

## MARE NIGRUM – THE FIRST ROMANIAN MULTIDISCIPLINARY RESEARCH VESSEL IN ROMANIA

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**Abstract.** In 1998, GEOECOMAR started the transformation of the SOMES trawler into the first Romanian multidisciplinary research vessel in Romania. In 2002, the vessel, renamed MARE NIGRUM, was inaugurated by the Romanian Prime minister and by the Secretary of State for Scientific Research. Between 2002 and 2004, Mare Nigrum performed many cruises through national research programmes such as MENER and CERES, and for private companies. In 2005, Mare Nigrum will start to participate in other national and international projects (e.g. *ASSEMBLAGE*)

**Key words:** Mare Nigrum, endurance, stern, prow, bridge, multibeam system

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### GENERAL DATA

#### Chronological Data

The Mare Nigrum (former Somes) vessel is a trawler built in Stralsund, Germany, in 1971. Between 1998 and 2002, Mare Nigrum (Fig. 1) was converted into the first multidisciplinary research vessel in Romania. The transformation took place in the Constanta and Mangalia shipyards (Romania).

Mare Nigrum was inaugurated on August 9, 2002 by the Romanian Prime minister and by the Secretary of State for Scientific Research, from the Ministry of Education and Research (Fig. 2).

The category of Mare Nigrum is "research vessel", and it is the property of the National Institute of Marine Geology and Geoecology (GEOECOMAR). It is operated by the Research Vessel Department. The Port of registration is Constanta (Romania); it flies the flag of Romania, and 824 is the official number from the Romanian Naval Authority (RNA).

In the second part of 2003, Mare Nigrum was included by the Ministry of Education and Research on the list of "national scientific objectives". The listing implies financial support for salaries, fuel, maintenance and administration.

#### Basic Dimensions and Technical Characteristics

The R/V Mare Nigrum (Fig. 3), has an overall length of 82.20 m, overall beam 13.60 m, operational draught 5.00 m and 3200 t displacement.

It is propelled by 2 engines, type SKL 8 NVD 48 A 2 U of 1160 HP each; a cruising speed of 10 knots and a maximum full speed of 13 knots. Mare Nigrum has a variable pitch propeller (active rudder VOSTRA) and has a maximum fuel capacity of 200 t, assuring 40 days endurance.

Tank capacities are: water ballast 400 m<sup>3</sup>, fuel oil 200 t and fresh water 120 m<sup>3</sup>.

The navigation and positioning are ensured by: two GPS Furuno GP 30 units and one GPS Magnavox unit, two Kelvin Hughes 5000 T 6000 A and a Nucleus 5000

radar unit. Other navigation systems of the vessel are: a gyrocompass Vega 2 M, log Furuno DS 70, echo-sounder LAZ 50 and a Ninas integrated navigation system.

A GMDSS system (Fig. 3) ensures the communications by VHF radiotelephone FM 8500 with a faximile Furuno Navtex Receiver and Furuno D Fax.

In compliance with SOLAS rules, for the specified class and number of crew members, the safety facilities on board of R/V Mare Nigrum are ensured by an emergency boat for 6 persons, 6 inflatable life rafts for 25 persons each, 54 life jackets, 54 immersion neoprene suits and 24 life rings.

**Power Generating Plant.** 2 x 320 KVA, 1 x 350 KVA, 1 x 50 KVA.

**Deck Equipment.** On the main deck of R/V Mare Nigrum there are winches and heavy lifting equipments:

- on the stern: a crane of 3t/15m, an A frame 20t SWL, one 20t winch, laterally launching system, streamer winch, and two winches for fishing, and
- on the prow: two mooring winches of 1.8t each and a CTD winch.

**Accommodation.** Accommodation for 50 persons, 25 scientists and 25 members of the vessel crew is provided in single and double cabins. Some cabins have separate bathrooms. On the bridge boat, a medical emergency room is in use.

### SCIENTIFIC FACILITIES

**Scientific Equipment.** A new ELAC multibeam system was assembled on the Mare Nigrum (Fig. 4). Other scientific uses are ensured by: the Sea Bird CTD Rosette system, a scientific computer system network, a Furuno fish echo-sounder, a Geo Acoustic side-scan sonar, X Star full spectrum sub-bottom profiler, gravity corers, box corer, Mark II multi-corer, Petersen and Van Veen grabs, GMN KM and GD K on board and bottom marine gravimeters, MPP 1 S marine magnetometers, and so on.

**Laboratory Facilities.** (Fig. 5) On board the R/V Mare Nigrum, there are 10 laboratories with a total surface of 200 m<sup>2</sup> with a local computer network, air conditioning, power supplies of 380/220/24 V, fresh water and sea water supply.

The laboratories have specializations such as: bathymetry and seismoacoustics, gravimetry and magnetometry, geochemistry, hydrology, core investigation, ichthyology, sample processing, photo and a monitoring center for towed equipment.

