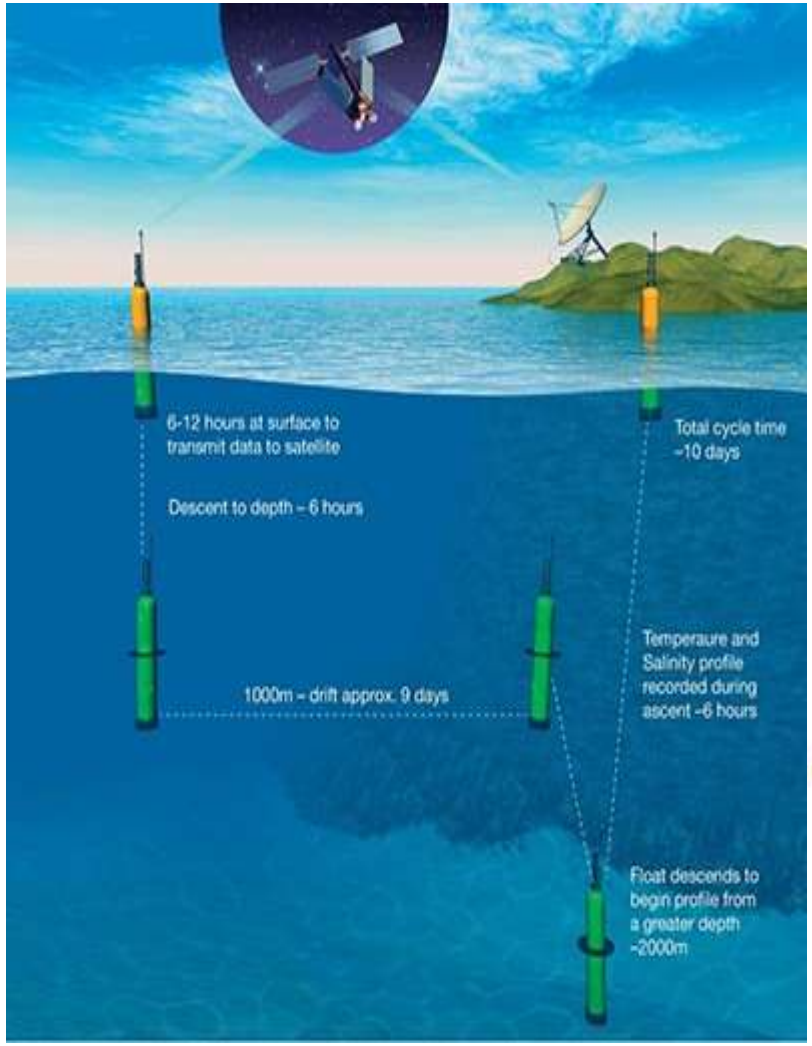
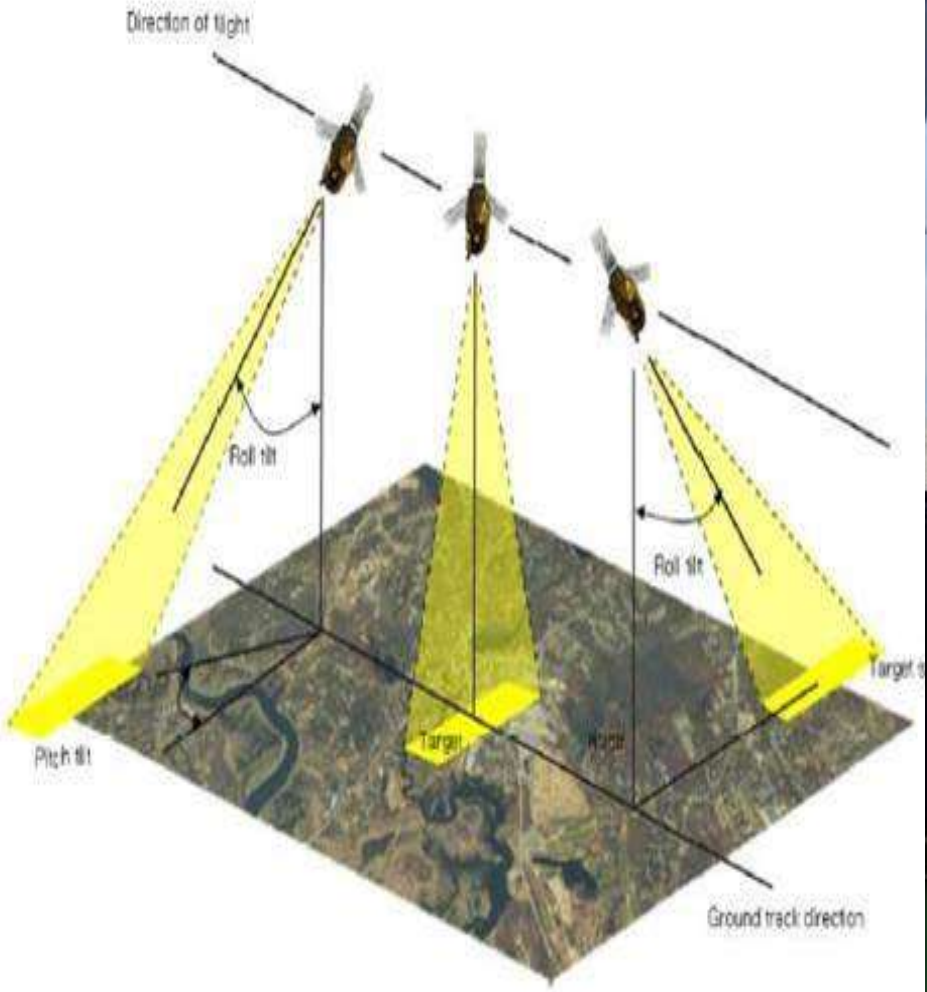
3D ВИЗУАЛИЗАЦИЯ ЭКСПЕДИЦИОННЫХ, МОДЕЛЬНЫХ И СПУТНИКОВЫХ ДАННЫХ

Дидов А.А., Будянский М.В., Улейский М.Ю., Файман П.А.

Лаборатория нелинейных динамических систем
ТОИ ДВО РАН

Получение данных





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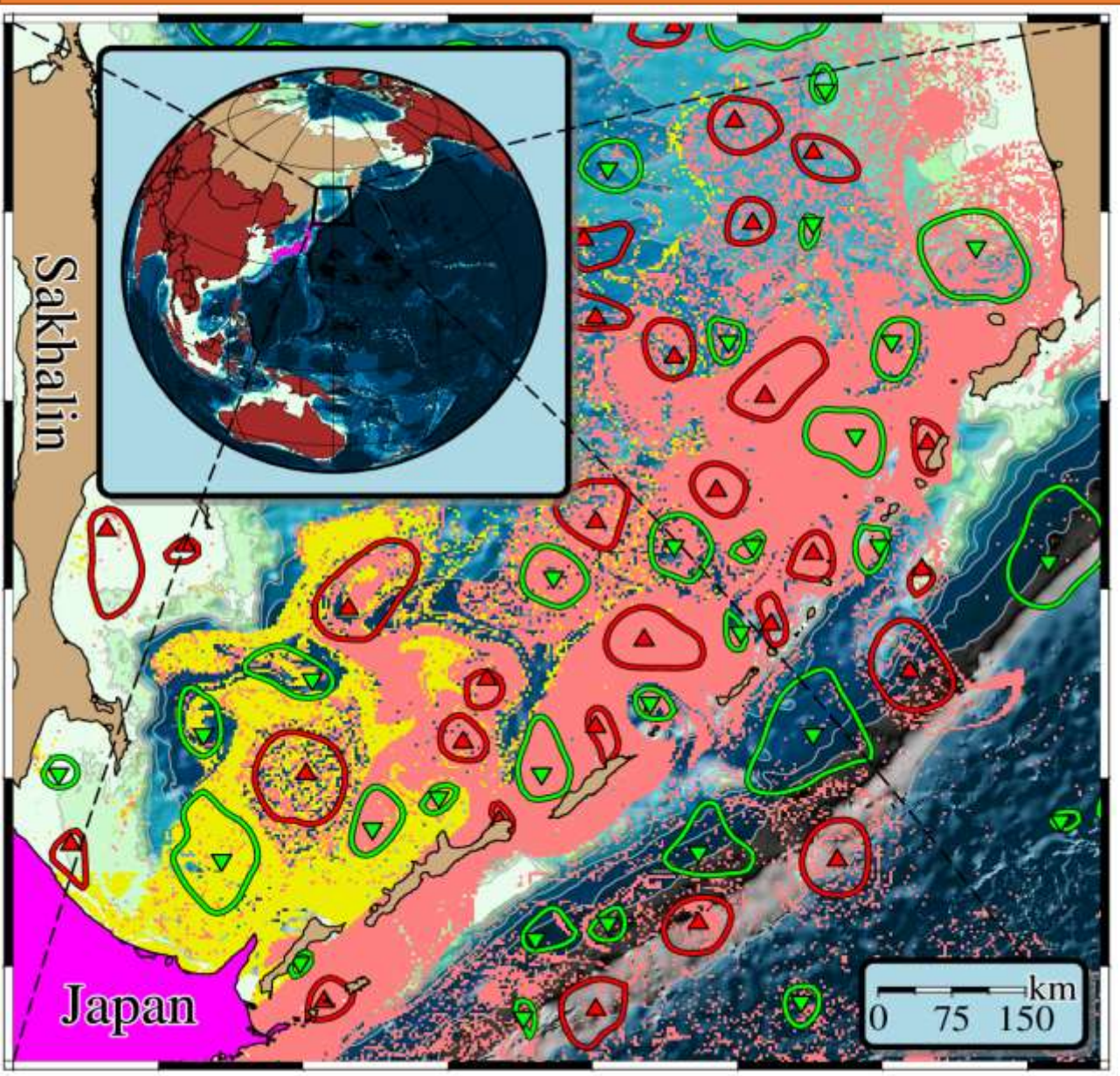

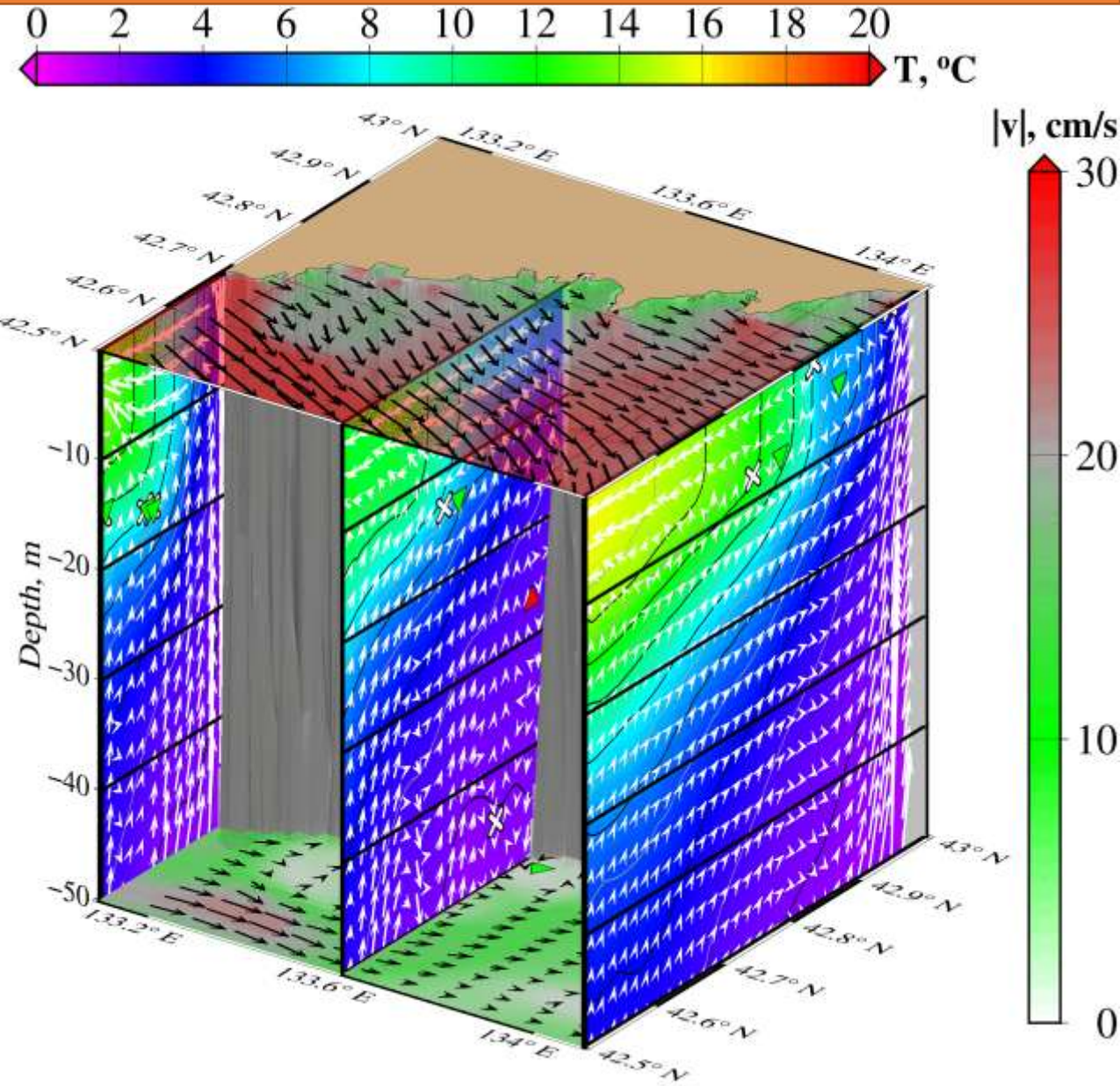

Циклонический вихрь вблизи р. Туманная

Marine Pollution Bulletin 194 (2023) 115414

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Transport of the Tumen River water to the Far Eastern Marine Reserve (Posyet Bay) based on *in situ*, satellite data and Lagrangian modeling using ROMS current velocity output

Pavel A. Fayman, Pavel A. Salyuk, Maxim V. Budyansky, Alexandr V. Burenin, Aleksandr A. Didov, Nadezhda A. Lipinskaya, Vladimir I. Ponomarev, Aleksandr A. Udalov, Yuri N. Morgunov, Michael Yu. Uleysky*, Sergey S. Shkramada, Mikhail K. Pichugin

