

PS Caspian Sea Geohazard Areas (Russian sector)*

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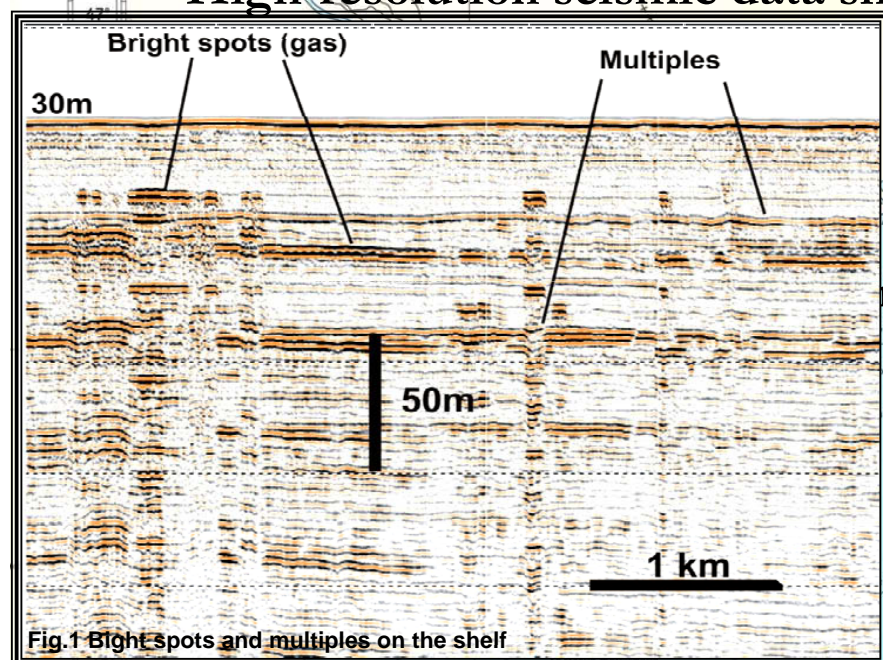
Abstract

High-resolution seismic data shows distinct zonation of North and Middle Caspian Sea (Russian sector). In the north are situated shelf plains with plenty of gas-saturated layers and numerous paleochannels, which are geohazards that affects exploration constructions. Southward, the shelf break and slope form Mangyshlag Threshold with paleodelta complexes, creep and great fan system with big channels. On channel levees there are several fields of modern sediment waves. These geomorphologic forms are evidences of solifluction and active hydrodynamics (both bottom-currents and turbidity flows in channels), which are hazardous for pipelines. Western slope of the Central Basin has undulating relief; the whole sequence has a form of a wedge and is situated between the shelf break and the steep step down to abyssal plain. Recent research has shown that the wedge is a long-living (700kyr) field of sediment waves with 4 generations of waves, interbedded with deep marine sediments (parallel or transparent acoustic pattern). Modeling of plastic deformation shows that wedge of sediment waves is stable, nevertheless the slope has second "break" with steeper angle (2-3° vs 1.5°), where occurs modern micro-slumping activity. All these distinct zones of different geological environments are connected with different geohazards. As a result, the map of geohazards has been obtained.

