As it is known the study of radioactivity are of great importance for developing our ideas of the Moon, planets and small Solar system bodies. It has given rise to extensive studies of the radioactivity of extraterrestrial substance from space vehicles and by laboratory methods through investigations of samples brought to the Earth. Fifteen vehicles explored cosmogetic and natural radioactivity of the Moon and planets. Gamma-spectrometry has been in wide use in these explorations. First measurements of gamma-radiation of the Moon were carried out by the "Luna-10" and "Luna-12" spacecraft in 1966. Detailed study of radioactivity in the equatorial region of the Moon was performed by the "Apollo-15" and "Apollo-16" missions in 1972. Radioactivity of the lunar samples brought to the Earth by the Soviet and American spacecraft has been studied in great detail. At last important results were obtained in the study of the radioactivity of Venus rocks by the "Venera-8,-9 and -10" spacecraft (1972-1975) and radioactivity of Martian surface by the "Mars-5" spacecraft (1974). (see fig.1).

The analysis of the data on the radioactivity of the Moon, Mars, Venus and the Earth show that on all these bodies there are two fundamentally different types of crustal material: the territories of the ancient crust and the younger territories of a volcanogenic character. On such slightly differentiated bodies as the Moon and Mars the natural radionuclide content on the territories of both types differs insignificantly. These territories seem to have a weakly pronounced difference in the basic rock-forming elements too. Such planets as the Earth and Venus have passed through a differentiation and, therefore, their surface are covered with the rocks considerably differing in the content of natural and rock-forming elements. The observed difference in the character and in particular, in the content of natural radionuclides stems from the difference in the degree of their differentiation which in its turn was determined by their primary mass and composition.

References:
Fig. K-U-sistemmatization of the main rocks of the Earth and the main formations of the Moon and planets.

$L_V$, $M_V$, $V_V$ - young volcanic formations of the Moon, Mars and Venus.

$L_C$, $M_C$, $V_C$ - ancient crust of the Moon, Mars and Venus.