RESULTS OF HYDROGRAPHIC SURVEYS OF SEA AREA - SOUTHERN SLUPSK BANK

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ABSTRACT

The Slupsk Bank, formerly known as the Stolpe Bank (after the former German name Stolp of the now Polish city of Slupsk) is a bank situated 16 miles northward of Ustka, is about 24 miles long east and west and 10 miles broad. It has on the greater part of it general depths of 10 to 18 m, sand; the shoalest part is the northwestern, where there are several patches with from 8 to 9 m water, and at the western end, where there is a depth of 10 m. On the southeastern edge of the bank the water deepens suddenly to 29 and 33 m and on the other edges gradually.
Because of long distance to the coast and large area, hydrographic surveys are carried out by large hydrographic vessels in 24H system. Results of hydrographic surveys of the part of Slupsk Bank have been presented.

INTRODUCTION

Slupsk Bank has been surveyed in March, 2010. During surveys have been used:
- **hydrographic multibeam echosounder Simrad EA3000D,**
- **GPS receiver Trimble 5700,**
- **motion sensor Octans,**
- **sound speed profiler,**
- **hydrographic system QPS Qinsy.**

AREA OF SURVEYS

Hydrographic surveys has been realised in B area limited by co-ordinates:

54 45'42.43"N	**016 29'59.88"E**
54 49'39.02"N	**016 28'56.62"E**
54 51'00.76"N	**016 45'18.16"E**
54 47'03.71"N	**016 46'22.44"E**

A area is limited by co-ordinates:

54 48'33.51"N	**016 57'31.89"E**
54 52'26.70"N	**016 55'49.89"E**
54 55'54.30"N	**017 20'40.80"E**
54 52'01.26"N	**017 22'17.40"E**

The area connecting A and B areas is limited by co-ordinates:

54 47'03.71"N	**016 46'22.44"E**
54 51'00.76"N	**016 45'18.16"E**
54 52'26.70"N	**016 55'49.89"E**
54 48'33.51"N	**016 57'31.89"E**

Surveys of Slupsk Bank are the result of international obligations in the field of delivering the actual bathymetric situation for cartography and maritime safety in HELCOM fairways.

There 80 profiles have been planned with 10 nmile distance and 90m separation. Separation between profiles is the result of multibeam echosounder geometry and the area depth.

