

MODIS – новая эра в дистанционном зондировании океана

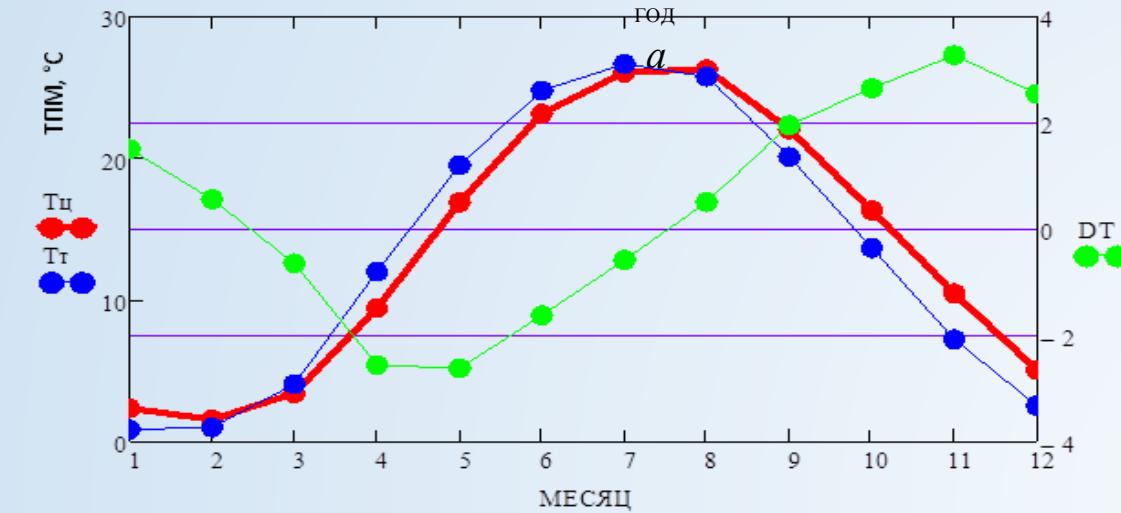
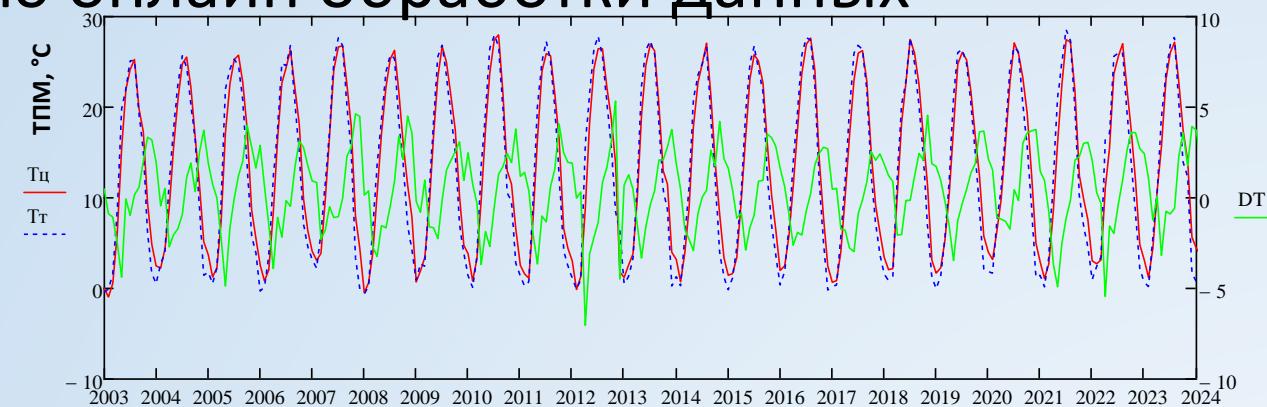
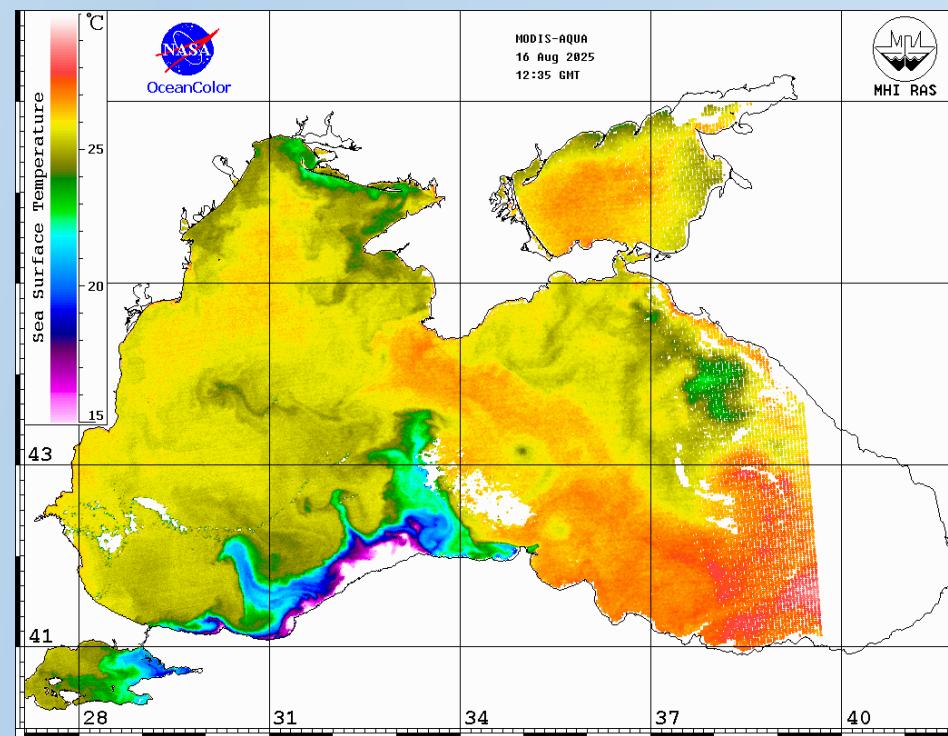
Станичный С.В., Кубряков А.А. , Соловьев Д.М. Медведева А. В., Станичная Р.Р. ,
Алескерова А.А. , Василенко Н.В. , Давыдова Е.П. , Плотников Е.В.

ФГБУН ФИЦ "Морской гидрофизический институт РАН", Севастополь

Факторы, повлиявшие на интенсивность использования данных

- Развитие интернета
- Развитие компьютерных возможностей

Появились ресурсы с оперативным **СВОБОДНЫМ** доступом к информации и, важно, порталы с возможностью онлайн обработки данных



Сканеры MODIS спутников TERRA и AQUA, функционирующие уже почти четверть века, вызвали ряд революционных изменений в системе дистанционного зондирования океана.

Основные преимущества:

1. Регулярная, ежедневная глобальная съемка океана в широком диапазоне длин волн.
2. Большой набор восстанавливаемых параметров – стандартных и экспериментальных.
3. Создание систем оперативного доступа к спутниковым и сопутствующим данным разных уровней обработки с возможностями удалённой обработки данных.

Большой прогресс при использовании данных достигнут в исследовании:

- долговременной изменчивости морских экосистем, связи термических и оптических характеристик с использованием многоспектральных подходов
- использовании последовательных снимков для определения скоростей поверхностных течений и смещения ледяного покрова
- аномальных и экстремальных процессов в морских экосистемах
- характеристик плёночных загрязнений и шероховатости морской поверхности.

Band	Wavelength (nm)	Resolution (m)	Primary use
1	620–670	250	Land/cloud/aerosols boundaries
2	841–876	250	
3	459–479	500	
4	545–565	500	
5	1230–1250	500	Land/cloud/aerosols properties
6	1628–1652	500	
7	2105–2155	500	
8	405–420	1000	
9	438–448	1000	
10	483–493	1000	
11	526–536	1000	Ocean color/
12	546–556	1000	phytoplankton/
13	662–672	1000	biogeochemistry
14	673–683	1000	
15	743–753	1000	
16	862–877	1000	

Основные каналы, используемые для исследования процессов в океане

File Edit View History Bookmarks Tools Help

http://disc.sci.gsfc.nasa.gov/giovanni

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GIOVANNI — GES DISC: Goddard Earth Sciences, Data & Information Services Center

National Aeronautics and Space Administration

Goddard Earth Sciences Data and Information Services Center

Search DISC + GO + Advanced Search

+ ATMOS COMPOSITION + HYDROLOGY + A-TRAIN + AIRS + MODELING + MAIRS + PRECIPITATION

Giovanni

You are here: [GES DISC Home](#) » Giovanni

GIOVANNI

Giovanni is a Web-based application developed by the GES DISC that provides a simple and intuitive way to visualize, analyze, and access vast amounts of Earth science remote sensing data without having to download the data.

Giovanni is comprised of a number of interfaces, called instances, each tailored to meet the needs of different Earth science research communities. To access a Giovanni instance, click on one of the four categories below.

- **Atmospheric Instances:** A-Train along CloudSat Track; Aerosol Optical Thickness Measurement and Model Comparison Daily and Monthly; Aqua/AIRS Global Daily and Monthly; Aura High Resolution Dynamics Limb Sounder (HIRDLS); Aura Microwave Limb Sounder (MLS); Aura OMI Level 3 and Level 2G; MISR Daily and Monthly; Clouds and the Earth's Radiant Energy System (CERES FM4); Modern Era Retrospective-Analysis for Research and Applications (MERRA) 3D Monthly and 2D Monthly; MODIS Terra and Aqua Daily and Monthly; Earth Probe and Nimbus-7 TOMS; Tropospheric Emission Spectrometer (TES); Upper Atmosphere Research Satellite (UARS) Halogen Occultation Experiment (HALOE).
- **Environmental Instances:** Agriculture; Air Quality; Monsoon Asia Integrated Regional Study (MAIRS) Monthly; Northern Eurasia Earth Science Partnership Initiative (NEESPI) Daily and Monthly
- **Ocean Instances:** Ocean Color Radiometry (SeaWiFS, MODIS, and derived and model products); Ocean Model Daily and Monthly.
- **Hydrology Instances:** Modern Era Retrospective-Analysis for Research and Applications (MERRA) 3D Monthly and 2D Monthly; MODIS Terra and Aqua Daily and Monthly; Northern Eurasia Earth Science Partnership Initiative (NEESPI) Daily and Monthly; TRMM Online Visualization and Analysis System (TOVAS); Global Land Data Assimilation System (GLDAS) Monthly.

If you already know which instance to choose, please select it from the table below.

A-Train	Aerosol Daily	Aerosol Monthly	Agriculture	Air Quality
Aqua/AIRS Daily	Aqua/AIRS Monthly	Aura HIRDLS	Aura MLS	Aura OMI L3
Aura OMI L2G	CERES (FM4)	GLDAS Monthly	MAIRS Monthly	MERRA 2D
MERRA 3D	MISR Daily	MISR Monthly	MODIS Daily	MODIS Monthly
NEESPI Daily	NEESPI Monthly	Ocean Color Radiometry	Ocean Model Daily	Ocean Model Monthly
TOMS	TRMM/TOVAS	TES	UARS HALOE	

MORE! Introductory chapter of our online user's manual for beginning Giovanni users

Latest News

Apr 05, 2010 - Rainfall anomaly visualizes severe drought in China's Yunnan province

6-month rainfall anomaly image generated by rainfall anomaly analysis shows extent of drought in southwest China

+ Read More

Старый
скриншот
Giovanni

Due to the lapse in federal government funding, NASA is not updating this website. We sincerely regret this inconvenience ... [1 of 2 messages] [Read More](#)

Select Plot

Time Averaged Map



Select Date Range (UTC)

YYYY - MM - dd 00 : 00 to YYYY - MM - dd 23 : 59

Valid Range: 1948-01-01 to 2025-11-12

Select Region (Bounding Box or Shape)

-180, -90, 180, 90



Select Variables

Observations

- Observation (158)
- Reanalysis (17)

Disciplines

- Aerosols (20)
- Atmospheric Chemistry (5)
- Atmospheric Dynamics (105)
- Ocean Biology (26)
- Oceanography (46)

Measurements

Platform / Instrument

Spatial Resolutions

Temporal Resolutions

Wavelengths

Portal

Number of matching Variables: 175 of 2054

Total Variable(s) included in Plot: 0

Please select at least 1 variable

Keyword : MODIS

Variable	Units	Source	Temp.Res.	Spat.Res.
<input type="checkbox"/> Normalized Fluorescence Line Height (water only) (MODISA_L3m_FLH v2022.0)	W m^-2 um^-1 sr^-1	MODIS-Aqua	Monthly	4 km
<input type="checkbox"/> Normalized Fluorescence Line Height (water only) (MODISA_L3m_FLH_8d_4km v2022.0)	W m^-2 um^-1 sr^-1	MODIS-Aqua	8-Daily	4 km
<input type="checkbox"/> Scattering Angle: Mean of Daily Mean (MYD08_D3 v6.1)	degrees	MODIS-Aqua	Daily	1 °
<input type="checkbox"/> Cirrus Reflectance: Mean of Daily Mean (MYD08_D3 v6.1)	-	MODIS-Aqua	Daily	1 °
<input type="checkbox"/> Scattering Angle: Mean of Daily Mean (MYD08_M3 v6.1)	degrees	MODIS-Aqua	Monthly	1 °
<input type="checkbox"/> Cirrus Reflectance: Mean of Daily Mean (MYD08_M3 v6.1)	-	MODIS-Aqua	Monthly	1 °
<input type="checkbox"/> Scattering Angle: Mean of Daily Mean (MOD08_D3 v6.1)	degrees	MODIS-Terra	Daily	1 °
<input type="checkbox"/> Cirrus Reflectance: Mean of Daily Mean (MOD08_D3 v6.1)	-	MODIS-Terra	Daily	1 °
<input type="checkbox"/> Scattering Angle: Mean of Daily Mean (MOD08_M3 v6.1)	degrees	MODIS-Terra	Monthly	1 °
<input type="checkbox"/> Cirrus Reflectance: Mean of Daily Mean (MOD08_M3 v6.1)	-	MODIS-Terra	Monthly	1 °
<input type="checkbox"/> Ice Cloud Water Path: Mean of Daily Mean (MYD08_D3 v6.1)	g/m^2	MODIS-Aqua	Daily	1 °

Активация W
Чтобы активировать
параметрами комп





<https://oceancolor.gsfc.nasa.gov/data/find-data/>

Product Status	Instrument	Product	Period	Resolution
Standard	Aqua-MODIS	Chlorophyll concentration	Daily	4km
Start Date	2002-07-04			

Previous

Image	Date	Product
	Fri, 10 Oct 2025 (L3)	Chlorophyll concentration
	Sat, 11 Oct 2025 (L3)	Chlorophyll concentration
	Sun, 12 Oct 2025 (L3)	Chlorophyll concentration
	Wed, 15 Oct 2025 (L3)	Chlorophyll concentration
	Thu, 16 Oct 2025 (L3)	Chlorophyll concentration
	Fri, 17 Oct 2025 (L3)	Chlorophyll concentration
	Sat, 18 Oct 2025 (L3)	Chlorophyll concentration
	Tue, 21 Oct 2025 (L3)	Chlorophyll concentration
	Wed, 22 Oct 2025	Chlorophyll concentration
	Thu, 23 Oct 2025	Chlorophyll concentration
	Fri, 24 Oct 2025	Chlorophyll concentration
	Sat, 25 Oct 2025	Chlorophyll concentration
	Sun, 26 Oct 2025	Chlorophyll concentration
	Mon, 27 Oct 2025	Chlorophyll concentration

CHL
Chlorophyll concentration

FLH
Fluorescence Line Height (normalized)

Instantaneous Photosynthetically Available Radiation

IOP

Absorption due to gelbstoff and detritus Uncertainty at 443

Absorption due to gelbstoff and detritus at 443

Absorption due to phytoplankton at uncertainty at 443 nm

Absorption due to phytoplankton at 443 nm

Backscattering spectral parameter

Detrital and gelbstoff absorption spectral parameter

Particulate backscatter Uncertainty at 443 nm

Particulate backscatter at 443 nm

Total absorption at 412 nm

Total absorption at 443 nm

Total absorption at 469 nm

Total absorption at 488 nm

Total absorption at 531 nm

Total absorption at 547 nm



Worldview

Layers Events Data

Coastlines / Borders / Roads
© OpenStreetMap contributors

Coastlines
© OpenStreetMap contributors

ORBITAL TRACK

Terra - Orbit Track & Time
Terra / Space-Track.org
Acquisition Time (UTC) - Descending/D...

Aqua - Orbit Track & Time
Aqua / Space-Track.org
Acquisition Time (UTC) - Ascending/D...

