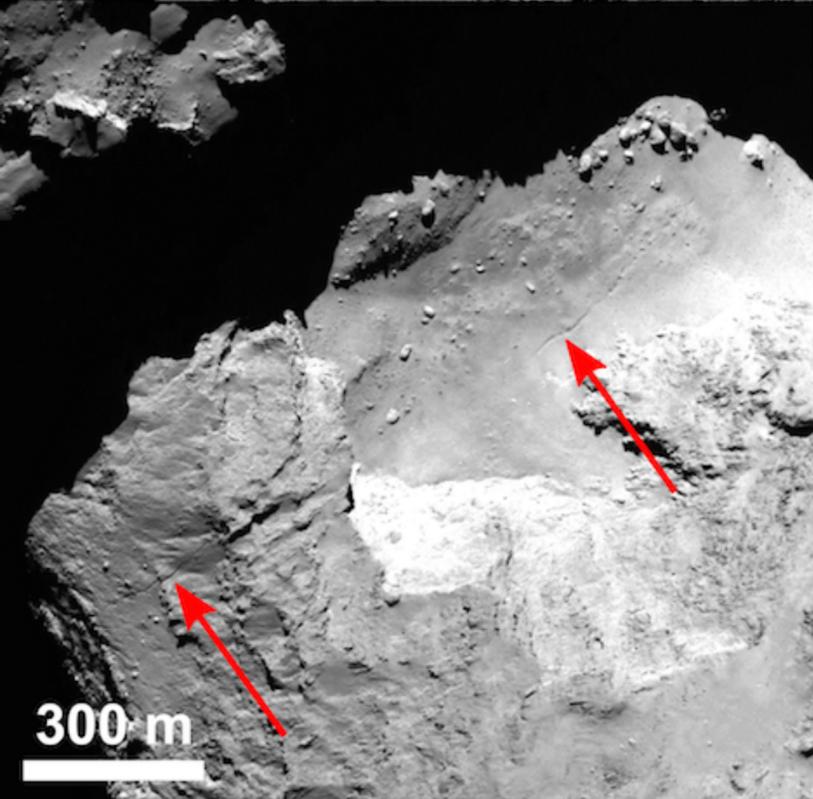


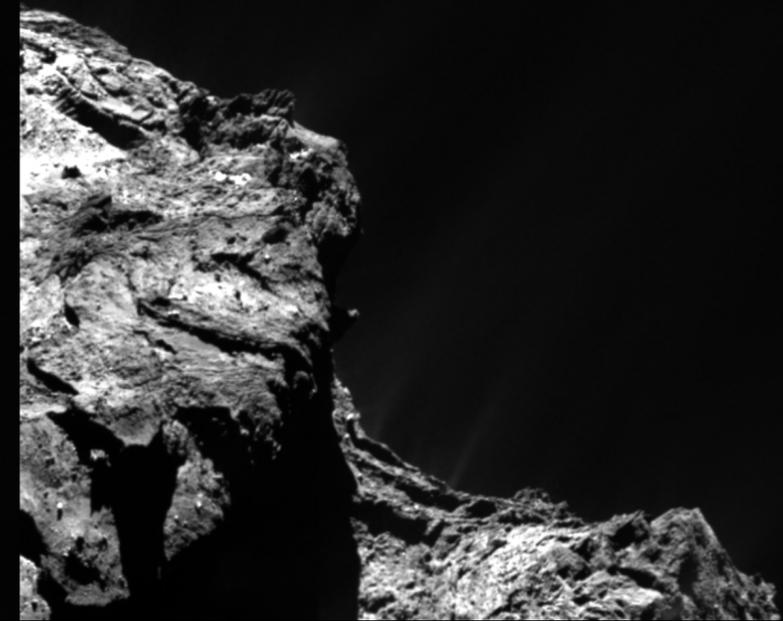
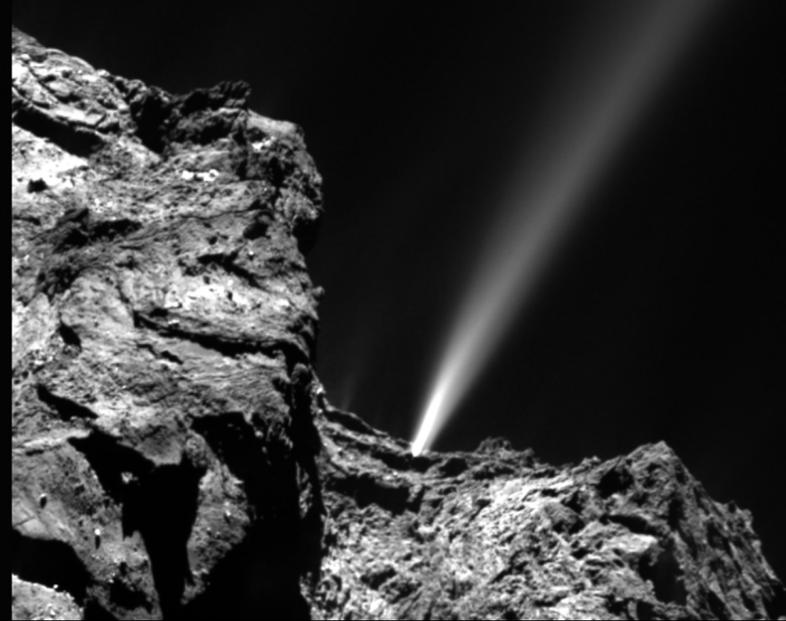
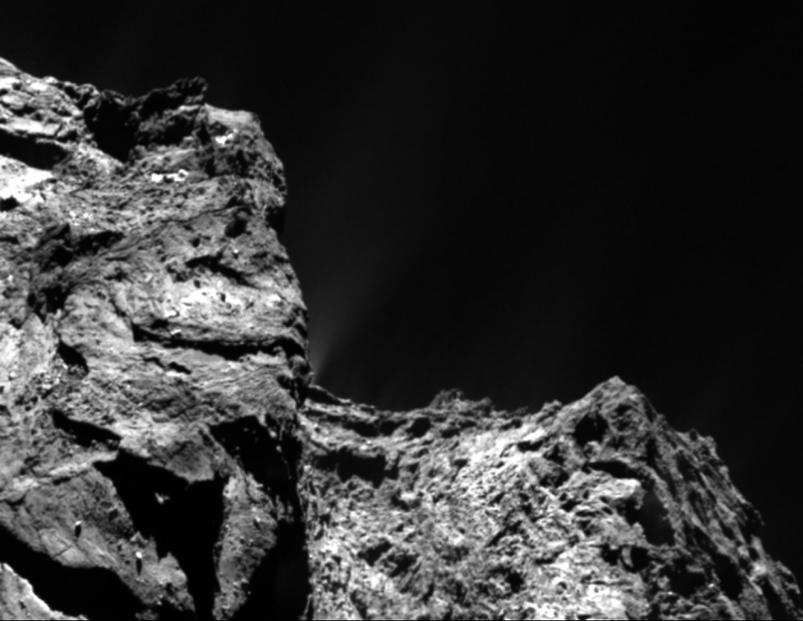








