MARINE HYDROPHYSICAL INSTITUTE
Russian Academy of Sciences
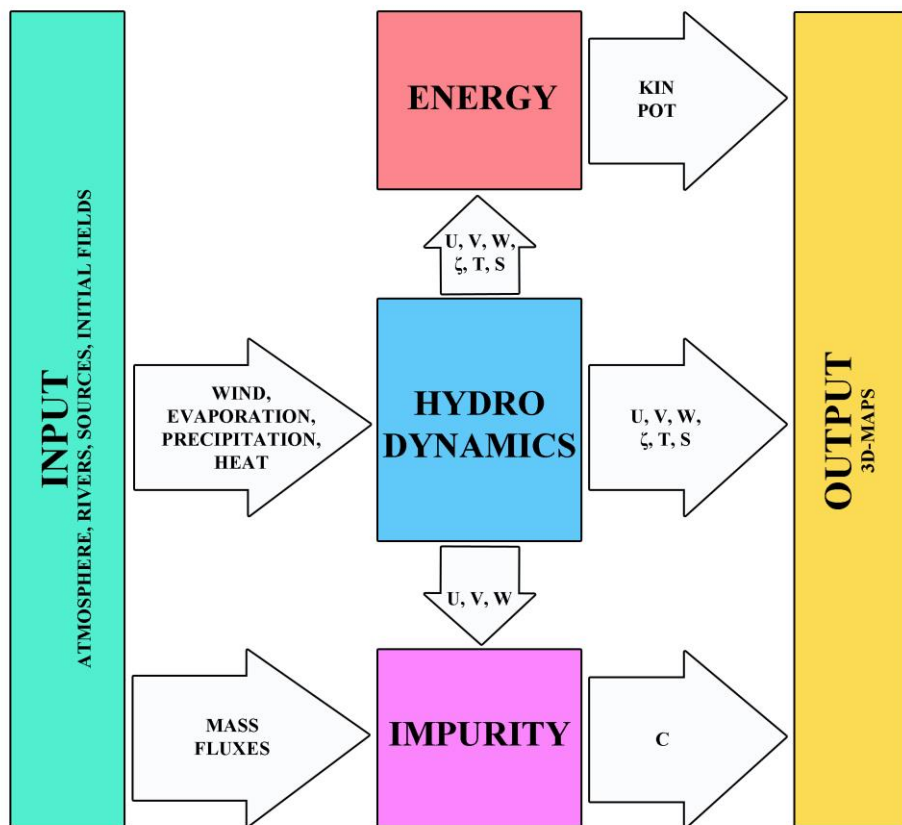http://мги-ран.рф

Computing complex for modeling of the Black Sea state

INTERNATIONAL CONFERENCE
and Early Career Scientists School on Environmental Observations,
Modeling and Information Systems
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Olga Dymova, Sergey Demyshev
olgadym@yahoo.com

STRUCTURE of COMPUTING COMPLEX

1. <u>Input</u>: Atmosphere data on the sea surface

2. <u>Hydrodynamics</u>: MHI-model [1], $0.02° \times 0.015°$, 27 z-horizons

3. <u>Energy</u>: the finite-difference analogs of energy equations [2] $KIN=0.5\rho(U^2 + V^2)$; $POT=-\rho gz$

4. <u>Impurity</u>: equation of impurity transport with taking into account the turbulent diffusion [3]