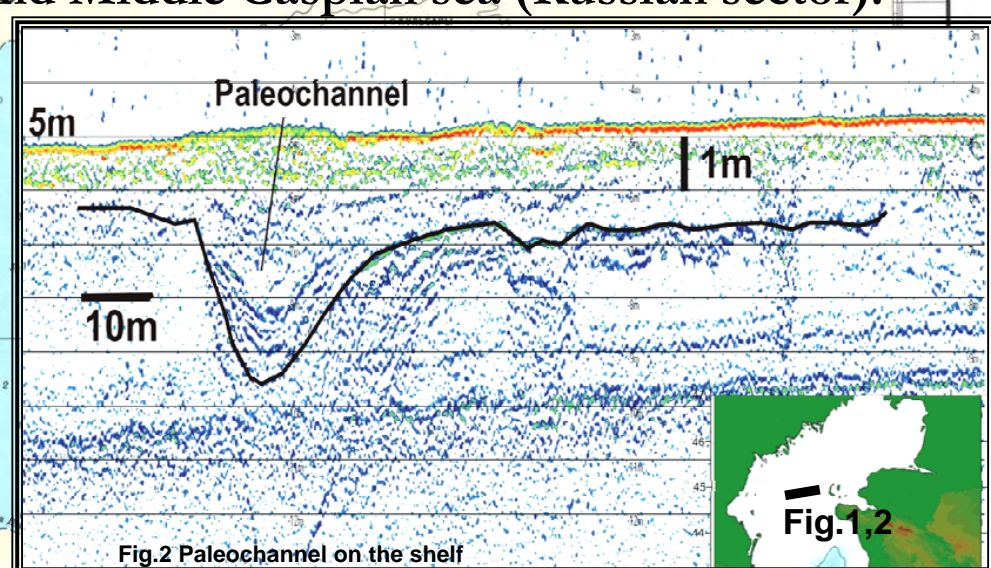
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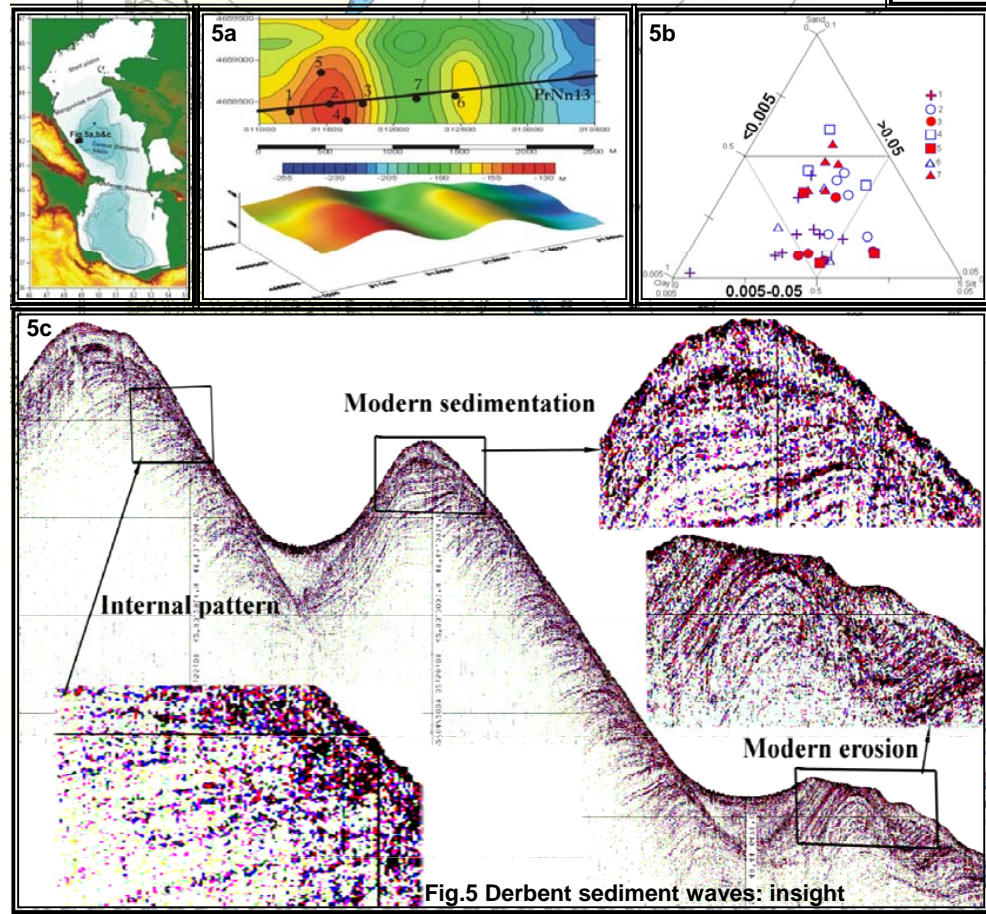
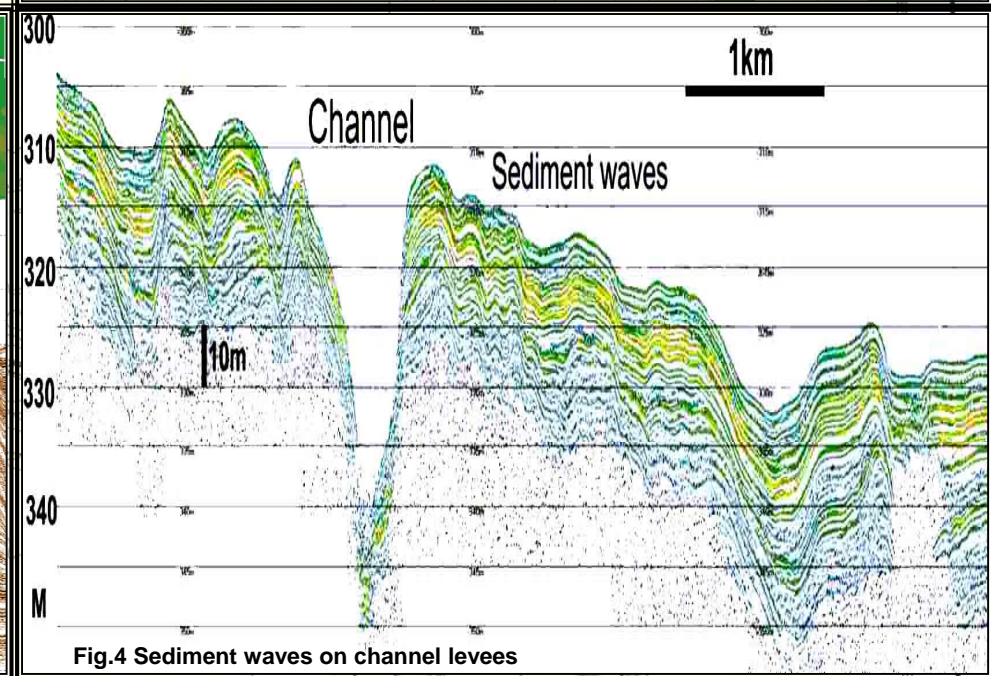