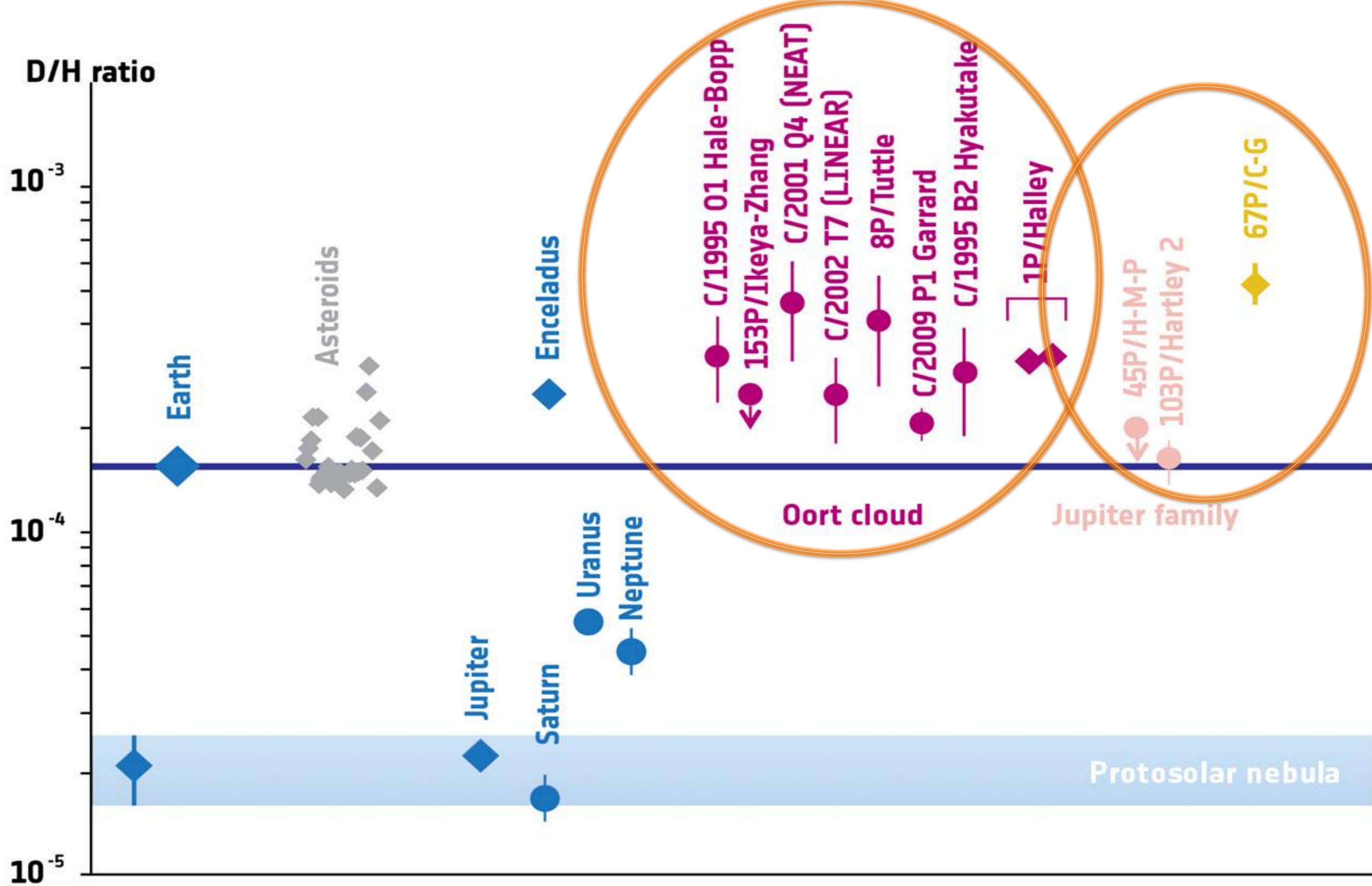




ROSINA (Rosetta Orbiter Sensor for Ion and Neutral Analysis)

Detected gases, organic compounds and radicals in the coma

H_2^{16}O	HDO	HCl	$\text{C}_2\text{H}_6\text{O}$	and
H_2^{17}O	N_2	H^{37}Cl	C_6H_4	many
H_2^{18}O	CO	CH_3OH	N_2H_4	more
CO_2	C_2H_2	OCS	N^{18}O	
H_2S	C_2H_4	CH_2O_4	H_2NO	
H_2^{34}S	C_2H_6	C_6H_6	H^{15}NO	
SO_2	CH_2N	C_3H_2	O_2	
CS_2	C_2HN	OH	H_2O_2	
HCN	C_2	C^{34}S	PH_3	
Ar^{36}	C_3	NO_2	CH_3CN	
Ar^{38}	C_2N	$\text{C}^{18}\text{O}^{16}\text{O}$	SO	