BASE LAYERS

Corrected Reflectance (True Color)

+ Add Layers

Group Similar Layers

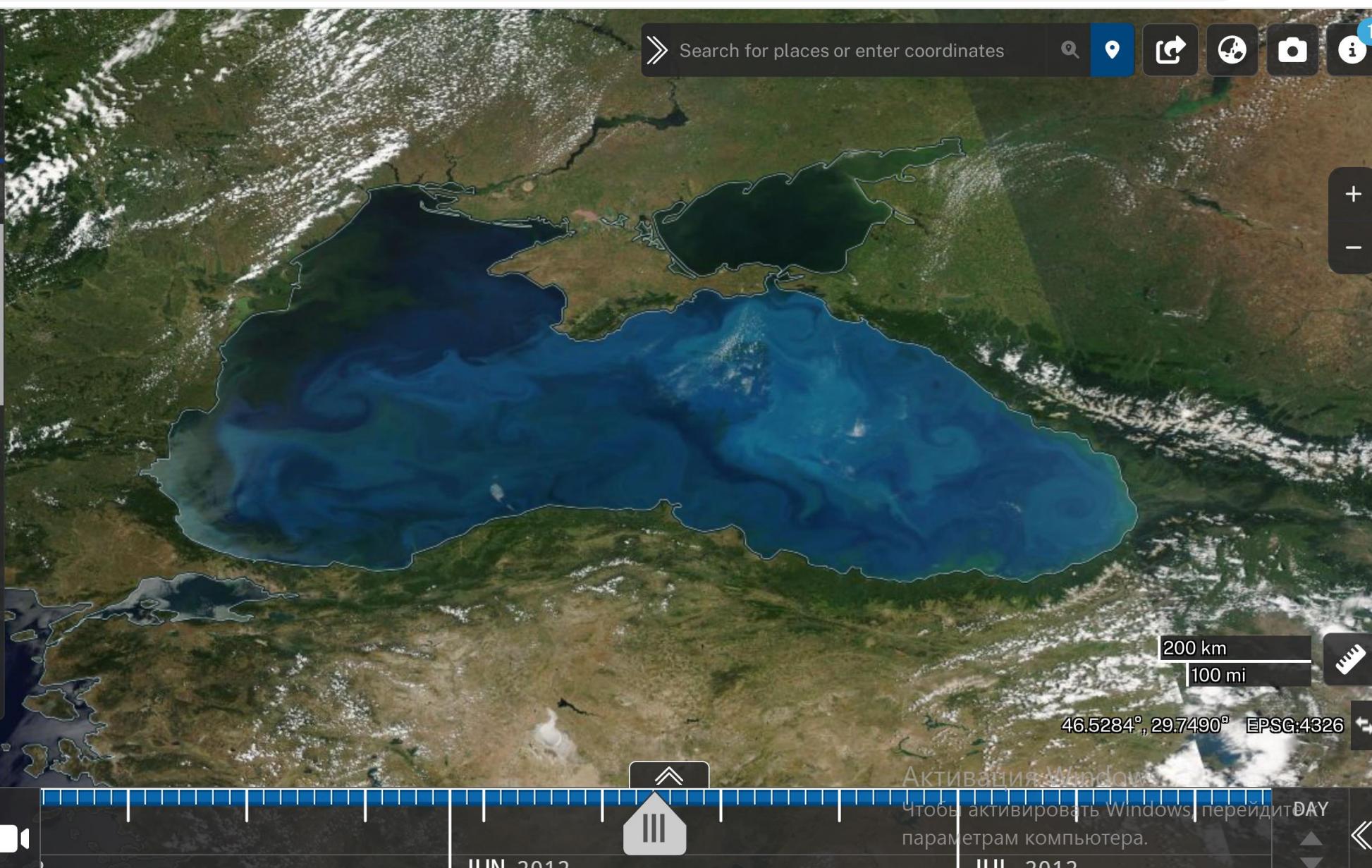
Start Charting

Start Comparison

1 DAY

2012 JUN 13

< > >I



JUN 2012

JUL 2012

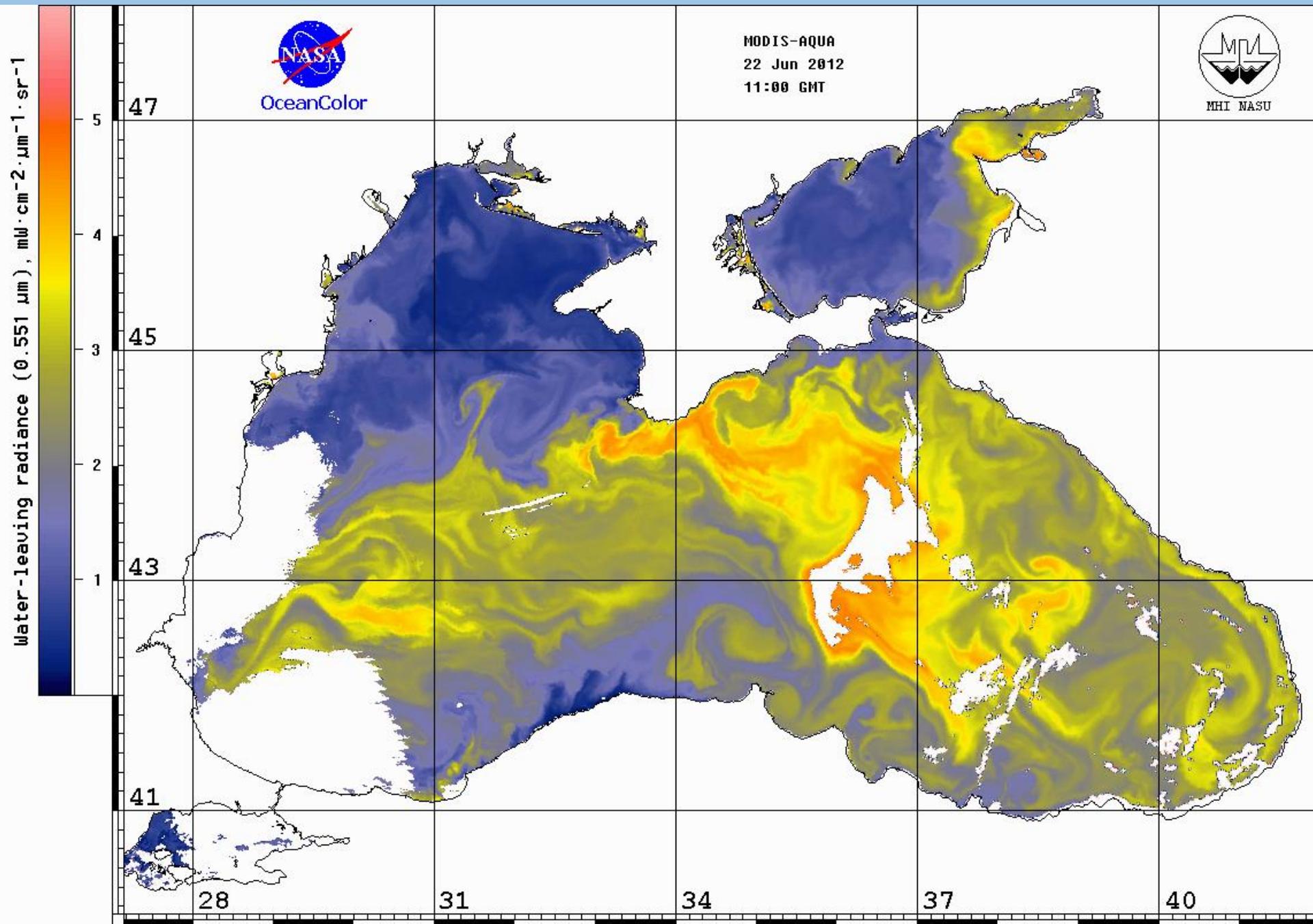
Активация Windows

Чтобы активировать Windows, перейдите
параметрам компьютера.

DAY

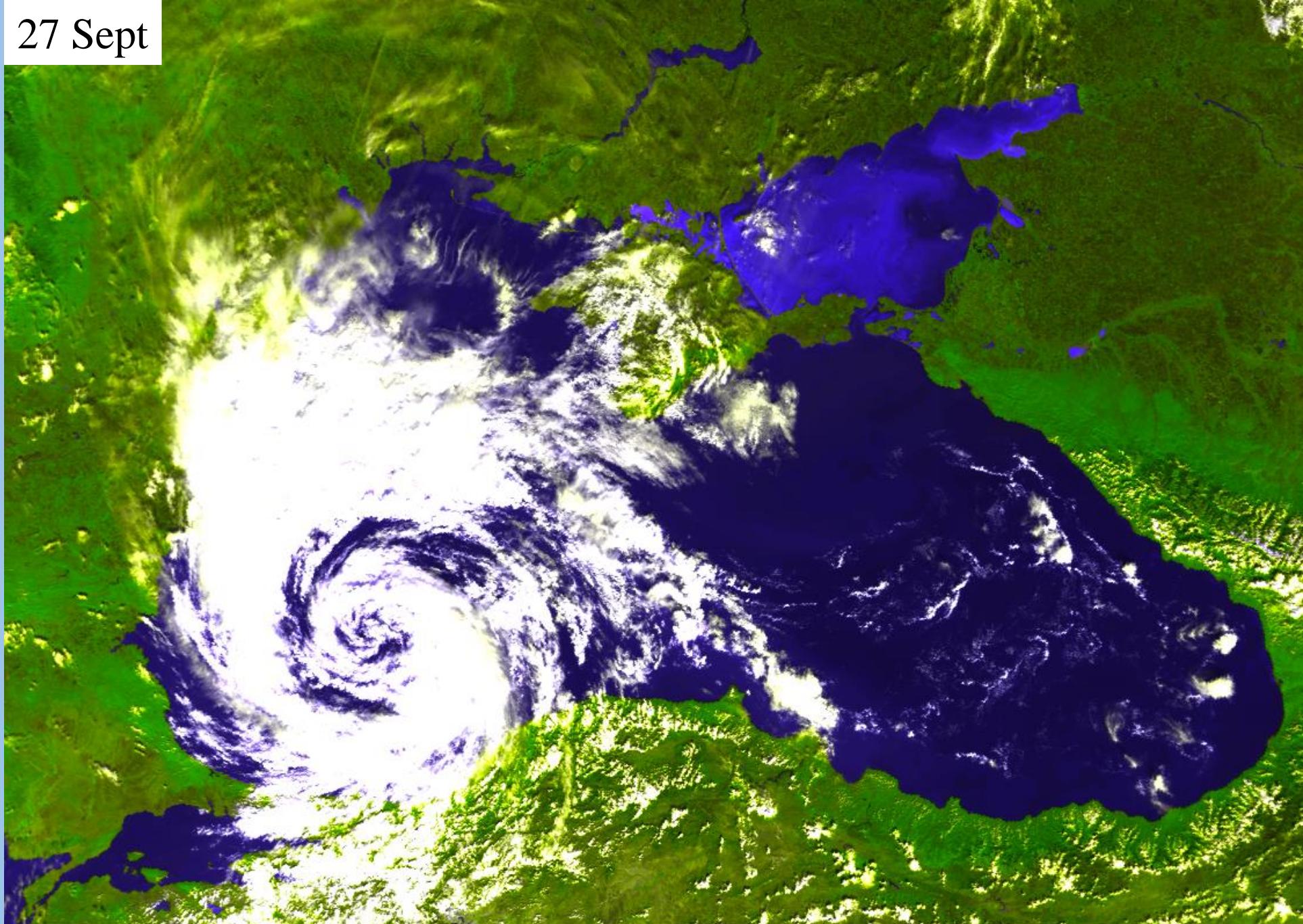
- Цветения фитопланктона

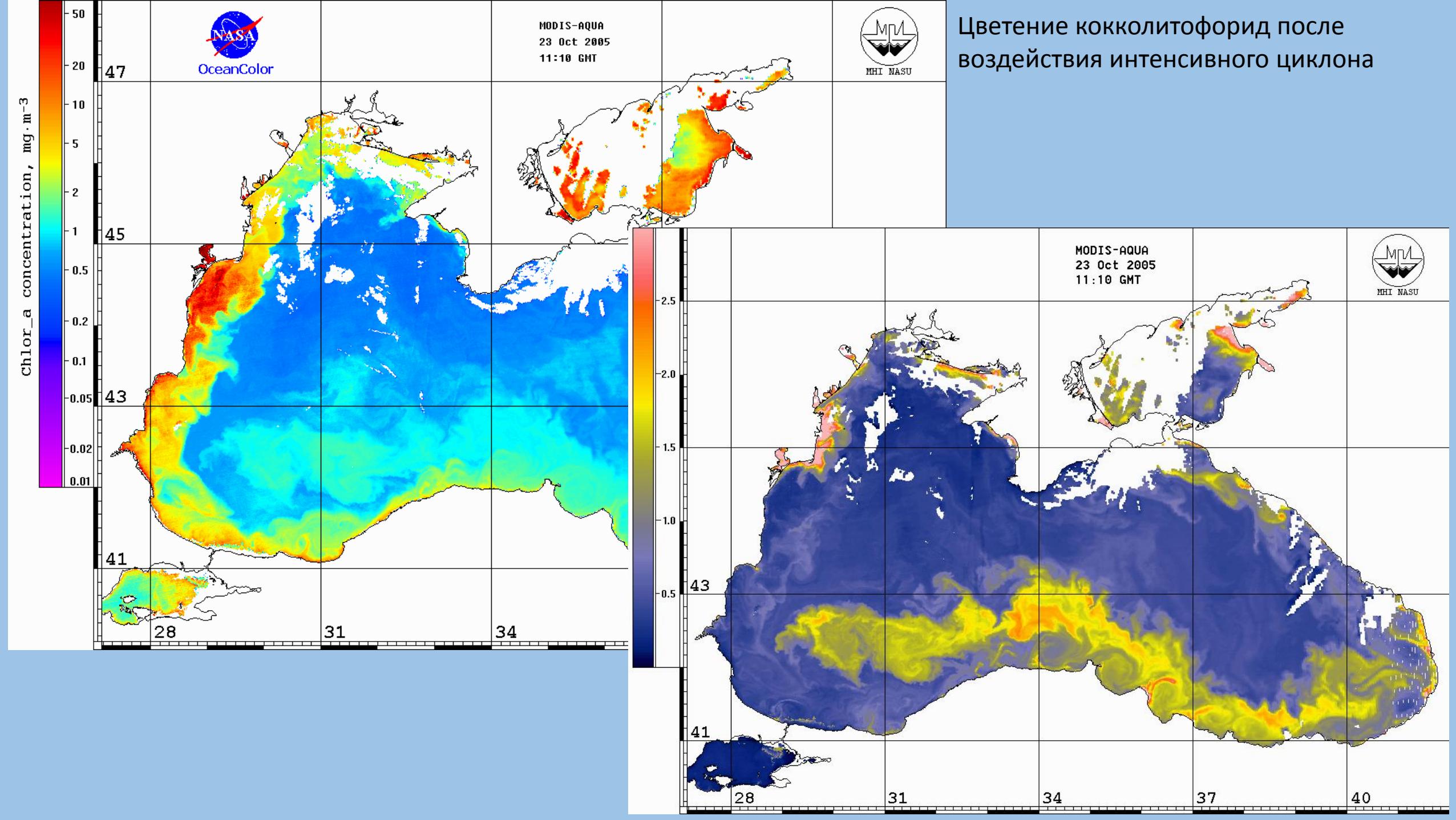




Цветение кокколитофорид

27 Sept





Влияние локальных особенностей поля ветра

A.A. Kubryakov, et al.

