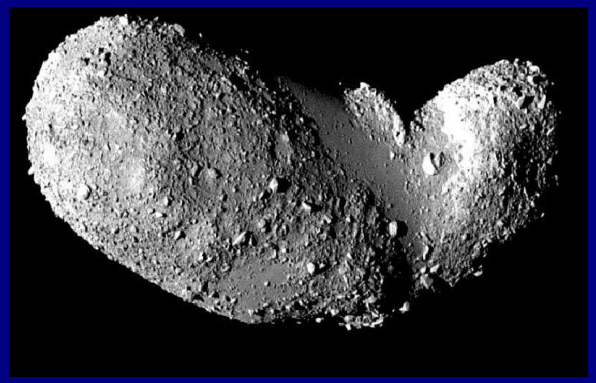
COSPAR Project:

Study of color variations in the asteroid (25143) Itokawa



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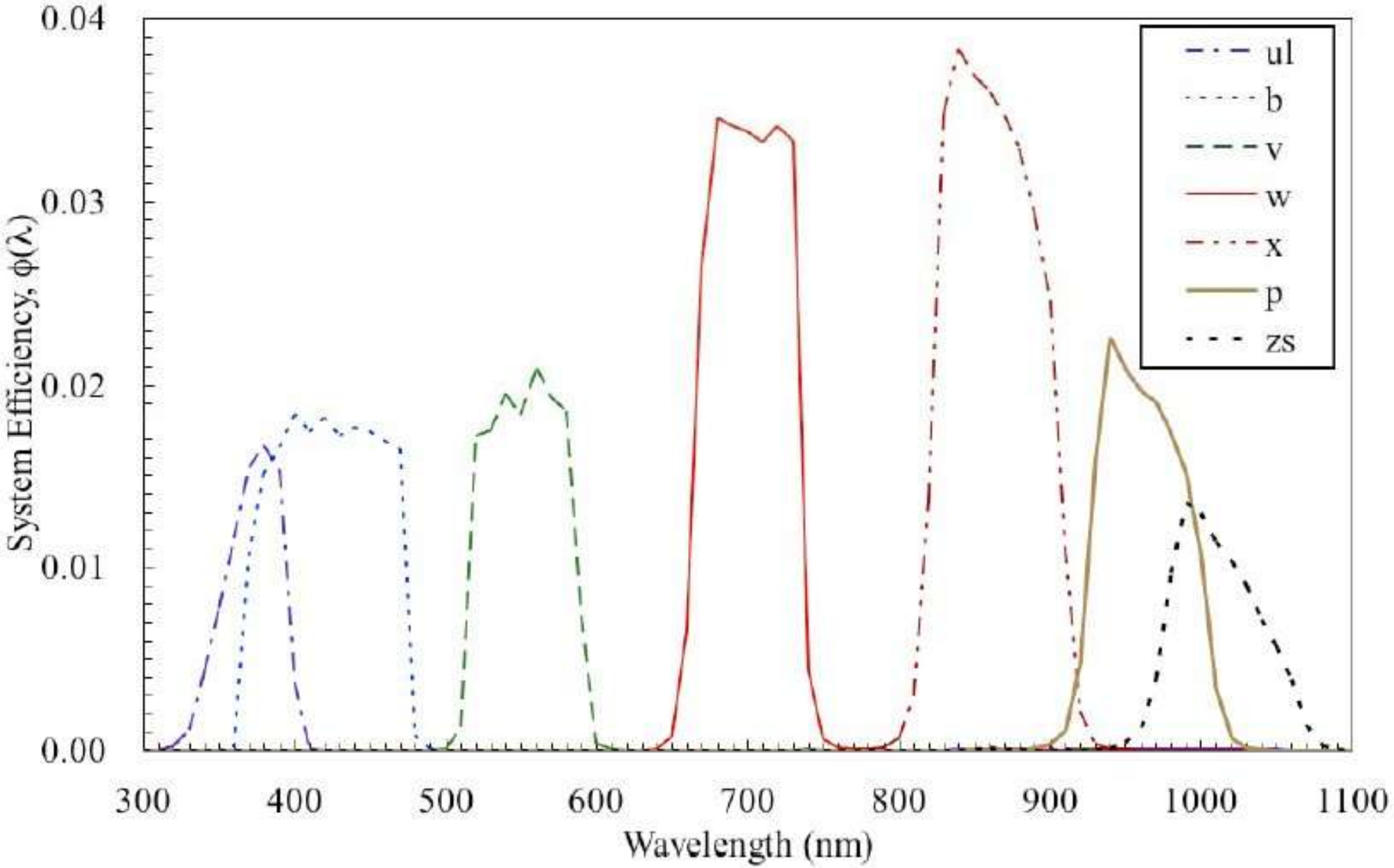
Motivation

- Different textures in the surface: craters, stones, seas...
- Look for surface color variations
  - Maybe related to space weathering?