On the stern, the surface for scientific activities is up to 300 m<sup>2</sup>. The same scientific activity surface on the prow is 50 m<sup>2</sup>.

On the main bridge, there is a room for the multibeam system and for the Furuno fish echo-sounder.

### SCIENTIFIC ACTIVITIES OF R/V MARE NIGRUM IN 2004

The first scientific cruise was taken for the "Black Sea-Danube Delta-River Danube geosystem: resources, energy and state of environment – GEOMAND" programme.

The second cruise was focused on the study of gas hydrates (Figs. 6 and 7) located on the Romanian shelf and shelf break of the Black Sea, in the "Research on Gas Hydrates in the Black Sea" project.

R/V Mare Nigrum provided special services to Agrotec Spa (Italy) for the positioning and mooring of 4 meteorological platforms in the Black Sea.

The next scientific marine programme of R/V Mare Nigrum includes yearly cruises for GEOMAND and MENER national projects and a first international scientific cruise.

### The Involvement of R/V Mare Nigrum in International Marine Studies

R/V Mare Nigrum will be involved in an international European project named *ASSEMBLAGE* (abbreviated from *Assessment of the Black Sea sedimentary system since the last Glacial Extreme*).

The first scientific cruise in the Black Sea was carried on board of French R/V Marion Dufresne, between 9 and 24 May, 2004. The R/V and scientific technology were provided by the Paul Emil Victor Institute from IFREMER (France).

The scientists were project partners from France, Germany, Spain, Italy, United Kingdom, USA, Turkey, Bulgaria and Romania (GEOECOMAR and University of Bucharest).

The knowledge of the past climatic and environmental changes provides an important scientific support to facilitate the access and sustainable use of the Black Sea floor resources benefiting the Riparian countries.

The project aims to quantify the impacts of climate changes and the sensitivity of the Black Sea to natural processes and anthropic activities.

The *ASSEMBLAGE* project will examine the geomorphology and stratigraphy of the north-western Black Sea shelf, using a large coring process, the determination of the consequences of the river inputs into the marine basin and the reconstruction of the depositional history of sedimentary sequences.

The second scientific cruise in the Black Sea will be

on board the Romanian R/V Mare Nigrum. Scientific technologies will be provided by IFREMER (France), University of Hamburg (Germany) and GEOECOMAR (Romania).

### The Involvement of R/V Mare Nigrum in the National Marine Programme of Romania

In Romania, the marine programmes are managed by the Ministry of Education and Research. All the programmes are a part of the National Plan for Scientific Research – Technological Development and Innovation (2001-2005) approved by the Government Decision no. 556/2001.

Marine sciences in Romania cover several major areas:

1. geological, geocological and geophysical investigation on the sea bottom, superficial and deep structure (e.g. sedimentary records, dynamics of the sedimentary processes, sea level changes, age of deposits, lithosphere dynamics),
2. present and future exploitation of living, mineral and energy resources (fishing, oil and gas hydrates exploration and exploitation),
3. environmental studies (global climate changes, assessment of water and sediment pollution, eutrophication phenomena),
4. studies on coastal erosion and littoral management.

The priority topics are: marine geology and geocology, marine chemistry, biochemistry and physics of the sea, biodiversity, structure, functioning and dynamics of marine ecosystems, management, protection and remediation of marine ecosystems, marine pollution and risk assessments, coastal zone integrated studies, conventional and non-conventional resources (mineral, biological and energy), marine engineering and technology.

The strategic objectives of marine scientific research, using R/V Mare Nigrum as main technical support, are: scientific knowledge of marine systems, interdisciplinary studies and an integrated monitoring of the marine environment, including the coastal zone, scientific management of marine environmental quality, understanding of global and sea level changes, developing and upgrading marine RTD capabilities to improve the international, European and bilateral partnership.

Because marine research is a very expensive activity, it is important that the interdisciplinary projects are carried out by networks/consortia of Romanian research institutions and universities and, in some cases, in collaboration with European universities or scientific institutions.

The main objectives of Marine RTD Programme of GEOECOMAR, as owner and operator of R/V Mare Nigrum, are:

1. studies of geological, physical, chemical and biological processes that control the structure and dynamics of the marine-fluvial system and their interactions. The programme includes interdisciplinary field investigations and modelling of the natural processes;
2. study of the generation and rehabilitation of conventional and non-conventional marine resources;
3. interdisciplinary studies of the marine-deltaic-fluvial environments, including the assessment of the social and economic impact;
4. introduction and improvement of special and modern technologies to ensure the access of Romania to marine resources;
5. improving the coordination, cooperation and the information transfer, and research efficiency by continuous training of the scientists and development of the logistic facilities for international, European, regional and bilateral co-operation.

For Romania, R/V Mare Nigrum represents the main component of the marine scientific infrastructure for the international co-operation projects, which are focused on the Black Sea area, providing the highest level of scientific capabilities.

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