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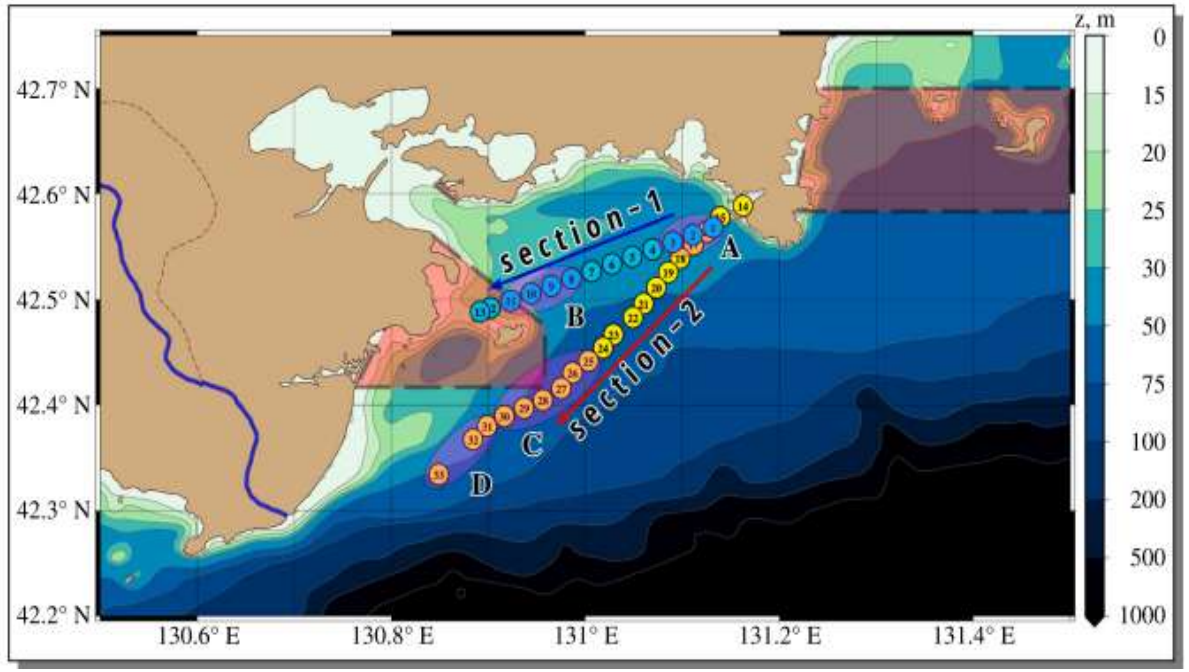
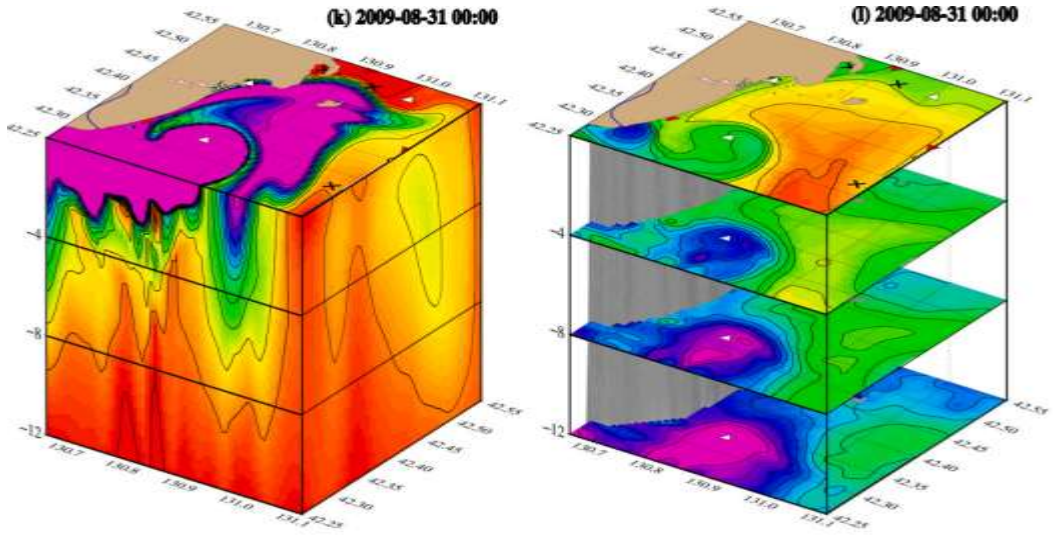
ARTICLE INFO

Keywords:
Tumen River plume
ROMS
Lagrangian modeling
Cyclonic eddy
Posyet Bay
Far Eastern Marine Reserve

ABSTRACT

We study physical mechanisms of the Tumen River water transport in the area of the Posyet Bay (Peter the Great Bay, Sea of Japan). This study is based on the satellite and *in situ* measurements, and numerical simulation of advection of river water by the current velocity simulated by Regional Ocean Model System (ROMS). The importance of this study is in identification of the reasons of the transport of pollutants into the area of the Far Eastern Marine Reserve. The results of the study showed that such reasons are wind currents and mesoscale cyclonic eddies. These eddies were originally detected on satellite imagery and CTD and bio-optical measurements. The anomalies in the form of spots of the chlorophyll *a* (CHL) increased concentration were detected on satellite images in fall 2009. The oceanographic sections of CTD and bio-optical measurements through the anomalies show that they are cyclonic eddies. These eddies consist of two cores — upper and lower. The upper core is filled with river waters with low salinity, high values of CHL and colored dissolved organic matter content (CDOM). The lower core is filled with cold saline waters. The ROMS results show that eddies are generated as a result of symmetrical and centrifugal instabilities.





P.A. Fayman, P.A. Salyuk, M.V. Budyansky, A.V. Burenin, A.A. Didov, N.A. Lipinskaya, V.I. Ponomarev, A.A. Udalov, Y.N. Morgunov, M.Yu. Uleysky, S.S. Shkramada, M.K. Pichugin
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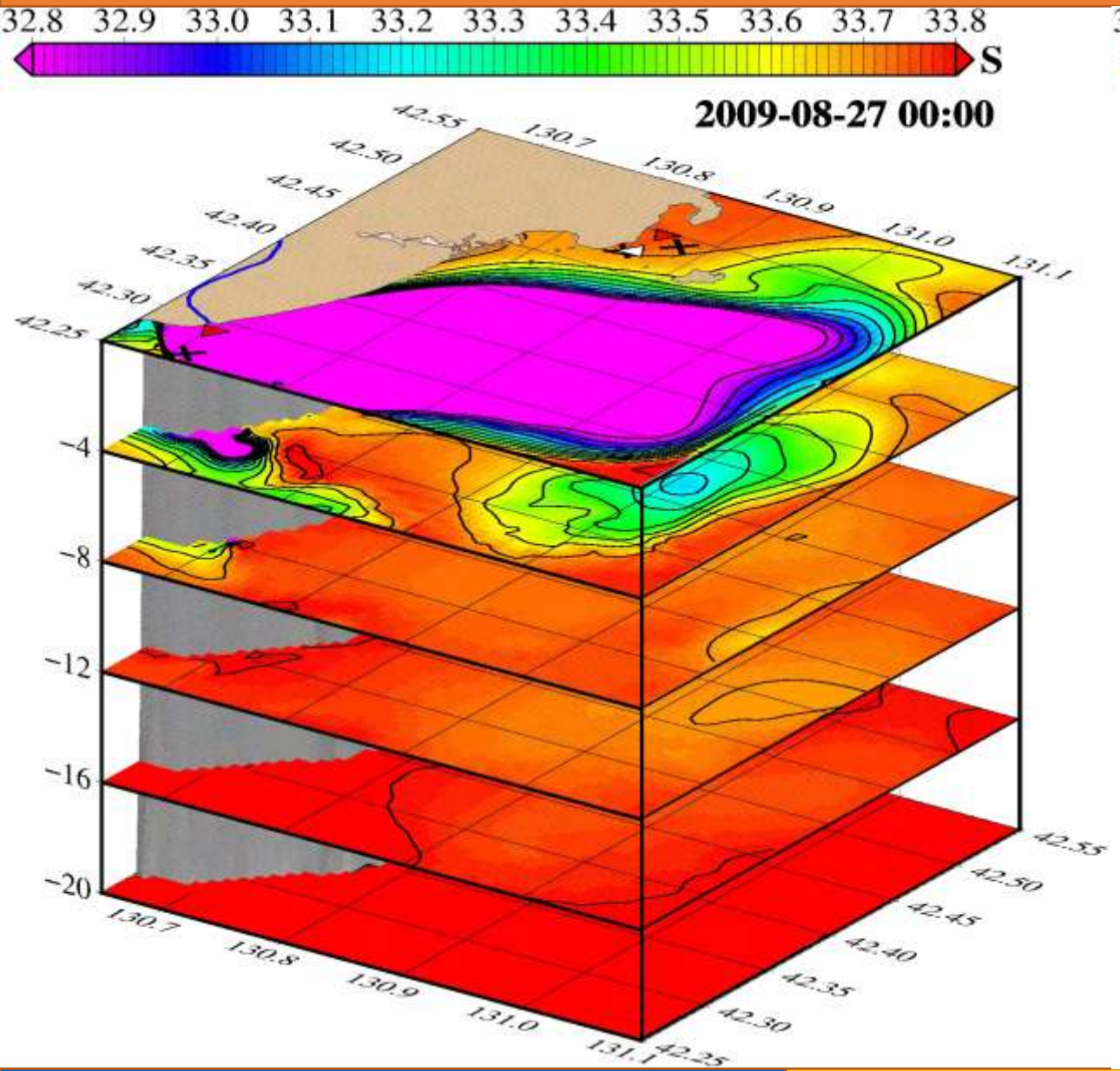
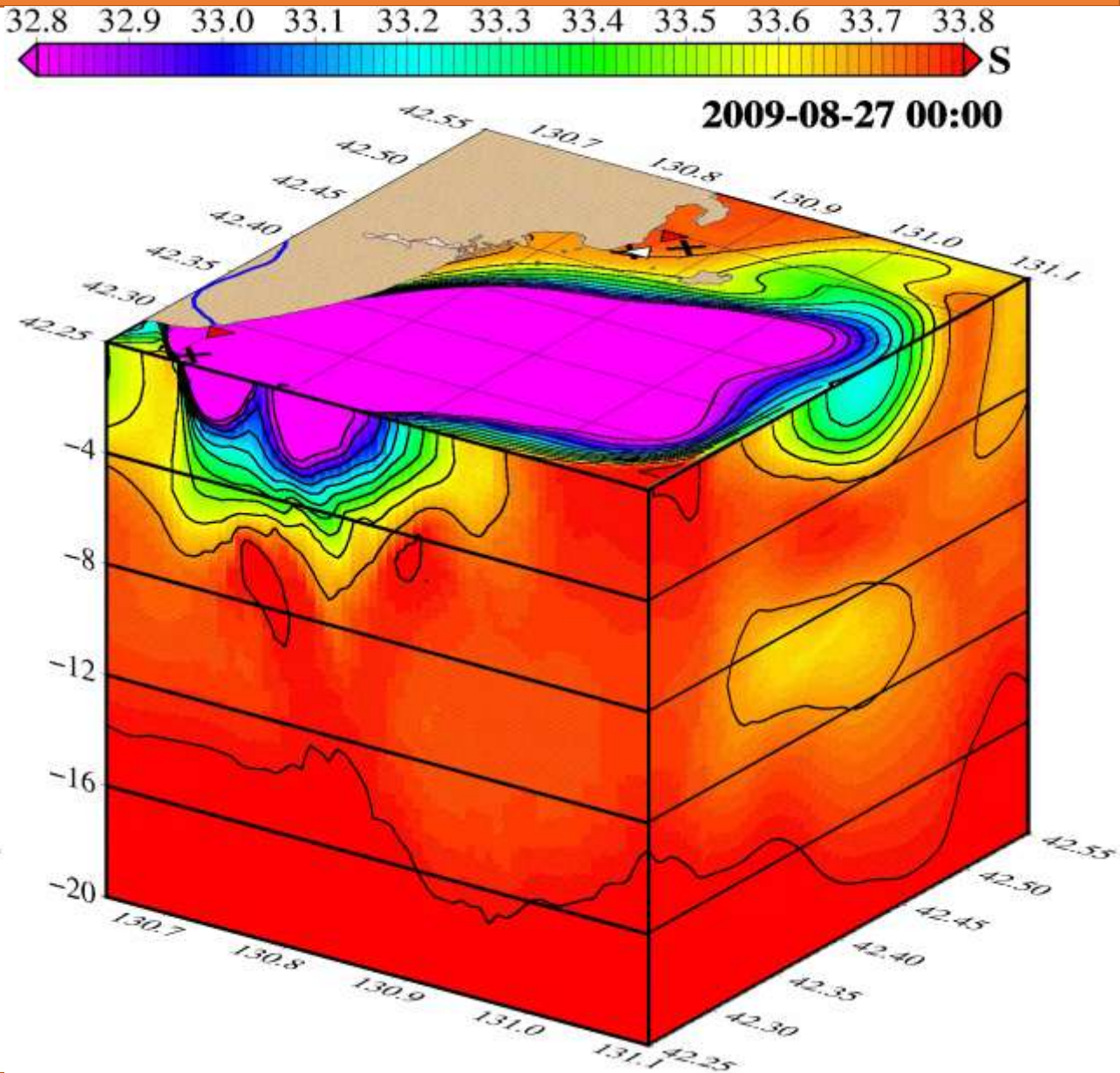
Циклонический вихрь вблизи р. Туманная





Апвеллинг в районе мыса Поворотный

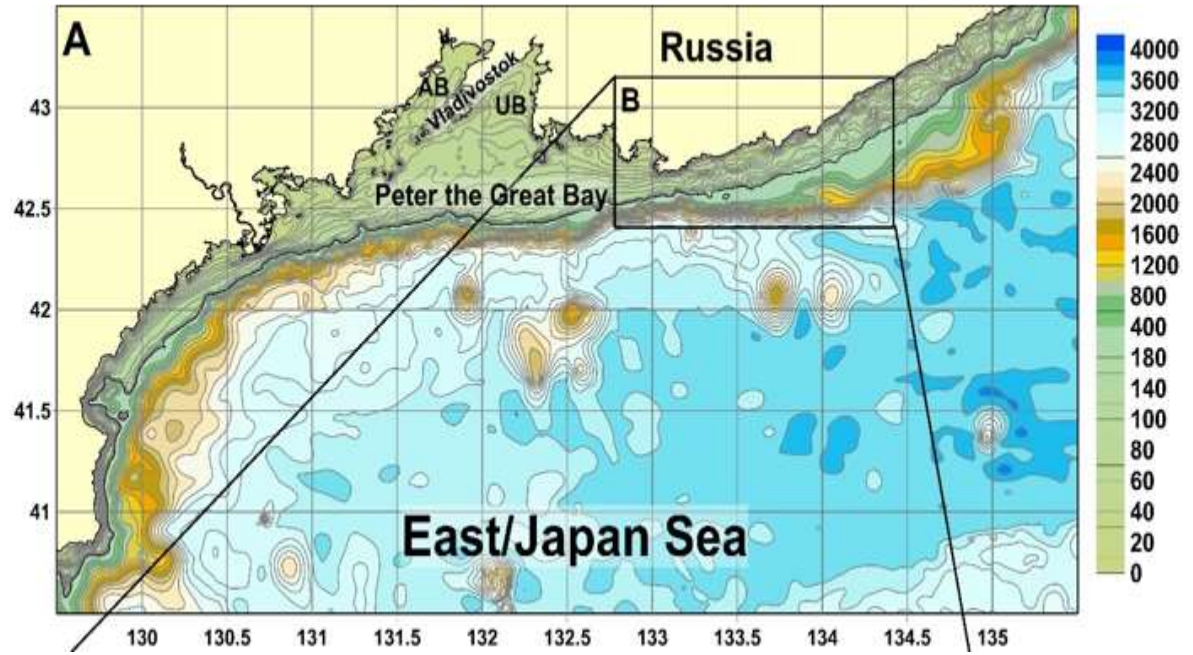
Simulation and Lagrangian analysis of coastal upwelling in the northwestern East/Japan Sea

