

CIRCUM PACIFIC COUNCIL (CPC)
MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT OF THE RUSSIAN FEDERATION
FEDERAL AGENCY FOR MINERAL RESOURCES (ROSNEDRA)
A.P. KARPINSKY RUSSIAN GEOLOGICAL RESEARCH INSTITUTE (VSEGEI)

ANNUAL CONFERENCE
GEOHAB 2019
MARINE GEOLOGICAL AND BIOLOGICAL
HABITAT MAPPING

ABSTRACTS
Russia, St. Petersburg, May 13–17, 2019

Gold sponsors:

R2Sonic

Esri

Bronze sponsors:

Norbit

Fugro

Ecotone

Teledyne

Co-chairs

Gary H. GREENE

President, CPC

Oleg PETROV

Director General, VSEGEI



VSEGEI Press
St. Petersburg • 2019

UDC 005. 745:551.46:502/504(261.243)

Annual conference “GeoHab 2019 – Marine Geological and Biological Habitat Mapping”: Abstracts (May 13–17, 2019, St. Petersburg, Russia). – SPb.: VSEGEI Press, 2019. – 240 p.

ISBN 978-5-93761-514-5

The book contains the abstracts for presentations from the Annual International Conference “GeoHab 2019 – Marine Geological and Biological Habitat Mapping” (May 13–17, 2019, St. Petersburg, Russia). The presentations are devoted to study and mapping of different types of habitats – from coastal and shallow water to shelf, deep-sea and coral habitats, geological and biological features of seeps and hydrate, interactions between oceanographic processes and habitats, mapping, planning, and impact assessment for ocean energy, sustainable development of marine minerals’ extraction, submerged landscapes and archeology.

Local organizing committee

Daria Ryabchuk 2019, Co-Chair (A.P. Karpinsky Russian Geological Research Institute)
Evgeny Petrov 2019, Co-Chair (A.P. Karpinsky Russian Geological Research Institute)
Vladimir Zhmoida (A.P. Karpinsky Russian Geological Research Institute)
Marina Orlova (Zoological Institute RAS)

International scientific board

Vaughn Barrie (Geological Survey of Canada, Pacific)
Craig Brown (Nova Scotia Community College, Canada)
Guy Cochrane (U.S. Geological Survey)
Margaret Dolan (Geological Survey of Norway, Norway)
Andrea Fiorentino (Geological Survey of Italy – ISPRA, Italy)
Gary Greene (Moss Landing Marine Laboratories, USA)
Daniel Ierodiaconou (Deakin University, Australia)
Aarno Kotilainen (Geological Survey of Finland, Finland)
Geoffroy Lamarche (NIWA, University of Auckland, New Zealand)
Tim Le Bas (National Oceanography Centre, UK)
Kim Picard (GeoScience Australia)
Daria Ryabchuk (A.P. Karpinsky Russian Geological Research Institute, Russia)
Donna Schroeder (U.S. Bureau of Ocean Energy Management)
Heather Stewart (British Geological Survey, UK)
Brian Todd (Geological Survey of Canada, Atlantic)

ISBN 978-5-93761-514-5

© Circum Pacific Council, 2019
© Ministry of Natural Resources and Environment of the Russian Federation, 2019
© Federal Agency for Mineral Resources, 2019
© A.P. Karpinsky Russian Geological Research Institute, 2019
© Authors-compilers, 2019

S3O18. GEBCO-NF Alumni Team Multibeam and HISAS Bathymetric Data Processing and Delivery Workflow developed for Shell Ocean Discovery XPRIZE competition

Yulia Zarayskaya¹, Wetherbee Dorshow², Rochelle Wigley³, Karolina Zwolak⁴, Evgenia Bazhenova⁵, Masanao Sumiyoshi⁶, Seeboruth Sattiabaruth⁷, Tomer Ketter³, Aileen Bohan⁸, Jaya Roperez³, Ivan Ryzhov⁹, Mohamed Elsaied¹⁰, Craig Wallace¹¹

¹ Geological Institute of Russian Academy of Science, 7, Pyzhevsky lane, 119017, Moscow, Russia, geozar@yandex.ru

² Earth Analytic, 227 East Palace Ave, Suite O, Santa Fe, New Mexico 87501, USA

³ Center for Coastal and Ocean Mapping/Joint Hydrographic Center Chase Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824, USA

⁴ Institute of Navigation and Marine Hydrography / Faculty of Navigation and Naval Weapon, Polish Naval Academy, Śmidowicza Street 69, 81-127, Gdynia, Poland

⁵ Saint Petersburg State University, Universitetskaya nab., 7-9, Russia, 199034, Saint Petersburg, Russia

