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Multi-sensor 3D mapping of Tethys Bay (Ross Sea – Antarctica) with PROTEUS, an innovative, highly reconfigurable and versatile unmanned marine vehicle

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During the XXXVIII Italian Expedition in Antarctica, in the framework of the PNRA RESTORE (Robotic-based invESTigation and mOnitoring Ross sEa) project the PROTEUS (Portable RObotic TEchnology for Underwater Surveys) unmanned marine vehicle (UMV) was used for carrying out an integrated 3D mapping of a portion of the Tethys Bay in the Ross Sea. PROTEUS is an innovative UMV developed by the Marine Robotics research group of CNR-INM which is particularly suitable, with its reduced size and weight, modularity, reconfigurability, and open hardware and software architectures, to operate in extreme environments as the polar ones. For performing the survey seven holes were drilled in the ice pack from which it was possible to deploy the robot in the water. Thanks to the versatility of PROTEUS, it was possible to acquire a comprehensive collection of bio-geo-chemical and physical parameters of the water column (acoustic, conductivity/salinity, temperature, depth, dissolved oxygen, turbidity and chlorophyll), acoustic and video data of the ice and the seabed. All the collected data, once processed, will be made available to the scientific community by means of FAIR (Findable, Accessible, Interoperable and Reusable data) techniques following the UN Ocean Science Decade directives.