Journal of Marine Systems 194 (2019) 11–24

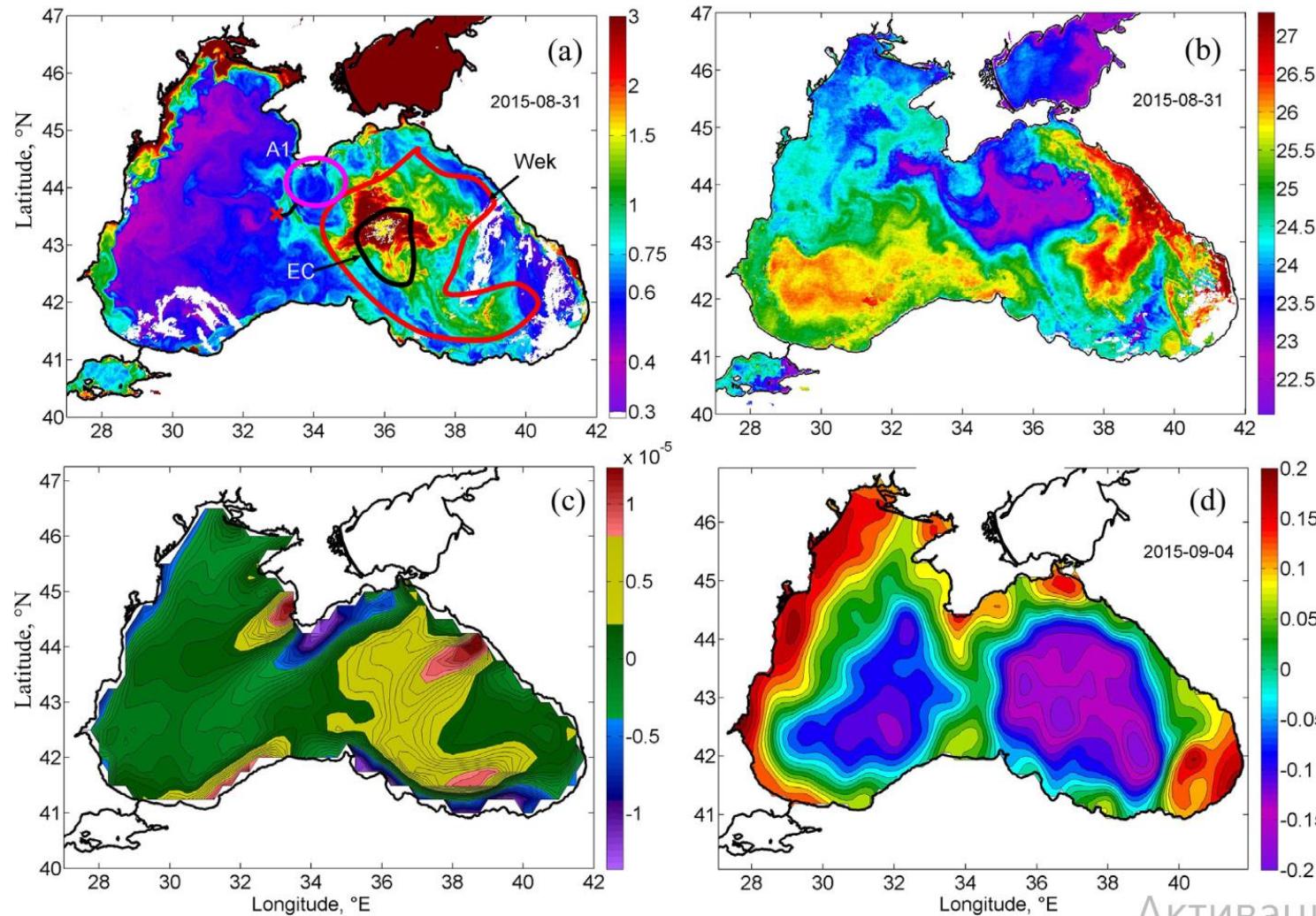
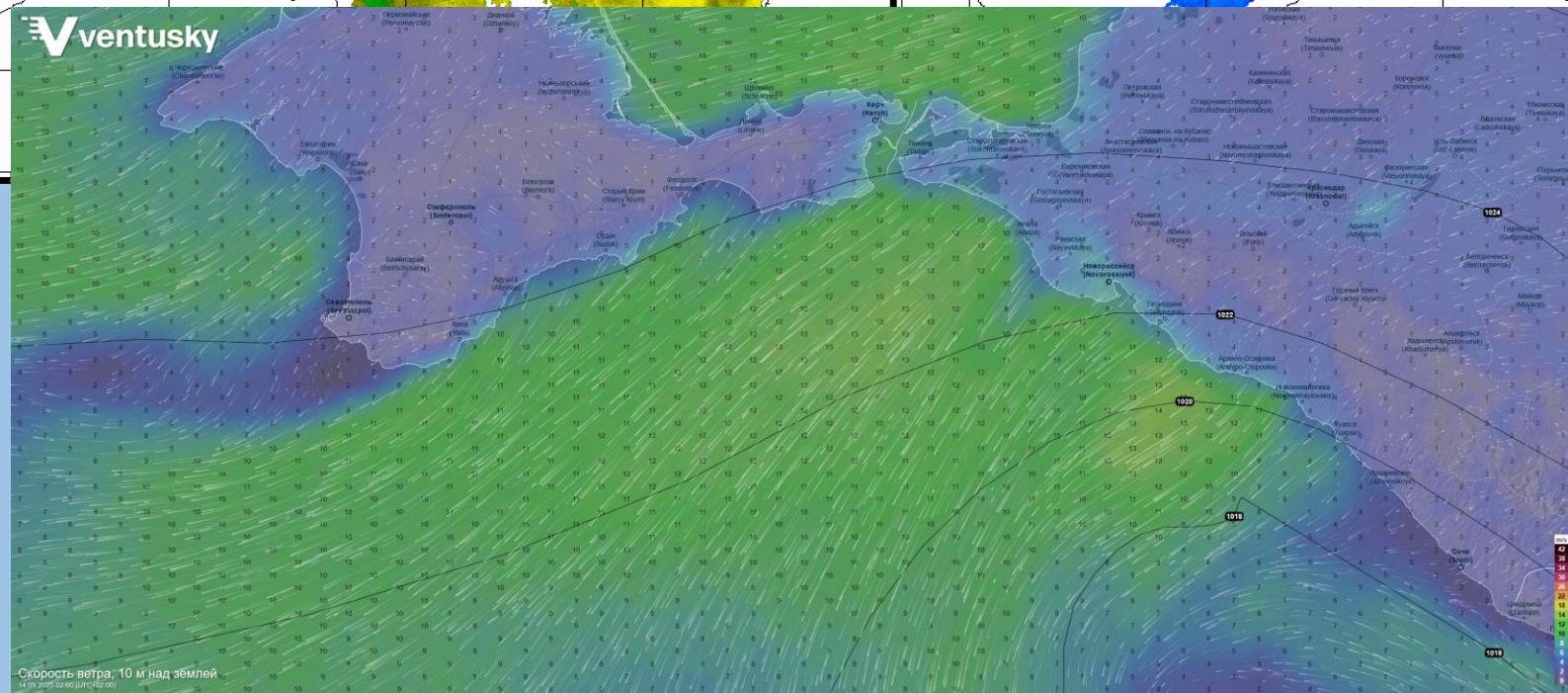
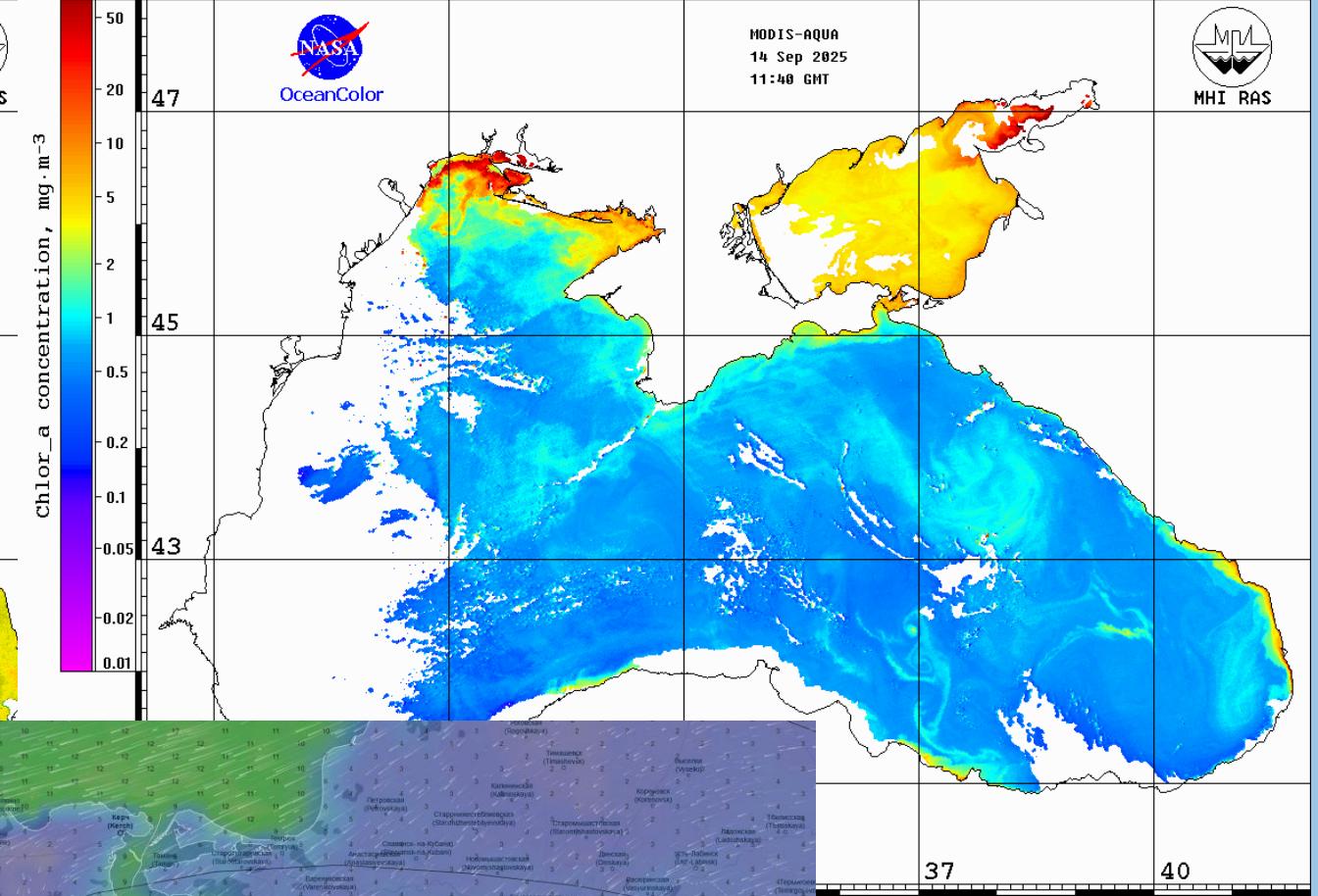
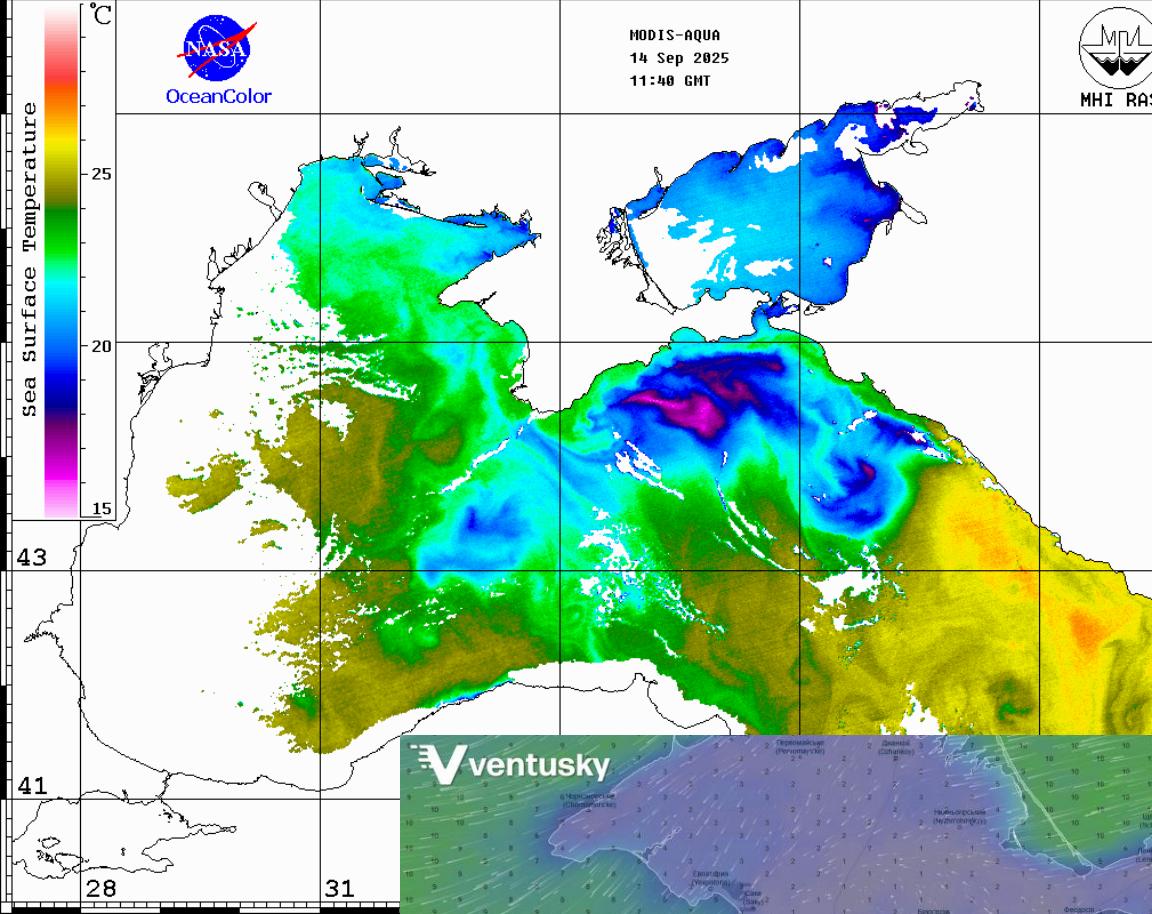
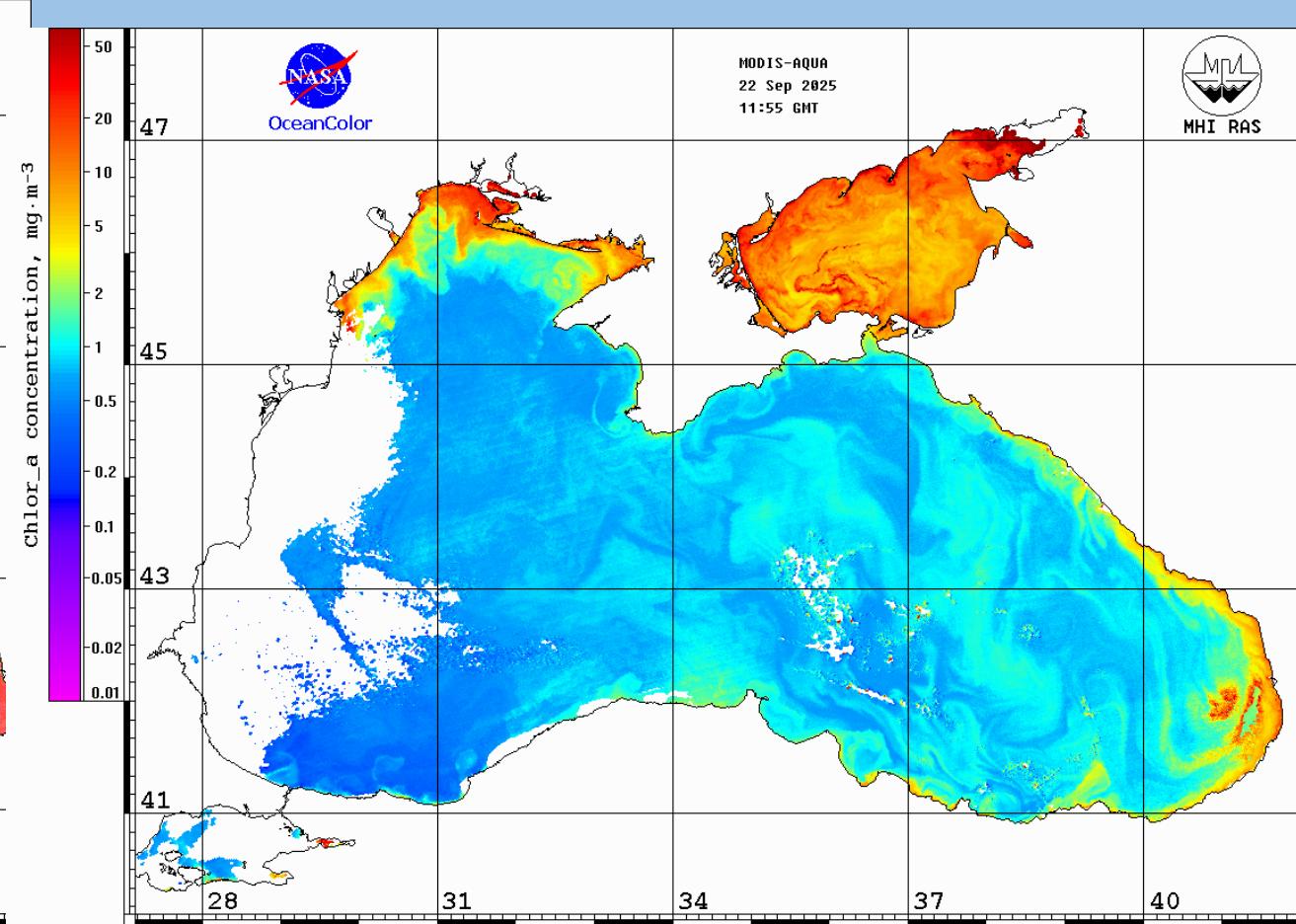
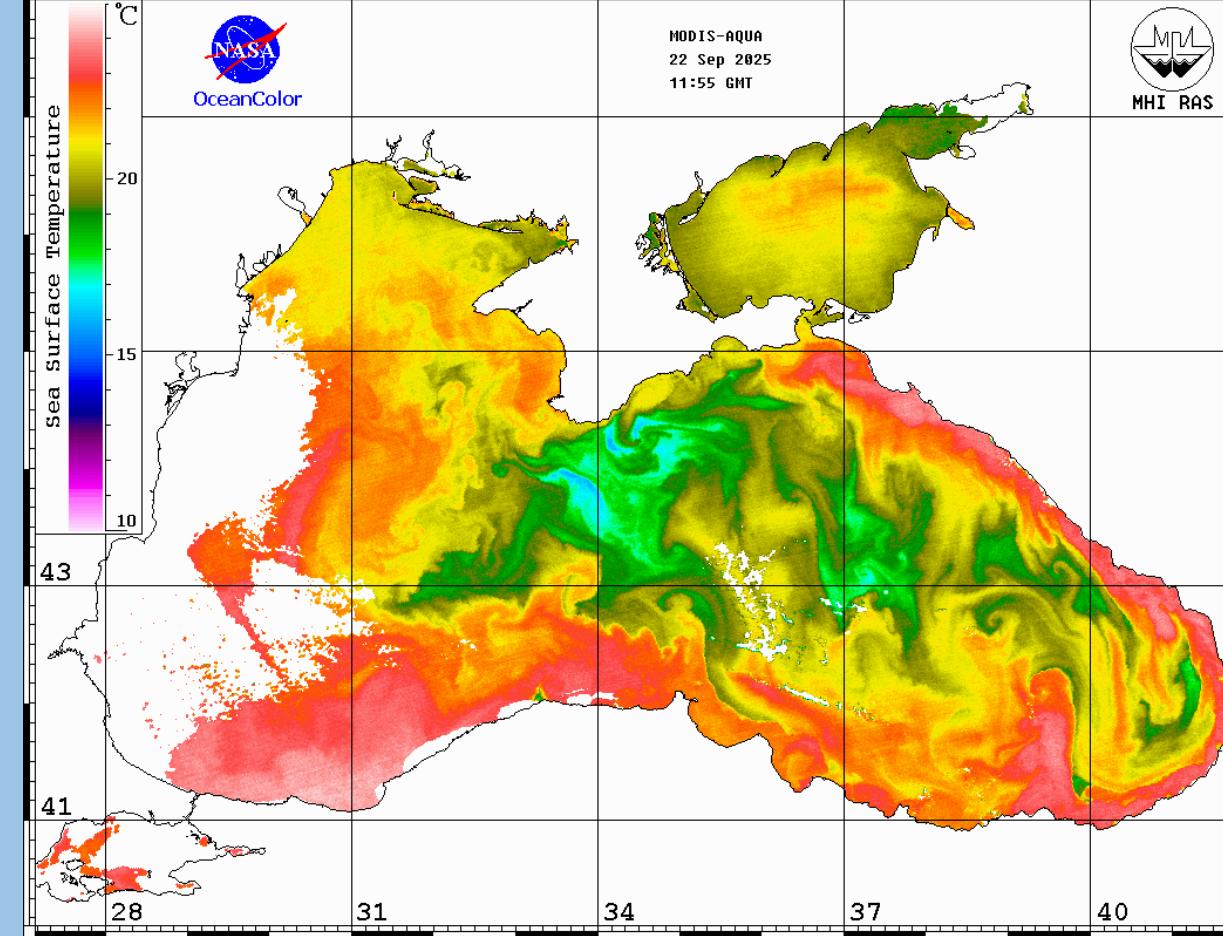
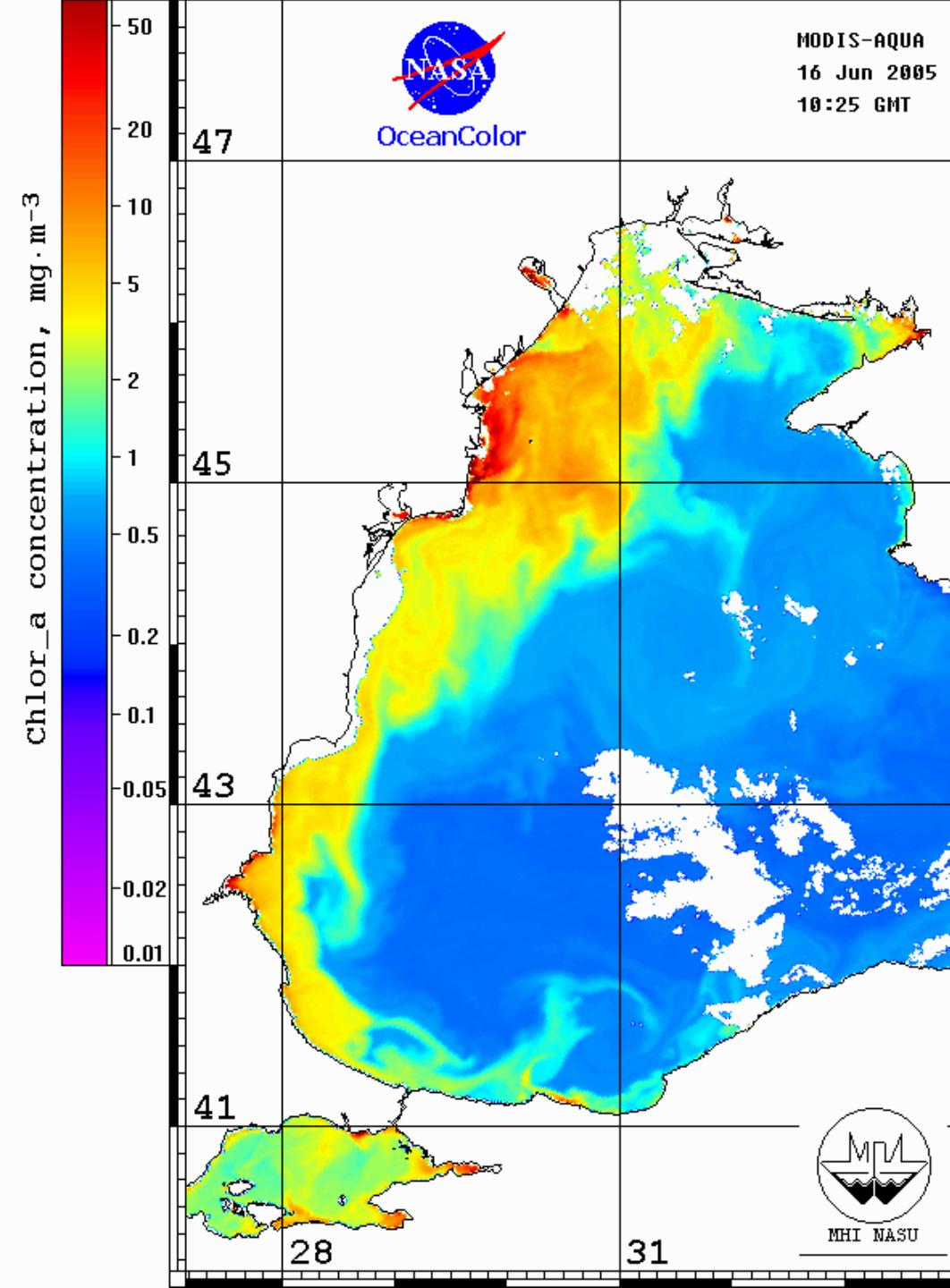