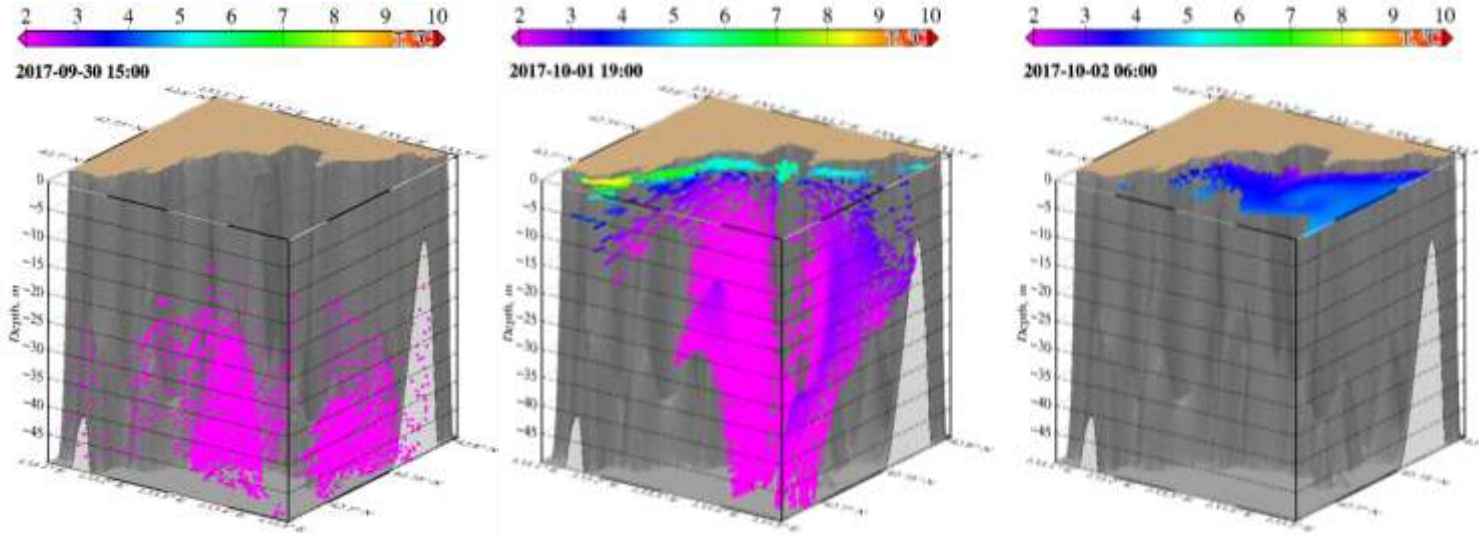
P.A. Fayman, M.V. Budyansky, I.S. Solonets, A.A. Didov, I.M. Sapogov, S.V. Prants

V.I. Il'ichev Pacific Oceanological Institute of the Russian Academy of Sciences , 43 Baltiyskaya St., Vladivostok, 690041, Russia. URL: http://dynalab. poi. dvo. ru

Abstract

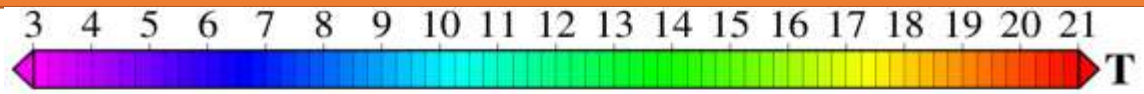
The seasonal coastal upwelling in the northwestern East/Japan Sea (EJS) is studied using five upwelling indices, 3D Lagrangian tracking of particles, finite-time Lyapunov exponents, and satellite data on sea surface temperature (SST) and chlorophyll-a concentration. The coastal upwelling, which has not yet been simulated and studied quantitatively in the study area, begins in the end of September when northwesterly, westerly and southwesterly winds dominate. The simulation results have been obtained using output data from the numerical circulation model ROMS with the high horizontal resolution of 600 m. The upwelling intensity has been estimated by calculating SST difference between the coastal and offshore zones, the Ekman transport and pumping indices, sea surface height and speed of offshore surface currents. A strong upwelling event in the fall of 2017 was identified from calculation of the thermal and other indices during the long period of time from 2000 until 2019 based on the model results and satellite observations. An intermittency of active and break phases of the upwelling process in the fall of 2017 correlates with variation of the direction of wind and surface wind stress curl in the study area. Upwelling of the cold bottom water to the surface has been directly shown by 3D





P.A. Fayman, M.V. Budyansky, I.S. Solonets, A.A. Didov, I.M. Sapogov, S.V. Prants. Simulation and Lagrangian analysis of coastal upwelling in the northwestern East/Japan Sea// **Continental Shelf Research**. 2024. [Направлена в печать]

Апвеллинг в районе мыса Поворотный



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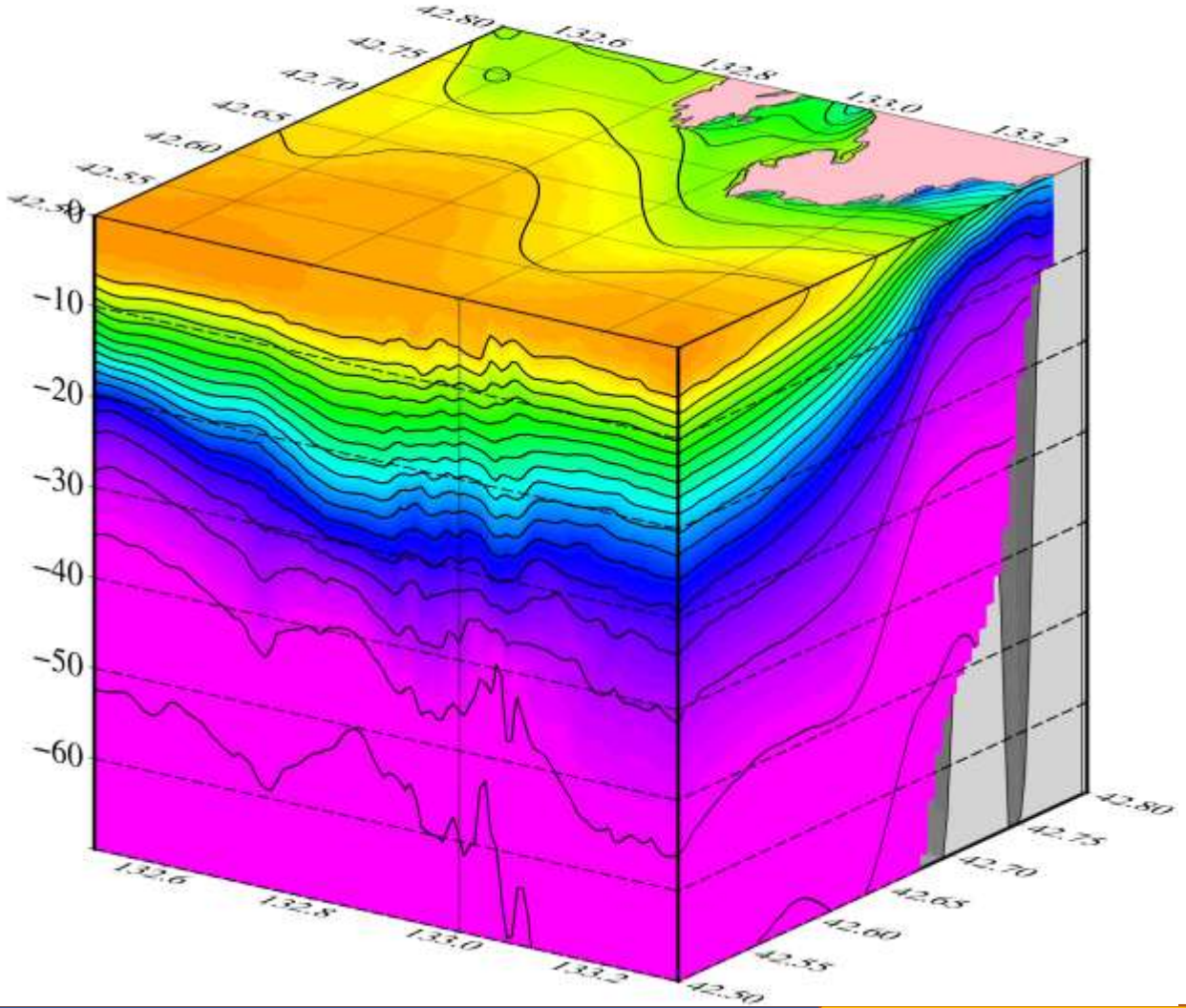

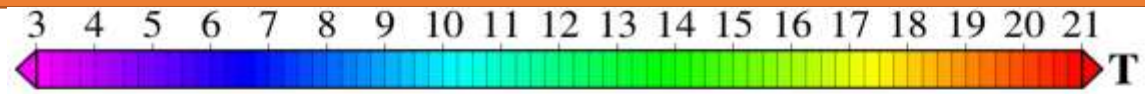

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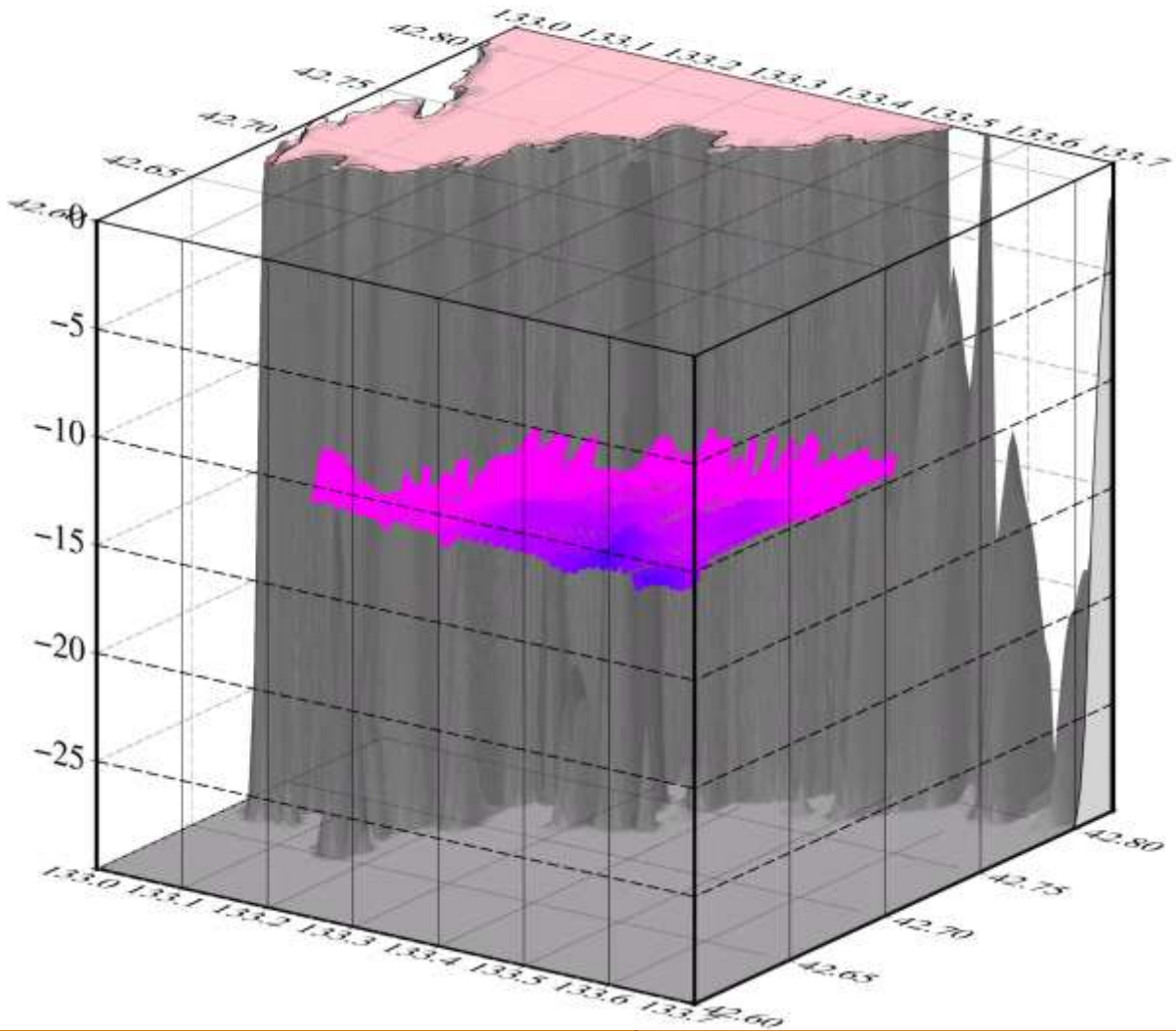