⁶ Hydrographic and Oceanographic Department in the Japan Coast Guard, 3-1-1, Kasumigaseki, Chiyoda-ku, Tokyo 100-8932, Japan

⁷ Hydrographic Unit of the Ministry of Housing and Land, Ministry of Housing and Lands, Ebène Tower, Plot 52, Ebène, Republic of Mauritius

⁸ INFOMAR, Geological Survey of Ireland, Beggars Bush, Haddington Road, Dublin, D04 K7X4, Ireland

⁹ Arctic and Antarctic Research Institute, Saint Petersburg, 38, Bering str., 321660, St Petersburg, Russia

¹⁰ Petroleum Geology Dept., Faculty of Petroleum and Mining Science, Matrouh University, Egypt

¹¹ Kongsberg Maritime AS — Subsea Division, Strandpromenaden 50, NO-3183, Horten, Norway

This study provides an overview of the GEBCO-NF (General Bathymetric Chart of the Oceans — Nippon Foundation) Alumni Team's solution for rapid and semi-automated seabed data processing, geospatial integration, and web mapping during the First and Final Rounds of the Shell Ocean Discovery XPRIZE (<https://oceandiscovery.xprize.org/prizes/ocean-discovery>). The team, comprised of alumni and affiliates of the Nippon Foundation — GEBCO Postgraduate program at the Center for Coastal and Ocean Mapping (UNH) assembled a robust, workflow and hybrid-cloud computing architecture designed to meet the competition deadline of 48 hours for data processing and submittal.

Once the team's innovative, customized Unmanned Surface Vessel (SEA-KIT) and Autonomous Underwater Vehicle (Hugin) completed a survey and returned to the port of Kalamata (Greece), data recovery, processing, cloud GIS integration and secure web publishing tasks were completed within a 43-hour period.

Datasets presented to the Shell Ocean Discovery XPRIZE representatives both as physical data deliverables and web services via the team's secure SmartOcean ArcGIS Enterprise environment and ArcGIS Online include: 1 to 5 m resolution bathymetry (multibeam and HISAS), 0.02 to 1 m synthetic aperture imagery, 1 m backscatter imagery and 3D images.

S6PO1. Landforms and geomorphological processes in the Southern Part of the Barents Sea Shelf

Yulia Zarayskaya, Evgeniy Moroz, Anastasia Abramova, Elena Sukhikh, Alexander Ermakov

Geological Institute of Russian Academy of Science, 7, Pyzhevsky lane,
119017, Moscow, Russia, geozar@yandex.ru

Barents Sea Shelf is the most studied area of Russian Arctic in terms of geomorphology, geology and geophysics. However, multibeam coverage in Russian sector is still quite sparse. Most of the studies are focused in the areas with confirmed gas fields. The study of landforms and geomorphological processes in the southern part of the Barents Sea shelf is basic for a region of promising resource development. Sea floor features of the study area include Pleistocene glacial landforms as well as modern features in the areas of focused fluids rise and degassing. Based on the complex of geophysical data (multibeam bathymetry, sidescan sonar mosaic, high-frequency and continuous seismic profiling data) received during the cruises of R/V “Akademik Nikolaj Strakhov”, a morphogenetic analysis of the seafloor landscape of the southern part of the Barents Sea is carried out. The detailed mapping of the fields of pockmarks and the complex analysis of their morphology and distribution and thermophysical properties of the sedimentary cover allows to assess the contribution of degassing processes to the development of the seabed.

Multibeam bathymetry acquired during 25–28 cruises of R/V “Akademik Nikolaj Strakhov” shows the distribution of glacial landforms in the vast depth range (50–400 m). Although the direction

of movement of glacial masses is well studied for the outer regions of the Barents Sea [1], it shows more complex structure in Central and Southern regions.

The pockmarks are distributed in the Southern part of the Barents Sea. These features have been mapped and described for the Norwegian part of the Barents Shelf [2]. Fields of pockmarks that were mapped during the R/V “Akademik Nikolaj Strakhov” cruises show the variety of features with different diameter and depth. The high frequency seismic profiling allows to map gas seeps in the water column.

The reported study was funded by RFBR according to the research project № 18–35–20060.

References

- [1] Dowdeswell J. A., Jakobsson M., Hogan K. A., O’Regan M., Sölvsten M., 2010: High-resolution geophysical observations of the Yermak Plateau and northern Svalbard margin: Implications for ice-sheet grounding and deep-keeled icebergs. *Quaternary Science Reviews* 29(25): 3518–3531
- [2] Rise, L., Bellec, V. K., Chand, S. & Bøe, R., 2015: Pockmarks in the southwestern Barents Sea and Finnmark fjords. *Norwegian Journal of Geology* 94: 263–282