

# Azerbaijan: Country of Mud Volcanoes

by Said Huseynov

Of the 800 or so mud volcanoes discovered throughout the world to date, more than 300 of them are located in Azerbaijan. Mud volcanoes, which are related to the more common magmatic volcanoes, are found in more than 26 countries, including Colombia, Italy, Romania, Russia, Ukraine, Iran, Pakistan, and Malaysia. But Azerbaijan's mud volcanoes differ from those in other countries in their frequency, morphological properties, high activity, and beauty.

Dr. Adil Aliyev, the leading specialist on mud volcanism in Azerbaijan, and head of the of the Mud Volcanism section at the Geology Institute of the Azerbaijan National Academy of Sciences (GIA), reports that most of Azerbaijan's mud volcanoes are in active phase, with the heights of some of these marvels of nature reaching 400 meters.

There are also some inactive, buried, submarine, and island mud volcanoes in the country. Furthermore, 21 percent of the mud volcanoes located on land produce oil. For all these peculiarities, Azerbaijan—known as the “land of flames” because of its burning hillsides, as gas seeps through fissures in the earth—has also been named “the country of mud volcanoes.”

Mud volcanoes play a great role for science. While studying mud volcanoes, geologists can explore deep layers of the Earth and deep geological settings: geochemical processes, mineral deposits, and especially oil accumulation at depth. There are dense connections between mud volcanoes and oil structures, so mud volcanoes are natural exploratory wells, created without any capital expenditure. These wells are the most suitable objects of research for estimating the oil and gas potential of the areas in which the volcanoes are located, also giving matchless information on mineral resources.



Courtesy of Geology Institute, Azerbaijan

*Toragay, one of the largest mud volcanos in Azerbaijan, is more than 400 meters high.*

Generally, mud volcanoes are an uncommon, sporadic, and amazing phenomenon of nature, but researchers have found many correlations between mud volcanism and seismology—earthquakes. As a result of such research in Azerbaijan, it has been discovered that mud volcanoes become more active in pre-earthquake periods. The amounts of some components in gaseous fluids overflowing from mud volcanoes increase strongly; for instance, the helium and carbon dioxide content of gas; boron; and, in some cases, the chloride and sulphate content of volcanic fluids.

Such eruptions mainly occur after powerful earthquakes.

At the moment, the activity level of Azerbaijan's mud volcanoes is quite high. Formerly, there were an average of 3 to 4 eruptions a year. But in the 21st Century, this pattern has been broken. For instance, 17 eruptions occurred on land and underwater in 2001. (One vol-

cano in Spring 2001, under the Caspian Sea, created a new island off the Azeri coast.)

The activity decreased a little in 2000-2003, and there were only 6 eruptions in 2004, and only 3 eruptions in 2005. Dr. Aliyev notes, however, that more eruptions are expected in the near term.

Let me emphasize that more eruptions are expected in the future as a result of increased human activities. It is very dangerous to carry out building, construction, and excavation activities around mud volcanoes, because such processes can cause eruptions. [See photo of Lusi]. This has happened in Azerbaijan in the past.

Although in general mud volcanoes are dangerous for human life, the increased mud volcano activity has been a boon to science. It has helped researchers to understand mud volcanoes more profoundly, and to develop



Courtesy of Geology Institute, Azerbaijan

*A gryphon (short, steep-sided cone oozing mud) from the Dashgil mud volcano in Azerbaijan.*



Courtesy of Geology Institute, Azerbaijan

*A large mud flow from the Dashgil mud volcano.*

*The mud volcano Lusi, in East Java, Indonesia, most probably caused by faulty procedures while drilling for natural gas.*



Anders Nermoen/University of Oslo

the tools to forecast future eruptions.

#### **Useful Characteristics**

Mud volcanoes have many other useful characteristics. They produce, for example, many products that can be used in construction, chemistry, and medicine. Volcanic breccia is a mineral source, and volcanic clay is a profitable primary ceramic material which is used widely, especially in brick production. Volcanic water consists of boron, bromine, and iodine, while breccia is enriched in many essential microelements—boron, manganese, lithium, and other minerals.

Volcanic mud assumes great importance in medicine, too. Various diseases—digestive, nervous, gynecological, urological, and dermatological—may be treated by means of such muds, including rheumatic fever, radiculitis, and quinsy (an abscess between the back of the tonsil and the wall of the throat).

Mud volcanism is one of the main topics in the foreign relations of the Geology Institute in Azerbaijan. Many research seminars in Baku are held each year in the framework of international joint projects, under the leadership of Academician Akif Alizadeh, Director of the Geology Institute. Many foreign scientists in various areas of science focus on the mud volcanoes of Azerbaijan, and explore them when they visit the country. That is why geologists the world over call Azerbaijan a “natural laboratory.”

*Said Huseynov is press secretary of the Geology Institute at The Azerbaijan Academy of Sciences.*