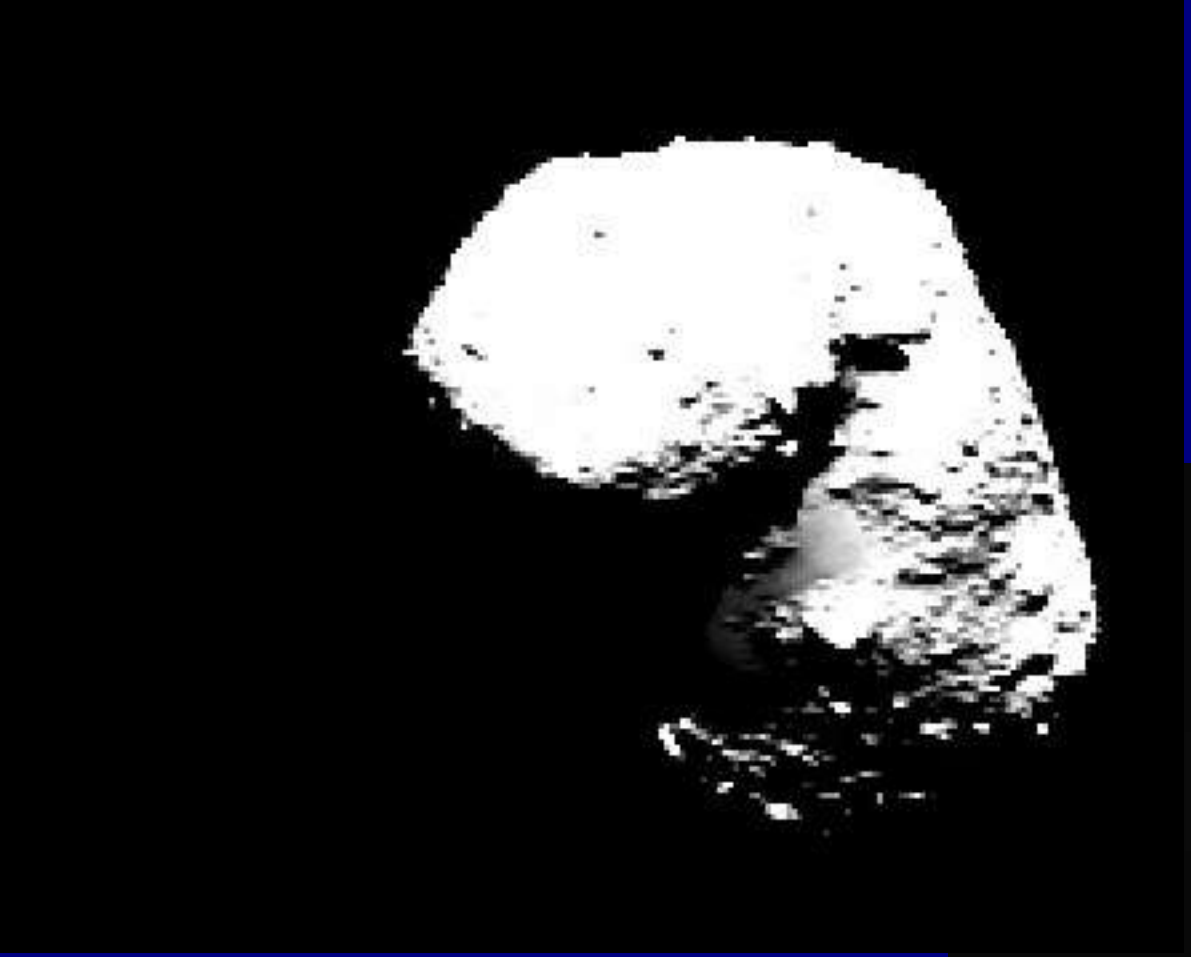
Data

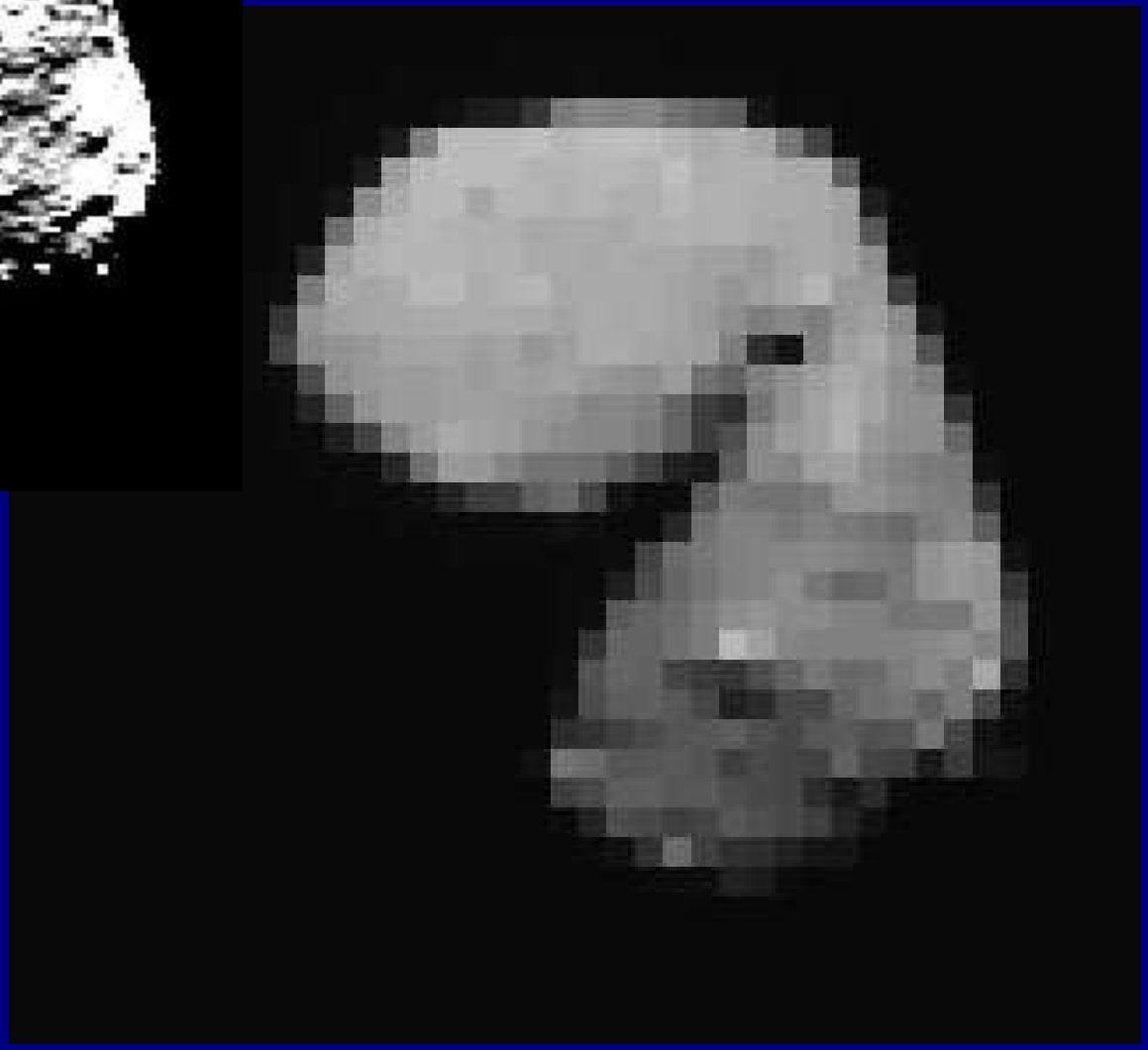
- Sample of Images from the Multi Spectral Telescope Imager (AMICA)
  - Filters: ul (380), b(430), v(550), w(700), x(860), p(960), zs(1010) – (units in nanometers).
  - Header info of images selected:
    - DAT_TYPE= 'SCIENCE '
    - BINNING = 4
    - NSUBIMG = 2 => corrected by smear an bias
    - UTC_0 = ' 2005-10-18T16:22:43.' - '2005-10-18T16:26:16.'