5. <u>Output</u>: 3-D arrays for analysis

[1] *Demyshev S.G.* (2012) A numerical model of online forecasting Black Sea currents. Izv. Atmos. Ocean. Phys. 48(1):120-132.
[2] *Demyshev S.G.* (2004) Energy of the Black Sea climatic circulation. 1. Discrete equations of the time rate of change of kinetic and potential energy. Meteorologiya i Gidrologiya. 9:65-80.
[3] *Kremenchutskii D.A., Dymova O.A., Batrakov G.F., Konovalov S.K.* (2018) Numerical simulation of the intra-annual evolution of beryllium-7 (7Be) in the surface layer of the Black Sea. Environmental Science and Pollution Research. 25(11):11120-11127.
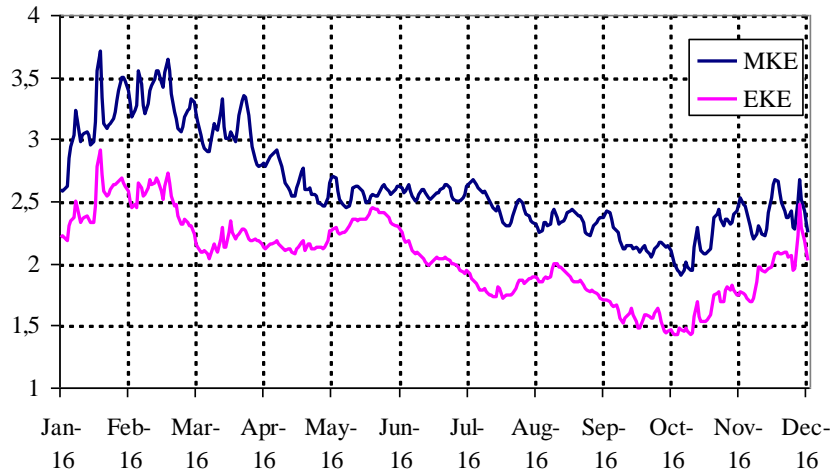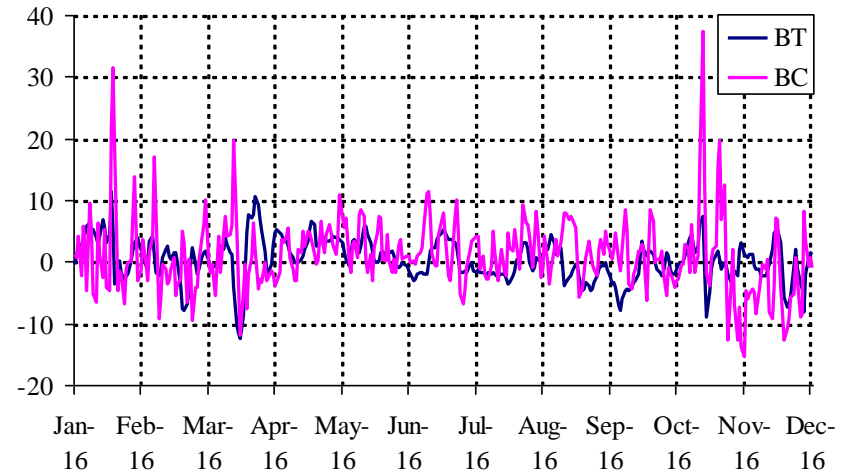
THE BLACK SEA HYDRODYNAMICS and ENERGETICS
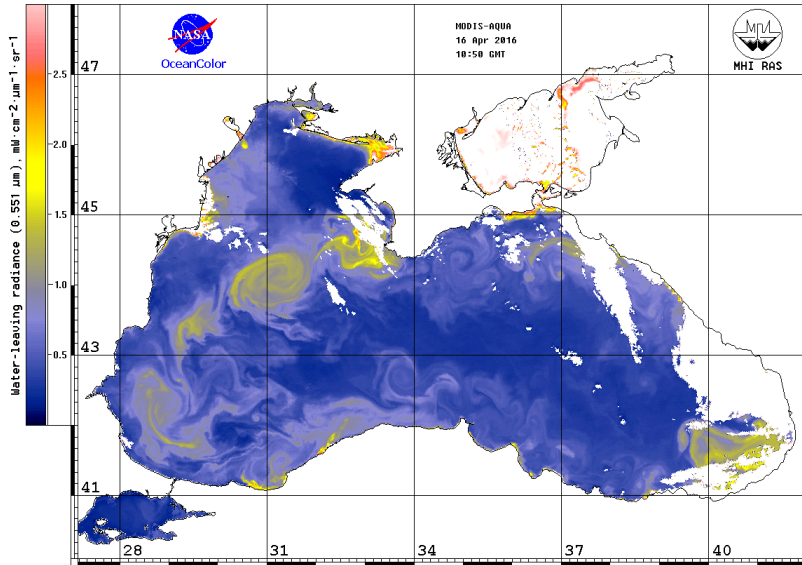
http://dvs.net.ru/mp/data/201604bs_mod_ru.shtml