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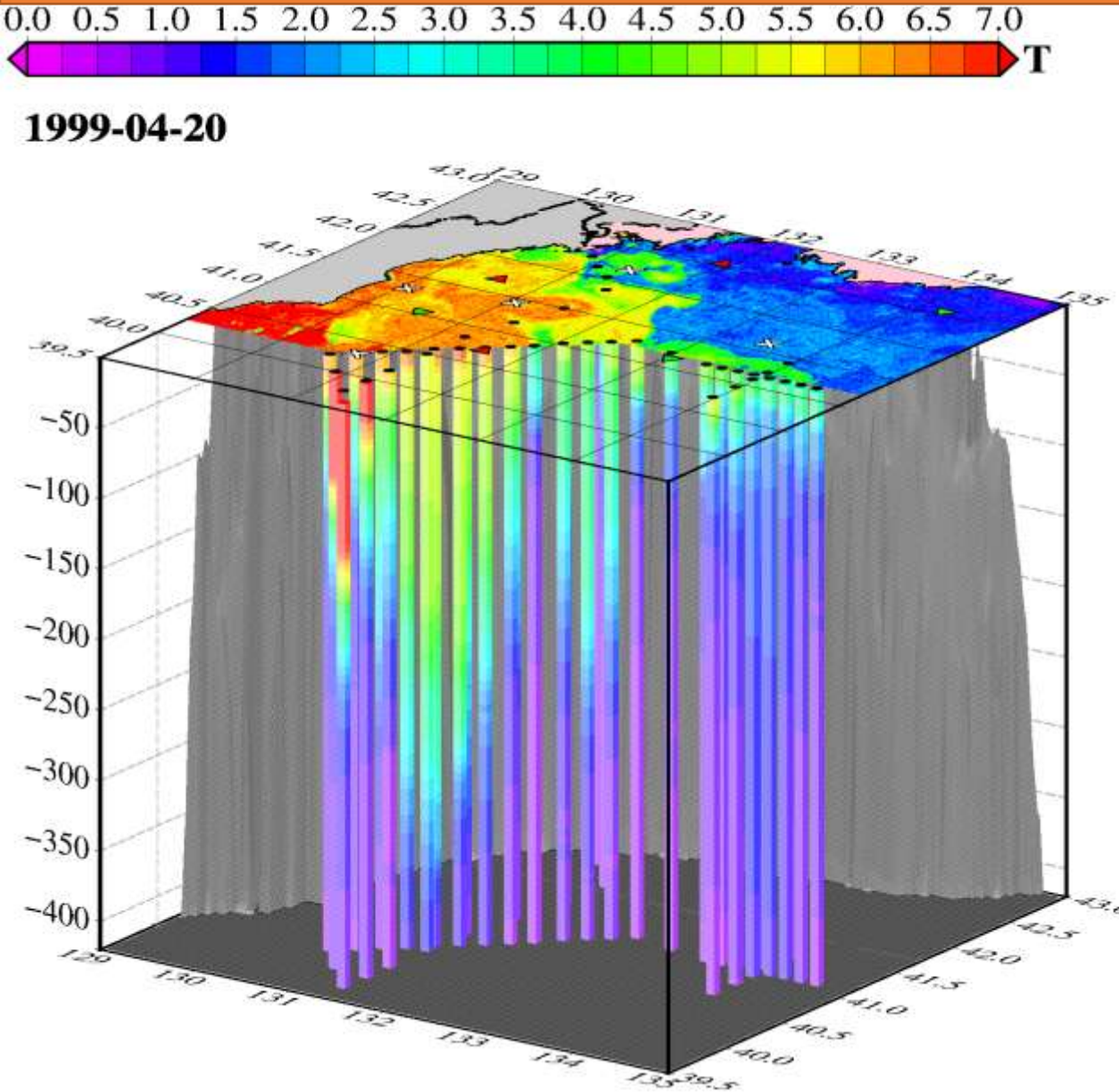
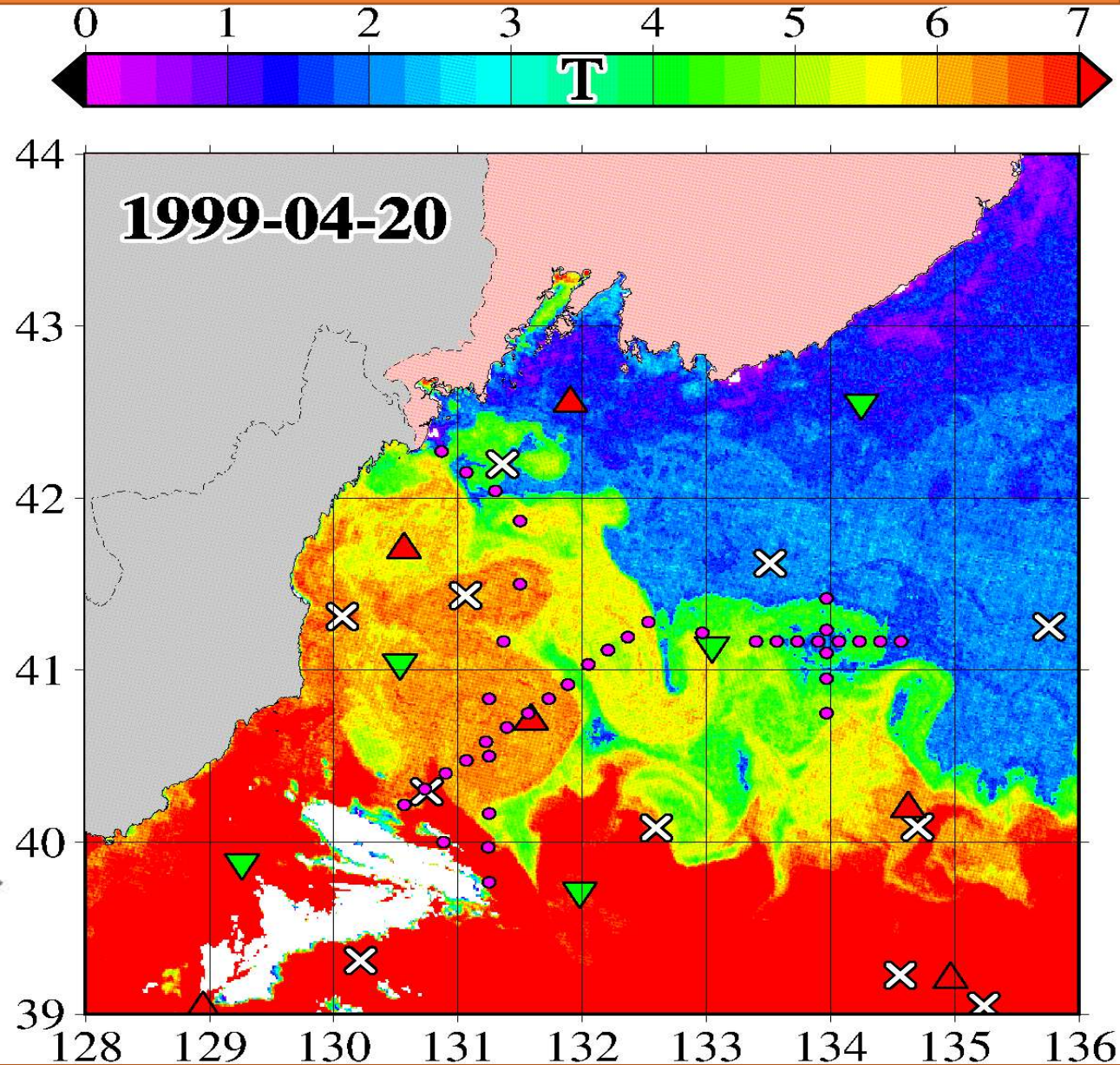
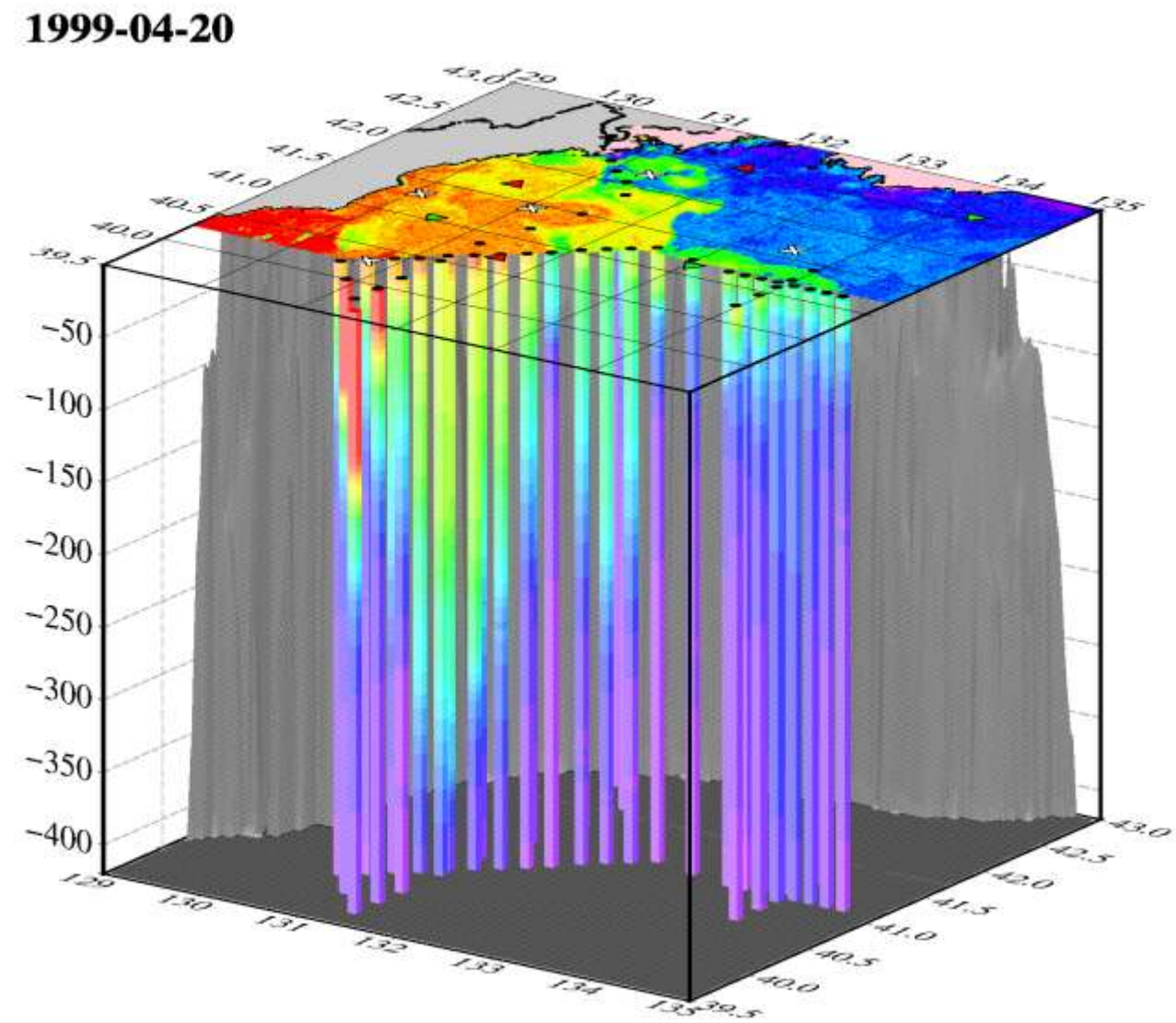
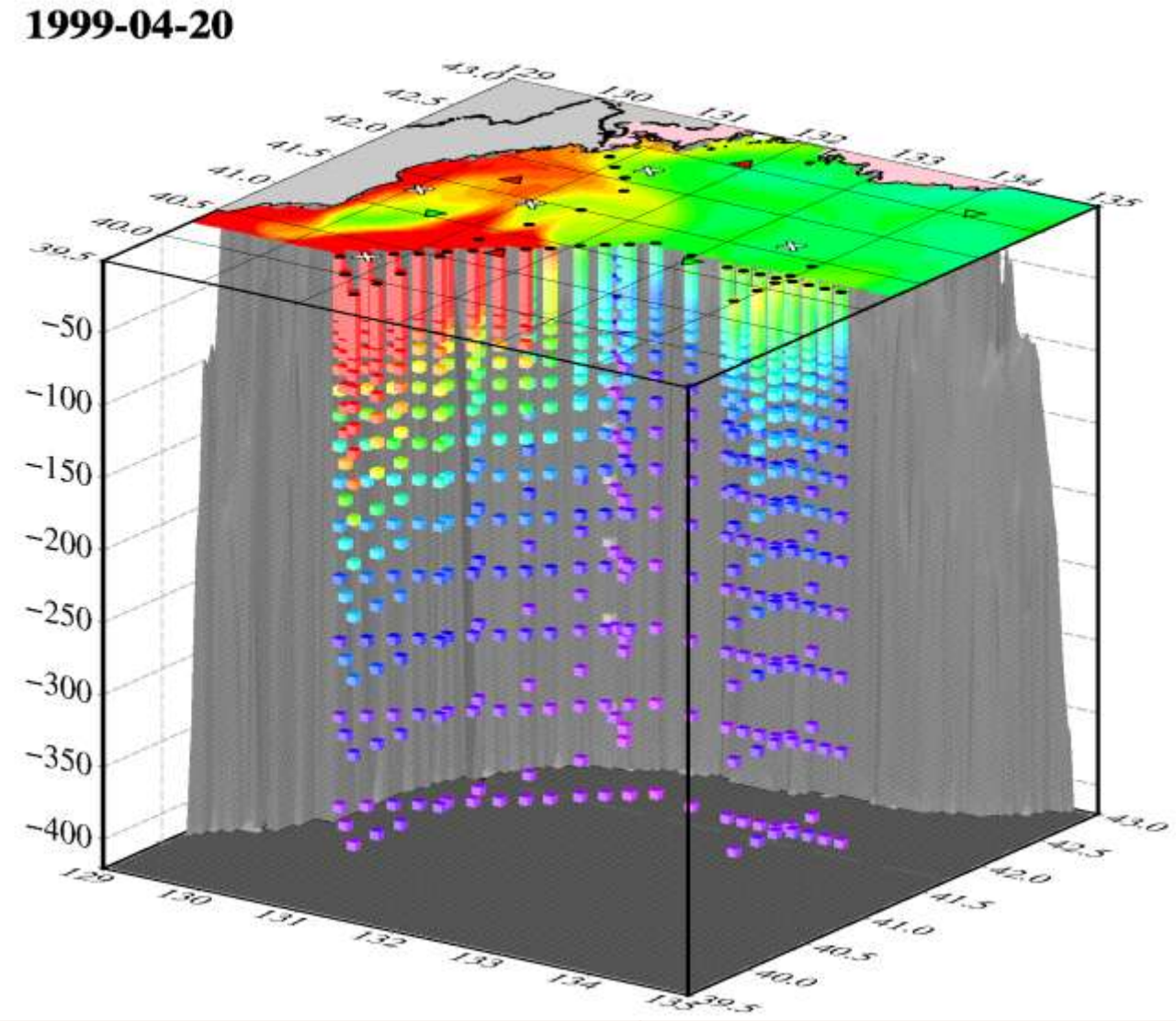




Данные in-situ и модели NEMO





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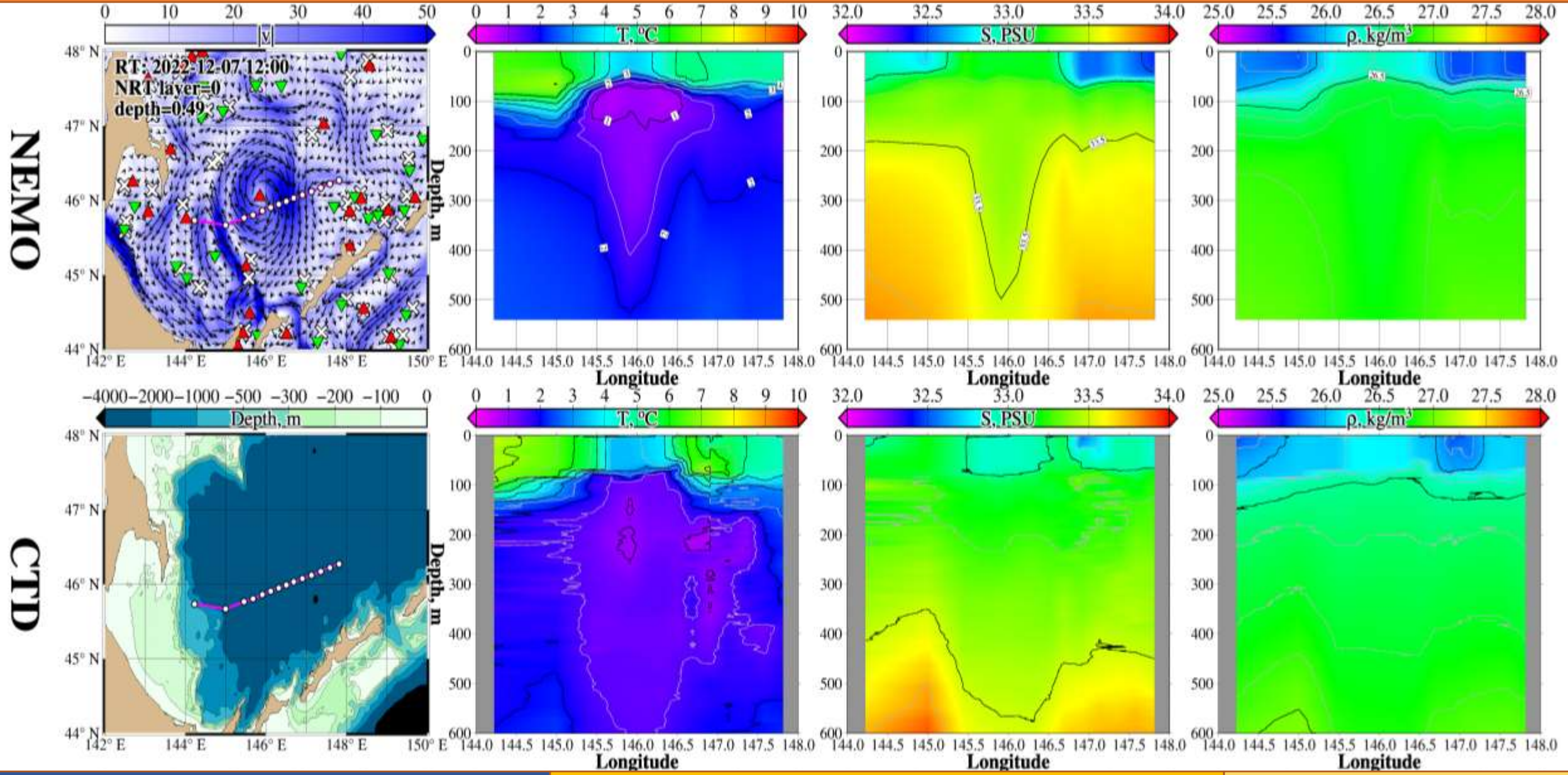

