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With the contribution of the European Maritime and Fisheries Fund of the European Union

Science Diver in the Blue Economy Era - International Conference

20-21 April 2023 – Valletta, Malta

Challenges in researching the deep sea cultural heritage in the Bulgarian Black Sea

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Keywords: shipwrecks, bottom-trawling, sea pollution,

ABSTRACT

The Centre for Underwater Archaeology is a national cultural institute of the Bulgarian Ministry of Culture. Founded in 1978, it is one of the oldest such institutions in Eastern Europe and the first to actively work in the Black Sea. It's responsible for the research, documentation and preservation of all the underwater cultural heritage of the Republik of Bulgaria regardless of its environment whether in rivers, lakes, dams or the Black Sea. Because of this and the strategic territorial location, the range of sites is vast that includes but is not at all limited to: submerged prehistoric settlements and necropoleis, ancient harbours and structures and a wide variety of shipwrecks from different ages and periods [1].

The unique environment of the Black Sea makes it very favourable for the preservation of underwater cultural heritage. It has very low salinity due to many large European rivers supplying it with fresh water which creates a positive outflow through the Turkish Straits and into the Aegean sea. Furthermore, saline water flows into the Black Sea which due to the difference in density of both types of water, creates a permanent anoxic layer. This hydrogen sulfide layer below 150 - 200 m of depth creates superb conditions for the conservation of organic artefacts and especially for wooden shipwrecks.

It has long been speculated and theorized that this anoxic environment must have very well-preserved the ancient shipwrecks but giving hard evidence was not easy. Because of the large depth and hostile environment research was done mostly with remote sensing techniques and equipment. Those sporadic and expensive explorations gave encouraging indications of the presence of shipwrecks on the Black Sea seabed. Even though on most wrecks further detailed information such as date or type could not be gathered [2], [3].

It wasn't until the international "Black Sea Maritime Archaeology Project" conducted from 2015 to 2017 that a breakthrough was made. Using large research vessels, more than 1200 sq. km. were surveyed with state-of-the-art equipment that led to the detailed documentation of 65 shipwrecks. They are at a depth from 40 m to 2200 m and documentation was done using the "Supporter" ROV. It was equipped with high-end recording sensors that produced more than 250 000 high-definition (HD) photographs and hundreds of hours of ultra-high-definition (UHD) video. Those were used to create accurate photogrammetric recordings. The oldest shipwreck is from the 5th or the beginning of the 4th c. BC and

was discovered at a depth of 2021m. It is almost identical to the depiction of a ship on a red-figure Stamnos from Vulci c. 480-450 BC [4].

The project revealed that despite the good preservation of organic the shipwrecks are being endangered by other threats. Even at a depth of more than 2000 m, there is modern plastic garbage accumulating around the wrecks which have turned into islands of trash on the sea floor. But on the shallower shipwrecks, a more destructive threat came to light. That is the sea-bottom trawling used by fishing ships that have destroyed many wooden shipwrecks down to 100m in depth. Hitting a shipwreck while bottom trawling would usually damage the net as well. That is why fishermen tend to avoid those areas but others intentionally go there to "fish" amphoras and other artefacts in the hopes of selling them on the black market. In addition, sonar scanning has documented numerous tracks lefts by bottom trawling on the seabed. The method is a major fishing practice for decades in Bulgaria, although it has not been legalized or regulated by legislation [5].

Those threats to the underwater cultural heritage in depths down to 100 m need to be addressed with the utmost urgency. It is necessary that those shipwrecks be located, researched and documented. Although small-scale ROVs have become more affordable and widely used they do not remove the need for a researcher to go down to see, touch and analyze the site. Another challenge is that the use of rebreather systems for scientific dives in Bulgaria is non-existent. That requires the development of best practices and methods for the research and protection of the Black Sea's deep sea cultural heritage. "The world's largest underwater museum." – Prof. Jonathan Adams

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