

ROBEX – Space Science

1. Introduction and Background to Methods

1.3 Surface features in the solar system (Volcanoes, canyons, impact craters, lava sheets, glaciers, rivers, oceans, tectonics, link between surface features and processes)

What exactly do we consider planetary surface? It is the solid or liquid material of the outer crust of a planetary body that is in contact with an atmosphere or space. The surface morphology – meaning the shape of the surface, but also the surface composition is of high importance and very interesting for planetary scientists. Exploring the surface gives us insights about the past and present history including the processes and events that happened on the surface.

Surface features can be seen on different scales. Some features are visible on a global, some only on a regional scale. These features can be of fluvial, glacial, volcanic, tectonic, or aeolian origin (Tab.2). Please note that the example features can also be developed by different or combined processes and therefore, have multiple possible origins. The size of the listed features varies a lot (e.g. craters can be meter in size or several hundreds of kilometers).

Origin	Example for Surface Features
Fluvial	Ocean, Lake, Flooding Area, Delta, River, Channel, Gullies
Glacial	Glacier, Inverted Terrain, Pit, Lineated Valley Fill, Stone Circles, Polygonal Terrain
Volcanic	Volcano, Lava Sheet, Crater, Caldera, Pit, Wrinkle Ridge, Rills
Tectonic	Graben, Canyon, Faults, Rills, Pit
Aeolian	Dunes, Wind streak, Rays
Other	Crater, Crater Chains, Land Slide

Table 1: Examples of global and regional surface features.

So, how do other planets and moons look like? Do they look like Earth?

We have to compare the natural surface of Earth to other planets and moons. We are ignoring cities, road systems, artificial channels, and created flooding areas. The changes humans made on Earth are versatile and countless. However, the list of natural surface features on Earth is just as long...

For more information about surface features try the books:

Mars: N.G. Barlow (2008): Mars- An Introduction to its Interior, Surface and Atmosphere, Cambridge University Press.

Moon:

Earth: F. Press, R. Siever, J. Grotzinger, T.H. Jordan (2003): Understanding Earth, W.H. Freeman.

Solar System in general: I. Pater and J.J. Lissauer (2010): Planetary Science, Cambridge University Press.

Tasks:

Describe and discuss which features are shown in the images and where the images were taken. All images are shown in grey, so that color is no indicator for the planetary body. The first three examples are to warm up, followed by more difficult images. If you should not be able to identify the location, please explain why this is the case.

Downloads:

Task Image

ROBEX – Space Science