Деление антициклонического вихря

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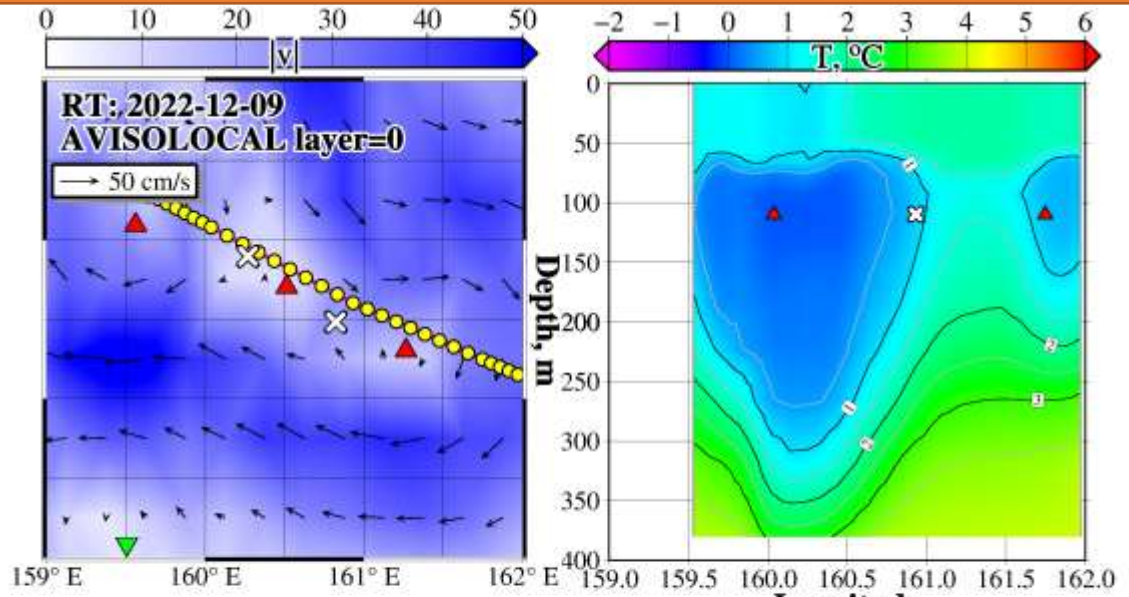

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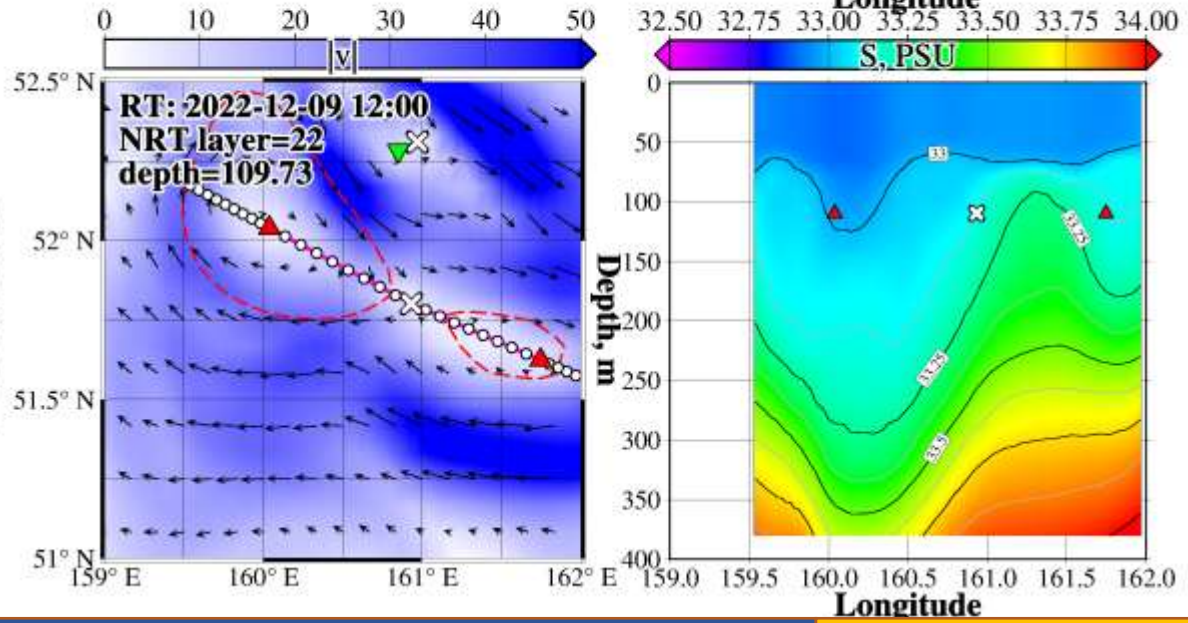

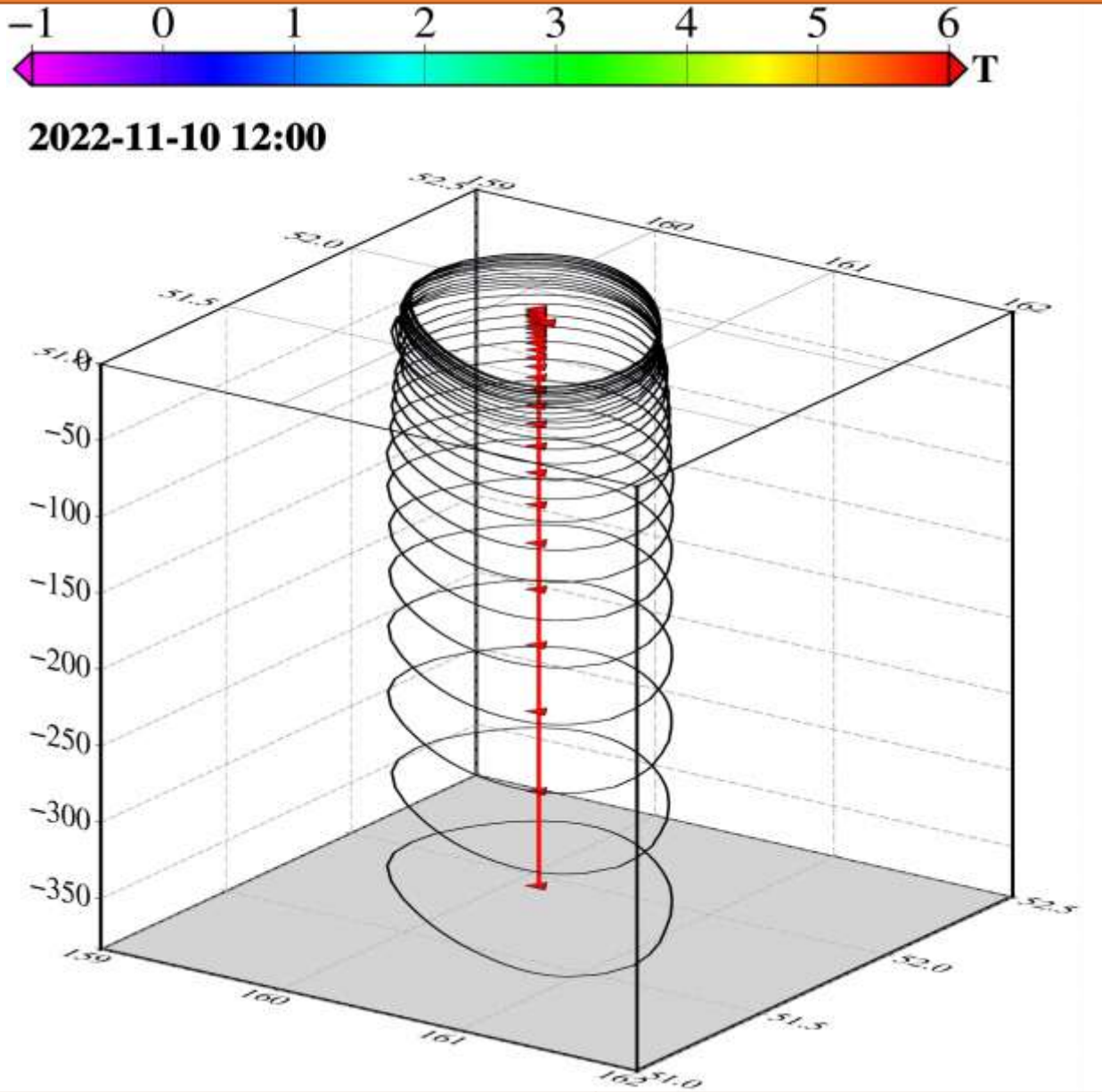

Вихрь над Лофотенской котловиной

Моделирование вентиляции вод Лофотенского антициклона

Новоселова Е.В.[1,2*], Файман П.А.[3], Дидов А.А.[1,3], Будянский М.В.[1,3], Солонец И.С.[3], Белоненко Т.В.[1], Улейский М.Ю.[3]

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[2]Научный Фонд "Международный центр по окружающей среде и дистанционному зондированию имени Нансена", г. Санкт-Петербург, 199034, Россия
[3]Тихоокеанский океанологический институт им. В.И. Ильичева, г. Владивосток, 690041, Россия

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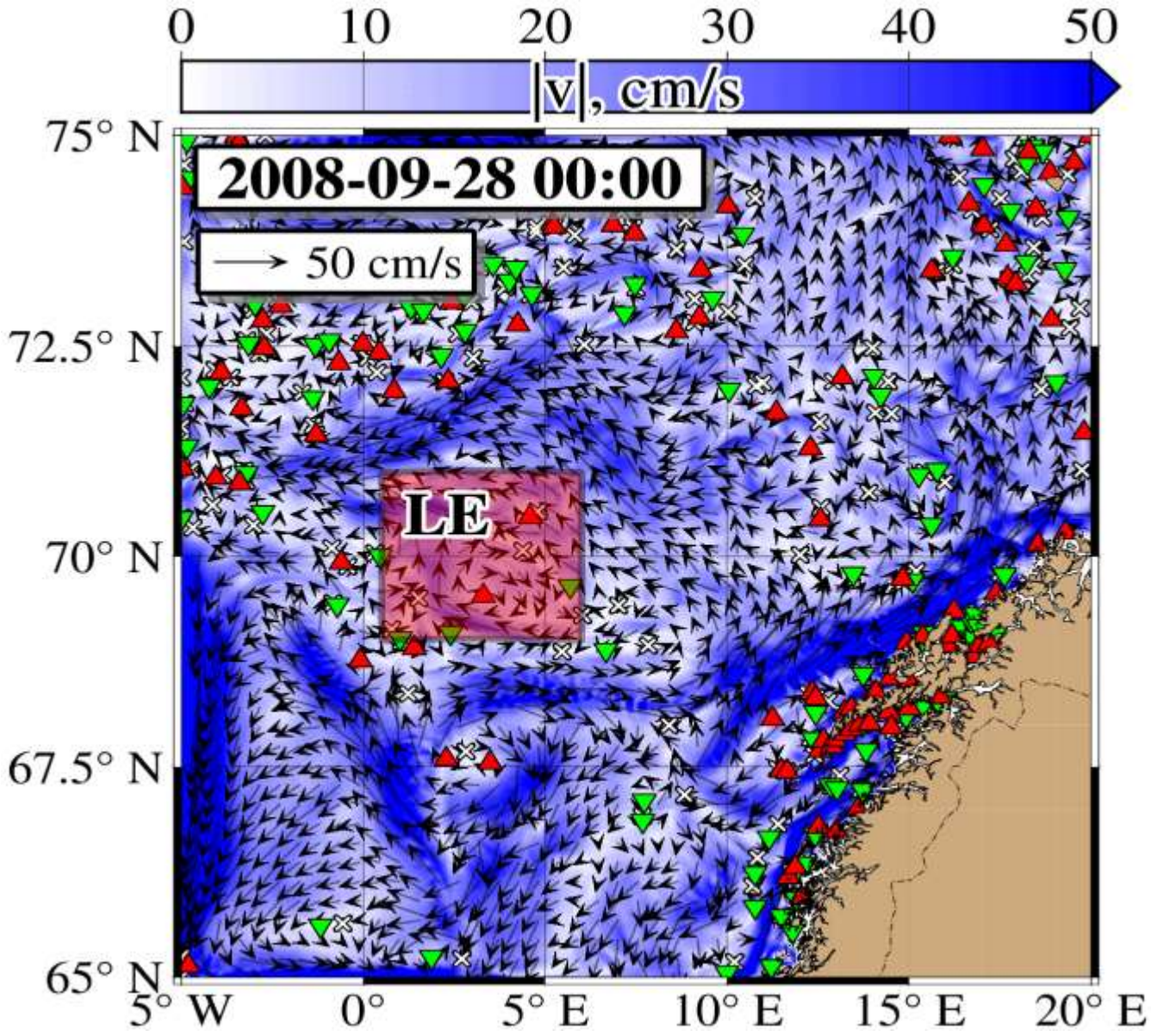
Аннотация

В работе изучается структура Лофотенского антициклона, расположенного в Лофотенской котловине Норвежского моря. Для гидродинамического моделирования циркуляции Лофотенской котловины используется модель ROMS высокого пространственного разрешения. Исследование динамики вод Лофотенского вихря производится лагранжевыми методами, для чего рассчитываются траектории пассивных маркеров, адвектируемых модельным полем скорости, и вычисляются лагранжевы индикаторы в исследуемом регионе. Рассматриваются маркеры, исходно находящиеся как



