GAS HYDRATES IN THE NORTHWESTERN BLACK SEA

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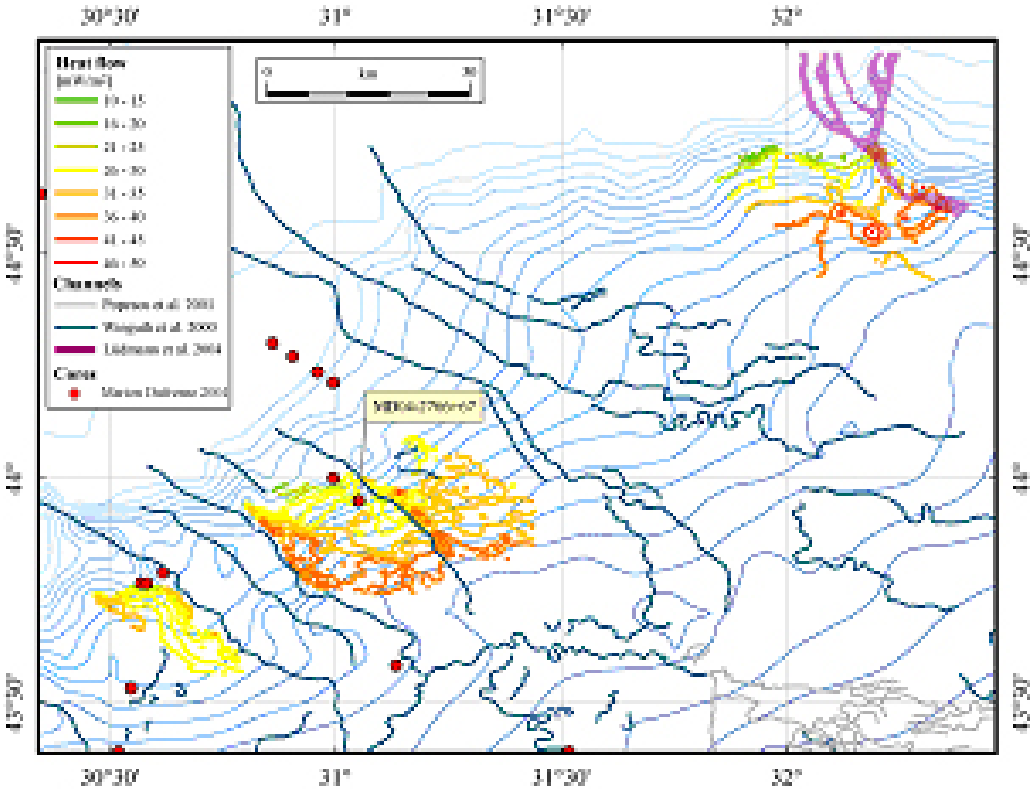

The semi-enclosed Black Sea, the largest present-day anoxic basin in the world, offers favourable condition for the accumulation of organic material in the sediments. Degradation of this organic matter is an essential prerequisite for the formation of methane. In turn, methane is the main component of marine gas hydrates, which are of increasing economic interest because they captured a large volume of gas (1 m^3 of gas hydrate = 164 m^3 of methane at STP). The stability field of gas hydrates suggests that they can occur in the Black Sea when the water depth exceeds 650-700 m. However, an accompanying BSR has been detected seismically only at a few places. Our study in the north western Black Sea shows three more-or-less isolated fields of BSR occurrence southwest of the Crimea and off Romania. In both regions, the gas hydrates are located close to deep sea channels. Reflection and refraction seismic studies adjacent to the Dniepr Canyon indicate that gas and gas hydrates occur in an area of 805±20 km^2, in which $12\pm3x10^{11}$ m^3 of methane are estimated to be associated with gas hydrates or occur as free gas below., The two observed gas hydrates fields at the continental margin of Romania in a water depth range of 700-1650 m have a maximal extent of 1100 km^2. The heat flow calculated from the BSR depth averages about 30-40 mW/m^2, with higher maximum values (55±15 mW/m^2, water depth range 700-1350 m) in the Dnieper area. These values are consistent with data obtained by measurements with heat flow probes in the Black Sea. In both areas, gas hydrates are associated with channel-levee deposits. At the Romanian continental margin, these deposits are intercalated by slumps and slides. At present, what limits the spatial distribution of gas hydrate accumulation is not fully understood, but grain size of the sediments probably plays a role. Coarser sediments with their higher permeabilities provide a better pathway for the migration of gas, which becomes a hydrate cement when it enters the gas hydrate stability zone. Further investigations will be focused on 3-D seismic profiling in combination with refraction seismic to provide more insight into distribution and concentration of the gas hydrates in the stratal column.