ROSINA/DFMS

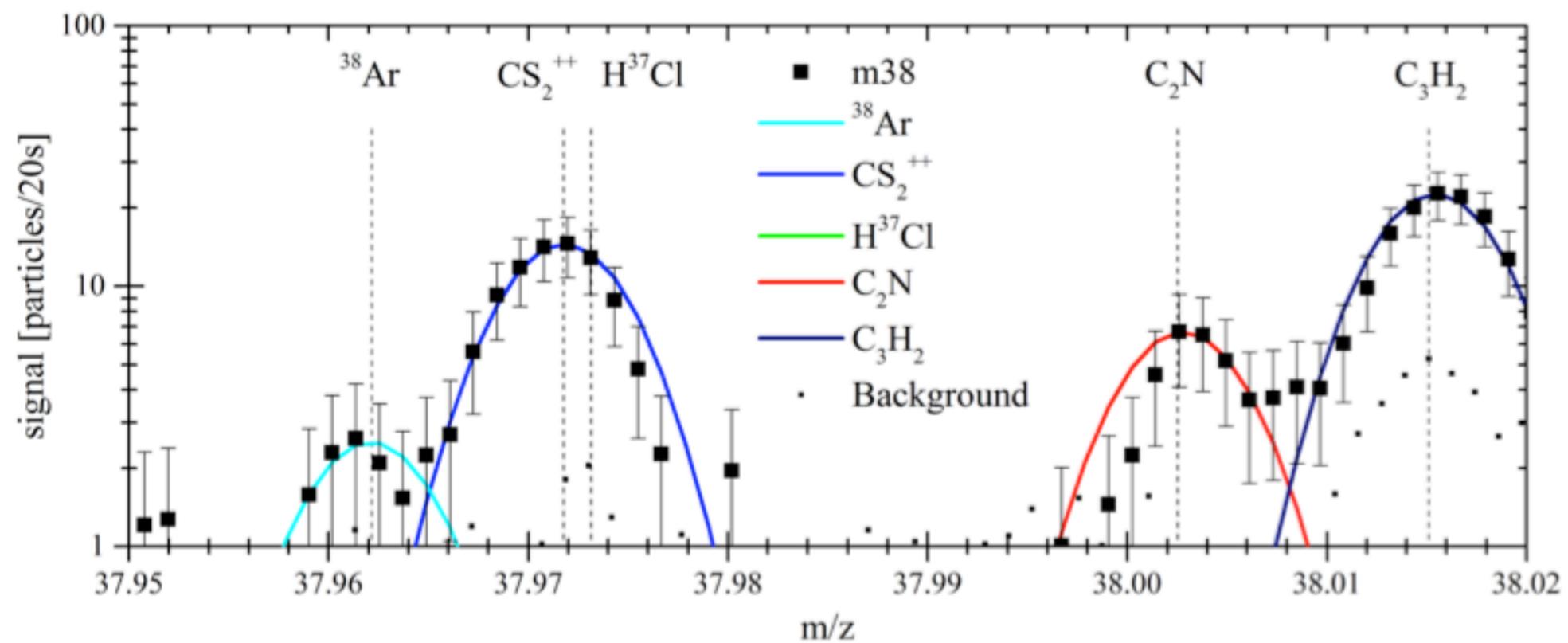
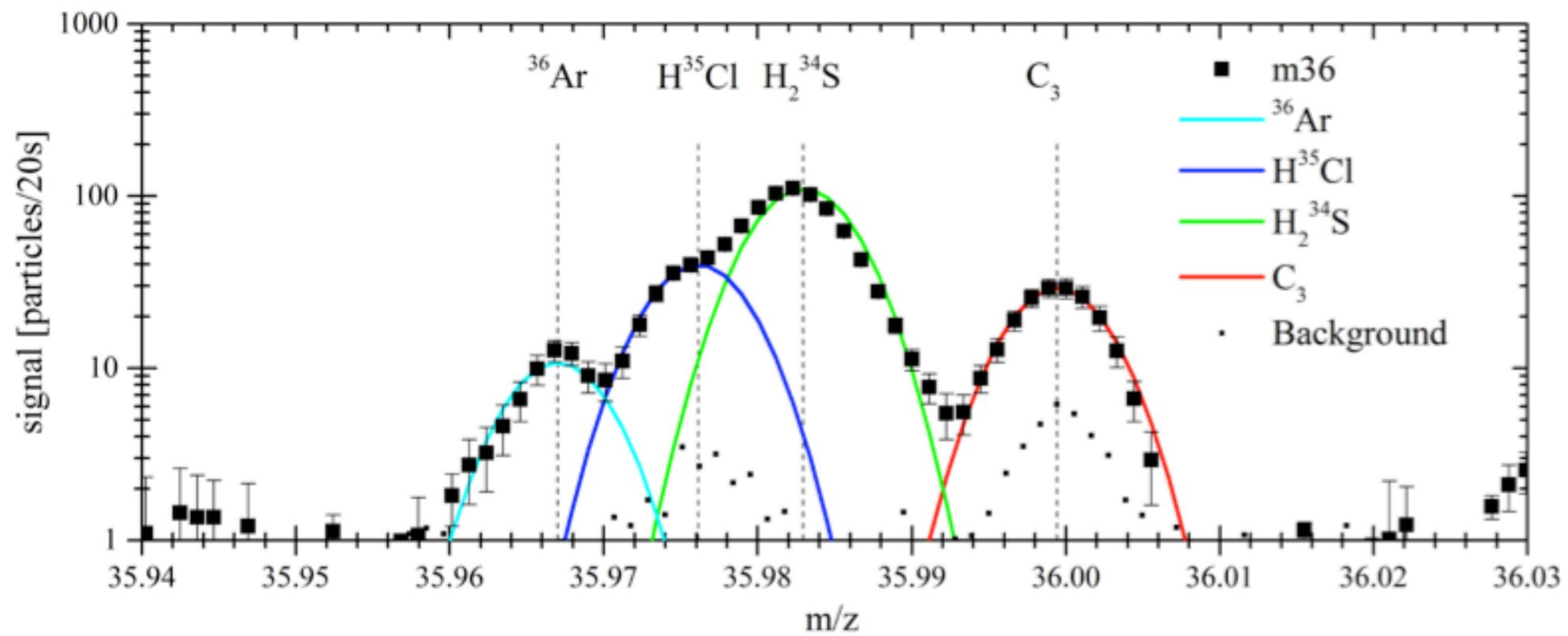
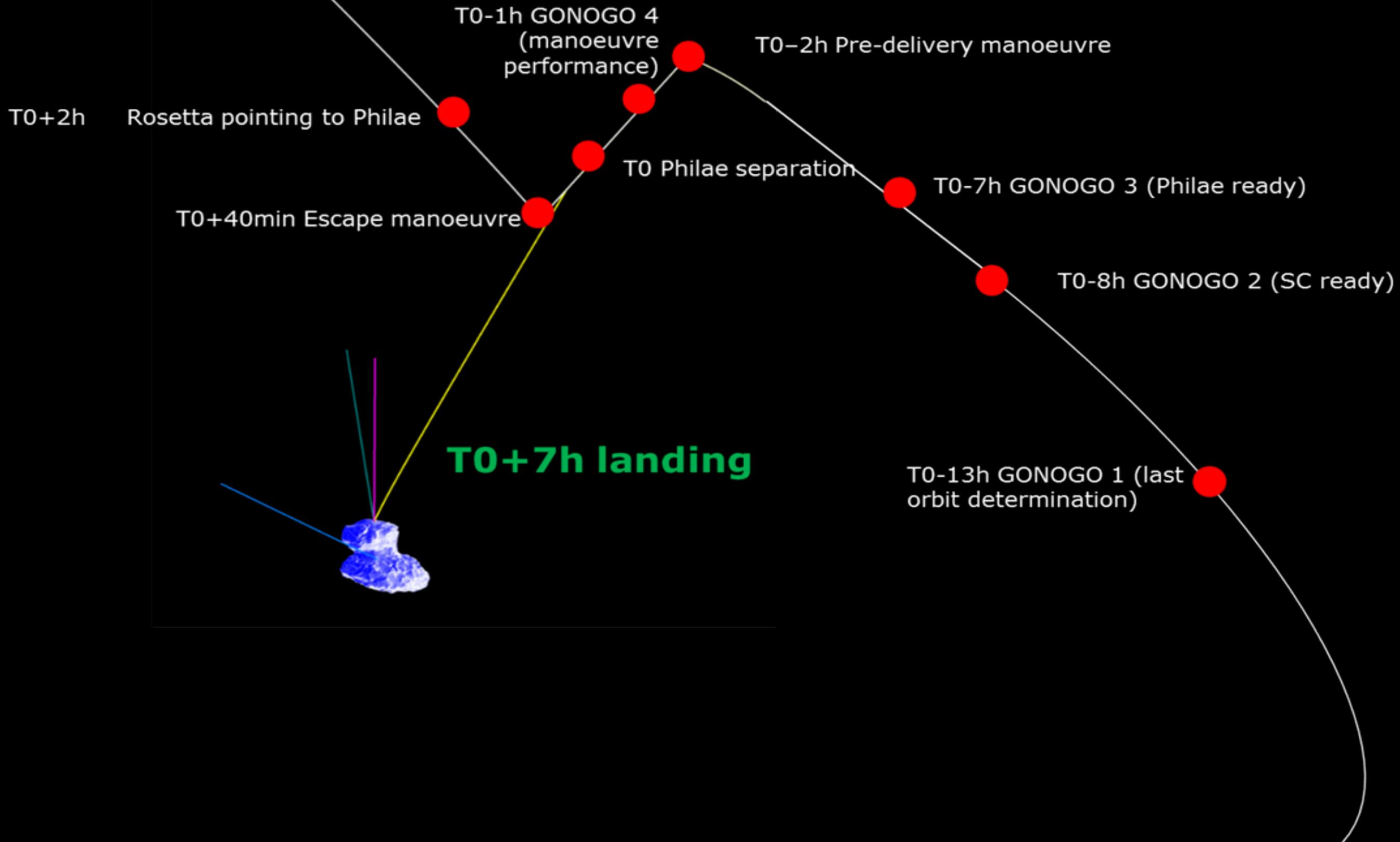
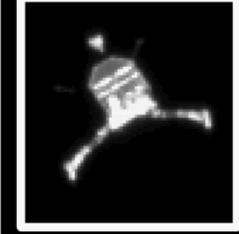


