Chapter 1. History of regular observations over the Kerch Strait and the data sets available

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Research on the Kerch Strait hydrology and water dynamics started in the late 19 — early 20 century, and these long-term observations and assessment results became summarized by the end of 1950s (Azov Sea, 1962). Further studies on the Kerch Strait water dynamics were carried out by SOI (Moscow) and its Sevastopol branch[1] under the supervision of E. Altman[2] in 1960–1980. The results of those studies were presented by several papers to be summarized in a monograph (Simonov A. I., Altman E. N., 1991) to include large bibliography on the subject. Presently, regular observations are carried out at the strait Northern narrowest part at the Crimea-Caucasus cross-section by the Opasnoe HMS personnel (Fig. 1a).

Regular research on the hydro-chemical regime and water pollution levels of the Kerch Strait started in the late 1970s. The monograph (Azov Sea, 1986) describes the hydrochemical regime of the Kerch Strait and adjacent area of the Azov Sea till the mid-1980s. The publications (Ilyin Yu.P. *et al.,* 2000, Ilyin Yu.P. *et al.,* 2001) contain substantial information about the water pollution levels and contaminant flows from the Azov Sea to the Black Sea based on the observations conducted at the Kerch Strait Northern narrowest part during the 1990s. Yet, it has been never published a comprehensive and full overview of pollution of the Kerch Strait taking it for an independent geographical unit. Hence, no long-term trends of water quality recorded during the 30 years of observations are available.

A vast archive of the observation data collected in the Kerch Strait is kept at **MB UHMI** (Sevastopol) and it contains the following data:

[1] It has been the Marine Branch of Ukrainian Hydrometeorological Institute (Kiev) since 1992.

[2] Head of Hydrological Problems Laboratory of Sevastopol Branch of SOI.

a) Meteorological, the water temperature and salinity, sea level, waves, and ice formation data collected by the coastal network of marine hydro-meteorological stations and posts at the Kerch Strait, and adjacent areas of the Black and Azov Seas during the period 1945–2009 (Opasnoe, Kerch, Zavetnoe, Mysovoe, Taman, Feodosiya);

b) Results of hydrological and oceanographic research conducted in the framework of various programs in 1962–2009. These materials contain results of the inspection-trip observations, including measurements of flows, discharges, and ice-condition surveys. The MB UHMI database contains 285 sets of the currents regular measurements taken by autonomous buoy stations with a period of observation ranging from 12 hours to 10 days and with a time-step from 5 to 30 minutes. A large dataset of currents (by current-meters) and discharges measurements is available for different areas of the strait.

c) Over 800 records of measurement of water discharges, and heat and salt exchanges collected at the narrowest Northern part of the Kerch Strait during 1957–2009.

d) Field and processed data seasonally collected in 1957–2009 on the Azov Sea by the Kerch Strait and in the Northern narrowest part of the strait at the Crimea — Caucuses cross-section include: levels of concentration of dissolved oxygen (O_2), pH, alkalinity (Alk), phosphates (P-PO_4) and total phosphorus (P_{total}), silicates (Si), nitrites (N-NO_2) and nitrates (N-NO_3) ammonia (N-NH_4), and total nitrogen, as well as certain pollutants, such as hydrogen sulfide, total petroleum hydrocarbons (TPHs), detergents, phenols and organo-chlorine pesticides.

Since 1999, regular observations are carried out in the Ukrainian section of the Northern narrowest part of the Kerch Strait by HMS Opasnoe at four (No 6, 7, 8, 9, Fig. 1a, Table 6.1.2a) out of seven earlier functioning stations of standard transect only. Since the early 1990s, an economic recession and lack of equipment have made monitoring impossible in the other parts of the Kerch Strait where it was previously conducted in the Kerch and Camush-Burun Bights of the Southern part of the strait, as well as in the Azov and Black Seas adjacent areas.