0.04
0.03
0.02
0.01
0.00
System Efficiency, φ(λ)
300
400
500
600
700
800
900
1000
1100
Wavelength (nm)
ul
b
v
w
x
p
zs

Procedures

- Download of the data
- Normalization and re-binning of Flat – to fit image dimensions
- Flat-fielding
- DN correction
- Centering of the images
- Re-binning of the images
- Flux normalization with respect to a stone
- Normalization with respect to y-filter

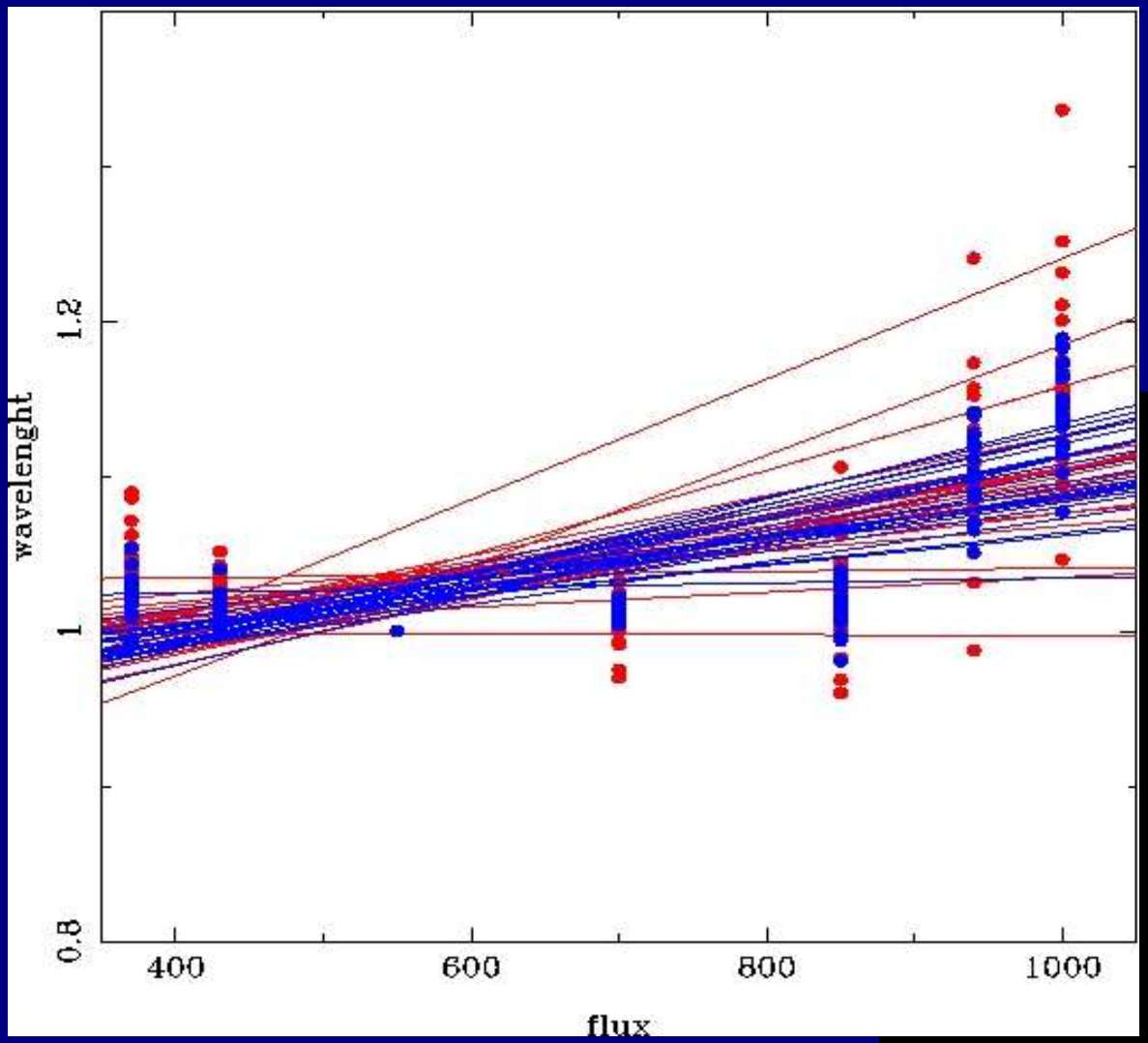


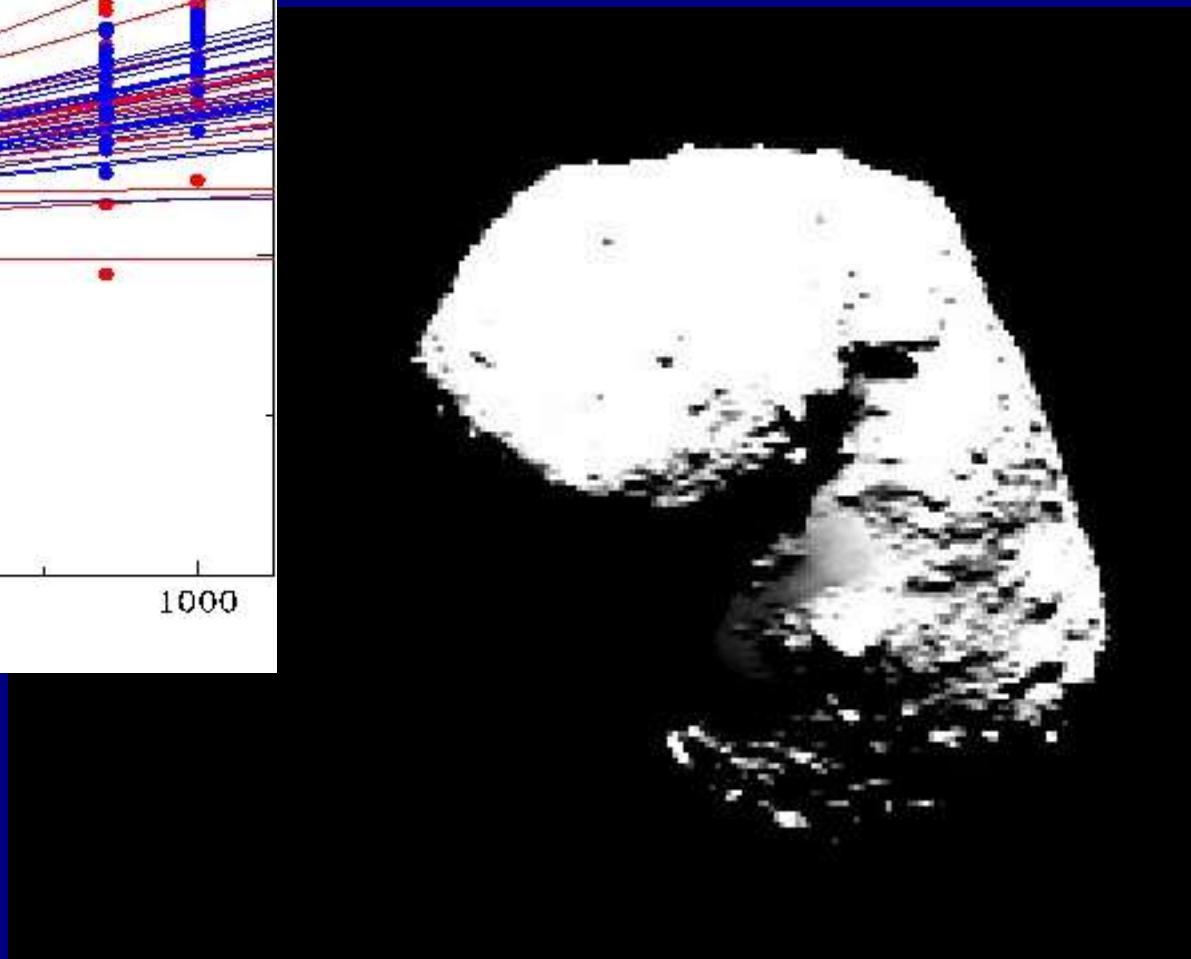


DN Correction Table

Filter	λ_{eff} (μm)	Conversion into Radiance (W m^{-2} μm^{-1} sr^{-1}) / (DN sec-1)	Scale factor (error)
ul	381	—	6.259 (0.063) *2
b	429	—	1.254 (0.008)
v	553	3.42×10^{-3}	1
w	700	—	0.645 (0.005)
x	861	—	0.600 (0.006)
p	960	(1.89×10^{-3}) *1	1.514 (0.014)
zs	1008	—	—*3

