



Studies of content of phyllosilicates in different regions of Mars based on data from Gamma-Ray Spectrometer suite (Mars Odyssey)

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Gamma-ray spectroscopy provides the unique technique for the depth distribution analysis (depth sensitivity in the range of 20-40 cm), which is very important for knowing the bulk composition of a particular mineral in the subsurface. Therefore, analysis of GRS data from NASA Mars Odyssey provides the complementary information to OMEGA and CRISM data for the bulk content of phyllosilicates, and even for particular type of these minerals.

To derive content of phyllosilicates, we use the simplest modeling approach for the Martian soil assuming that it is a bi-modal mixture of a regolith with standard composition and some kind of phyllosilicates. In our study we use the average chemical composition of standard regolith derived from MER data. The reference content of Al, Fe and H for the standard regolith is thought to be 4.9 wt%, 14.6 wt% and 0.2 wt%, respectively. We assume 2 wt% of water for the standard regolith, as it was suggested according to GRS and HEND data. Using the GRS data, we may obtain the measured content of Al, Fe and H for all known regions of detection of the signatures of phyllosilicates on the surface.

The *Si-nontronite* is thought to be the most probable type of phyllosilicate. It could be found practically at each region, and its estimated bulk content is ranged from the top value of 30 wt% for the Mawrth Vallis, to 18-22 wt% for Nili Fossae and for S. and W. Merridiani, to 13-15 wt% for Shalbatana region and Holden crater,

and down to practical absence (within few percents) for the Terby crater. The content of this type of phyllosilicate is mainly limited by observable content of Fe, but in two cases (Nili Fossae and Holden crater) the content of *Si-nontronite* is limited by the content of H. On the other hand, the *montmorillonite* and *kaolinite* could not be abundant phyllosilicates on Mars. They may only be suggested for the soil at Terby crater with a moderate content of 8 wt% and 4 wt%, correspondingly.