LONGITUDINAL VARIATIONS OF IMPACT CRATER DENSITY ON VENUS G. A. Burba, Vernadsky Institute of Geochemistry and Analytical Chemistry, Moscow, Russia

Introduction: There are about 1000 impact craters on the planet Venus, which surface area is $460x10^6$ km^2. A difference in impact crater density is considered as criterion for estimation of the relative geologic age of the surface regions on the planets. As a first approximation the craters on Venus looks to be situated over the surface randomly. The density of craters is about $2x10^6$ $km^{-2,}$ which is low in comparison with the other planetary bodies, such as Moon, Mars, Mercury and many of the satellites of the giant planets. To find out any possible regularity within such low crater density, it is necessary to analyse the crater distribution over the sufficiently large areas of Venus.

Approach: Analysis of the crater distribution by the planetographic longitudes has been used in this work to derive an estimation of differences in crater density. 967 craters have been count up within 36 sectors. Each sector is located from North Pole to South Pole and is bounded by two meridians, which are 10° of longitude apart. Each sector contains 27 ± 11 craters. The values have been smoothed with three different running windows: 30, 90 and 180 degrees of longitude. The step of moving in all three cases was 10 degrees of longitude, i.e. one sector (of the 36 original sectors).

Results: It has been found with 180° running window that there is a meaningful difference in crater density between the two longitudinal hemispheres of the planet bounded with 100/280°E meridian. The hemisphere 100-190-280°E contains 463 craters, and the supplemental hemisphere 280-10-100°E contains 504 craters. The smoothing with 30 and 90° running windows revealed very sharp boundary in crater density along 270° E meridian.

Interpretation: It could be concluded that there are considerable differences in crater density between the regions of Venus and 270-280°E is a boundary zone of the sharp difference. This boundary could be important with respect to the geological structure and/or evolution. The differences in crater density are more clearly within the Northern hemisphere of Venus, and they are traced in the Southern hemisphere in subdued, but still readable expression. This observation could point that the process of crater elimination was more intensive (either it have been active for a longer period) in the Northern hemisphere, where it took place within the certain regions to be resulted into the present differences in crater density. In the Southern hemisphere the eliminating process was less intensive (either its duration was shorter), but it took place within the same longitudinal regions, as in the Northern hemisphere.