

Mudvolcanoes in the Black Sea

Tj. C.E.VAN WEERING ⁽¹⁾ and M. IVANOV ⁽²⁾

⁽¹⁾ Netherlands Institute for Sea Research, TEXEL (The Netherlands)

⁽²⁾ Dept. Geology, Moscow State University, MOSCOW (Russia)

During 1991 an international group of scientists and students carried out a training and research program on board the Russian Research Vessel "Gelendzhik". In the Russian sector of the Black Sea this was partially directed towards a study of the distribution and character of mudvolcanoes in an area South East of the Crimean peninsula, by means of subbottom profiling and side scan sonar recording, followed by box- and gravity coring.

In the study area the upper two seconds of the sedimentary sequence consist of Plio/Quaternary sediments with well stratified, parallel to sub parallel reflectors which locally are interrupted by the piercing and diapirism of the mudvolcanoes.

The mudvolcanoes generally have a mushroom shaped or volcanic crater like cone that rises 40-120 m out of the surrounding, flat seafloor. Their diameter at the seabottom ranges from 900-2700 m. However, a number of mudvolcanoes has an asymmetrical shape, with a depressional sink and with rims along the margins.

Numerous diapiric structures were also observed at greater depth below the seafloor, sometimes associated with growth faults extending from their tops towards the surface, and with faulted or folded reflectors above and on top. Aside from positive features in the sedimentary column, collapse structures at depth can also be observed, and are relatively abundant.

Side scan sonar records show the presence of smaller scale vents and seeps and locally show the presence of mudflows, carrying blocky lumps of semiconsolidated material over the rims.

Most probably the bright spots observed at 440-600 ms TWT below the seafloor represent the presence of gas; earlier results from MSU indicate the presence of methane and gas hydrates in and near the zone where mud volcanoes are abundant.

Fig. 1 Shows the shallow seismic reflection and (partially) sidescan sonar recording lines (indicated by nrs) of Black Sea cruise R.V. "Gelendzhik" 1992 in the area south east of the Crimean peninsula. Circles give positions of (expected) mudvolcanoes.