E.V. Novoselova, P.A. Fayman, A.A. Didov, M.V. Budyansky, I.S. Solonets, T.V. Belonenko, M.Yu. Uleysky
Modeling the Ventilation of the anticyclonic quasi-permanent Lofoten Vortex //
Pure and Applied Geophysics 2024.
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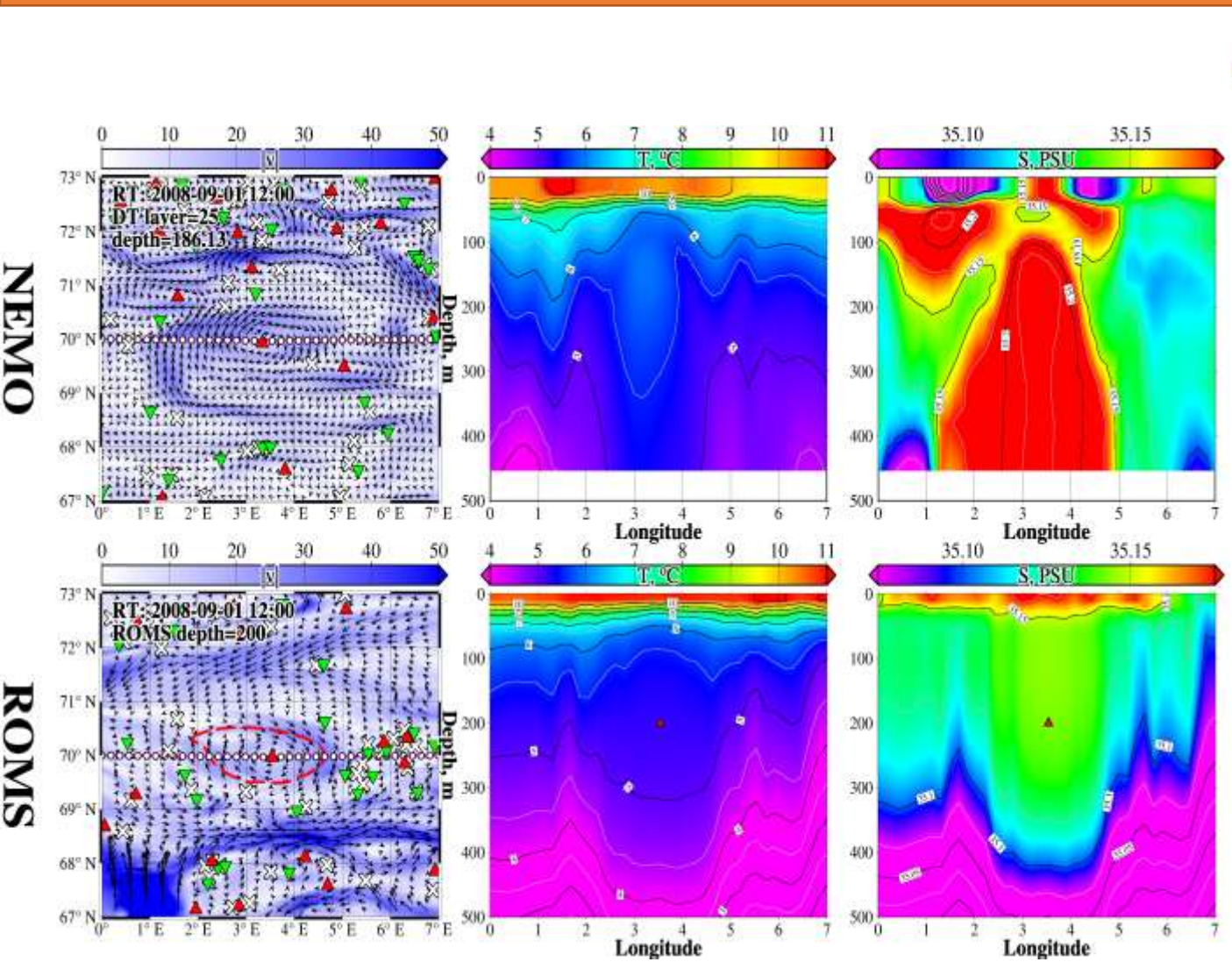
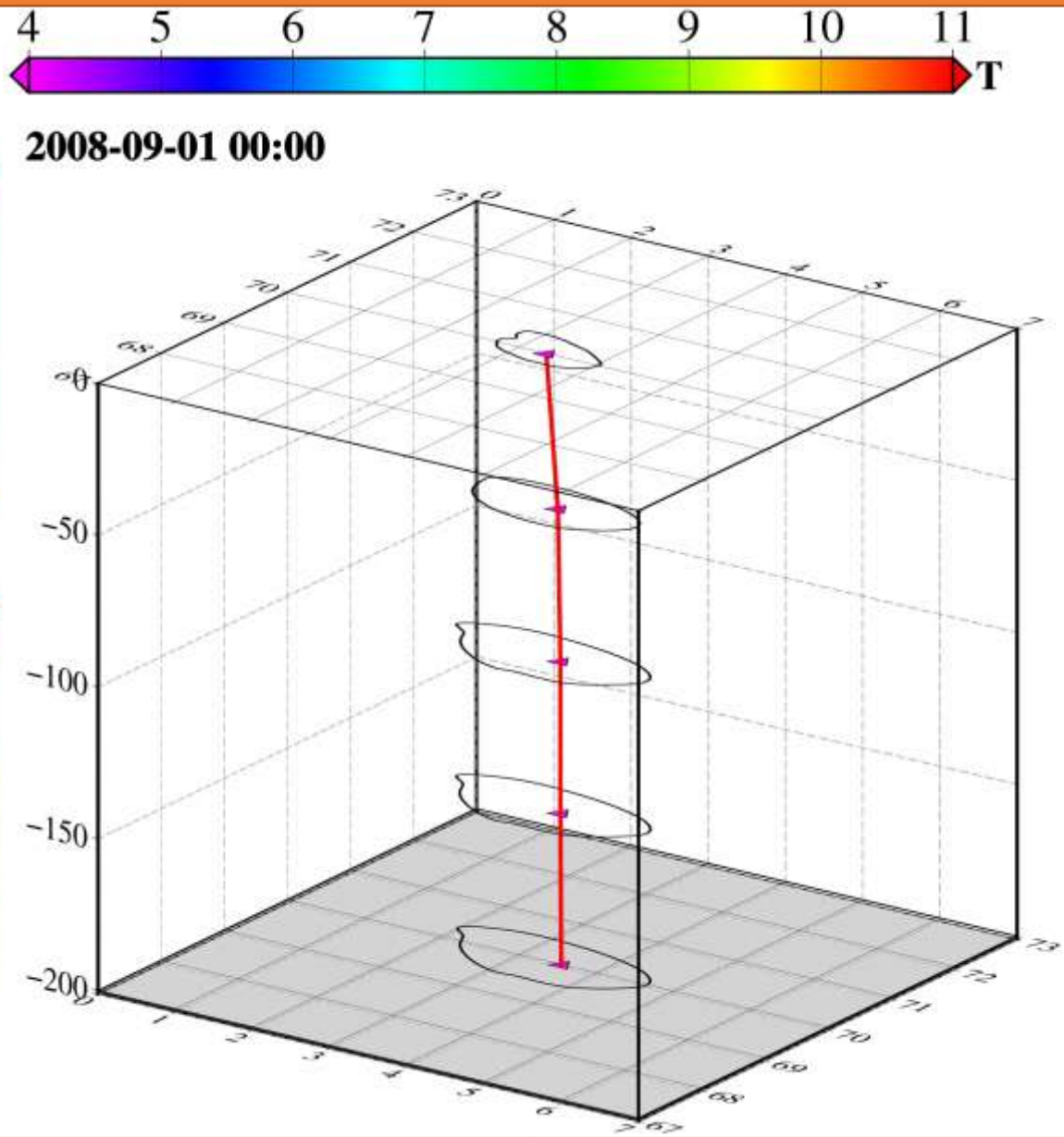
Вихрь над Лофотенской котловиной





Визуализация данных SmartFish

communications earth & environment Article

https://doi.org/10.1038/s43247-024-01529-x

A unique warm–water oasis in the Siberian Arctic's Chaun Bay sustained by hydrothermal groundwater discharge

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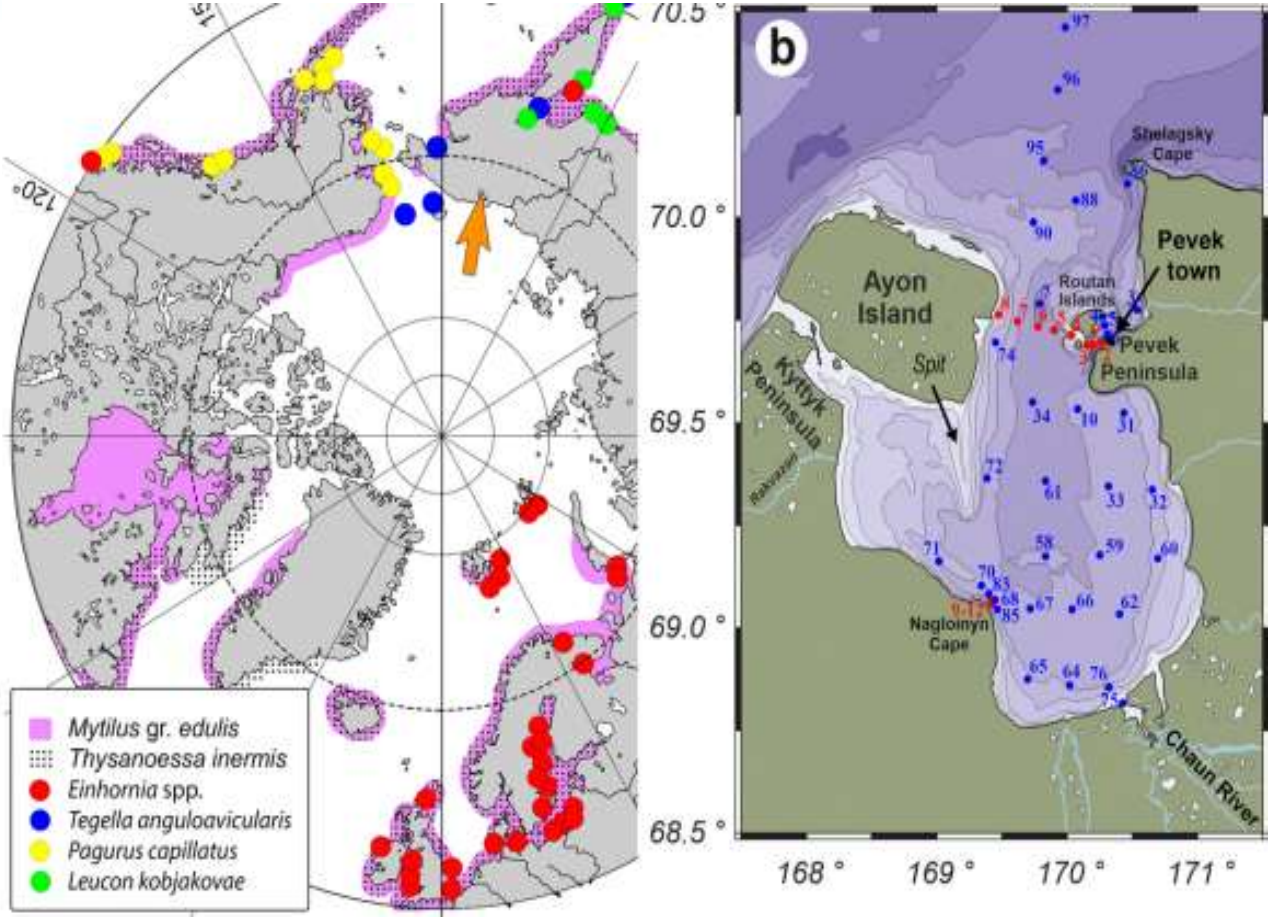
Alexander N. Charkin[1], Ksenia N. Kosobokova[2], Elizaveta A. Ershova[3], Vitaly L. Syomin[2], Glafira D. Kolbasova[2,4], Pavel Yu. Semkin[1], Andrey E. Leusov[1], Oleg V. Dudarev[1], Timofey A. Gulenko[1], Elena I. Yaroshchuk[1], Anatoly M. Startsev[1], Pavel A. Fayman[1], Vladislav A. Krasikov[1], Sergey A. Zverev[1], Elena A. Bessonova[1], Alexander S. Ulyantsev[2], Evgeny V. Elovsky[5], Daria A. Yurikova[2], Kirill A. Kobyakov[6], Olga L. Zimina[7], Alexandra V. Gerasimova[8], Peter P. Tishchenko[1] & Alexander A. Didov[1]



A.N. Charkin, K.N. Kosobokova, E.A. Ershova, V.L. Syomin, G.D. Kolbasova, … , A.A. Didov
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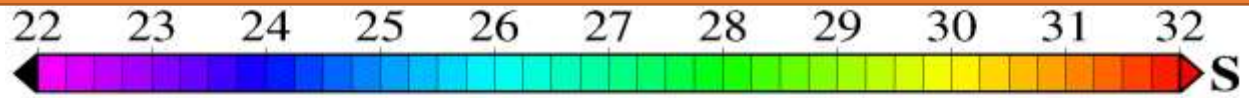