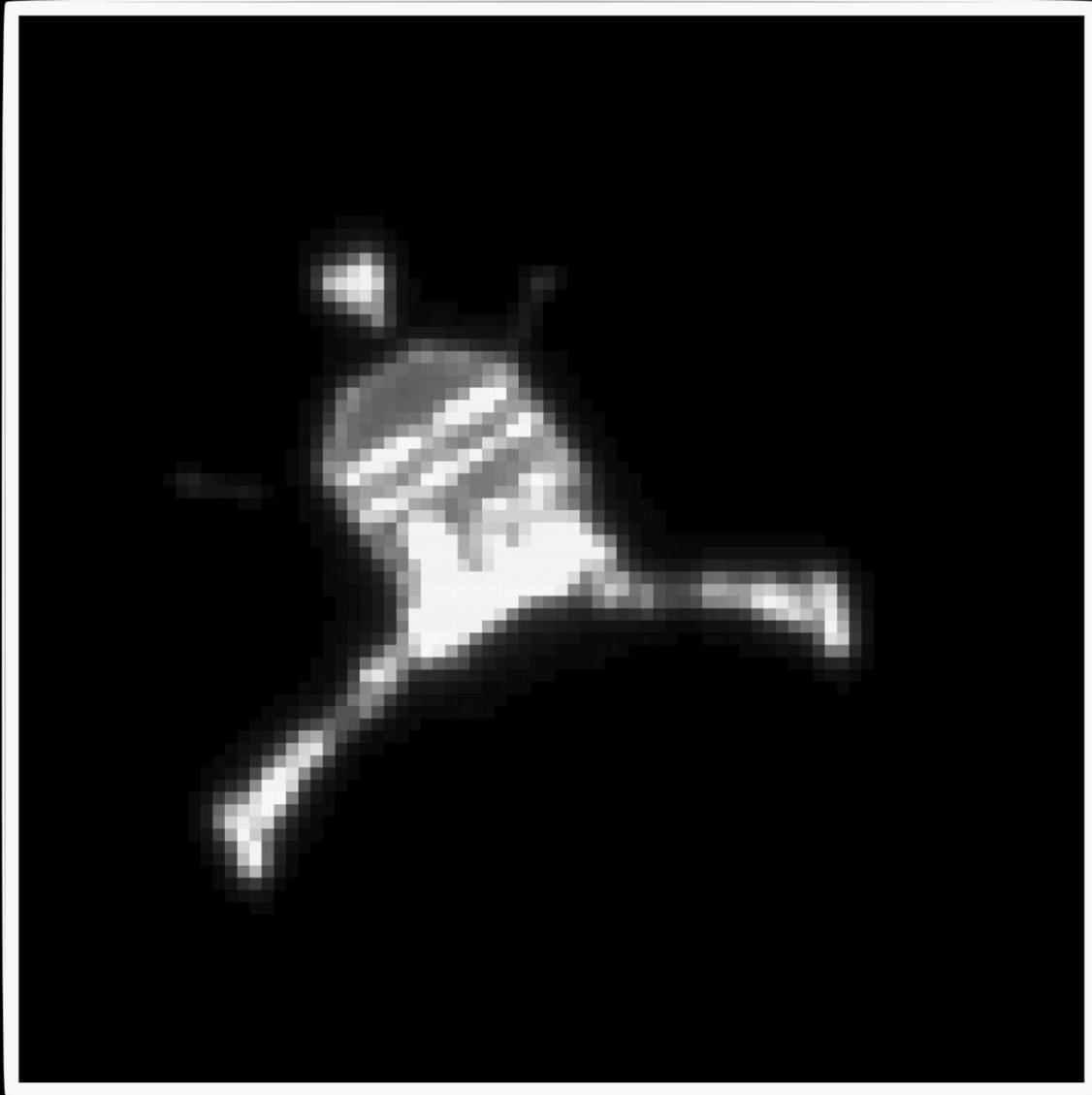


Image: ESA/ATG Medialab



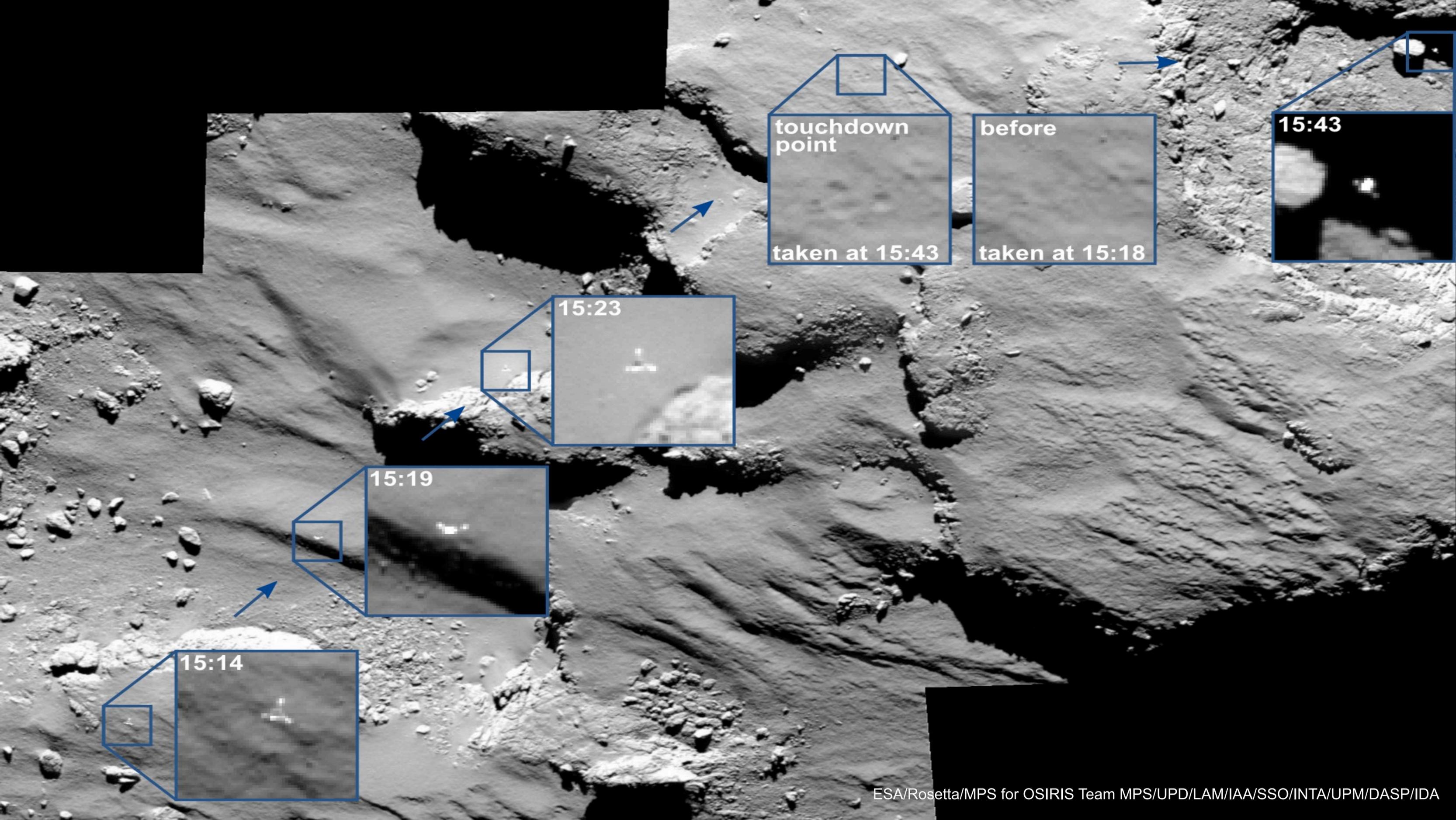


ESA/Rosetta/Philae/ROLIS/DLR



10:18:55

ESA/Rosetta/MPS for OSIRIS Team MPS/UPD/LAM/IAA/SSO/INTA/UPM/DASP/IDA