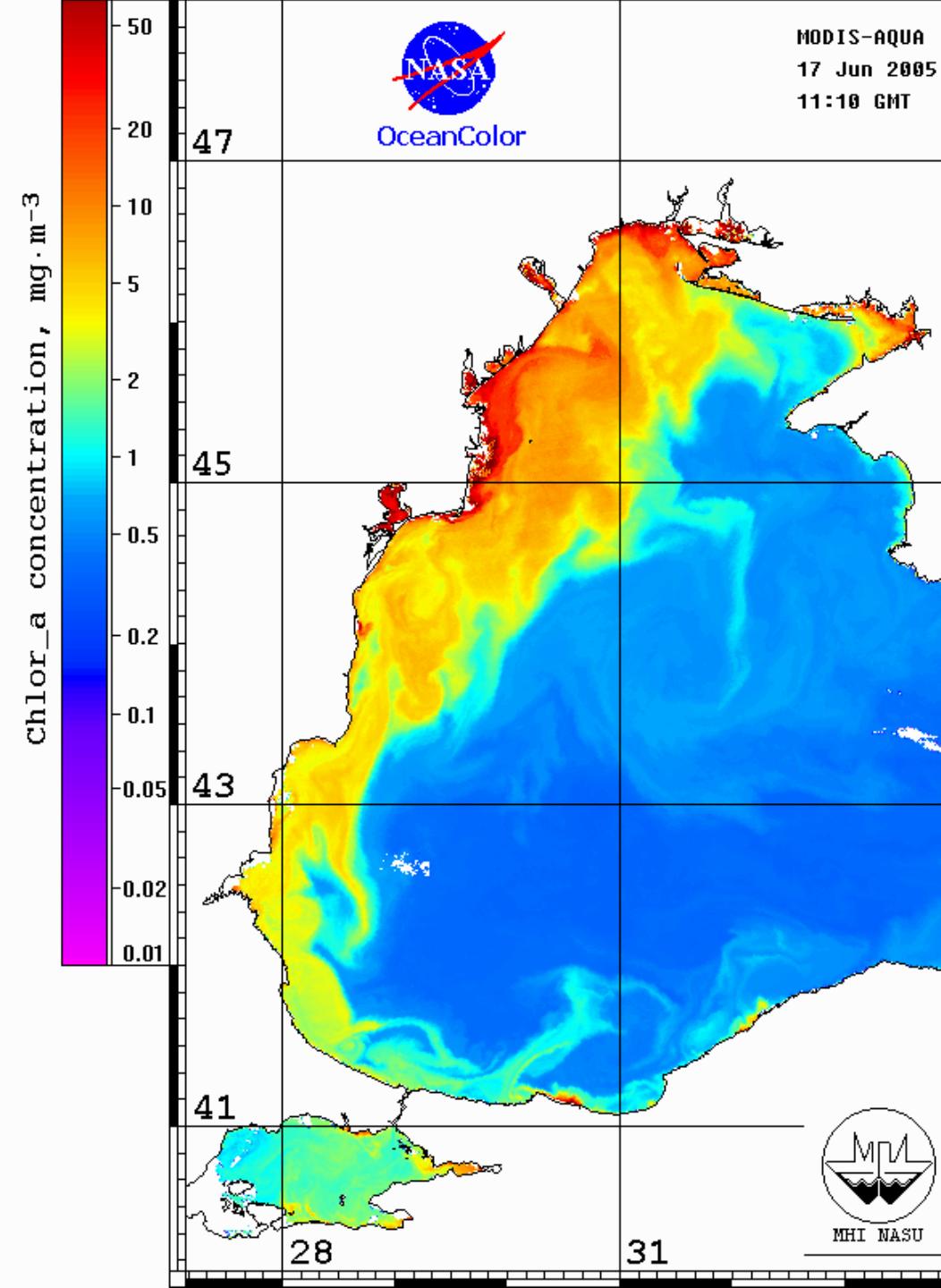
Fig. 8. a) Maps of Chl-A (a) on 31 August 2015. The red line shows the position of high monthly averaged W_{ek} ($W_{ek} > 3 \times 10^{-6} \text{ m/s}$) (see panel c); the black line indicates the position of the east-central gyre from altimetry data; the purple line shows the position of anticyclone A1; red crosses show the position of Bio-Argo floats; b) SST map dated 31 August 2015; c) monthly average Ekman pumping velocity in August 2015; d) altimetry-derived sea level on 4 September 2015. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)



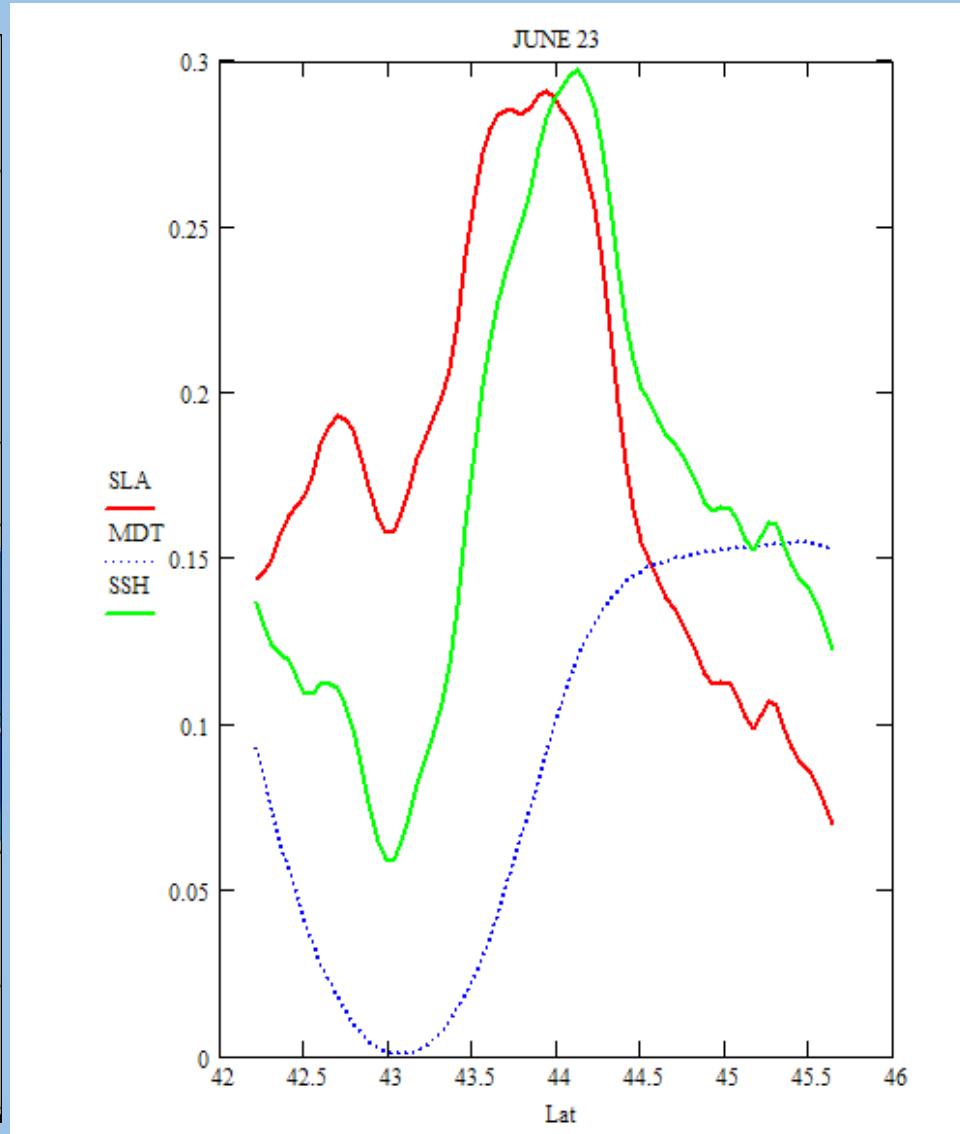
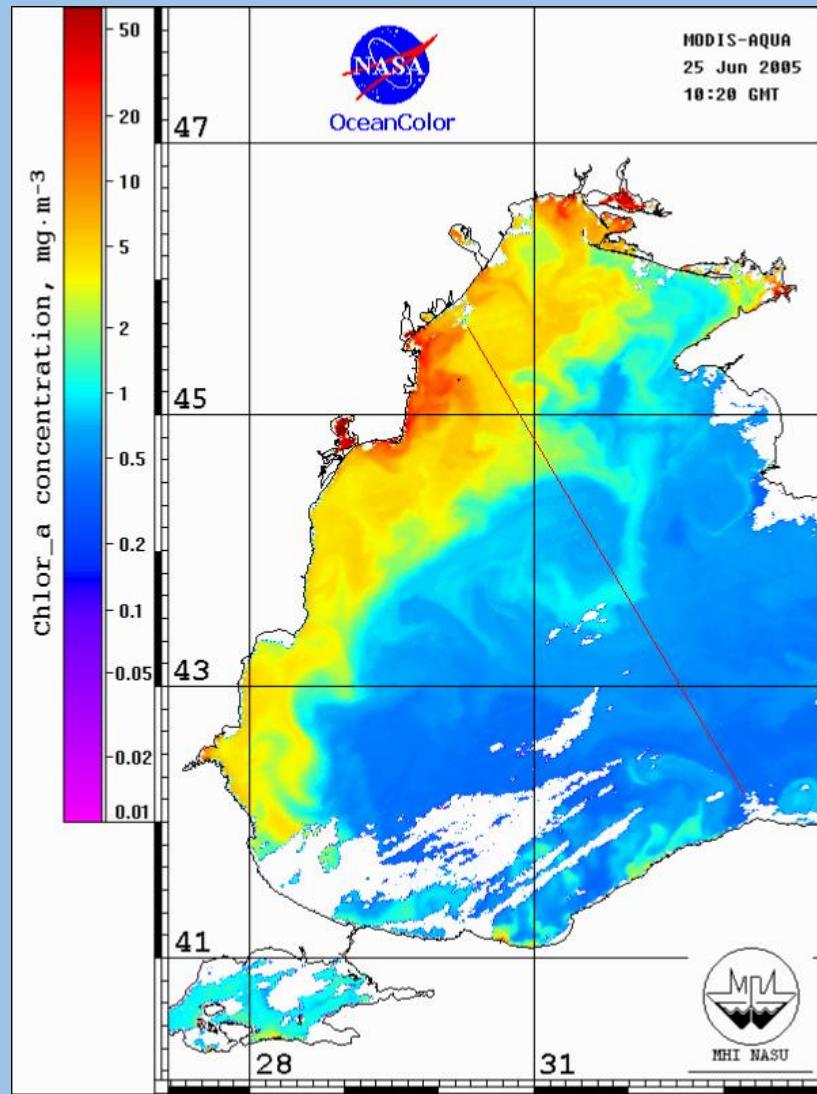