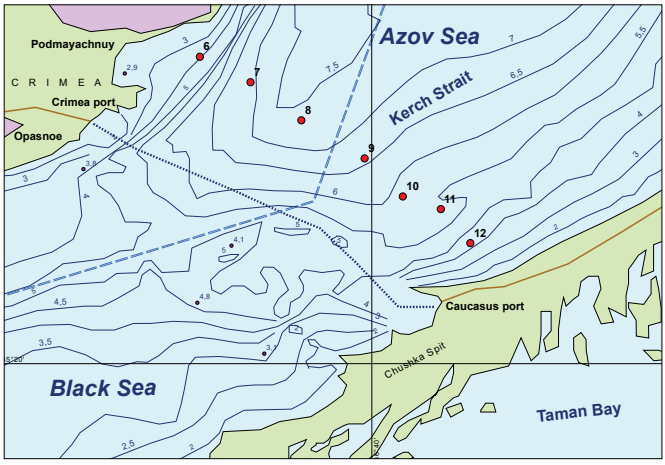

Fig. 1a. The bathymetry of the narrowest place in the northern part of the Kerch Strait and ferry between ports Crimea and Caucasus (the dot line across the Strait). Red squares — monitoring stations.

YugNIRO monitors the ecosystem of the Kerch Strait since 1955 within the framework of the former USSR, and since 1991 — under the governance of the Hydromet Services of Ukraine. For a long time, the monitoring was complex, conducted seasonally during oceanographic surveys in the Black and Azov Seas (Fig. 1b).

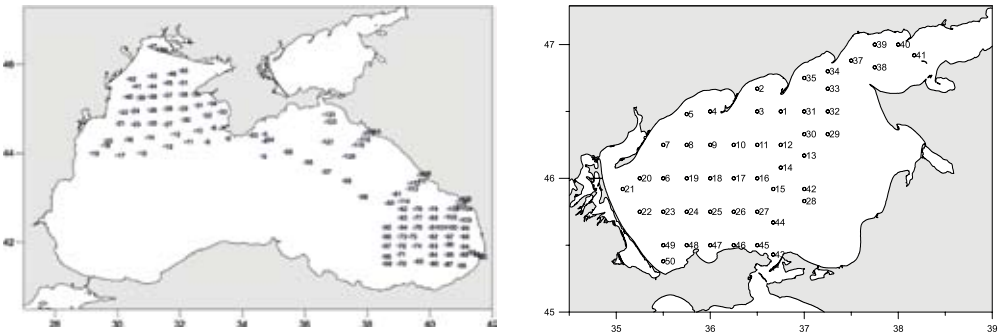

Fig. 1b. Sampling stations of YugNIRO (AzCherNIRO) in the Black and Azov Seas in period 1955–1996.

Since 1996 the monitoring of the Kerch Strait was limited to the area of 44°50'–45°29'N/36°21'–37°00'E, Fig. 1c, covering 412 stations during 140 expeditions. Meteorological, hydrological and hydrochemical observations have been carried out at standard depths, together with collection of specific information. Since 2002, monitoring with a different level of complexity was conducted mainly in the central and Southern parts of the Strait, and at the Kerch and Camush-Burun Bights (Fig. 1d).