touchdown
point
taken at 15:43

before
taken at 15:18

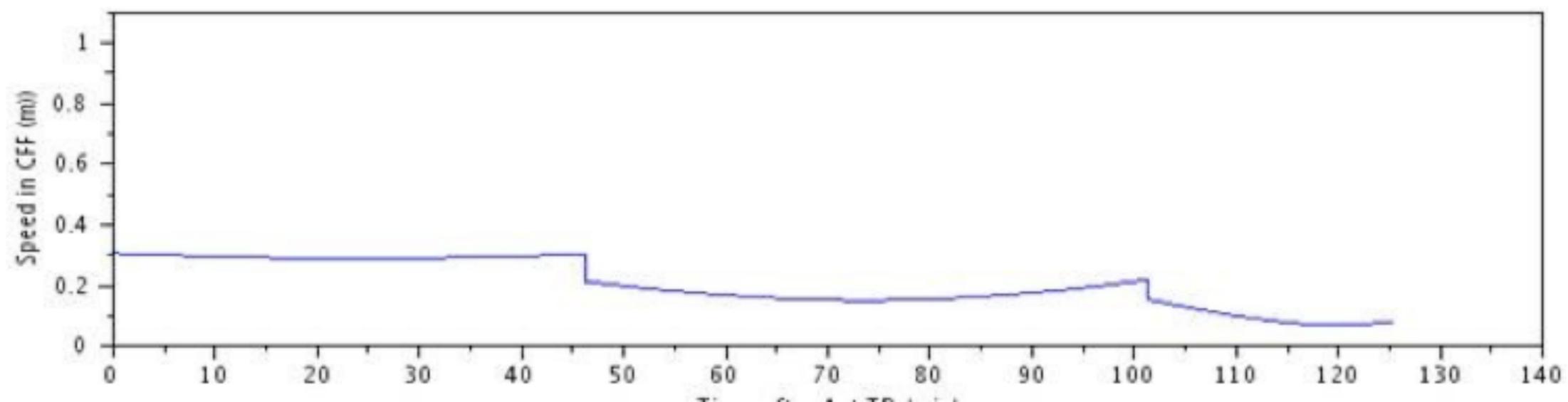
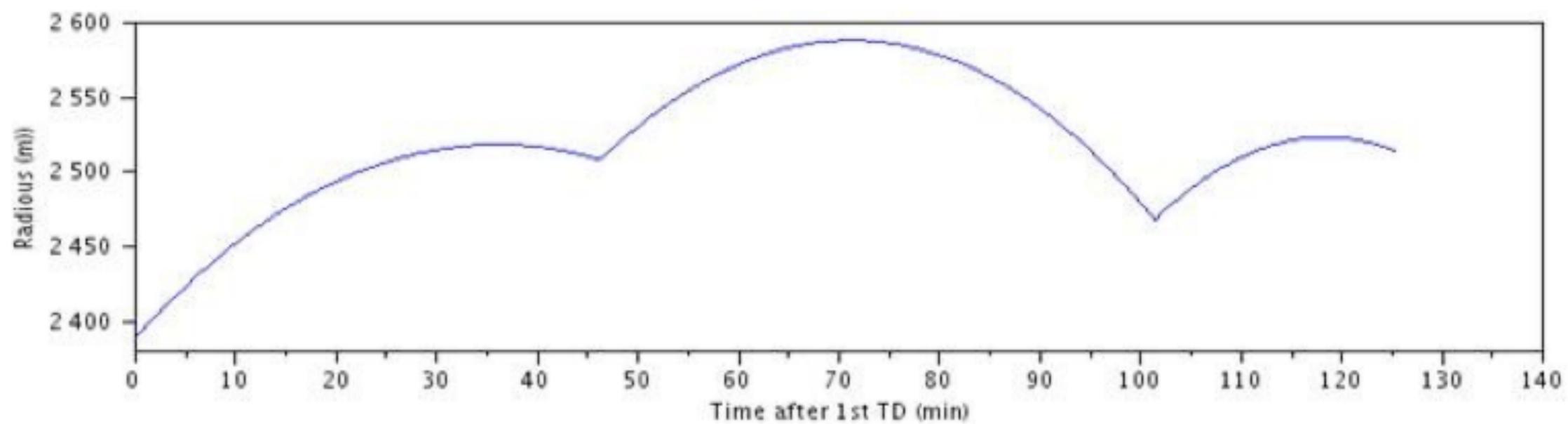
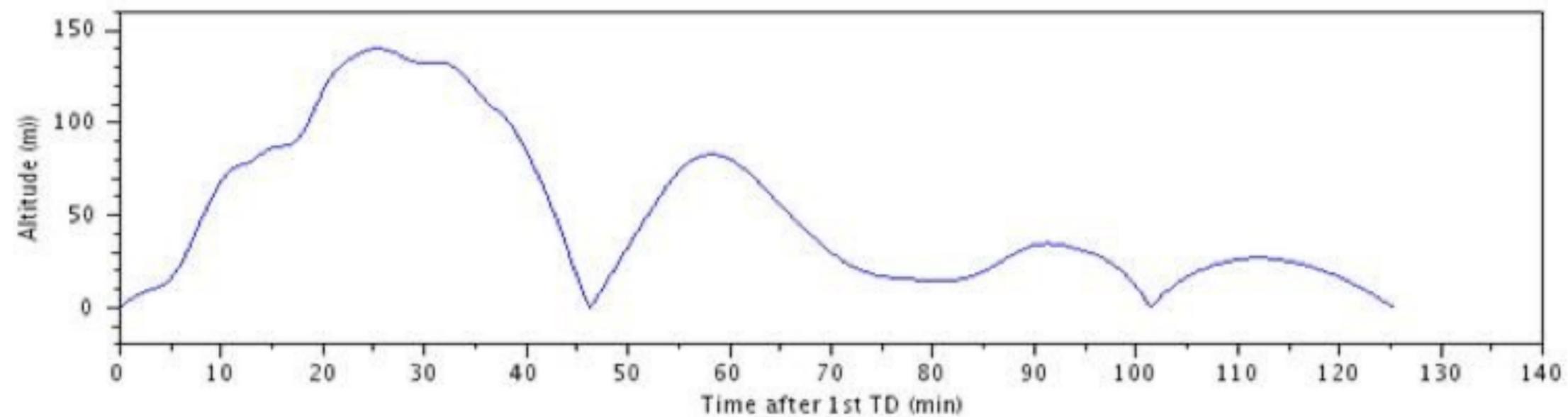
15:43