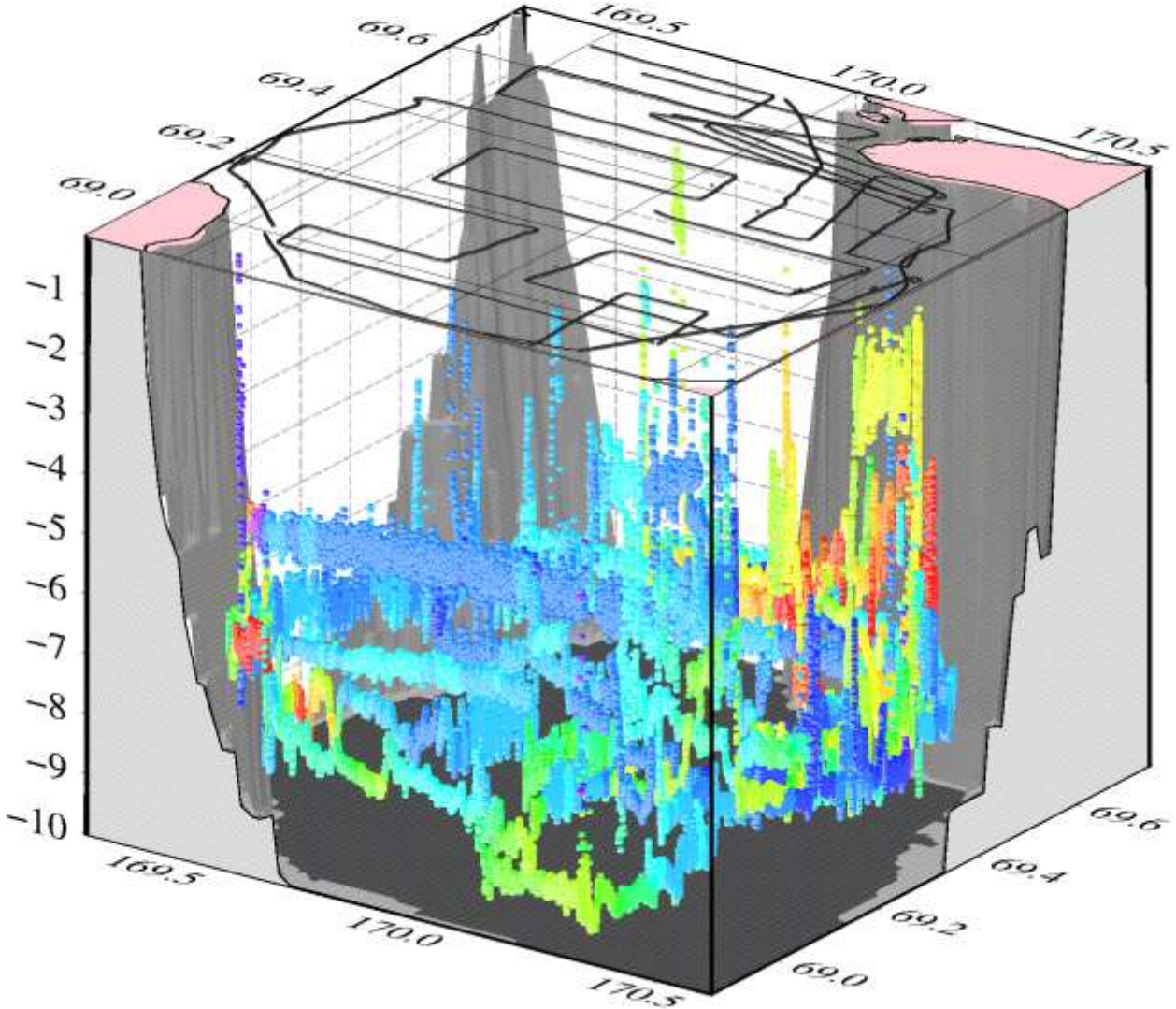

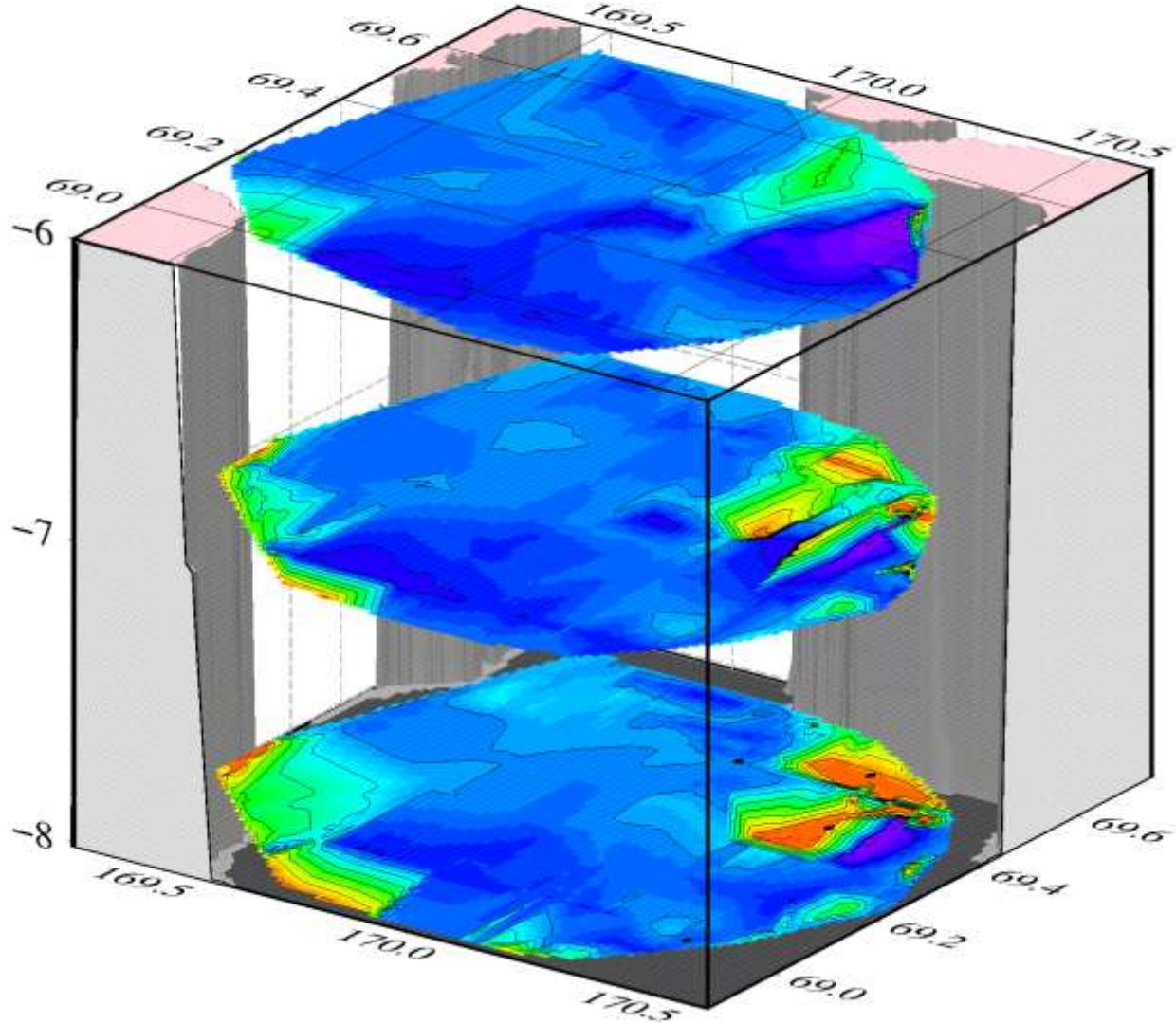

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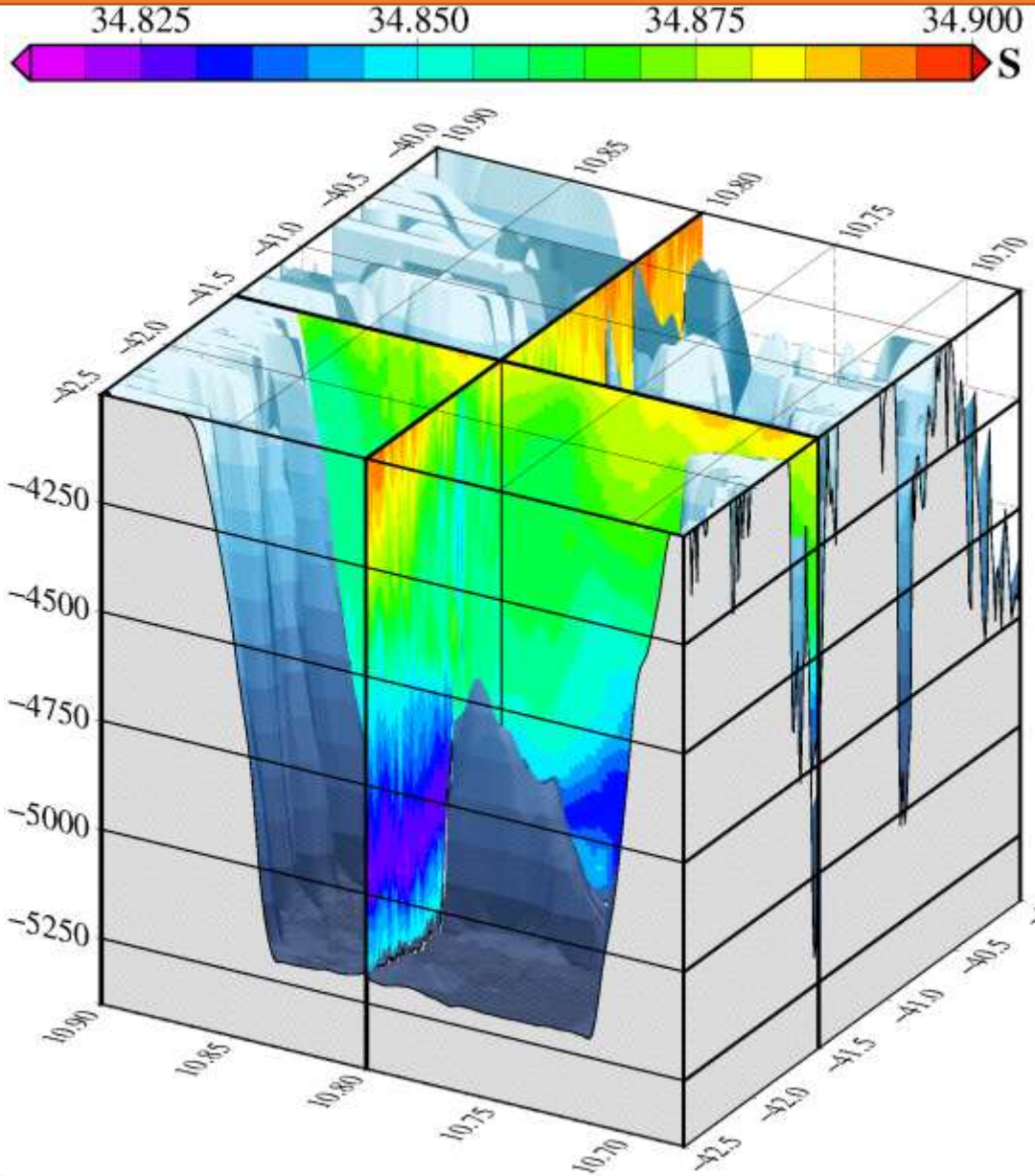
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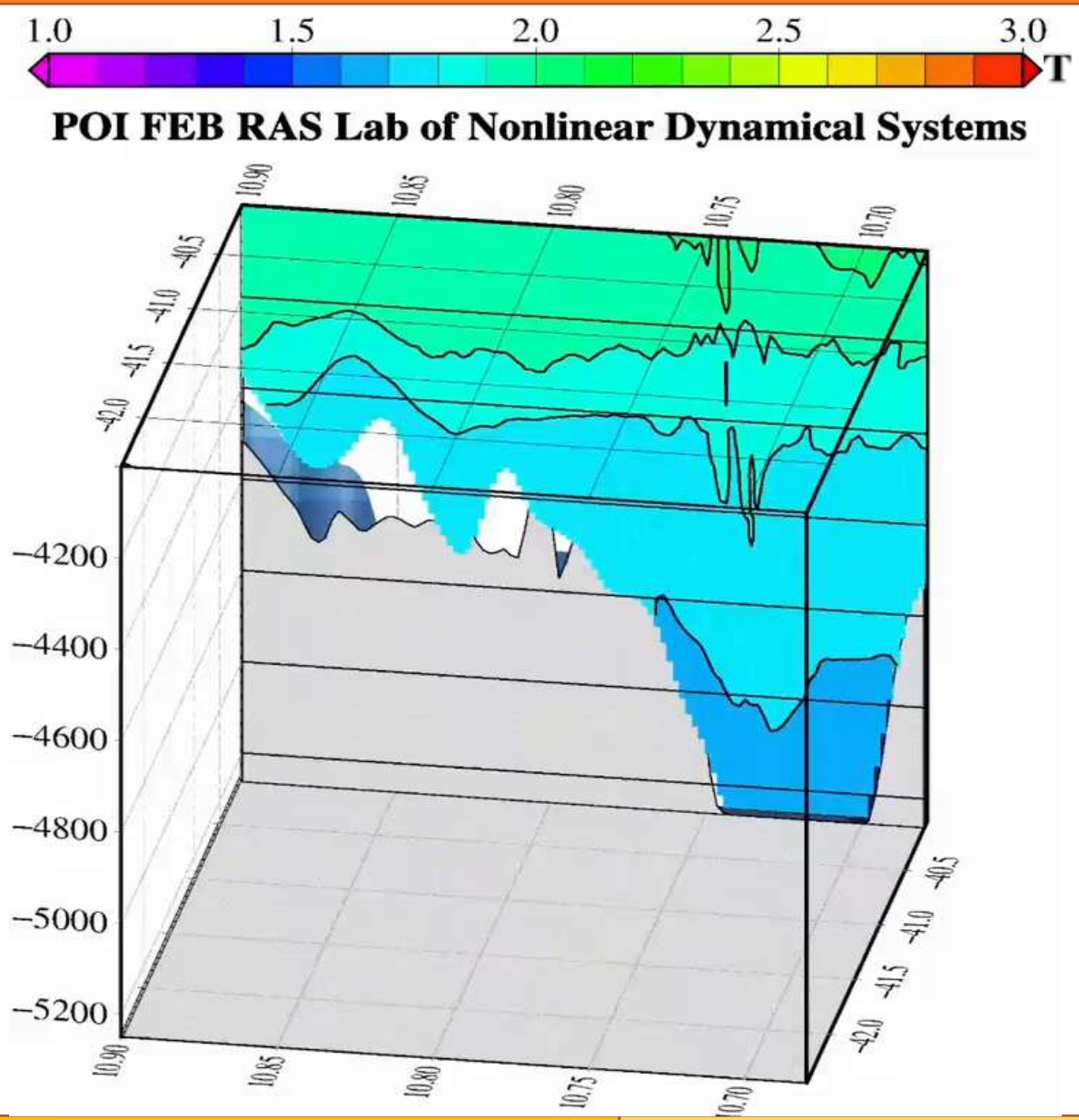
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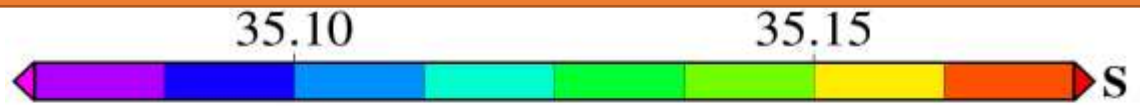
Эволюция лагранжевых маркеров



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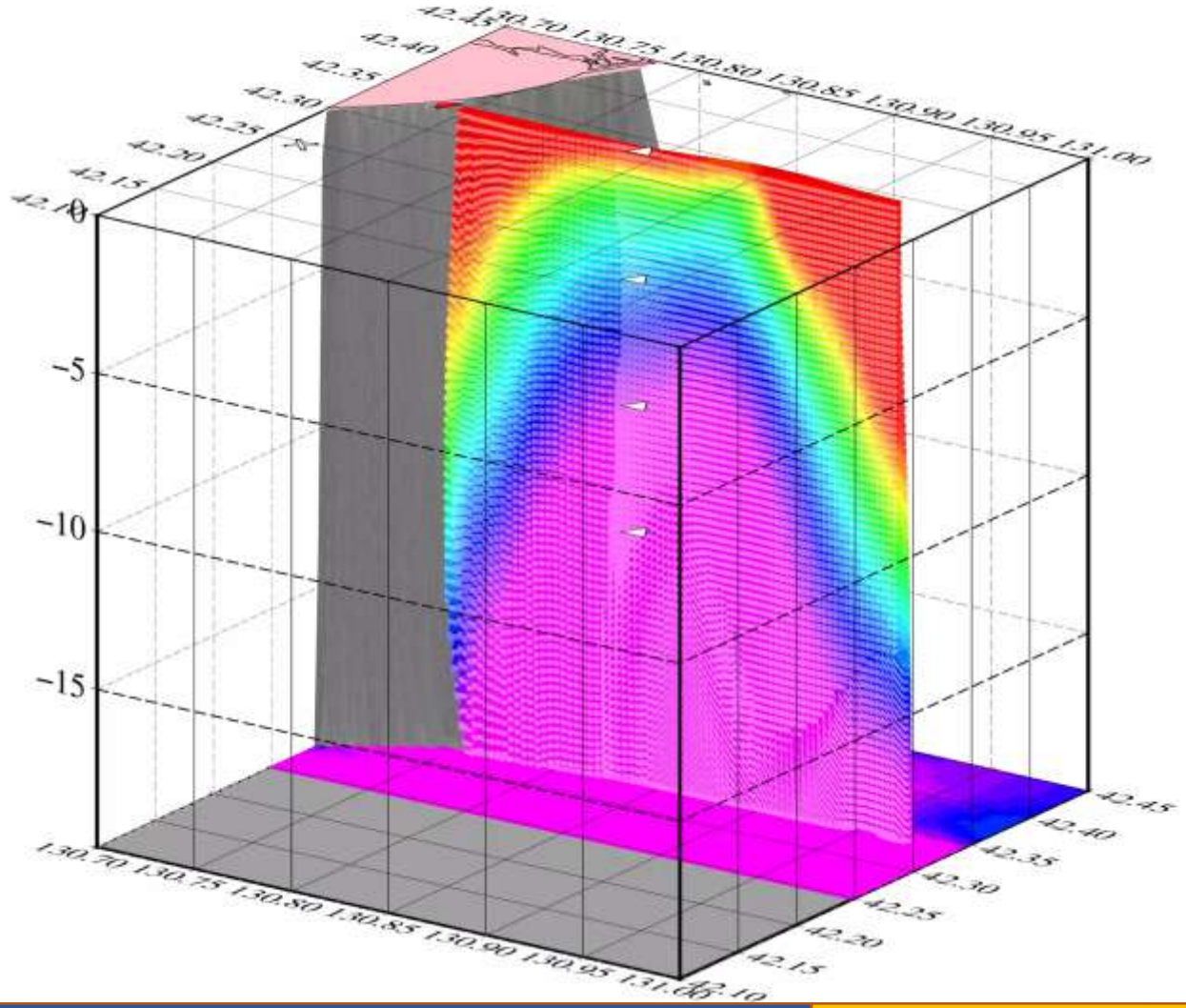