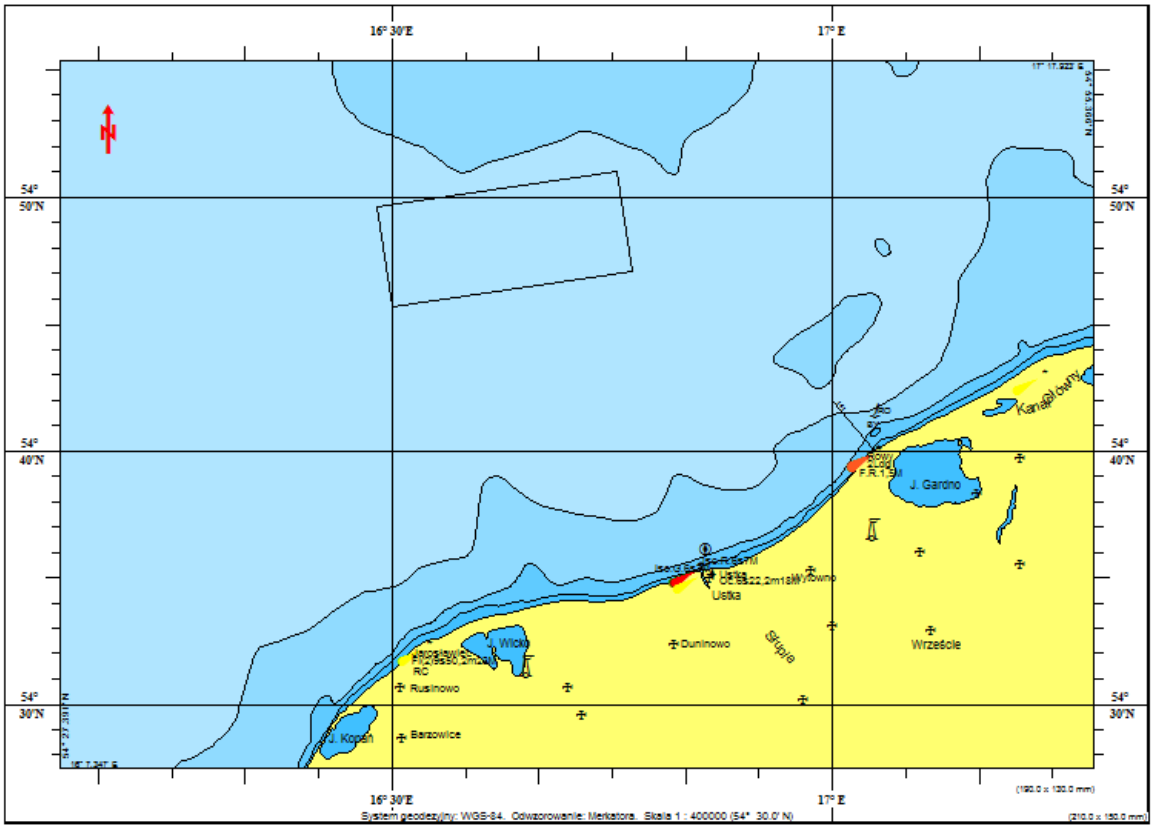

Fig. 1. The area of Slupsk Bank – A area.

HYDROGRAPHIC SURVEYS

During hydrographic surveys, vertical distribution of sound speed in water has been measured. Because of variable water temperature, sound speed in water is measured several times a day. Sound speed was measured using ultrasonic profiler.

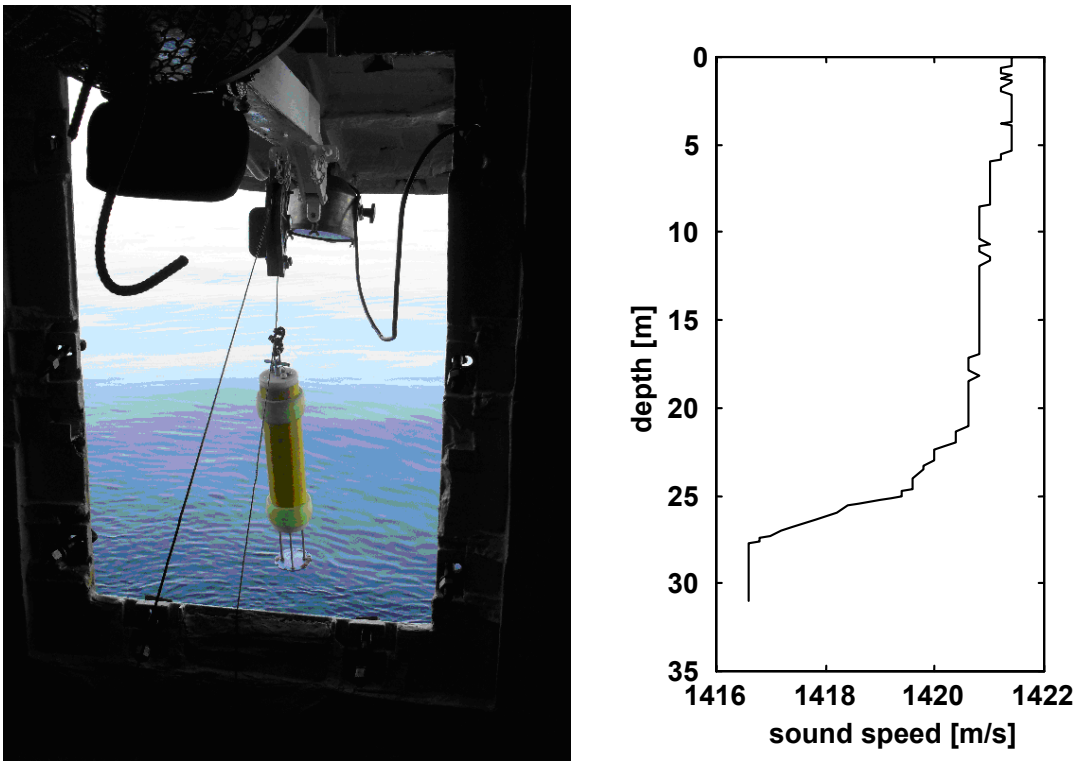

Fig. 2. Depth measurement and its vertical distribution.

