

VOLCANISM IN MARE ORIENTALE. Sukhanov A.L. Geological Institute, USSR Academy of Sciences, Moscow, USSR.

The analysis of "Lunar Orbiter 4,5" and "Zond 8" pictures has revealed that an extensive areal volcanism took place in Mare Orientale after this impact basin was created but before it was filled with mare basalts.

The annular zone 100-150 km wide around the central basin of this mare is filled with flat-topped isometric domes with hilly-furrowed surface. There are gradual transitions from dark central basin lavas to the domes. It is seen in certain places that the dark smooth lavas are raising a little along the basin's border and furrows and expansion fissures appear. Farther away from the central basin they are increasing in number and thickening into a dense net, producing with additional hills and craters the typical rugged surface of the domes. Their pattern is similar to the "shattered-plate" structure of terrestrial salt domes and brachy-anticlines. Some domes have summit pits or light hills with summit pits; they are thought to be small volcanoes and cinder cones. In certain places between the domes one can see ridges and furrows pattern similar to warping ridges on lava flows. Some of the domes seem to mantle the inner buried cordillera that protrudes at random, but most of them should be considered as uplifts above intruded magmatic bodies (laccoliths), their summit volcanoes being the result of magmas' break-through in the apexes of domes. As a rule these structures are overlapped with dark lavas.

The annular zone between Montes Rook and Montes Cordillera is filled with volcanic accumulations, their surface structure being in strong contrast to the surface of the impact ejecta blanket nearby. Regular fissures and furrow pattern are seen there as well as a lot of small smooth hills and hollows, most of them being cinder cones and vents. The accumulations overlap the two annular cordilleras and seem to be emplaced later, but prior to the emplacement of mare lavas. Some individual volcanoes on the cordilleras and the pairs of craters Wright-Sheiler and Pettit-Nicolson were created at about the same time, the craters being considered as large calderas because of certain features peculiar to them.

There is seen the remarkable ring of dark material on the pictures of "Zond 8" (Mare Mirnoe), that overlaps all the structures surrounding Mare Orientale, but it is not pronounced in topography. Evidently it is made of young (contemporaneous with the mare lavas) pyroclastic deposits along a ring-fracture 160 km in diameter.

Thus, in addition to the effusions of mare lavas there was an extensive areal volcanism in this region that differed from the mare's one both in the morphology of features created, time of emplacement (initial stages of basin filling), and perhaps in the composition of volcanic rocks. There are signs of a similar volcanism along the borders of other circular mares, Mare Humorum in particular. Such volcanic areas may be responsible for the presence of "non-mare" basalts and other exotic effusive rock types on the sampled sites.