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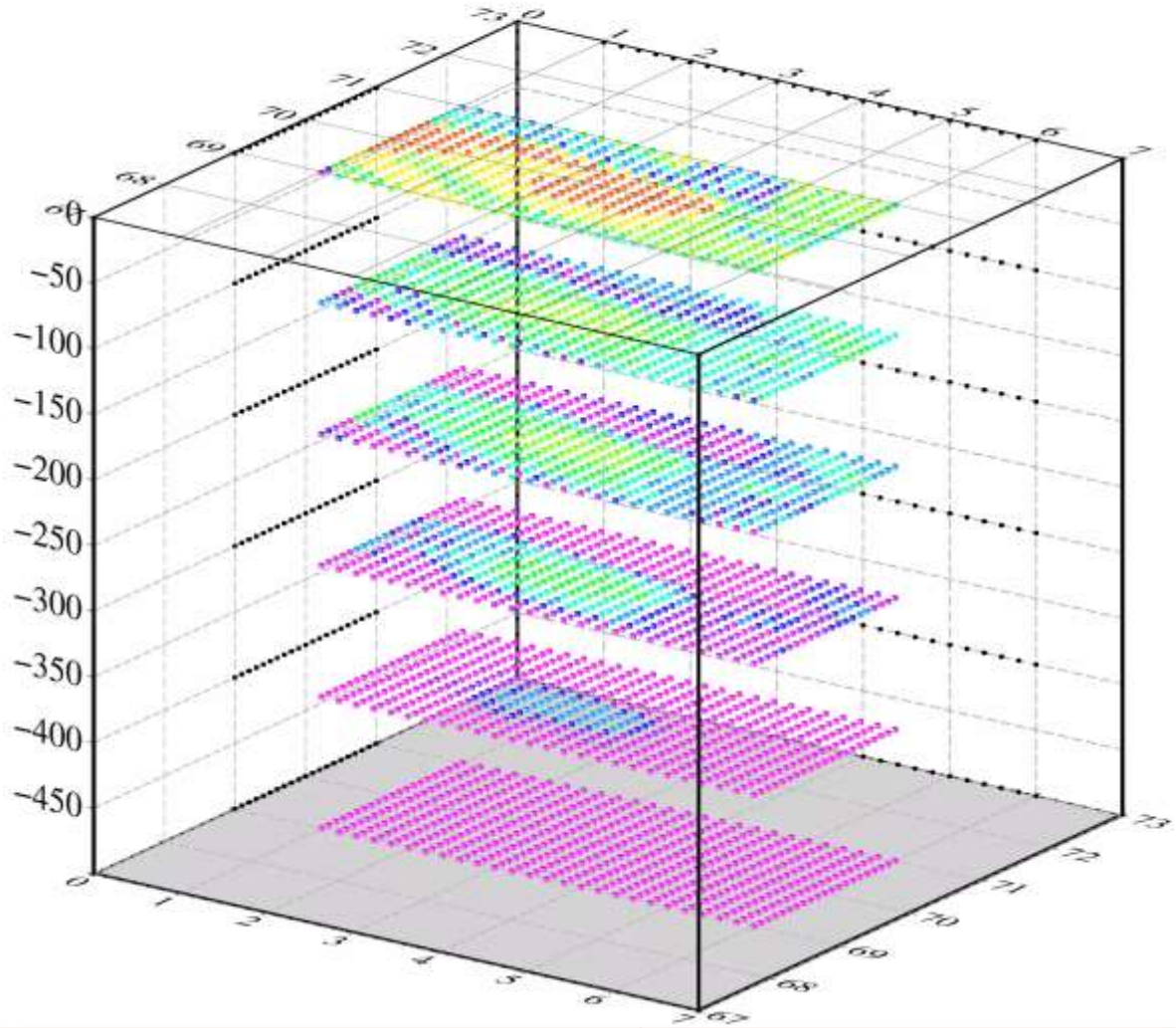

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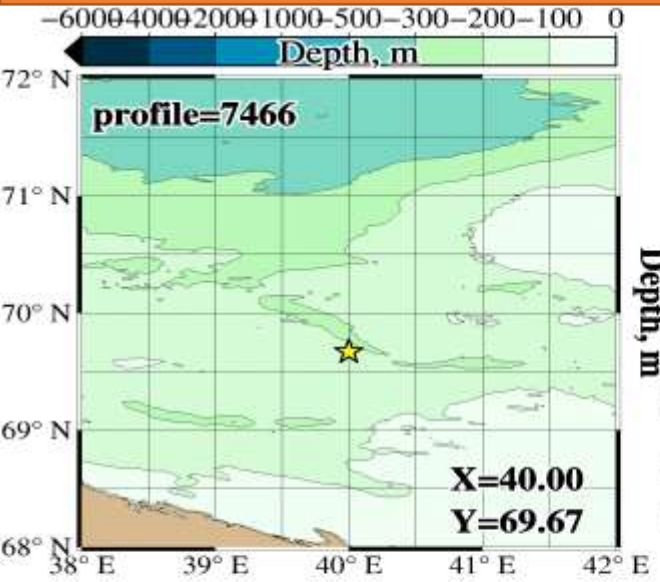

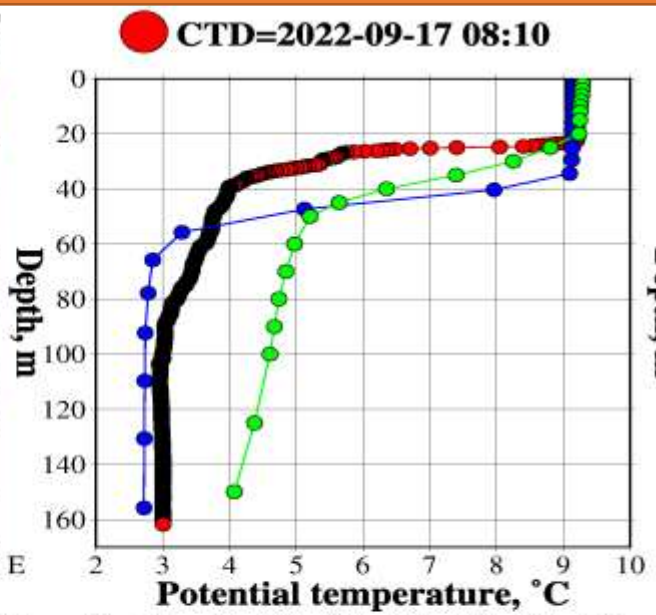

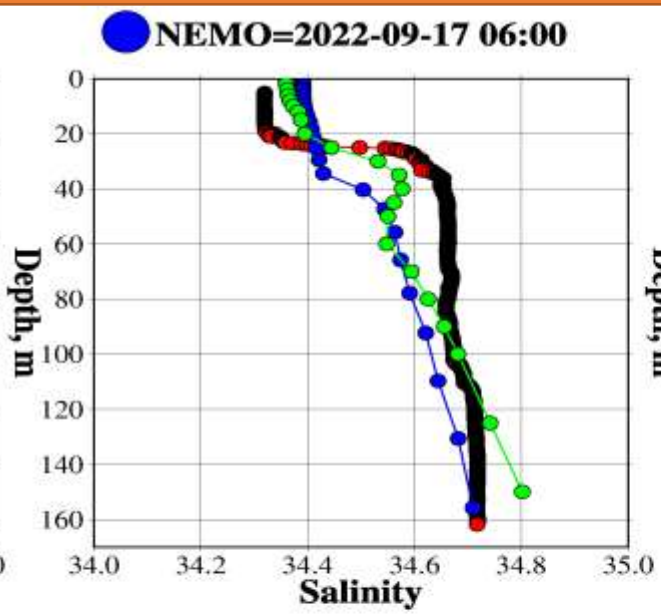

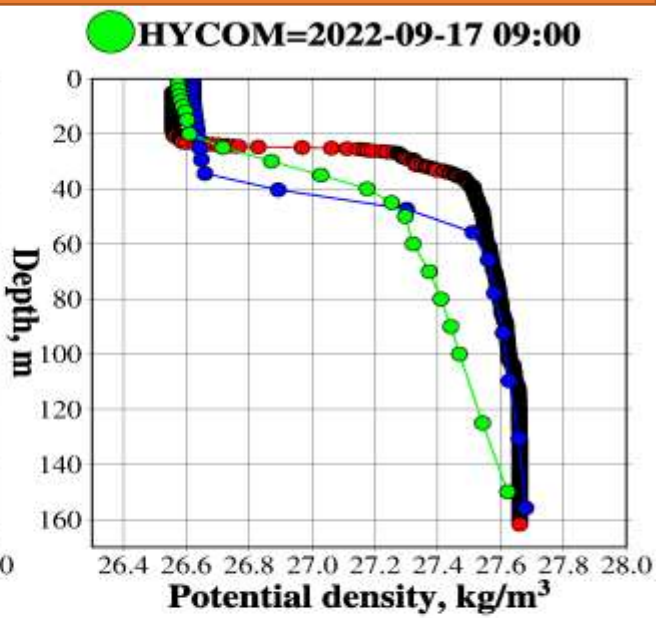

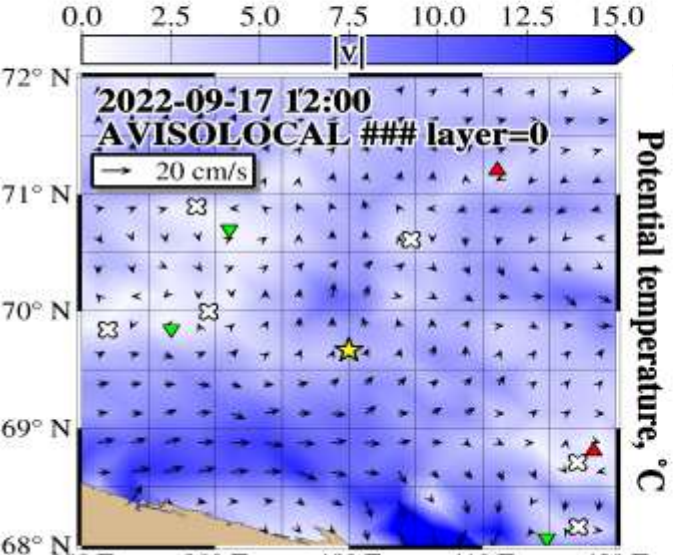

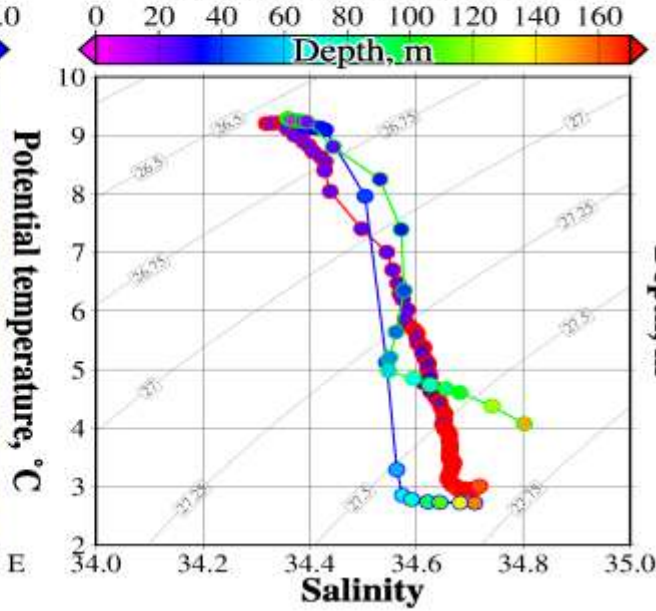

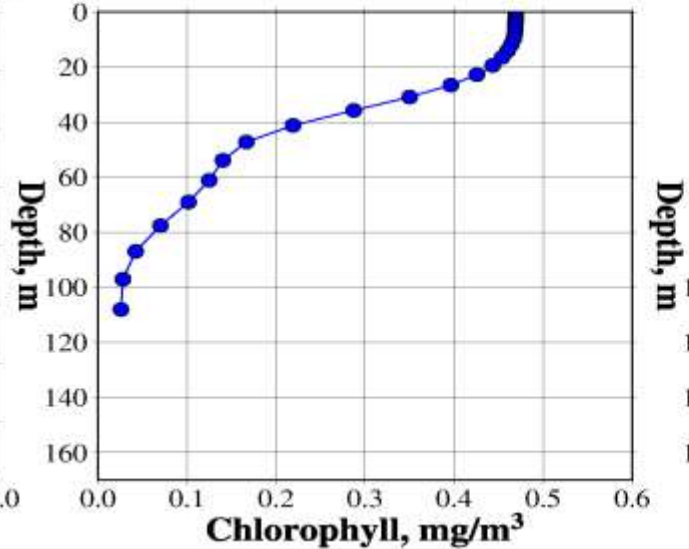

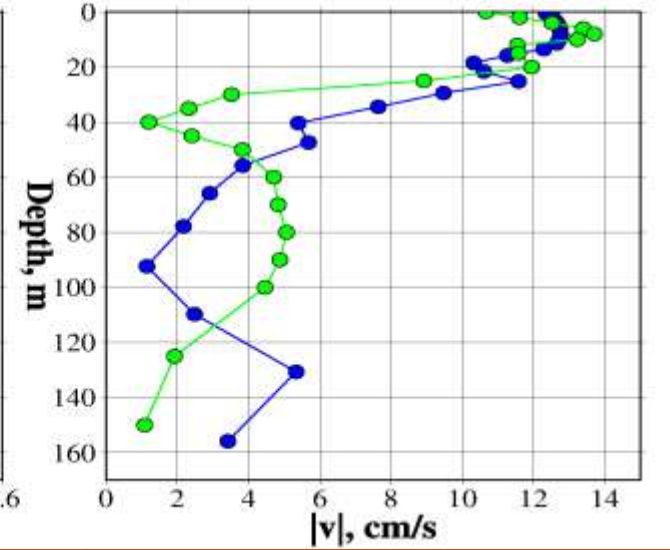

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