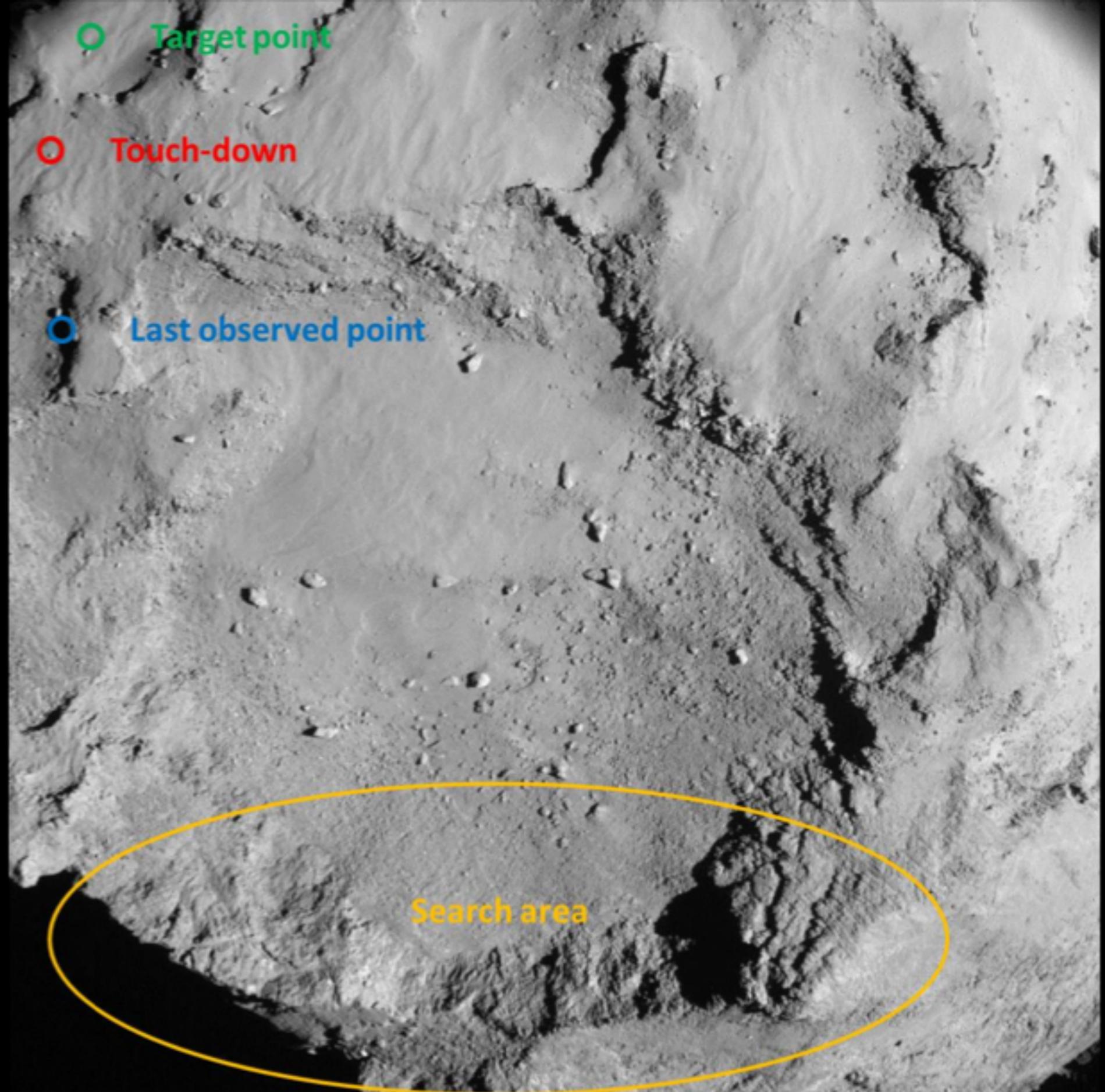
15:23

15:19

15:14

Evolution during bouncing



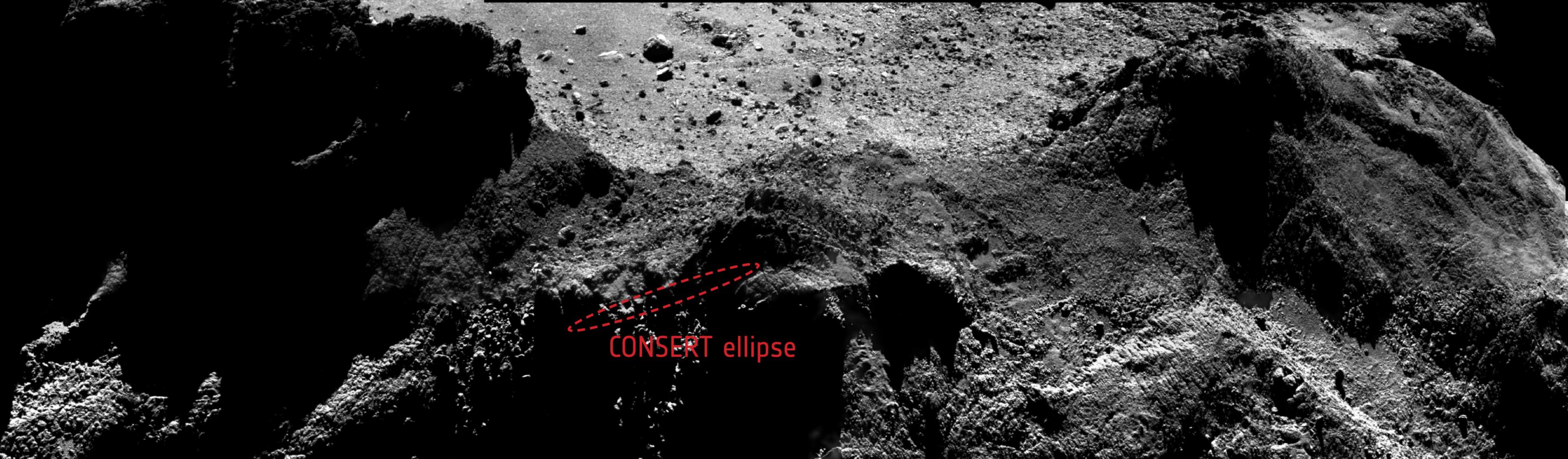