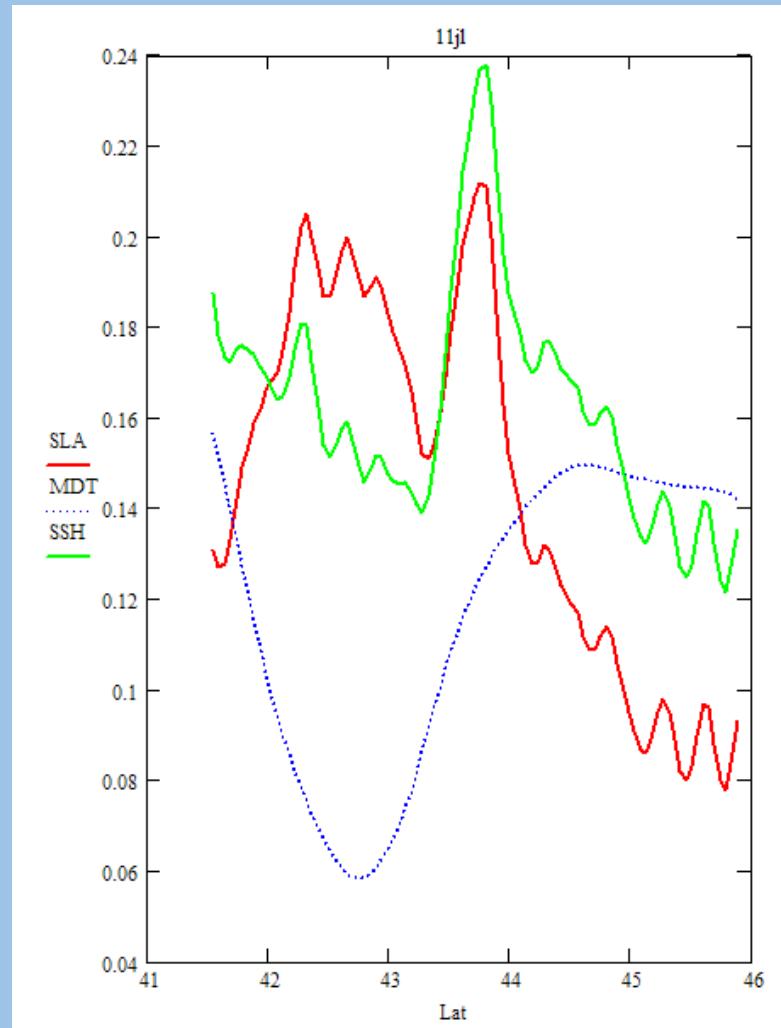
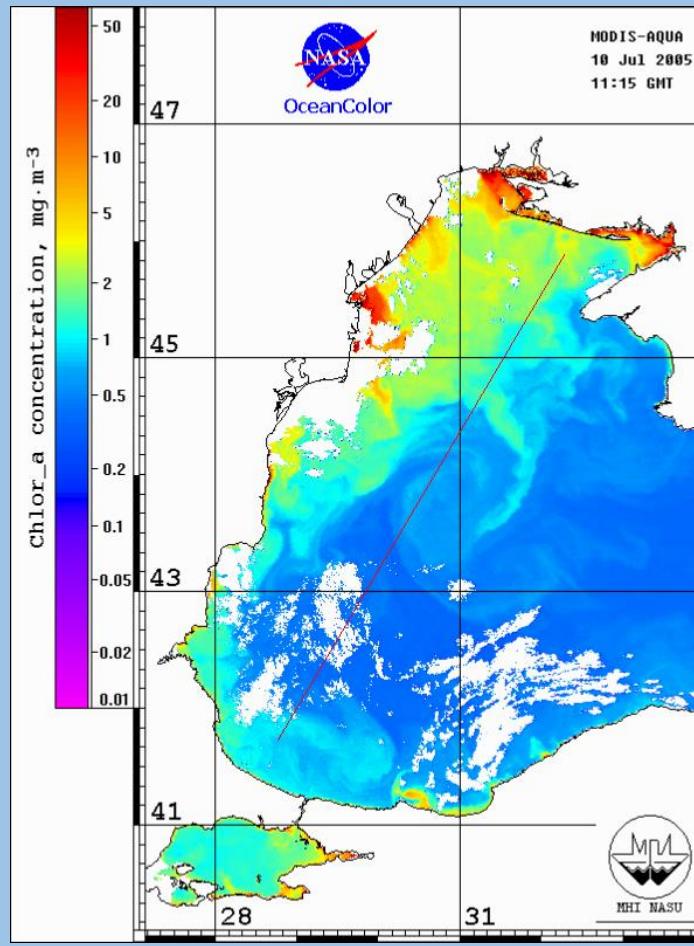
Увеличение наблюдаемой концентрации хлорофилла - перемешивание подповерхностного максимума концентрации?





$F = W \cdot D \cdot H$
F-поток
D-ширина струи
W- скорость
H – глубина





D=20000 m

W=0.15m/s and

H=100m

F= 3×10^5 m³/c

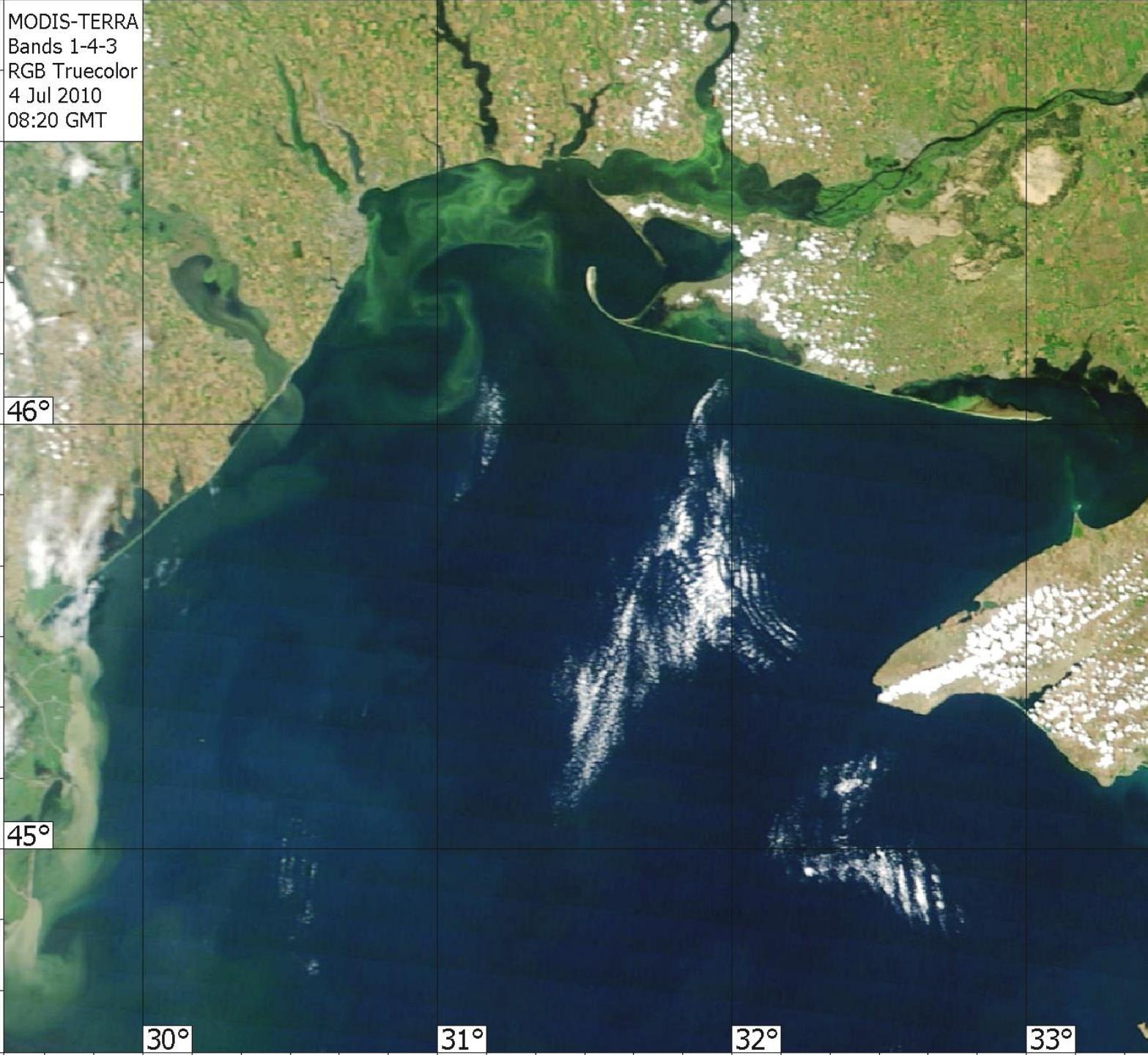
ДУНАЙ- 6.5×10^3 m³/c



ЦИАНОБАКТЕРИИ БАЛТИКА 2014 22 июля



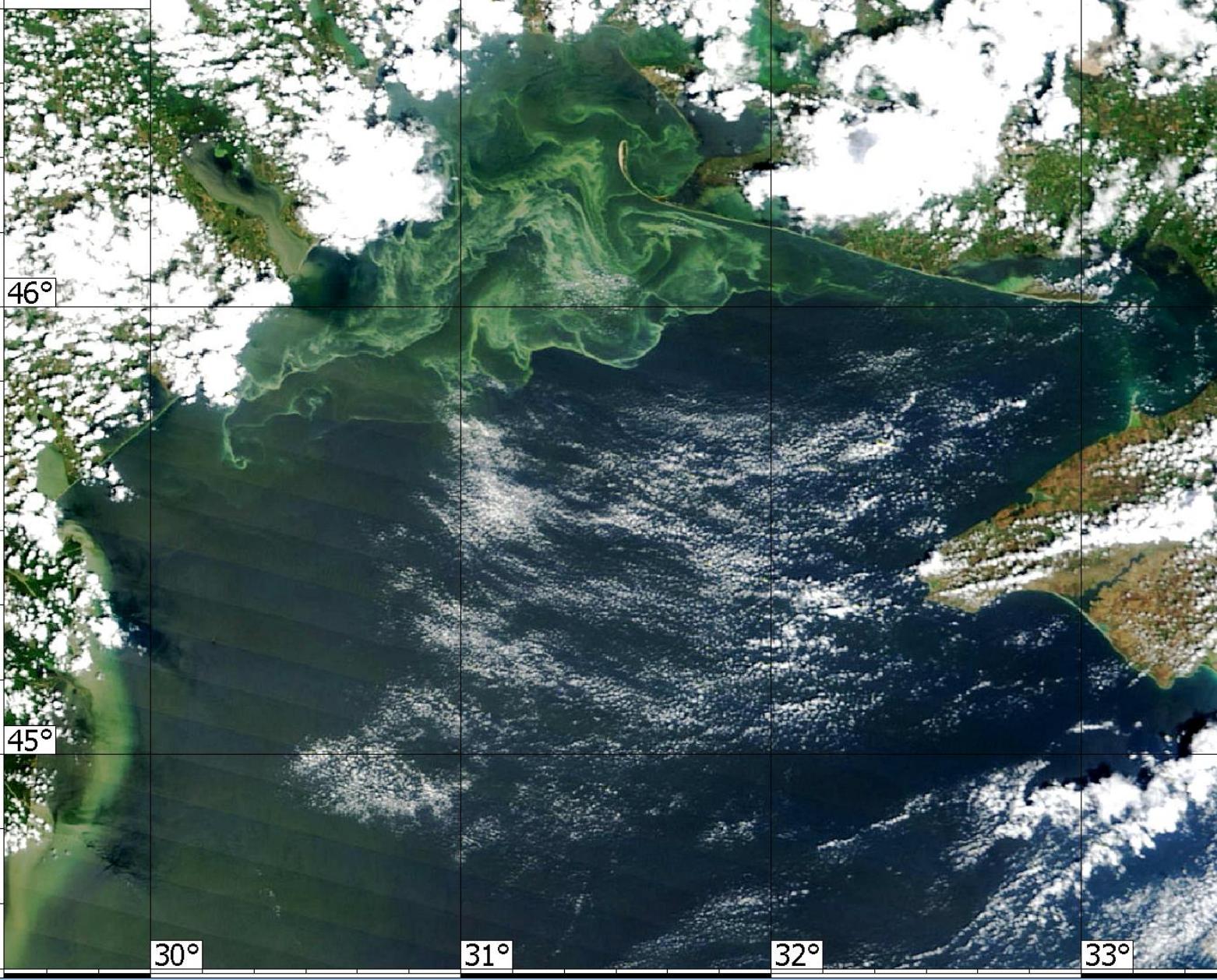
MODIS-TERRA
Bands 1-4-3
RGB Truecolor
4 Jul 2010
08:20 GMT



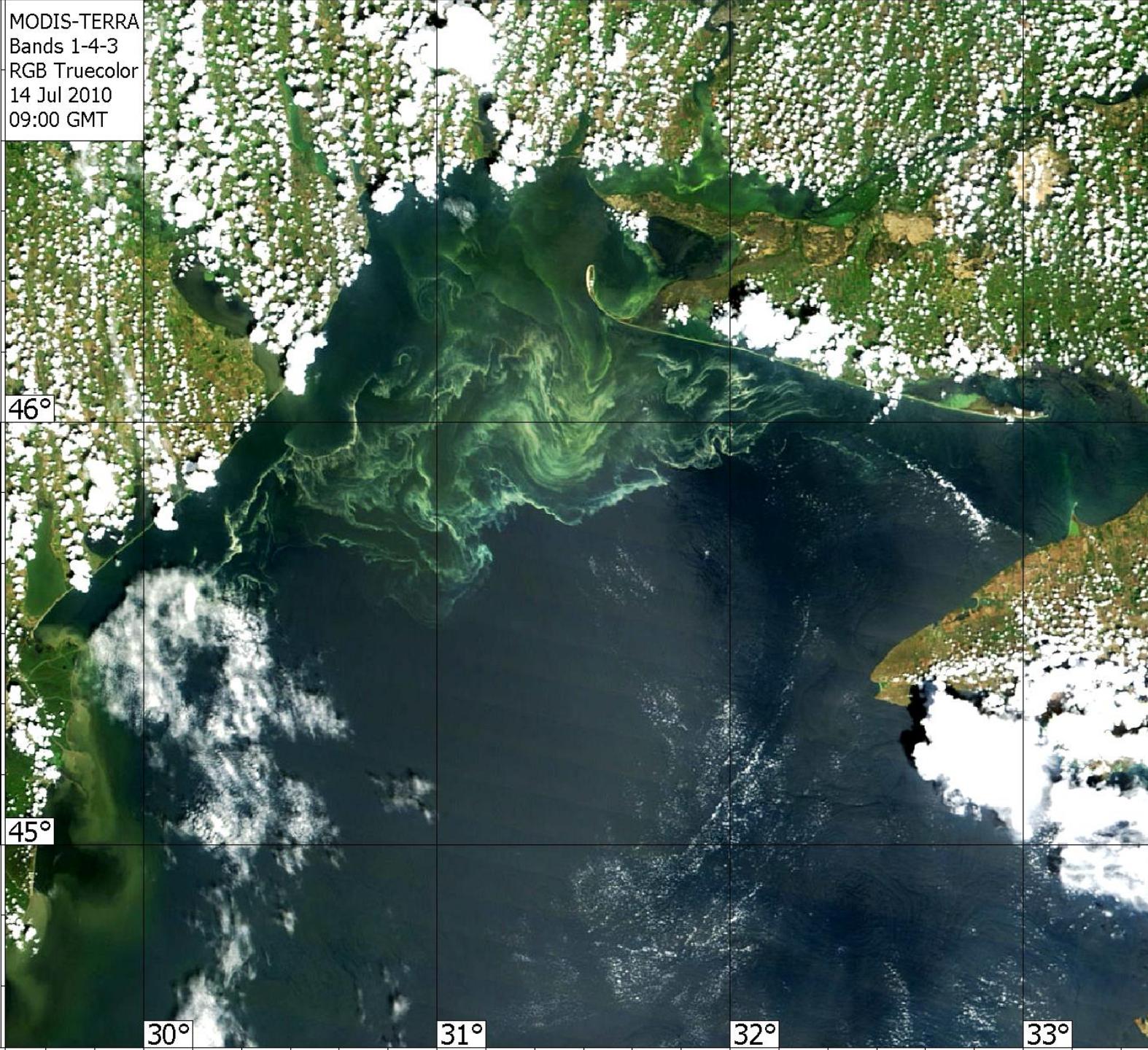
MODIS-TERRA
Bands 1-4-3
RGB Truecolor
7 Jul 2010
08:55 GMT



