

ALTERNATIVE RESOURCES AND ENERGY SOURCES FROM THE BLACK SEA BOTTOM

Dimitar DIMITROV and Petko DIMITROV

Bulgarian Academy of Sciences, Institute of Oceanology, Department of Marine Geology and Archaeology, P.O. Box 152, 9000 Varna, Bulgaria

e-mail: margeo@io-bas.bg

The present paper was prepared under the ASSEMBLAGE Project 5th FW EC. All existing till now investigations on non-traditional raw materials and energy resources in the Black Sea were generalized. The Black Sea was examined as a natural geo-biotechnological reactor which is source of resources.

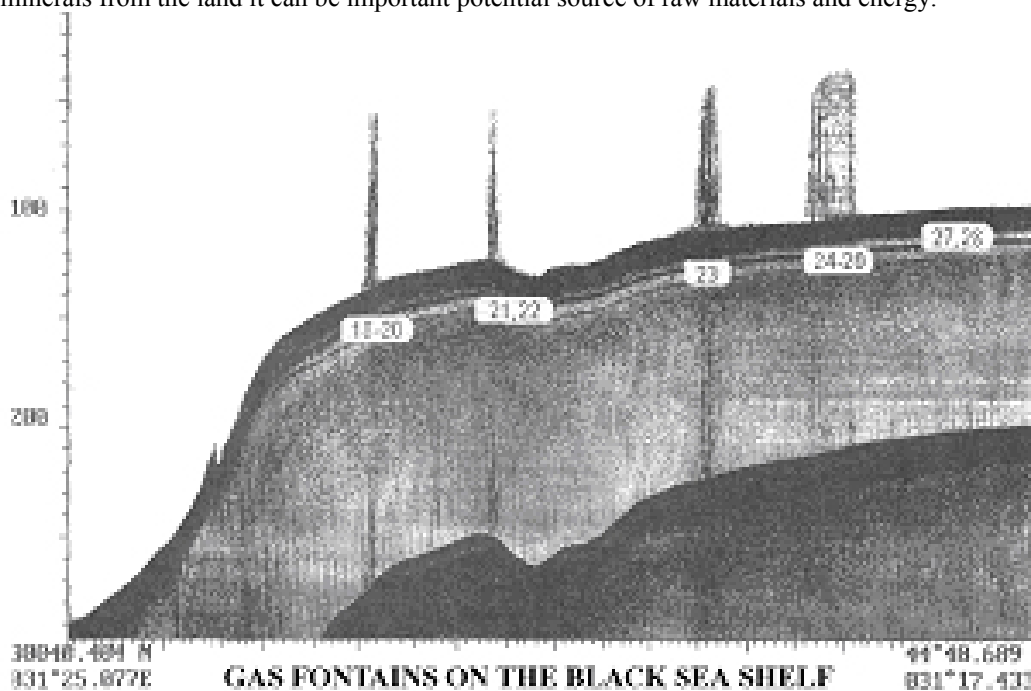
The sapropel, diatomic and coccolitic muds, hydrogen sulphide, gas hydrates, carbon sulfide gases, natural gases and fresh water are the most promising easy alternative power resources. The sapropel, diatomic and coccolitic muds are found from 200 to 2200 m depth. They can be used as natural ecological fertilizers for adding nutrients to poor soils; adsorbents for purification of water (radioactive included.); ceramics: sound-, thermo- and hydroisolation materials; amorphous, carbon and silica glasses; cosmetics, pharmaceuticals etc. There is a patent No 63868/30 April 2003 published by National patent office of Republic of Bulgaria for using of sapropel as an ameliorant for soils and substrates.

Hydrogen sulfide in the Black sea is considered not only as major characteristic, but also as a possible energy source. The comparison between the hydrogen sulfide and a high-calorific energy source such as methane shows that during the combustion of one cubic meter of methane 8500 Kcal of heat are liberated, while from the combustion of 1 cubic meter of hydrogen sulfide 5.535 Kcal are liberated. Therefore H₂S in suitable concentrations can be used as a major energy source. However the technology of its extraction most probably will be economically unprofitable. The bottom sediments are of great interest, because the concentrations of H₂S are reaching 24 g/t.

The hydrocarbon gas-hydrates in the Black Sea sediments are a most promising power resource. Compounds are composed of water molecules and different gas molecules (methane, propane, isobutane, carbon dioxide, hydrogen sulfide, nitrogen, etc.) called clatrates. They are characterized by a high gas concentration in a volume unity of sediment (1 m³ of porous sediments contains 30 - 36 m³ methane). Projected reserves are estimated to 20-25 trillion m³. The most perspective for investigation are gas-hydrates deposits disposed in neoexunian sediments at depths 3-5 meters under the sea bottom.

Degassing structures can be found everywhere on the Black sea bottom. They are accompanied usually by fresh water springs. These sources, after precise mapping and creation of a suitable recovery technology can be used as a low long lasting energy source.

In conditions of limitation of the nuclear energy and in increasing of ecological requirements during extraction of minerals from the land it can be important potential source of raw materials and energy.



Key words: Black Sea, sapropel, H₂S, hydrocarbon gas-hydrates, degassing structures, alternative resources, energy sources.

