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CLIMATE CHANGE IN THE **B**LACK **S**EA – **H**YPOTHESIS, **O**BSERVATIONS, **T**RENDS SCENARIOS AND MITIGATION STRATEGY FOR THE ECOSYSTEM

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Paper Abstracts

RESULTS OF INVESTIGATIONS OF ATMOSPHERIC POLLUTANTS FLUXES IN ZMEINY ISLAND STATION IN WESTERN PART OF BLACK SEA IN 2003-2007 YEARS.

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It is known, that main source of pollution in open parts of the Black Sea is the atmospheric deposition. Fluxes of atmospheric pollutants to the sea surface are results of long-range atmospheric transport of pollutants from industry-developed regions of Europe and Black Sea countries sources. Zmeiny Island located in the north-western part of the Black Sea and about 35-40 km from the Danube Delta is a very representative site for development of atmospheric pollutants monitoring, especially measurements of chemical content of bulk depositions and precipitations.

The main goals of our investigations in 2003-2007 were regular measurements of concentration of inorganic ions (anions and cations) in samples of atmospheric precipitations and depositions to underground surfaces and evaluation of fluxes intensity of measured ions to the sea surface. In the same time, we estimated the marine and continental-anthropogenic parts of pollutants, which are being deposited to the surface of the sea. In the report here we describe the methodology used for sampling and measurements of pollutants and parallel meteorological observations. The main samplers for precipitations were Tretiakov rain gauge (bulk precipitation quantity), precipitation water sampler (samples for measurements of ions composition), bulk deposition sampler (sum of dry and wet atmospheric aerosol depositions). We measure also wind direction and velocity, temperature, pressure and other meteorological parameters daily. Ionic composition of samples was measured by ion chromatography method using of ionic chromatograph Personal IC 790 (Metrohm ltd, Switzerland).

The results of our investigations are discussed. It is shown that in 2003-2007 the deposition intensity in the area of Zmeiny island increased in 2,0 and 2,6 times (for nitrates and sulfates accordingly) in comparison with historic data for the north-western part of the Black Sea in 1990-1992. The input of separate ions in total ions deposition is analysed. The row (from maximal to minimal input) is following chlorides, sodium, sulfates, calcium, magnesium, nitrates, ammonium, potassium, phosphates, bromides, fluorides, nitrites and lithium. Comparison of real ion's ratio in deposition samples and rainfall water with ion's ratio of marine water showed that enrichment practically for all measured ions was observed. It was shown that highest enrichment coefficients were observed in depositions samples for ammonium-ion -456, phosphate-ion -224 and nitrate-ion -221, and in precipitation samples: for ammonium – 834, nitrate-ion – 770, phosphate – 154. For other ions the enrichment coefficients were significantly lower. Our conclusion was that the main part of biogenic substances in aerosol and in rain water for nitrogen and phosphor's compounds is not from the sea surface, but is long-range atmospheric transport from anthropogenic and natural sources, which are located in the continental basin of the Black Sea. On the background of such conclusion we estimated the contributions of continental-anthropogenic sources into the fluxes of nitrogen and phosphor's compounds in the total bulk deposition to marine surface in the area near of Zmeiny island. The results of our investigations showed that during 2003-2007 yearly 649,8 kgN/km^2 as ammonium-ion, nitrate-ion and nitrite-ion, 41,5 kgP/km^2 as phosphate-ion, 1225 kgS/km^2 as sulfate-ion were deposited from continental-anthropogenic sources.

It is proposed to use Zmeiny Island for development of an international atmospheric monitoring site in the framework of future Black Sea area atmospheric monitoring program like EMEP as an example.

IMPACT OF UNDERWATER CANYONS OVER BLACK SEA KOLKHETI COASTLINE FORMATION

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Variations of redundant accumulative and erosion districts are spread over Kolkheti coastline of the Black Sea. Fraction >0.11mm are considered as beach constructing material, which causes large volume alongshore streams > 300-400 thousand m^3 in shelf zones.

Sediments of accumulative beaches mostly are fed by big rivers, whose ravines are lineaments and have underwater canyons in shelf zones.

Rivers Enguri, Rioni and Supsa have the biggest canyons on the Kolkheti coastline, which determines the natural process of coast formation.

The canyon of river Enguri absorbs major part of beach constructing materials, discharged by the river and whole northern alongshore stream. Due to the fact, the erosion across the Anaklia recreation complex comprises 9-10 m/year.

Sediment flow stopped in 1939 because of moving River Rioni junction to the north by 4km in the Poti Canyon. The head of the canyon gradually hid away.

About 50% of river beach constructing accretion and 350 thousand m^3/year of the northern alongshore stream are lost in the Supsa canyon. About 300ha coastline was eroded due to intensive erosion at Poti-Maltakva area.

Opposite situation is on the north, at Poti-river Khobistskali areas, where 110-120million m^3 sediments were received due to intensive accumulation during seventy years. Coastline moved forward by 2-2.5km.

VARIABILITY OF THE CYCLONIC ACTIVITY IN THE MEDITERRANEAN AND BLACK SEA REGIONS

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Key words: characteristics of cyclones, North Pacific, North Atlantic, Black Sea region, Mediterranean region, climate/weather anomalies.

The work is dedicated to study of the important problem concerning recent regional climate change and variability associated with large-scale atmosphere-ocean interaction on interannual and decadal scales and their influences on climatic anomalies in the Black Sea and Mediterranean regions. Variability of the different characteristics of cyclones over the studied regions was considered as the main indicator of climate anomalies.

Using daily NCEP/NCAR re-analyses data sets on 1000 mb geopotential high on the 2.5° x 2.5° greed square in 1948-2006, the following data sets of cyclonic parameters were calculated: