LUNAR OPTICAL TYPES AS REVEALED BY GALILEO; A. N. Naydyonov, Yu. G. Shkuratov, D. G. Stankevich, Kharkov Astronomical observatory, Sumska 35 Kharkov 310022 Ukraine, shkuratov@mak.kharkov.ua

The albedo-color diagram using albedo $A (0.76 \mu m)$ and color index $C (0.76/0.41 \mu m)$ images from Galileo data is presented. With the help of this diagram a map of optical types of lunar surface was prepared.

Among images obtained by Galileo's SSI in 1990 two those, which have relatively high signal to noise ratio, were used in this work. Each image has resolution about of 5 km/pixel and occupies the zone from $50^\circ$ to $160^\circ$ on longitude and from $-60^\circ$ to $+40^\circ$ on latitude. The images were taken in wavelengths $0.76 \mu m$ and $0.41 \mu m$ at the phase angle of $24^\circ$. For data calibration we used our albedo and color-index measurements for the lunar nearside [1] The global limb-terminator trend of the brightness was corrected with using Akimov's formula.

In order to map the color-index it was necessary to transform one of the images to the other. The transformation consists of scaling, 2-D displacement and 3-D rotation of the lunar sphere. The map was obtained by dividing one of the image($0.76 \mu m$) to the other ($0.41 \mu m$) in each point. The color index map was calibrate in the same manner as the albedo map. The albedo-color diagram was made with using the albedo and color index distributions (see Fig. 1). This diagram is similar to the diagram for the nearside [1] (see Fig. 2), but it has some difference. On the Galileo's diagram relatively "red" regions with low albedo (like Mare Frigoris) are absent. Relatively "blue" mare regions with low albedo form three independent domains. Clustering of the diagram enables one to classify any point of the lunar surface according to its albedo and color-index. By this way the map of optical classes of the lunar surface was produced.

This map in the Laplace projection with central longitude of $60^\circ$ and the scheme of the clustered albedo-color diagram are shown in Fig. 3. One can see that: the mare domain marked "1" in diagram Fig.3 corresponds to Oceanus Procellarum; the second marked "2" is formed by Grimaldi basin, coastal region of Oceanus Procellarum near Cardanus and Krafft craters and by part of South Pole - Aitken basin; the third cluster marked "3" is due to Mare Orientale.

Reference
LUNAR OPTICAL TYPES AS REVEALED BY GALILEO: Naydyonov A. N. et al.

Fig. 1. Albedo color diagram of studied region

Fig. 2. Albedo color diagram of lunar nearside according [1]

Fig. 3. The map of optical types of lunar surface and scheme of albedo-color diagram dividing