Velocity (cm/s) on 5m, 16 APR 2016
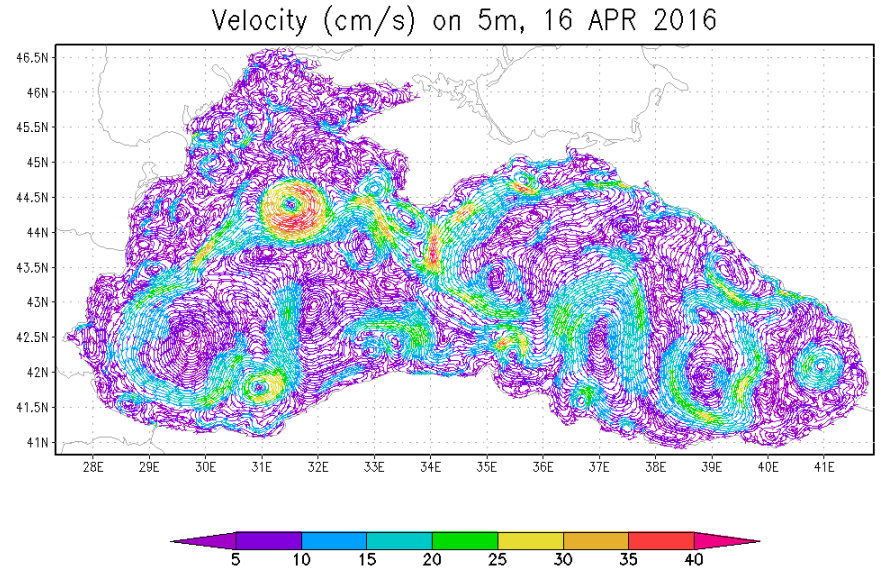
Kinetic energy of mean current (MKE) and eddies (EKE), 10^{14} J
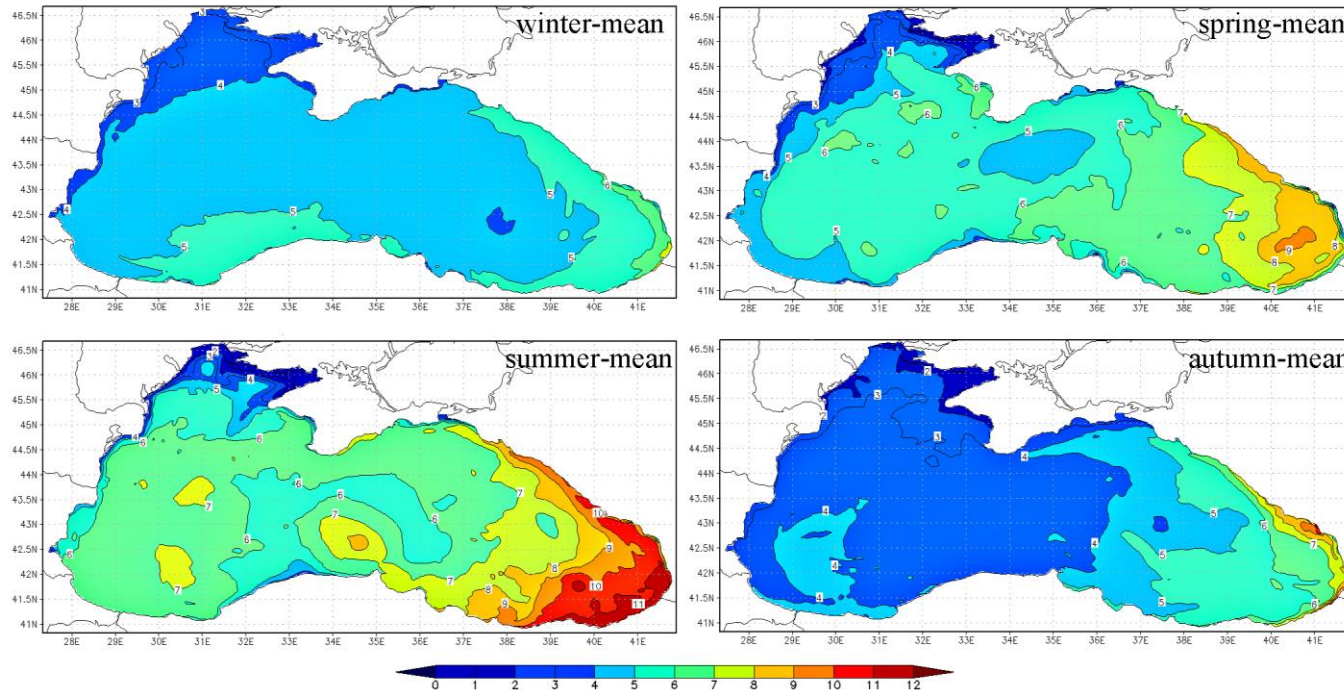

The rate of energy conversion between MKE and EKE (barotropity - BT), the rate of energy conversion between EPE and EKE (baroclinity - BC), 10^7 W

MODELING of RADIONUCLIDE DISTRIBUTION in the BLACK SEA

Seasonal variability of the 7Be surface concentration, Bq/m³

Comparison of simulated surface concentration with observations, Bq/m³