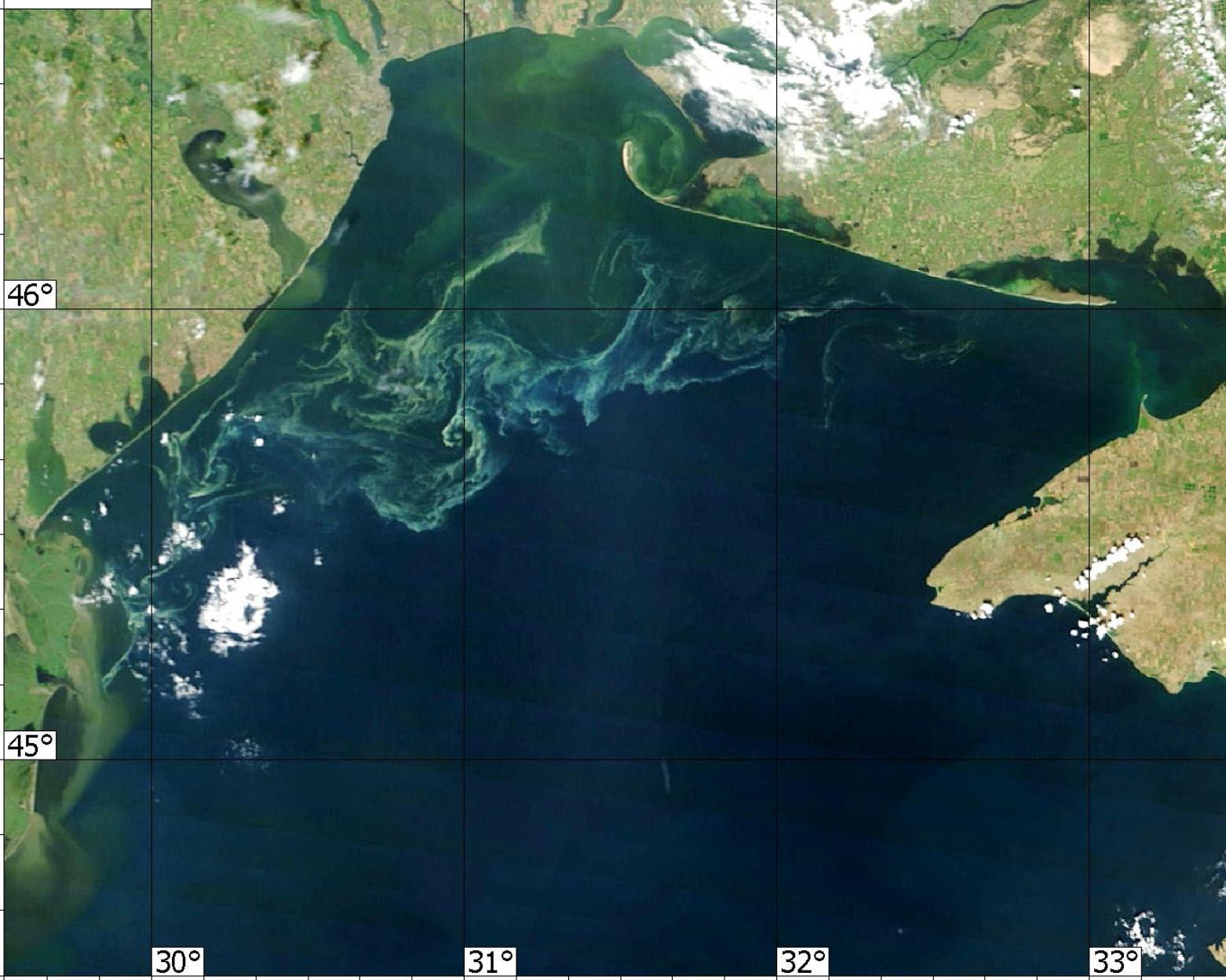
MODIS-TERRA
Bands 1-4-3
RGB Truecolor
12 Jul 2010
09:10 GMT



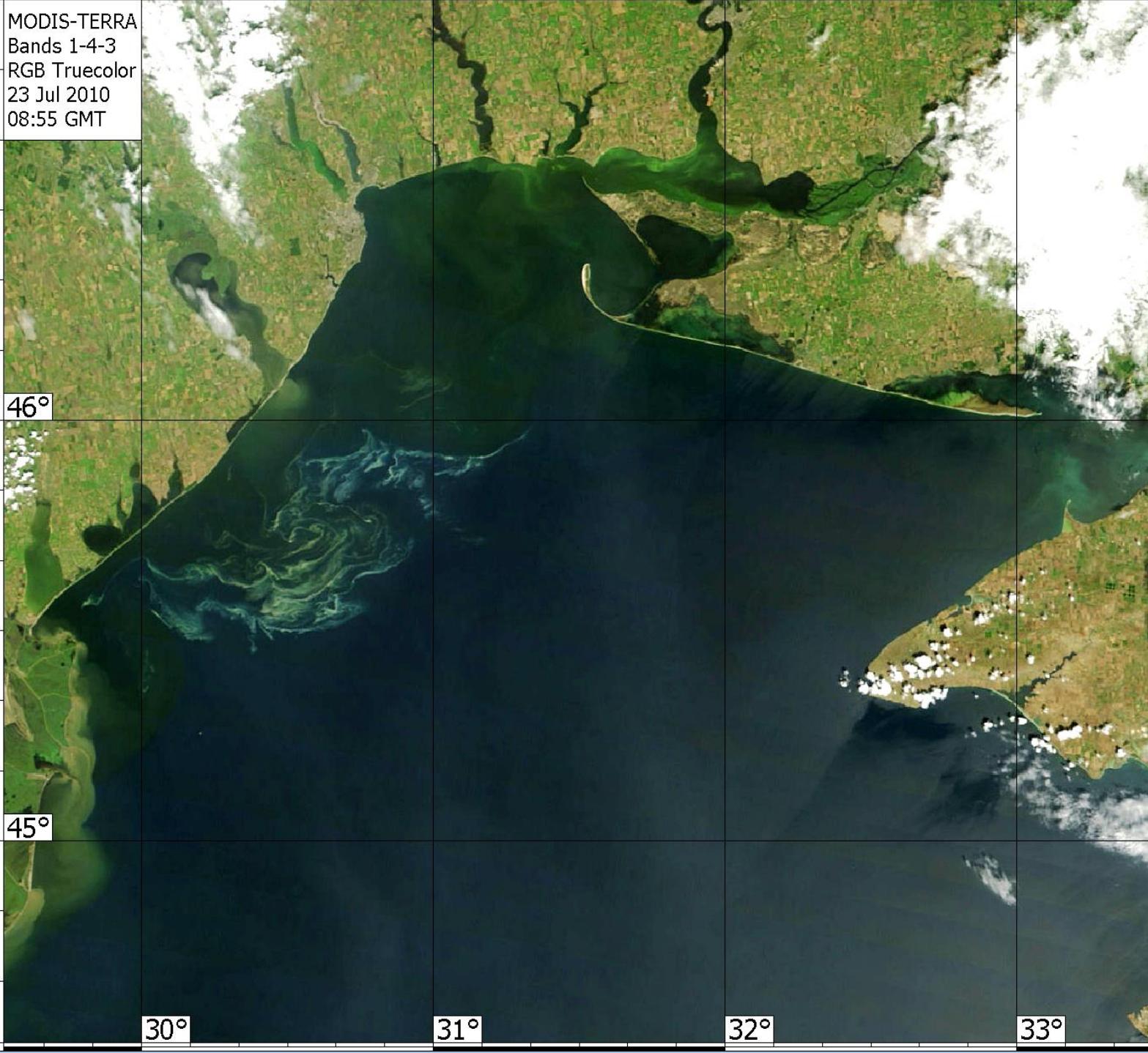
MODIS-TERRA
Bands 1-4-3
RGB Truecolor
14 Jul 2010
09:00 GMT

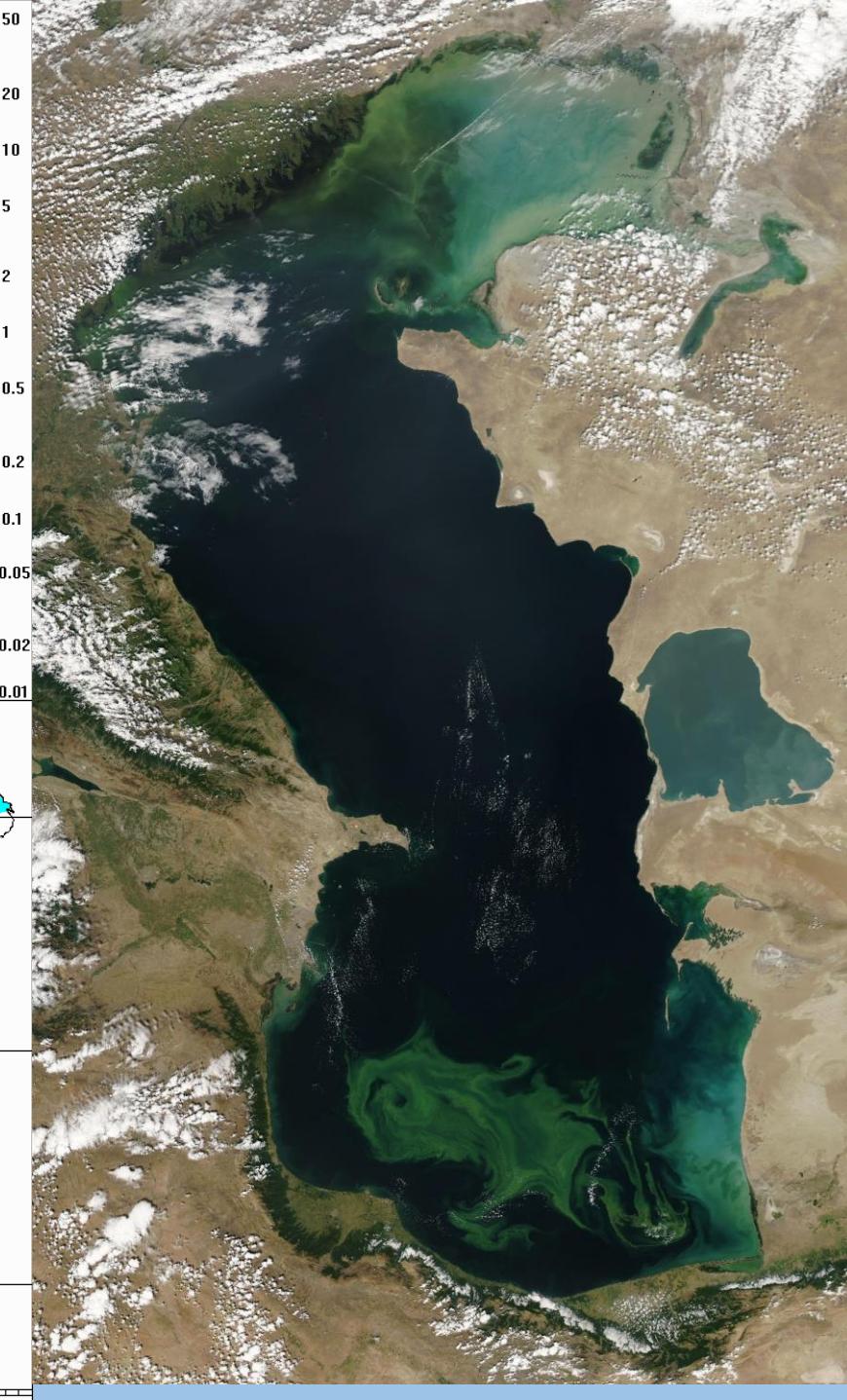
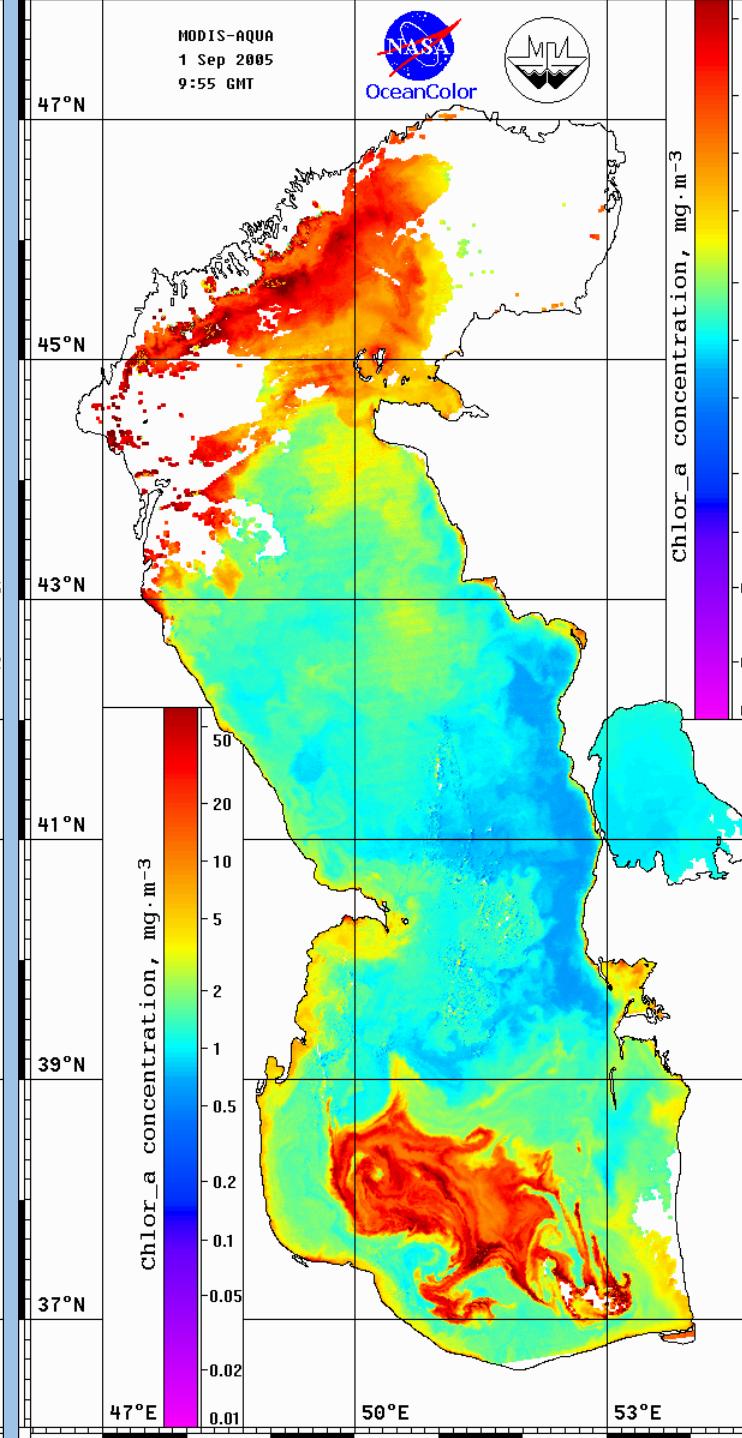
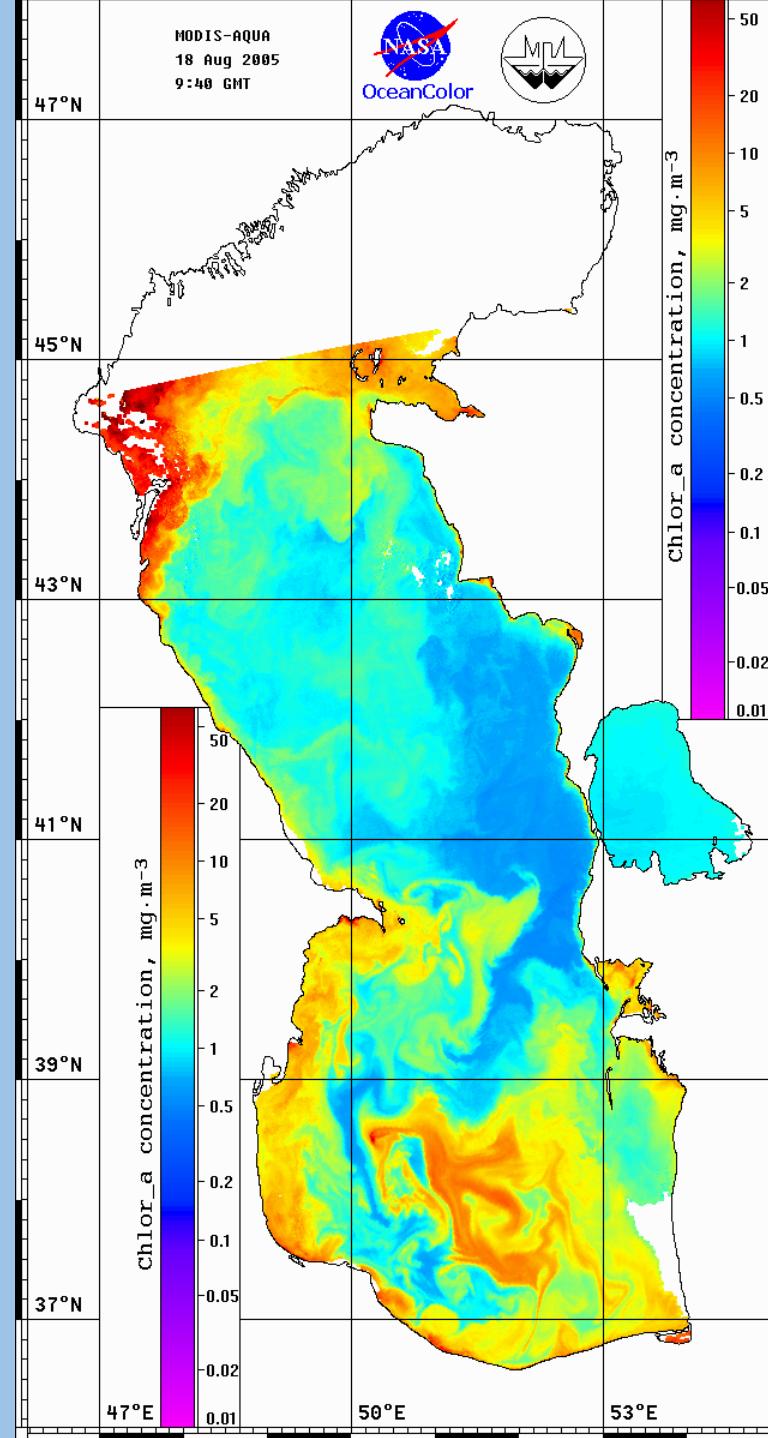