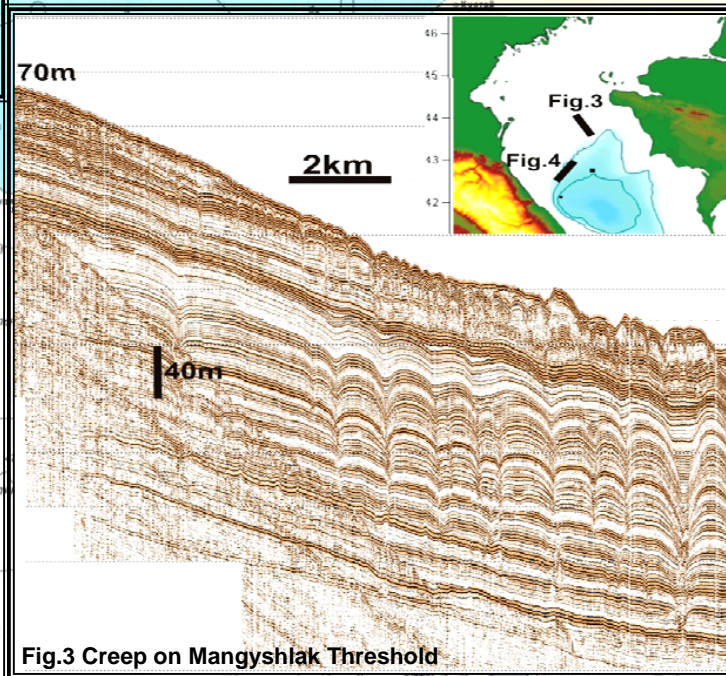
High-resolution seismic data shows distinct zonation of North and Middle Caspian sea (Russian sector).



