

# **Bulgarian gas hydrates and bottom instability**

Atanas VASSILEV

Institute of Oceanology- BAS, PO Box 152, Varna 9000, Bulgaria

[gasberg@mail.bg](mailto:gasberg@mail.bg)

The present work focuses on the relatively shallow water depths (300-800 m). In this zone, gas hydrates (GHs) are thought to be relatively unstable and may impact drilling operations, sea-floor installations, and pipelines. The main objective is to study the influence of bottom water temperature changes on GH stability.

## **Procedures**

Modeled and analyzed are:

- Minimum water depth of GH formation;
- Seasonal variations of bottom water temperature and GH stability;
- The influence of eddies on GH stability.

Approach accounting for the impact of seismicity and mud volcanoes' activity.

## **Results**

The results of modeling indicate that long (50 years), seasonal and short- term variations of bottom water temperature may affect GH stability only in the upper 1-2 m of sediments. However, the zone where repetitive GH formation-decomposition occur because of bottom water temperature change is extensive - mainly water depths range 300-500 m.

## **Conclusions**

Gas blowouts, oil ejection into water column, sediment slumps, and other geohazards triggered by GH decomposition could occur in the area, and impact sub-sea operations.

The Black Sea mud volcanoes are at other – older stage of their evolution – they are not erupted during the last century but their necks are main pathways for deep strata degasation. Or the eruption process is too slow – let name it “turtle eruption”, and thus is invisible for seismic stations on land.

Supposed mud volcanoes in the area of Bulgarian offshore obey to the same general rule of distribution according seismicity as known in the Black Sea (30 objects), and their location is a function of the sedimentation rate.

**Acknowledgements.** This work is in the frame of the Bulgarian-Romanian Transboundary Project “Marine Geohazards” (EC).