Sound speed in water is important parameter for precise determination the depth using singlebeam and multibeam echosounders [1, 2, 3, 4, 6].
For compensation pitching, rolling and heaving [1, 5, 6], Octans motion sensor has been used.

Fig. 3. Multibeam echosounder Simrad EM3000 (down left), singlebeam echosounder Simrad EA400 (top left) and motion sensor Octans (right).

QPS Qinsy has been used for collecting hydrographic data using positioning system and echosounders. Singlebeam echosounders (Simrad EA400 and Atlas Deso 25) were used for validation depth measurement by vertical ray of multibeam echosounder. Distribution of acoustic rays transmitted by two frequency Deso 25, EA400 and EM3000 has been presented below. Additionally, QPS Qinsy is used for

presentation the position of the sounding vessel on profiles and mosaics sea bottom in real time.

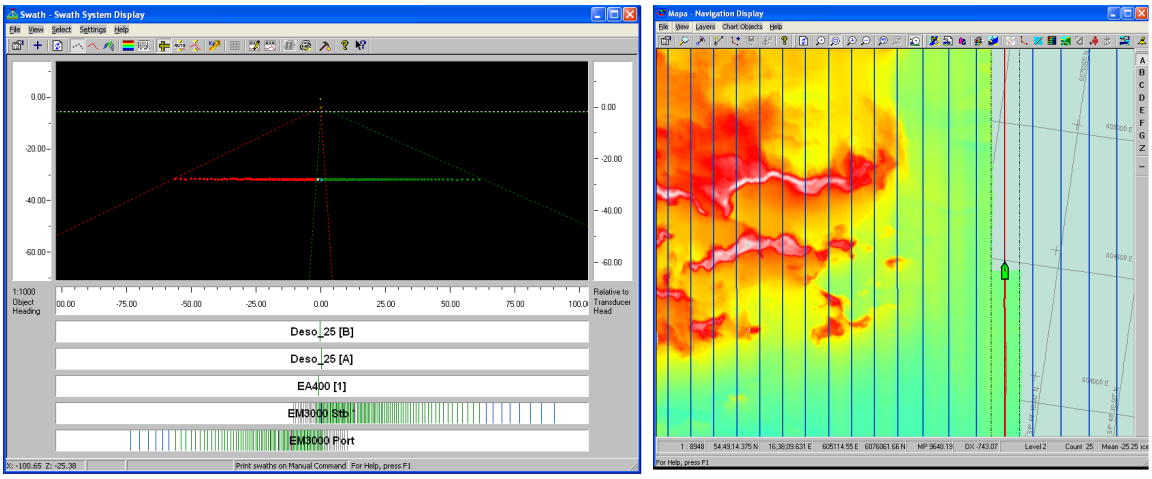

Fig. 4. Realisation of hydrographic surveys using QPS Qinsy.

RESULTS

First visualisation on bathymetric sheet has been presented below. There have been presented results of hydrographic surveys of three areas surveyed in different time. This is a first visualization before data cleaning.

