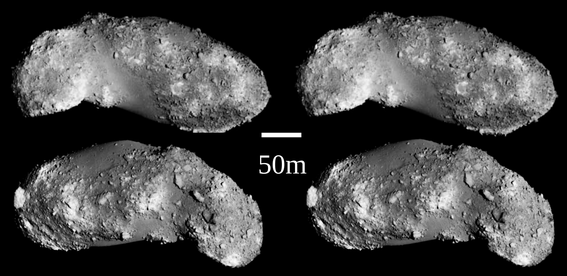
Boulders are not evenly distributed on Itokawa



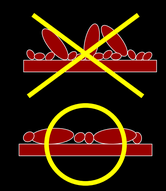
Rough terrain has relatively higher topographic roughness due to the existence of boulders

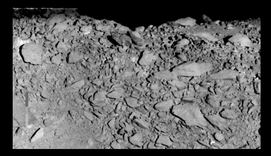
Smooth terrain has apparently flat, featureless surface with similar brightness

Two important characteristics:

1. None of the smaller gravels are isolated on top of boulders

2. The position and orientation of ravels are stable against local gravity



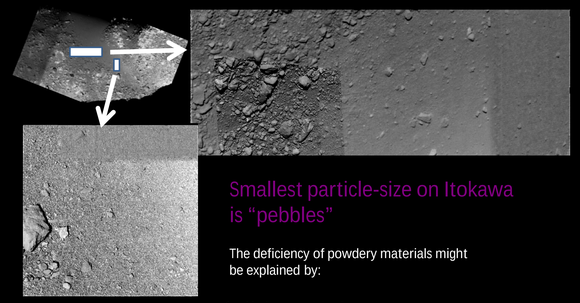


"Gravels were reallocated after deposition"
at any location

The surface has been subject to *global vibrations*

Gravels are segregated due to the vibrations

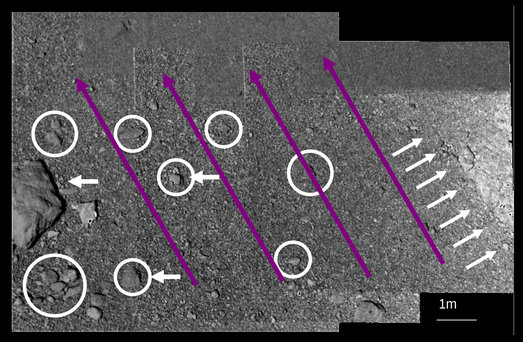
"Fines" on Itokawa



Smallest particle-size on Itokawa is "pebbles"

The deficiency of powdery materials might be explained by:

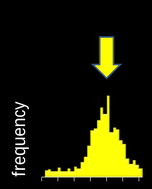
1. No fine particles from the beginning.
2. Fines were removed to the space.
3. Fine have buried into the subsurface.

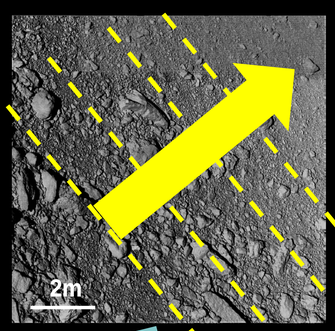


- Boulders appear to be in gravitationally stable conditions.
- Clusters of boulders are found.
- Most boulders are not buried by pebbles.
- A boulder alignment exists

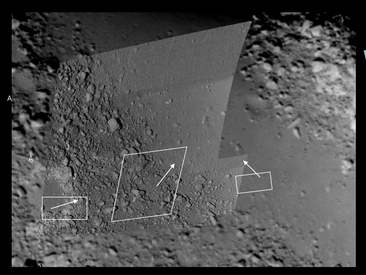
Gravel migrations in rough terrains are evidenced by a range of morphological characteristics similar to terrestrial landslides:

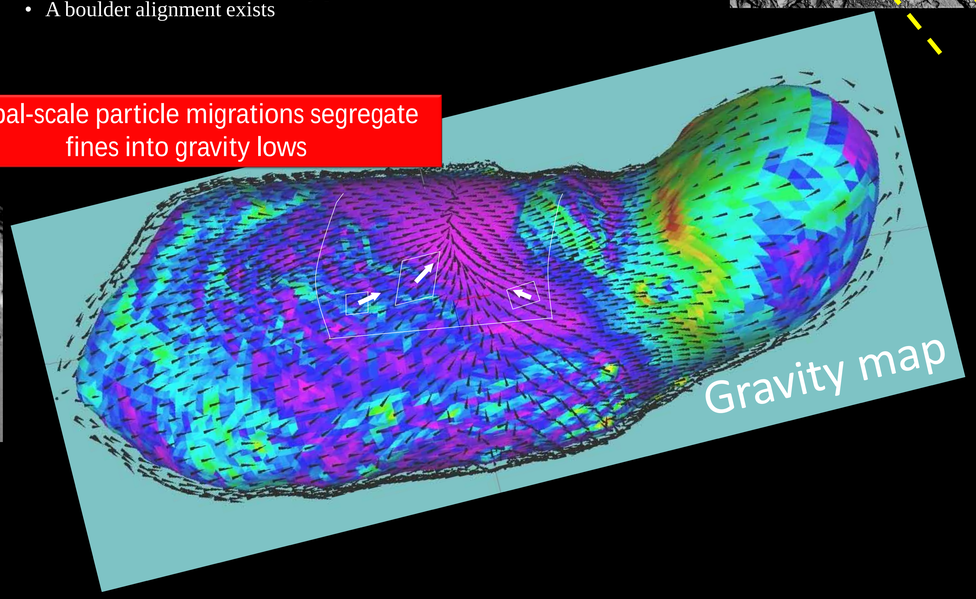
- Piles of gravels exclusively on the uphill sides
- Boulder alignments / Imbrications of boulders





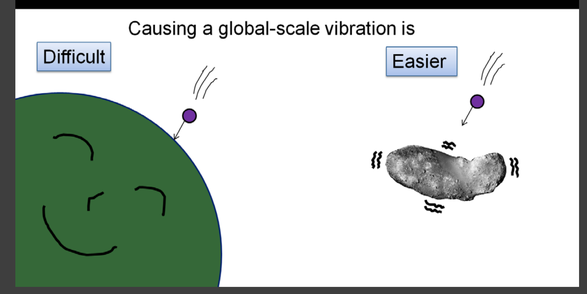
Global-scale particle migrations segregate fines into gravity lows





Why this process found only on Itokawa?

- Because Itokawa is by far the smallest body ever studied at high resolution… or
- Simply because Itokawa is small



Note the huge difference in mass

Moon > 10^6 Ida > 10^6 Itokawa

Itokawa is by far the smallest asteroid ever studied at high resolution.