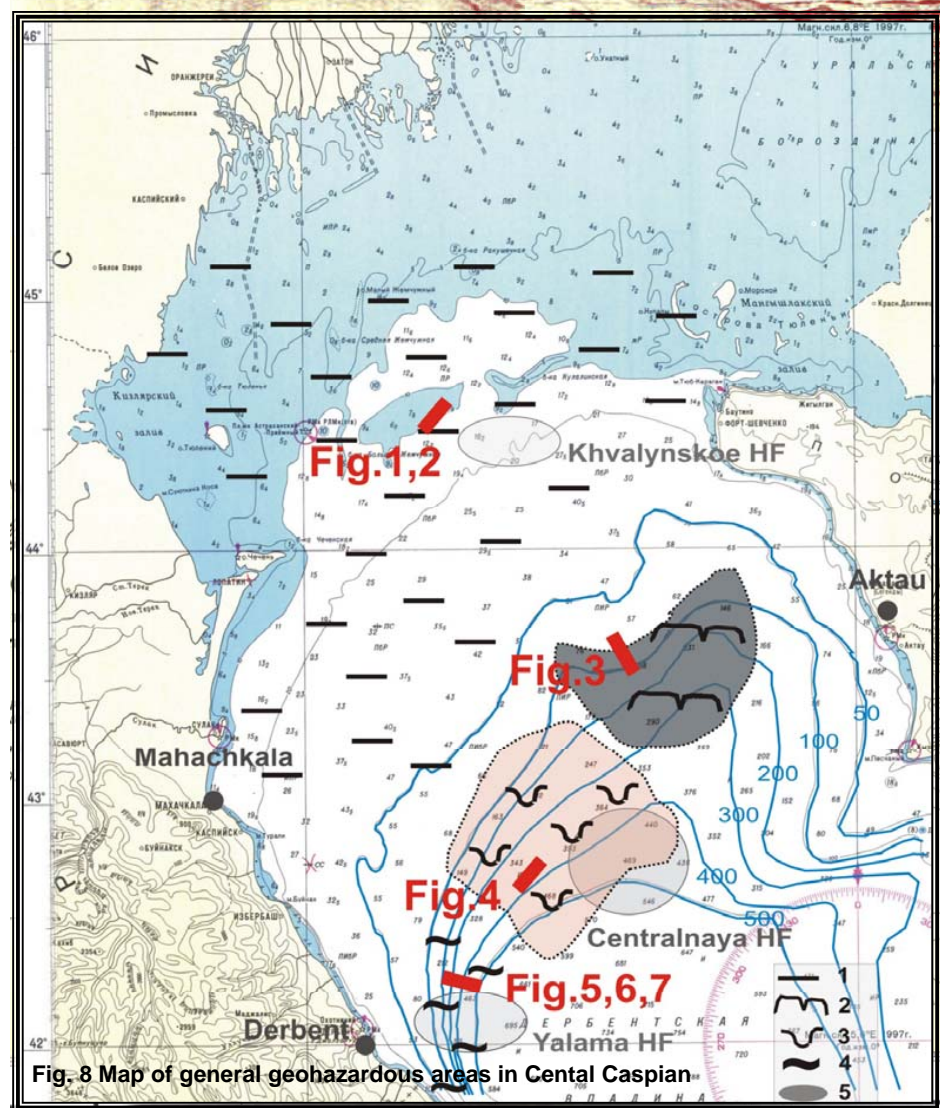
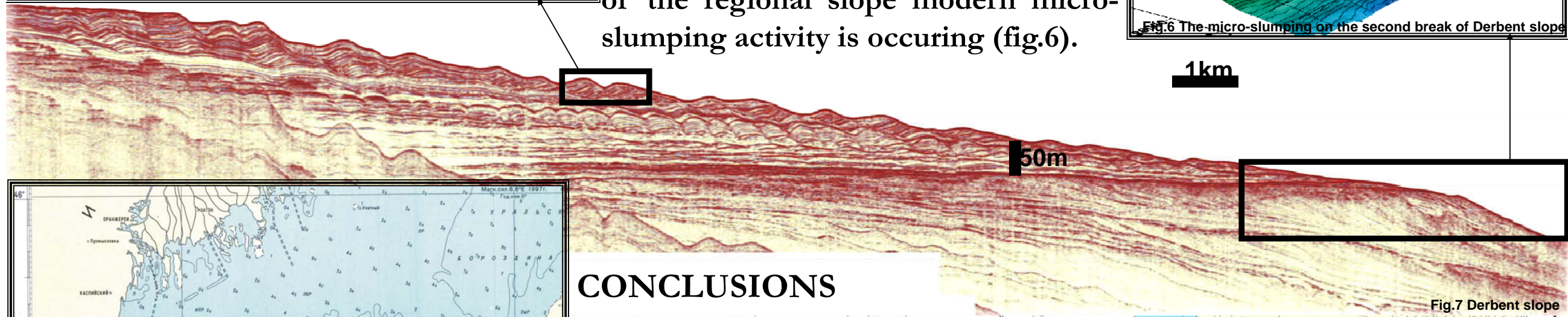
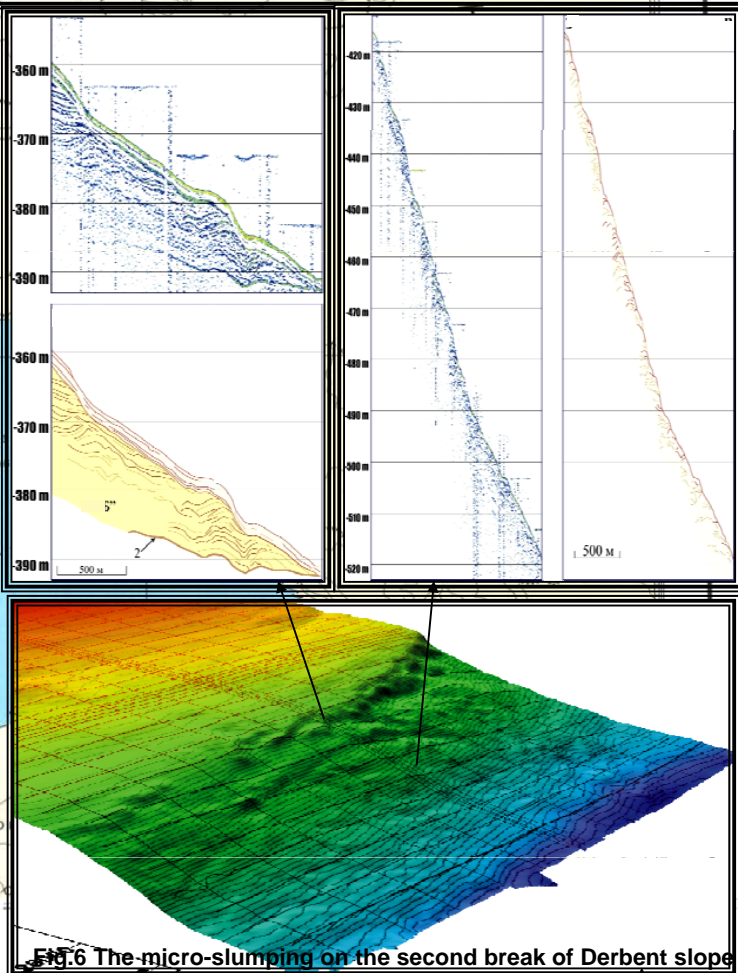
In the north are situated shelf plains with plenty of gas-saturated layers (fig.1) and numerous paleochannels (fig.2). These are geohazards for exploration constructions because of possible slumping and construction corrosion.



Southward, the shelf break and slope mark Mangyshlag Threshold with creep area (fig.3) and great fan system with big channels. Creep evidences solifluction, while several sediment waves fields on channel levees (fig.4) evidences of active hydrodynamics. Both processes are of danger for any constructions.



Western slope of the Central Basin has undulating relief (fig.5). Seismoacoustic sections show a long-living (700kyr) field of sediment waves; the sequence is wedge-formed (fig.7) and represents transgression-regression history. The age is obtained from correlation with regional seismic "markers". Short geological cores (4m) show mixed material of different grain size and origin (fig.5). Modeling of plastic deformation shows that the wedge in the whole is stable. Nevertheless on the second "break" of the regional slope modern micro-slumping activity is occurring (fig.6).



CONCLUSIONS

- zones of different geological environment provide different geohazards. As a result, the map of geohazards has been obtained (fig.8).
- pipeline construction will face a lot of problems; it is necessary to obtain more data about current pattern and bottom relief.
- the Caspian Sea is a natural polygon for better understanding of inter-dependent sedimentation processes.

For any questions and possible collaboration please contact vitapu@ocean.ru