



A complex TDEM and radar sounding of the Earth Moon. Ozorovich Yu.R.¹, Smirnov V.M.²

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Abstract

The primary goal of the Luna-Resurs mission in 2013 year is an investigation of the Moon and particularly its near layers subsurface structure. These studies are based on the following measurements which are performed by various instruments carried by the lander:

- Low-frequency sounding of the subsurface layers of the Moon by the ground measurement instrument RESPONSE-TDEM.
- High-frequency sounding radar for ground measurement on $f=2$ GHz with sounding depth in order to on 100 m .

In 1998 – 2005 , a novel hardware for deploying onboard the spacecraft (landers) and related numerical methods has been developed for TDEM and magnetotelluric sounding of the subsurface layers of Mars, particularly for an investigation of the planetary crylitozone. Similar methods are planned to use for studying the internal structure of the Moon.

The developed toolkit is proposed for TDEM low-frequency sounding in the MARSSES experiment on board the Martian balloon, rover and landing module.

It allows to obtain an aprioristic information about the top layer of moon rocks (down to 5m- 100m) which facilitates, then, an interpretation of data recorded with the electromagnetic sounding by means the long wave radar.

The complex sounding of the moon provides not only the information about its upper layer subsurface structure (important for understanding of the origin of the Mars –Phobos – Deimos, Earth - Moon systems) but also an outstanding experience of sounding at surface of celestial body. This experience is of particular importance for further investigation of subsurface structures of Mars and its paleoclimatic history which will be carried out in the future space missions.

References

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