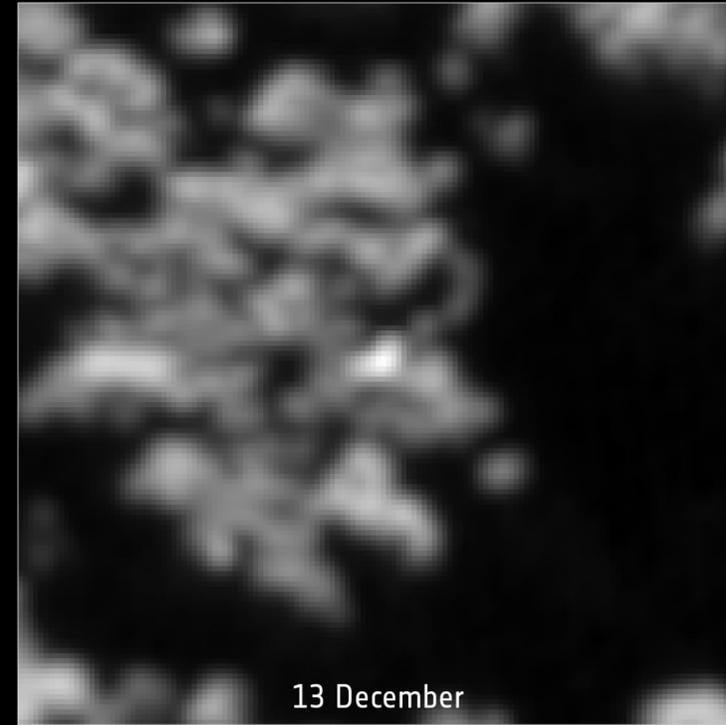
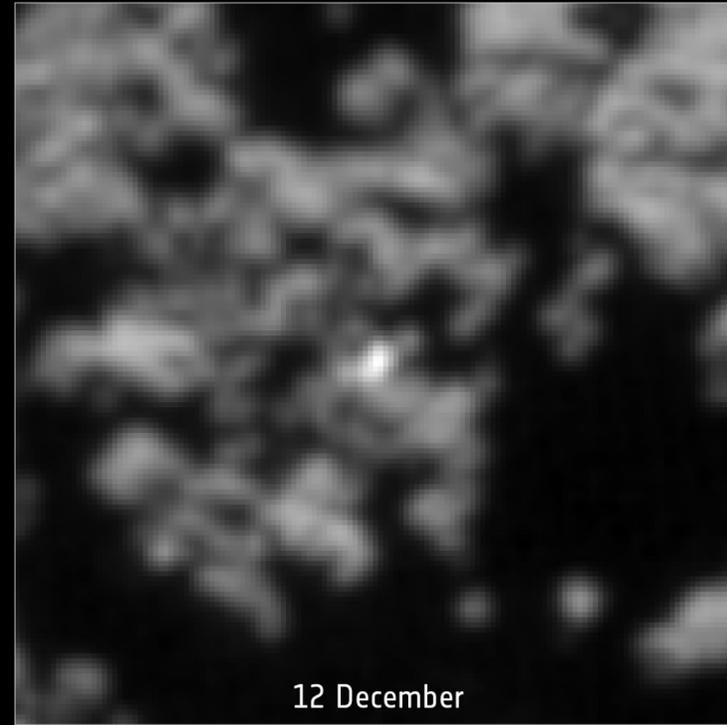
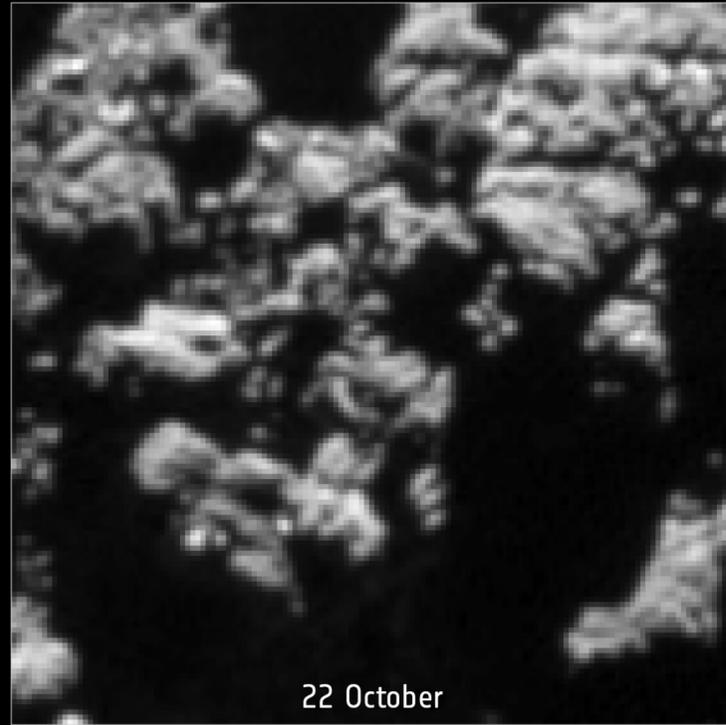
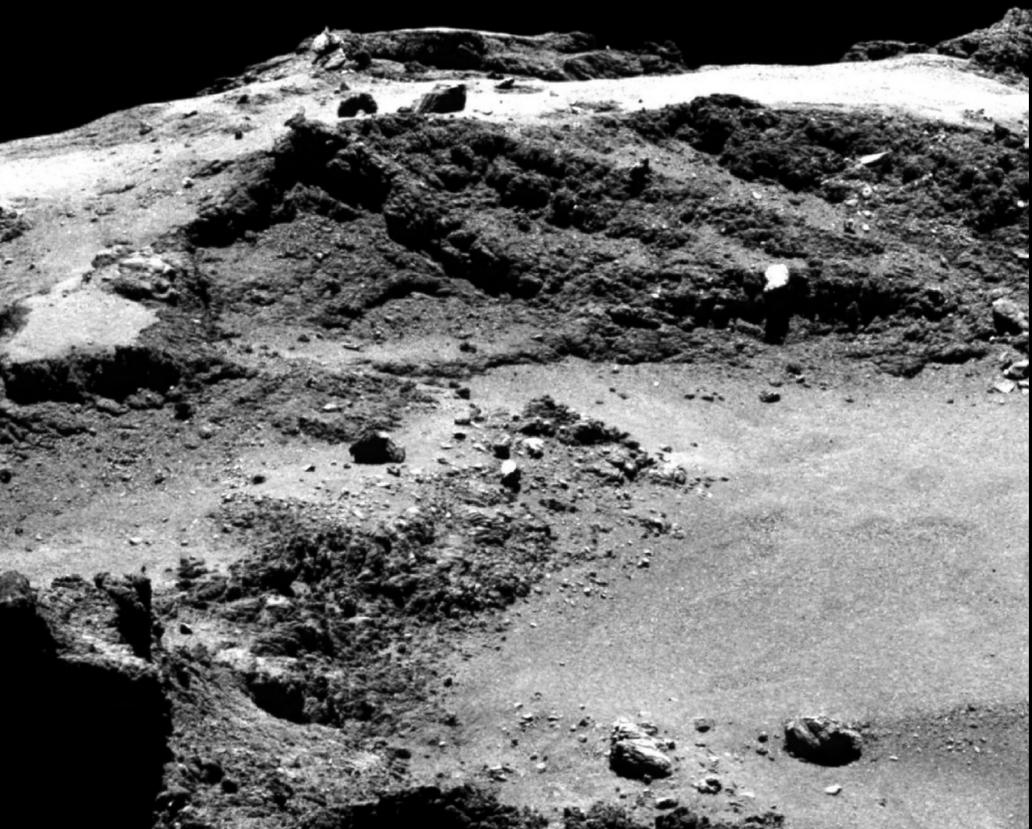