MODIS-TERRA
Bands 1-4-3
RGB Truecolor
18 Jul 2010
08:35 GMT



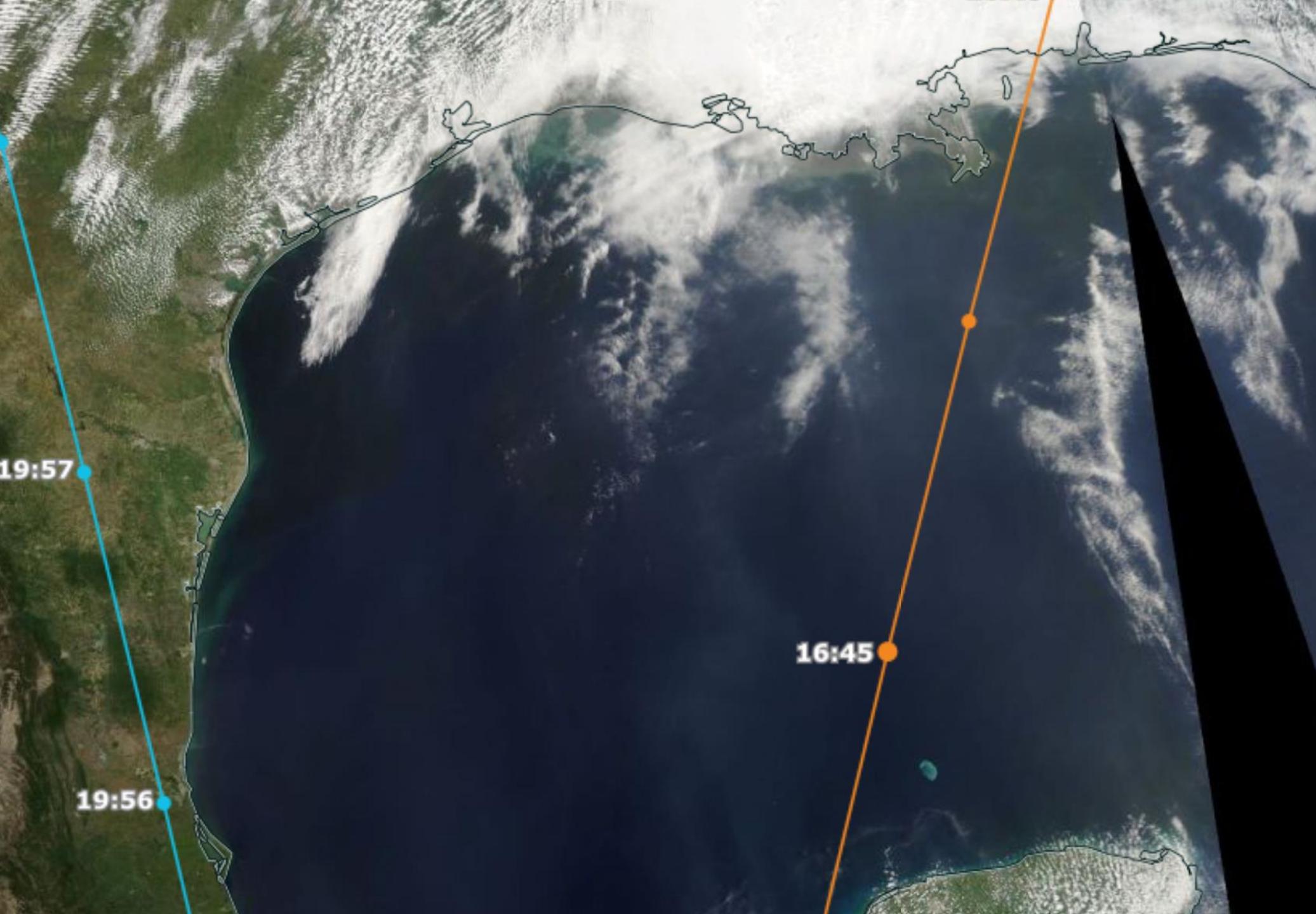
MODIS-TERRA
Bands 1-4-3
RGB Truecolor
23 Jul 2010
08:55 GMT

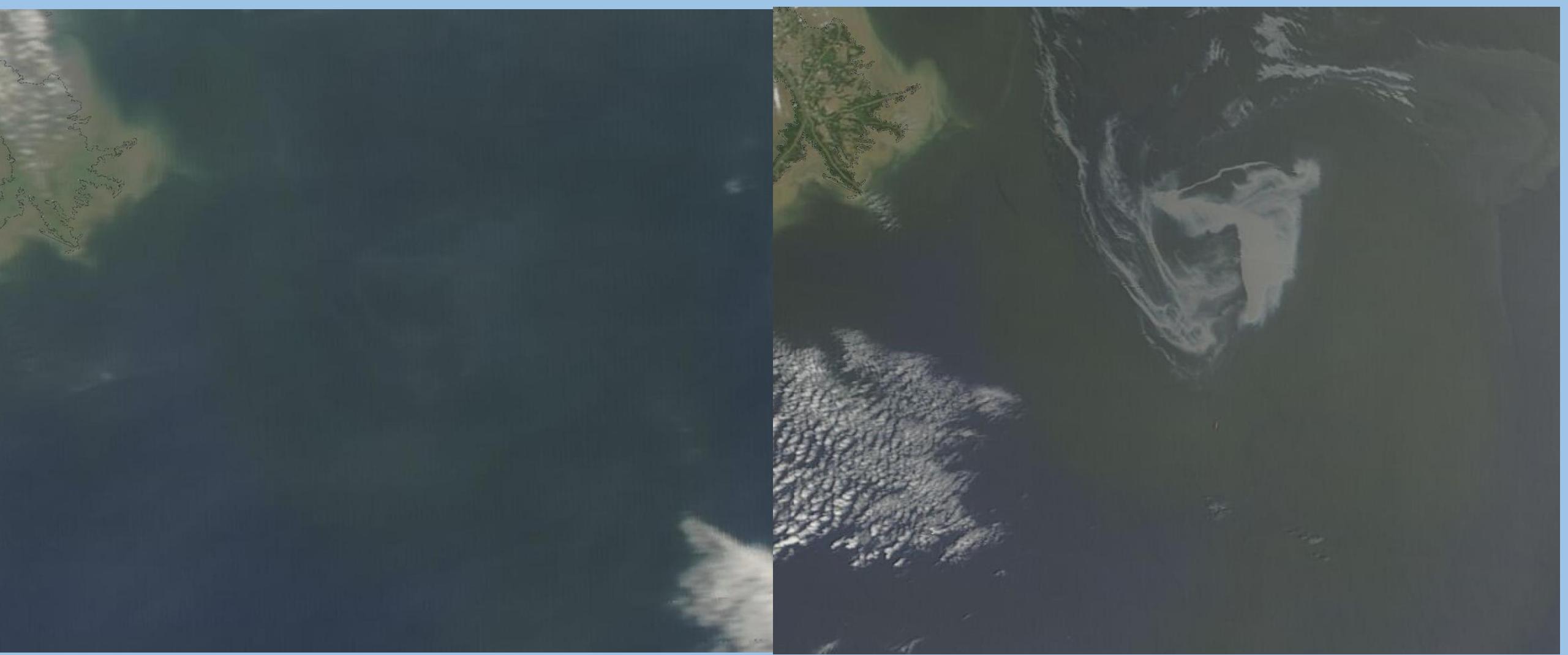


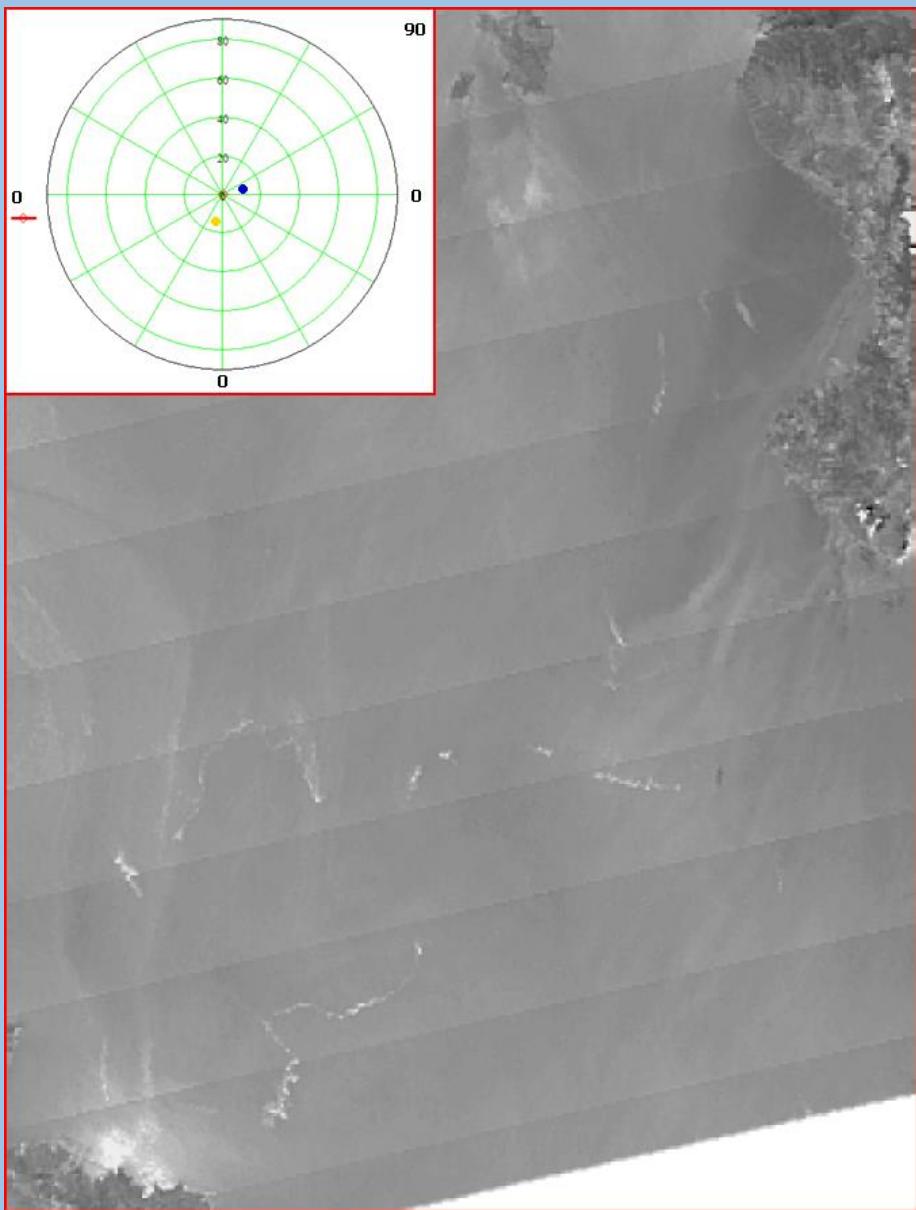


ПЛЁНКИ

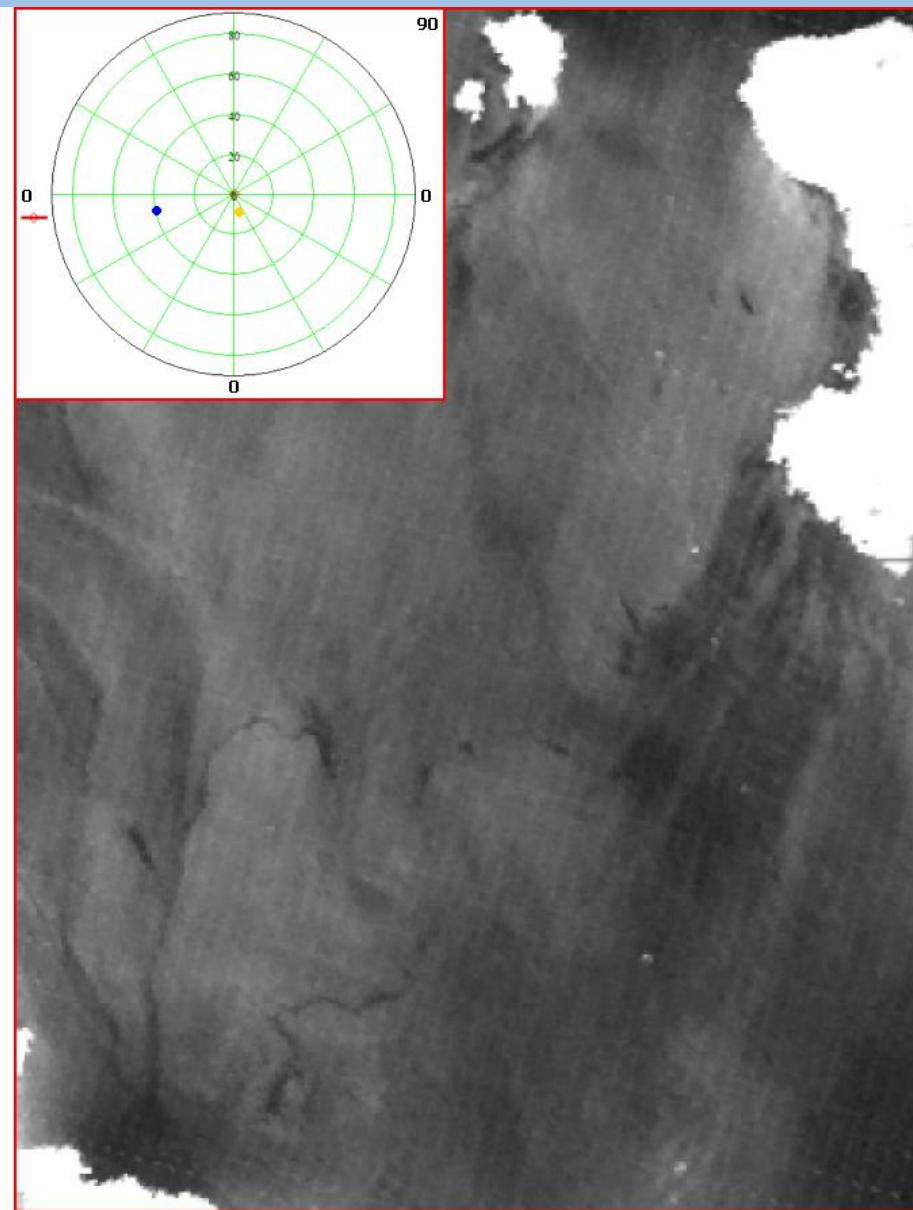
- - Видишь суртика?
- - Нет
- - И я не вижу. А он есть.







