INTRODUCTION

Trying to answer this simple question the paper presents results of quantity evaluation of the Black Sea Methane Hydrate bearing area by three different approaches.

The preliminary calculations show that the average water depths in the Black Sea from which methane hydrate start to form are from 900-1200 meters. The area of the Black Sea is about 4200 km² having a volume of 20,000 km³. The bottom water temperature and salinity in the Black Sea are about 10°C and 18-19 ppt respectively. The average thickness of hydrate layer is about 300 meters. The bottom water salinity is about 18-19 ppt. The total volume of methane hydrates in the Black Sea area is estimated to be about 300 billion m³ of methane gas trapped in the Black Sea sediments.

SECOND APPROACH

The more realistic approach is to define areas of great prospect for gas hydrate bearing based on hydrographic, geophysical, and geologic criteria and then to evaluate the potential for the existence of shallows areas, submarine canyons, mud volcanos, mid-ocean ridges etc., and then estimate which parts of these areas, based on the consideration of their local peculiarities (the areas determined (Fig. 2) are the continental slopes in the far north and as follows (1) South Western Area (South Bulgarian and Black Sea slope and eastern Thrace/Crimea), (2) West Crimea, (3) South Crimea area (Soomen, Novo-Soomen, and Shablo), (4) Central area (Ukrainian and Bulgarian shelf), (5) North Eastern area (the Black Sea shelf), and (6) Central area (Black Sea shelf) having a total area of about 1.5 million km² and representing about 30% of the Black Sea area. The thickness of the gas hydrate layer is estimated to be about 300 meters. The total volume of methane hydrate in the Black Sea area is estimated to be about 300 billion m³ of methane gas trapped in the Black Sea sediments.

THIRD APPROACH

The third approach is based on a detailed evaluation of thematic areas of hydrate occurrences and extrapolating the results on the defined prospects for gas hydrates having the total areas of the gas hydrates bearing areas in the Black Sea submarine fans, abundance faults and fracture zones and mud volcanoes and submarine canyons with area of about 5.5 million km² and representing about 30% of the Black Sea area. The total volume of methane hydrates in the Black Sea area is estimated to be about 300 billion m³ of methane gas trapped in the Black Sea sediments.

Submarine fans complexes

In the Black Sea methane hydrates are formed in sediments with relatively high content of coarse fraction. In the submarine fans complexes such sediments are limited mainly to channel-ledge systems developed mainly by mass transport processes. These areas are turbidite deposits at the channel area and middle slope fans where, in spite of high density flow hazards, the current velocities in the channel banks, overbank deposits at the sides and ends of channeline systems and all these are sparsely bioturbated.

Black Sea Methane Hydrates – How Many Are They?

Lyobomir Dimitrov and Atanas Vassilev

Institute of Oceanology, P.O. Box 152, Varna 9000, Bulgaria, e-mail: geo@io-bas.bg

ABSTRACT

The Black Sea is an area of great interest for the gas hydrate studies. In this paper, an overview on the state of the art of Black Sea gas hydrate research is given. The results are presented in three different approaches and the potential for the existence of North and South Black Sea methane hydrate bearing zones are examined. The total volume of gas hydrates in the Black Sea is estimated to be about 300 billion m³ of methane gas trapped within the Black Sea sediments.

The joint Donuzlav and Bazar deep sea fans emboss an area of approximately 20,000 km² in the northwestern part of the Black Sea from the shelf break to the abyssal plain. There are only a few, if any, published data on the occurrence of gas hydrates in the area of the two fans. No gas hydrates are found in the sediments in the area of the Fans. The total volume of gas hydrates in the area of the Fans is estimated to be about 1.5 billion m³ of methane gas trapped in the Black Sea sediments.

The total volume of gas hydrates in the Black Sea is estimated to be about 300 billion m³ of methane gas trapped within the Black Sea sediments.