○ Target point

○ Touch-down

○ Last observed point

Search area



CONSERT ellipse



COSAC (COmetary SAmplying and COmposition)

Table 1. The 16 molecules used to fit the COSAC mass spectrum.

Name	Formula	Molar mass (u)	MS fraction	Relative to water
Water	H ₂ O	18	80.92	100
Methane	CH ₄	16	0.70	0.5
Methanenitrile (hydrogen cyanide)	HCN	27	1.06	0.9
Carbon monoxide	CO	28	1.09	1.2
Methylamine	CH ₃ NH ₂	31	1.19	0.6
Ethanenitrile (acetonitrile)	CH ₃ CN	41	0.55	0.3
Isocyanic acid	HNCO	43	0.47	0.3
Ethanal (acetaldehyde)	CH ₃ CHO	44	1.01	0.5
Methanamide (formamide)	HCONH ₂	45	3.73	1.8
Ethylamine	C ₂ H ₅ NH ₂	45	0.72	0.3
Isocyanomethane (methyl isocyanate)	CH ₃ NCO	57	3.13	1.3
Propanone (acetone)	CH ₃ COCH ₃	58	1.02	0.3
Propanal (propionaldehyde)	C ₂ H ₅ CHO	58	0.44	0.1
Ethanamide (acetamide)	CH ₃ CONH ₂	59	2.20	0.7
2-Hydroxyethanal (glycolaldehyde)	CH ₂ OHCHO	60	0.98	0.4
1,2-Ethanediol (ethylene glycol)	CH ₂ (OH)CH ₂ (OH)	62	0.79	0.2

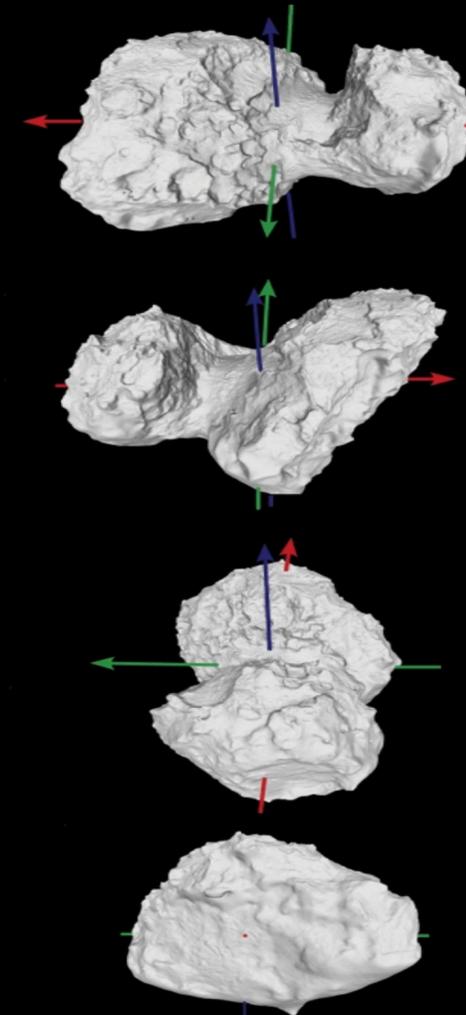
→ COMET 67P/C-G'S VITAL STATISTICS

This comet would float when thrown in water !

1.0 × 10¹³ kg
Mass

470 kg/m³
Density

70-80%
Porosity



Rotation period
12.4043 hours

Spin axis:
69.3°
Right Ascension

64.1°
Declination

52°
Obliquity of the comet's rotational axis

X, Y Equatorial axes
Z Spin axis

4
Dust/gas ratio

5.3 × 10⁻⁴
D/H ratio

Average water vapour production

300 ml/s → June

600 ml/s → July

1200 ml/s → August

-93°C – -43°C
Surface temperature

-243°C – -113°C
Subsurface temperature

6%
Average albedo

Rotation/Shape model: OSIRIS; Surface temperature: VIRTIS; Subsurface temperature: MIRO; Water production rate: MIRO; D/H: ROSINA; Dust/Gas: GIADA, MIRO, ROSINA; Volume: OSIRIS; Mass: RSI; Density: RSI/OSIRIS; Albedo: OSIRIS, VIRTIS; Comet images: NAVCAM

Data based on values published in January 2015

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Hadley Freeman
Pick-up artists
who fear
feminism

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spirit: Palestinian
politics and the
long shadow of
Yasser Arafat

the long read

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Embattled Labour leader will vow to help victims of 'zero-zero' economy

Embattled Labour leader will vow to help victims of 'zero-zero' economy

Embattled Labour leader will vow to help victims of 'zero-zero' economy

LE TEMPS

la Repubblica

«Nous sommes sur la comète!»

Renzi-Berlusconi, c'è il

«Nous sommes sur la comète!»

Renzi-Berlusconi, c'è il

Renzi-Berlusconi, c'è il

dS De Standaard

Oeso vraagt vermogenswinst-

Oeso vraagt vermogenswinst-

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2014: A Space Odyssey

Russia Dial Uj Military Threat:

2014: A Space Odyssey

Rendezvous With a Comet

European Probe Makes Historic Landing on Celestial Wiggler; a First Then Scurry

Rendezvous With a Comet

Le Monde

The New York Times

Le Monde

Philae, au cœur de la comète

Mort de Rémi Fraisse: les silences embarrassés du ministre de l'Intérieur et du gouvernement

Philae, au cœur de la comète

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The Washington Post

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House, Senate to hold votes on pipeline project

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EL PAÍS

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La Generalitat estudia convocar elecciones • La fiscalía retrasa las querrelas • El PSOE no consigue concretar su reforma constitucional

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LA STAMPA

Intesa Renzi-Berlusconi Resta il nodo sbarramento

LA STAMPA

Intesa Renzi-Berlusconi Resta il nodo sbarramento

Intesa Renzi-Berlusconi

GOOGLE

Cerca con Google

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setta EUROPE'S COMET CHASE

setta EUROPE'S COMET CHASE

BREAKING NEWS SPACE PROBE LANDS ON SPEEDING COMET

BREAKING NEWS SPACE PROBE LANDS ON SPEEDING COMET

Thank You

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