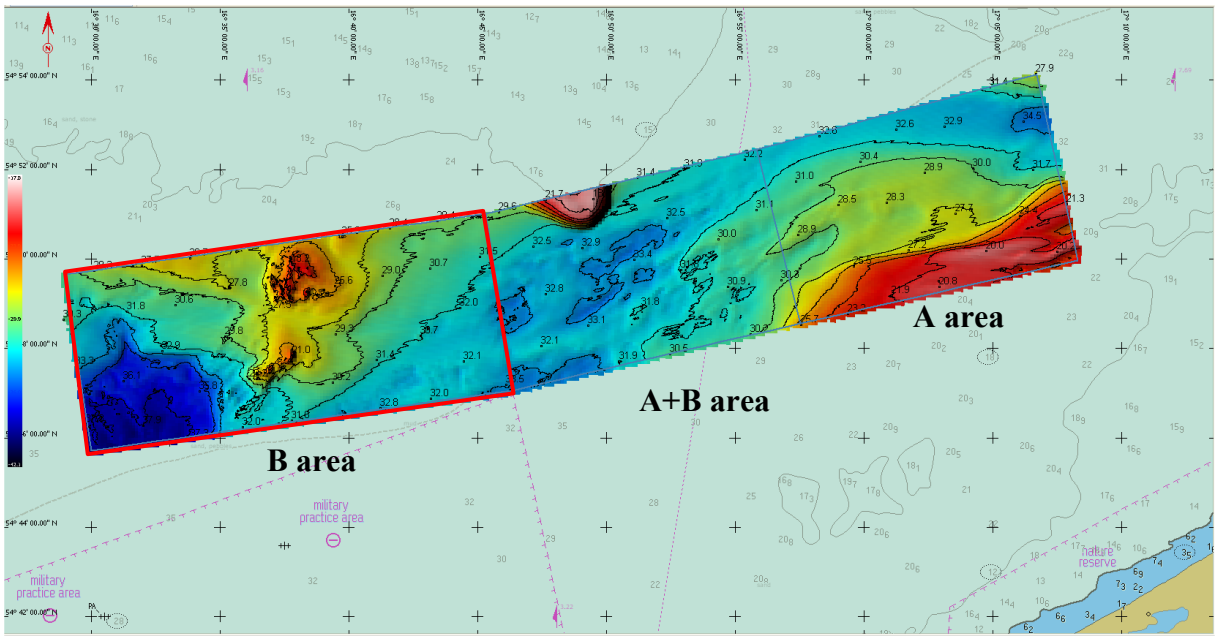

Fig. 5. Results of hydrographic surveys of A area.

UNDERWATER OBJECTS IDENTIFICATION

During surveys, some underwater objects have been detected. They can be detected, because many acoustic rays are transmitted by the multibeam echosounder. Next,

identification of underwater object is realized using the sonar. Because of bad weather, underwater objects was only detected. Echogram of detected object has been presented below.

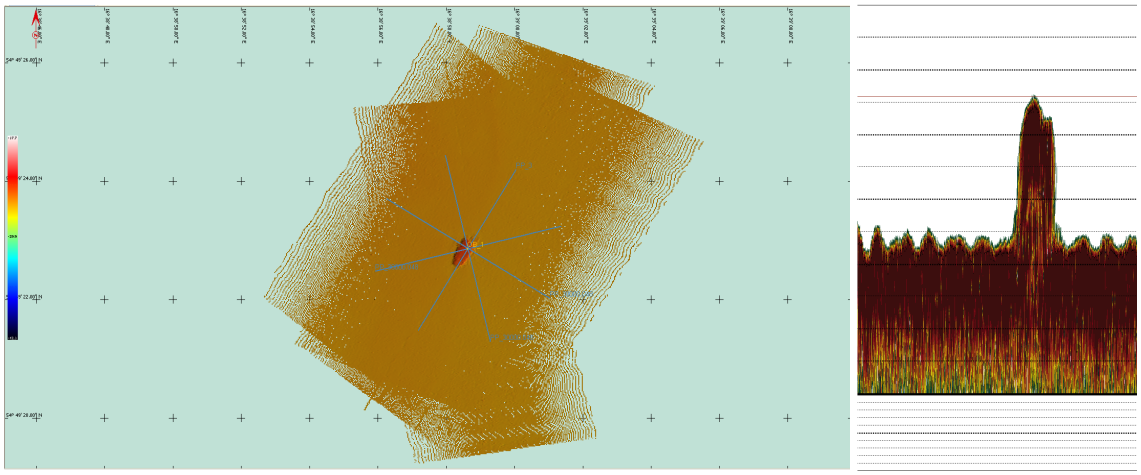

Fig. 6. Underwater object and its echogram.

CONCLUSIONS

Hydrographic surveys of large area with long distance to the land (harbour) are realized by large vessels, such as Arctowski and Heweliusz with 24H watch. They are equipped with hi-tech hydrographic equipment, enables obtaining high accuracy of measurements.

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