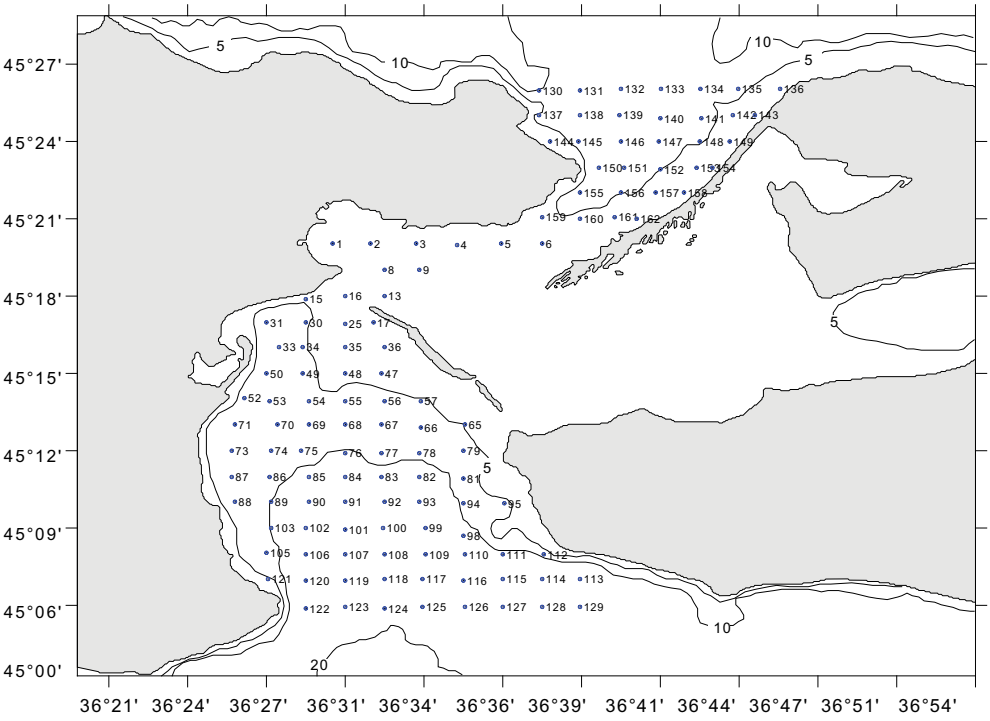

Fig. 1c. Sampling stations of YugNIRO (AzCherNIRO) in the Kerch Strait.

Presently, an integrated regular monitoring of water, bottom sediments and biota are required to trace the impacts of increasing anthropogenic pressure on the ecosystem of the Strait, including dredging in the navigation channel, commerce and fishing ports, dumping of dredged materials, increase in shipping, transshipment in ports and outside of ports, exploration and extraction of oil at areas close to the Strait.

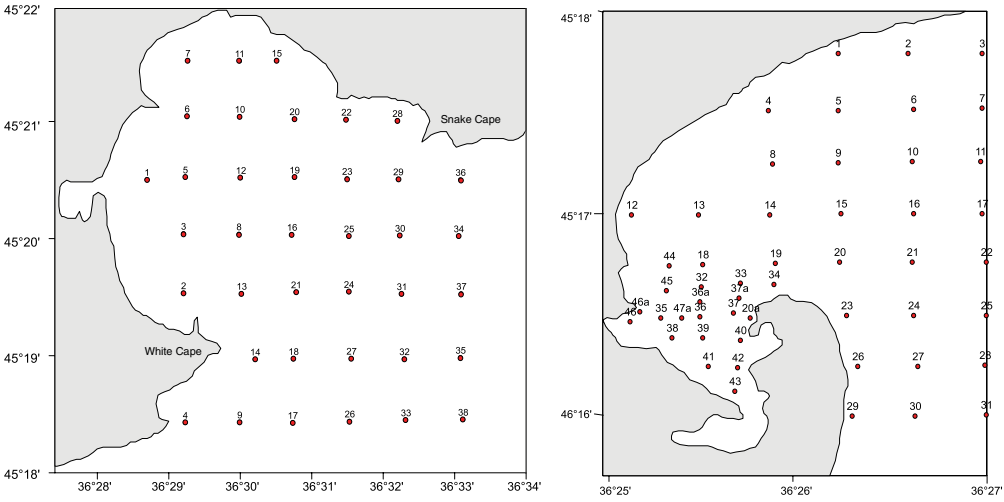

Fig. 1d. Sampling stations of YugNIRO (AzCherNIRO) at the Kerch and Camush-Burun Bights.