VOLCANOGENIC - SEDIMENTARY DEPOSITS ON THE SLOPES OF THE TYRRHENIAN SEA SUBMARINE VOLCANOES AS AN EVIDENCE OF EXPLOSIVE VOLCANISM

V.N. Moskalenko*, K.M. Shimkus

Southern Branch of Institute of Oceanology named by P.P.Shirshov of Russia Academy of Sciences , 353470, Gelendzhik, Russia.

Abstract

Complex geological - geophysical research of Tyrrhenian sea underwater volcanoes has been performed during 16-th expedition of R/V *Akademik Mstislav Keldysh* (1988). Stratified siesmic layers consisting of volcanic-sedimentary rocks, formed due to explosive volcanism, have been for the first time discovered on slopes of submarine volcanoes during seismic single channel profiling. Certain geological evidences have been received during underwater geological survey, performed from submersible manned apparatus "Mir".

Key-words : deep sea basins, seismic, stratification, volcanology

Stratified siesmic layer distribution.

Vavilov, Magnaghi and Marsili underwater volcanoes are usually considered as a lava flow's cones (1,3). In 16-th expedition of R/V *Akademik Mstislav Keldysh* a lot of geological information, proving the wide spreading of basalt lavas in structures of all mentioned volcanoes, has been collected. Furthermore, for the first time we have received data of participation of volcanogenic - sedimentary complexes in their structures. The evidences are seismic sections with stratified structure, crossing the mountain slopes (1).

Vavilov volcano is the biggest submarine mountain in the central part of Tyrrhenian sea deep-water basin, its height is 2.9 km, the top is at the depth of 0.7 km (fig 1). It is asymmetric by geomorphological and tectonic structure: its western slope is steep (up to 26.5 degree.), and the eastern slope is gentle with numerous tectonic steps. Lava flows are discovered everywhere on western slope and on northern and southern ends of this submeridionally stretched volcano. On the seismic section of western slope there is steeply inclined stratified formation with thickness from 80 to 150 ms. Photo / video shooting has revealed a number of tectonic ledges, where the stratified formations, related to lavas, has been found. By the character of bedding some of them could be considered as tuff-lavas, lava-breccia. Stratified structures on this slope are found during dives of French apparatus "Siana" (2).

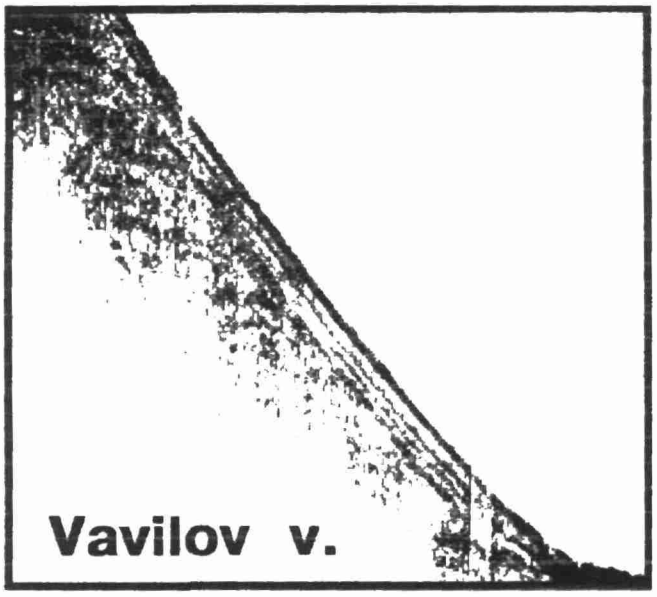

Figure 1.

Magnaghi. Several stratified siesmic layers were revealed on Magnaghi underwater volcano with top on 1465 - 1600m, located on west from Vavilov mountain. The upper siesmic layer is monitored not everywhere. It is spreaded on north - eastern slope and elevation adjacent to Magnaghi. Its small fragments are marked out in southern part of mountain. On western slope, on the part, which transits to the adjacent elevation, the upper stratified siesmic layer is presented by three consecutively overlapping formations, each of them ended at different distance from the top.

On the southern slope this siesmic layer is divided into steps, located at different hypsometric levels and is exposed on tectonic ledges in its whole thickness that equals 300 - 500 m (fig. 2). On almost vertical ledges the visual monitoring, photo and video shooting had discovered thick lava flows partially overlaid with stratified, obviously volcanogenic - sedimentary formations.

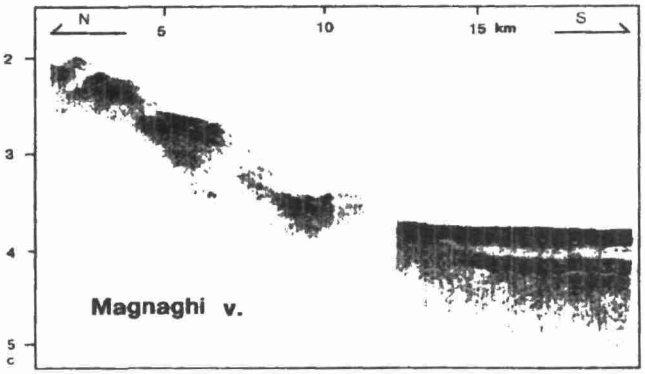

Figure 2.

Marsili volcano is located in south - eastern part of deep-water basin, and, like the others, is stretched in submeridional direction. Its width is twice bigger than Vavilov volcano. Its height is 2700 m, and its tops are at depths 500-800 m. Lava flows are exposed, mainly, on northern and southern ends of volcano, in the areas of young tectonic activity. The stratified formation is revealed on seismic sections crossing upper and middle parts of slope (fig.3). Its thickness increases downhill from 50 to 100 ms. On some parts of slope it is underlaid with lava formations, creating very uneven surface. In the bottom part of north - eastern slope the thickness of stratificated formation is 200 - 250 ms, it is smaller in upper part of western slope.

During underwater survey performed from "Mir" apparatus, the stratified formation has been photographed and video recorded in one

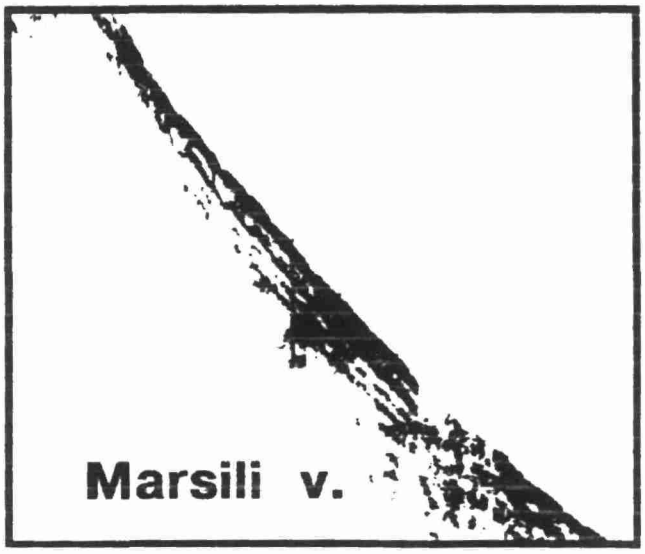

Figure 3.