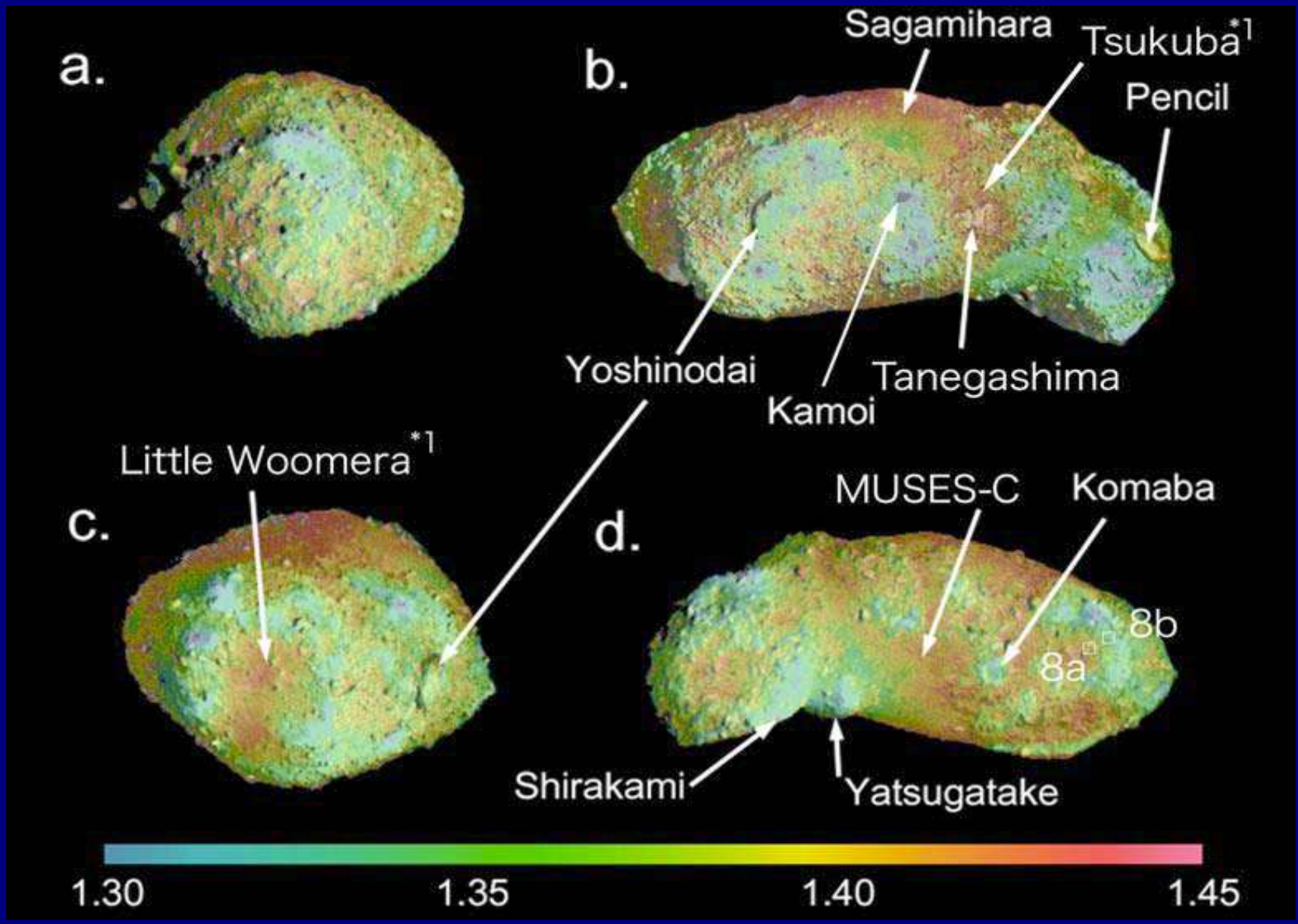
Preliminary Results





Future steps

- Compare colors for the whole surface;
- Use more images;
- Search for correlations with space weathering works.
- Compare with recent paper from Ishiguro et al. 2007 (in press) that uses 4 filters.


a.
b.
Sagamihara
Tsukuba*1
Pencil
Yoshinodai
Kamoi
Tanegashima
Little Woomera*1
c.
MUSES-C
Komaba
d.
8b
8a
Shirakami
Yatsugatake
1.30
1.35
1.40
1.45