11-20 MODIS AQUA



9-40 MODIS TERR



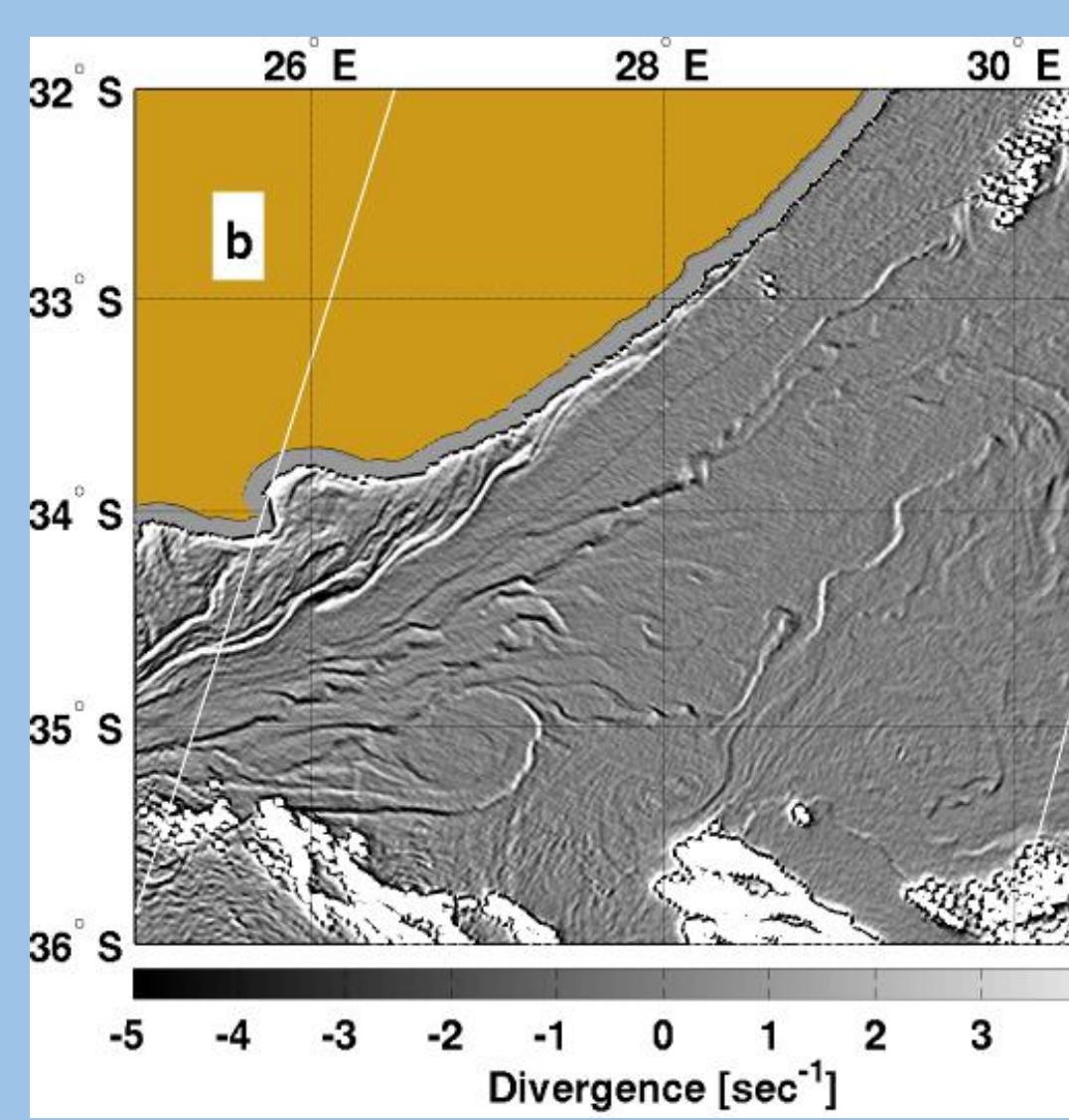
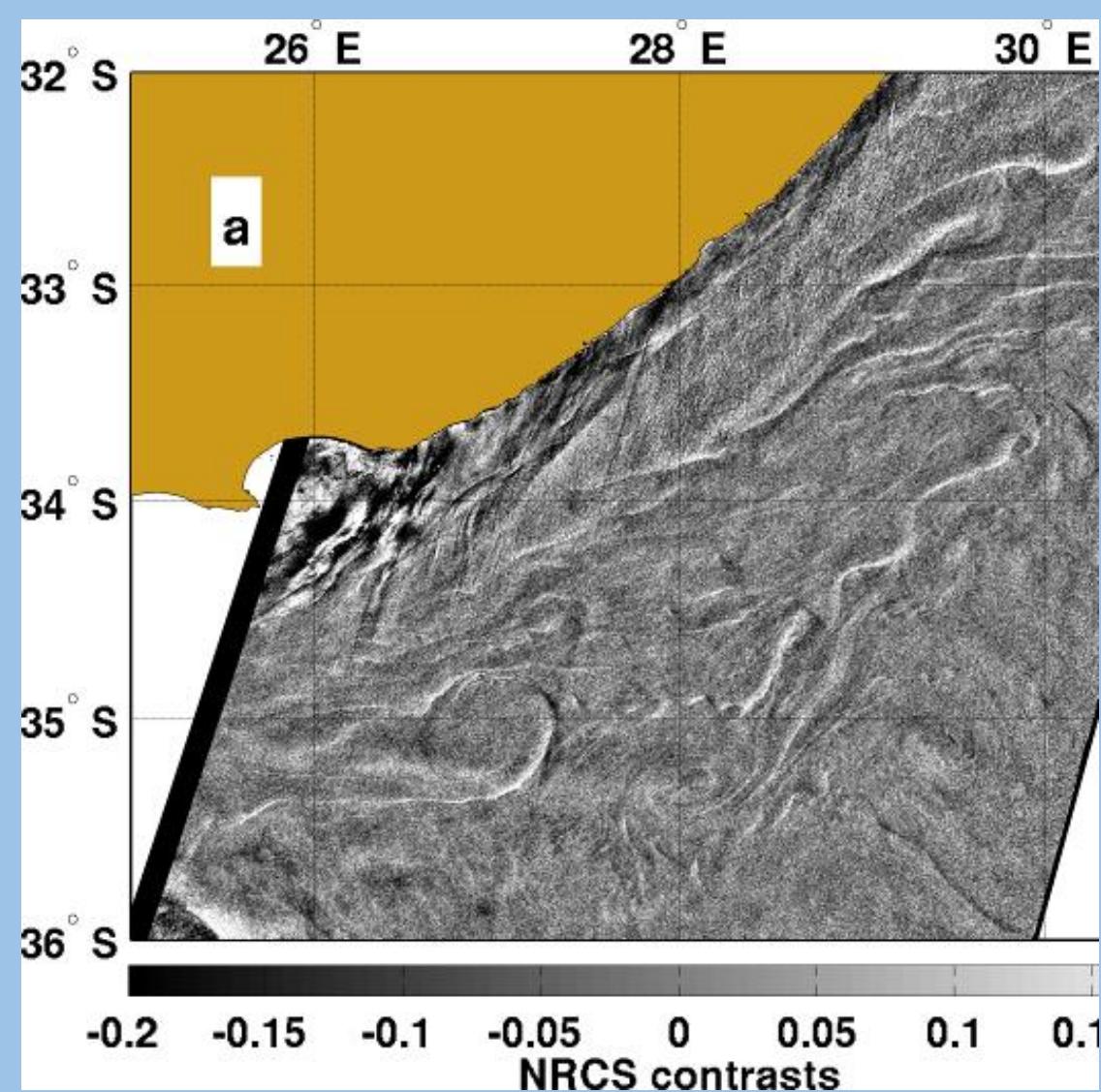


MODIS AQUA, MODIS TERRA, VIIRS
Различные условия наблюдений,
Инверсия контраста.





Нефть от разлива на КТК 29.08.2025

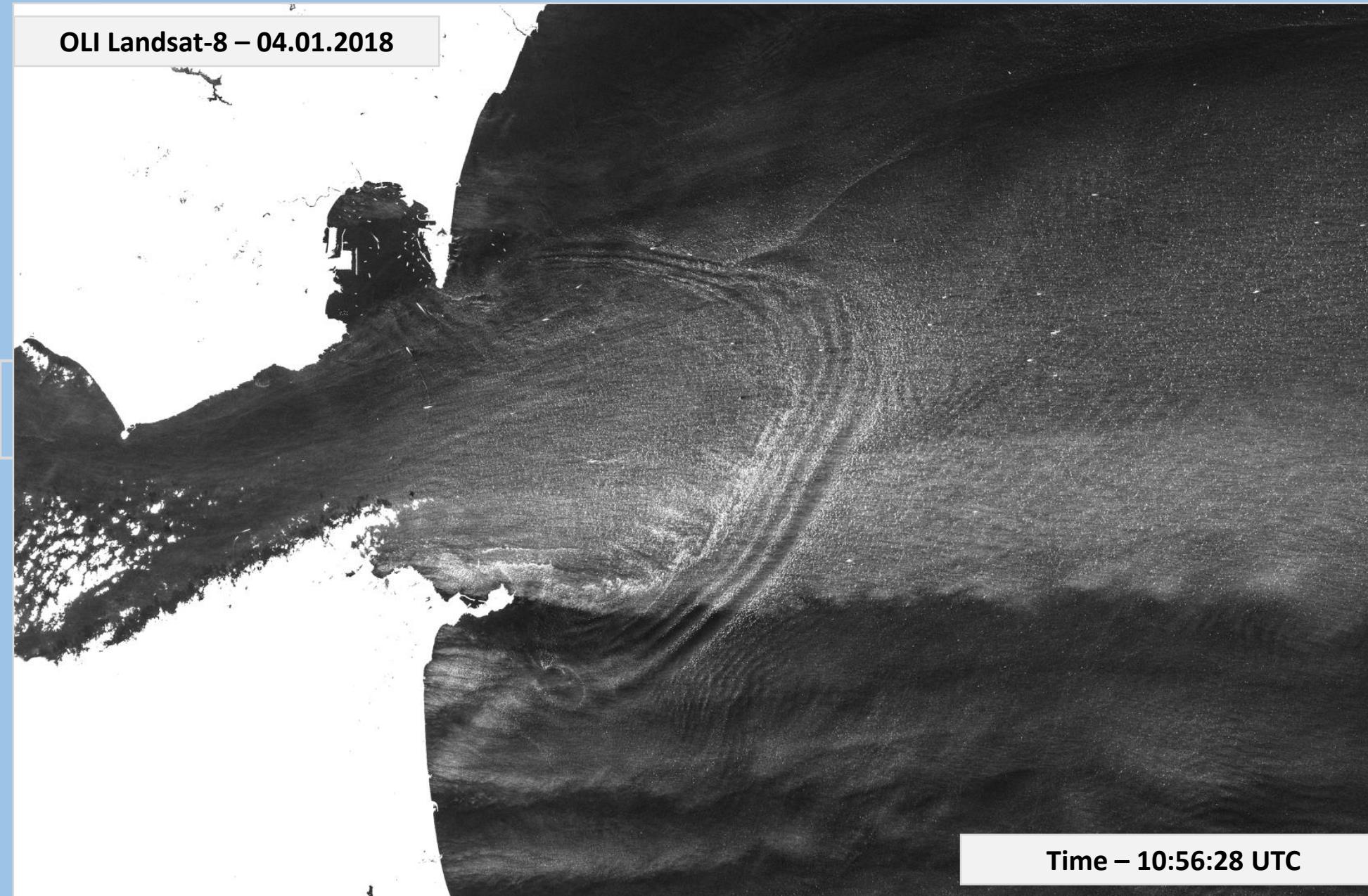


Фрагмент изображения контрастов УЭПР РСА, полученное по изображению ASAR WS (18 Ноября 2007, 7:24 GMT), и (b) соответствующий фрагмент поля дивергенции поверхностного течения по данным MODIS (18 Ноября, 2007, 12:05 GMT). Яркие области на рисунке (b) соответствуют зонам конвергенции, а тёмные – дивергенции течения.

ВНУТРЕННЯЯ ВОЛНА В ГИБРАЛТАРСКОМ ПРОЛИВЕ

35

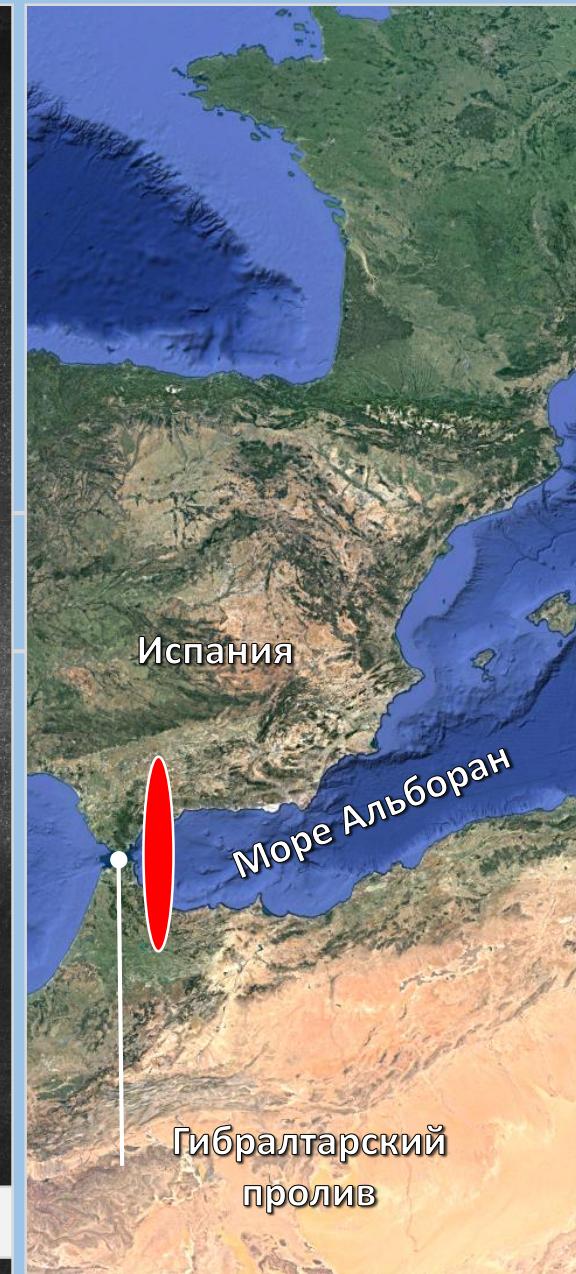
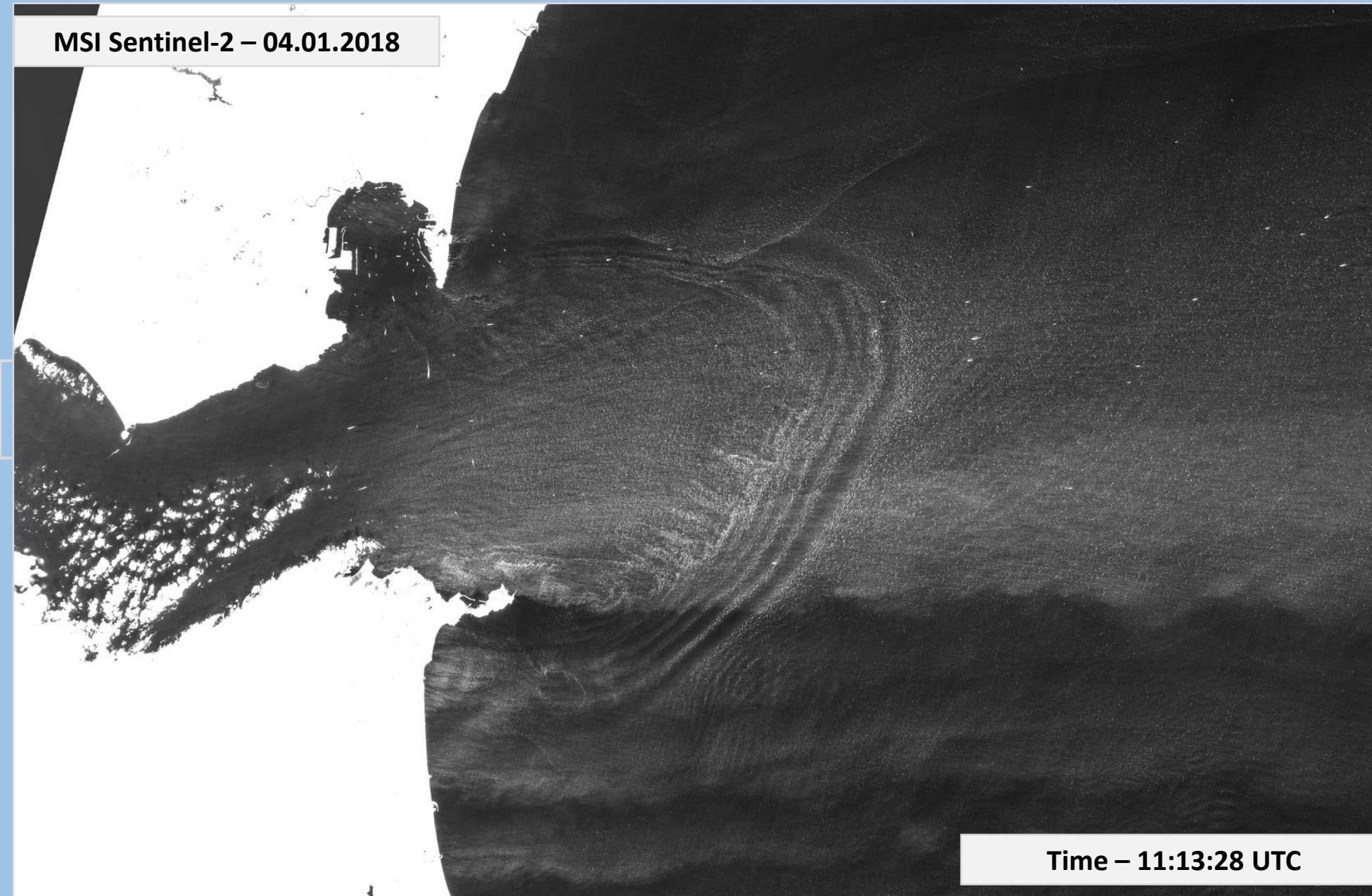
OLI Landsat-8 – 04.01.2018



ВНУТРЕННЯЯ ВОЛНА В ГИБРАЛТАРСКОМ ПРОЛИВЕ

36

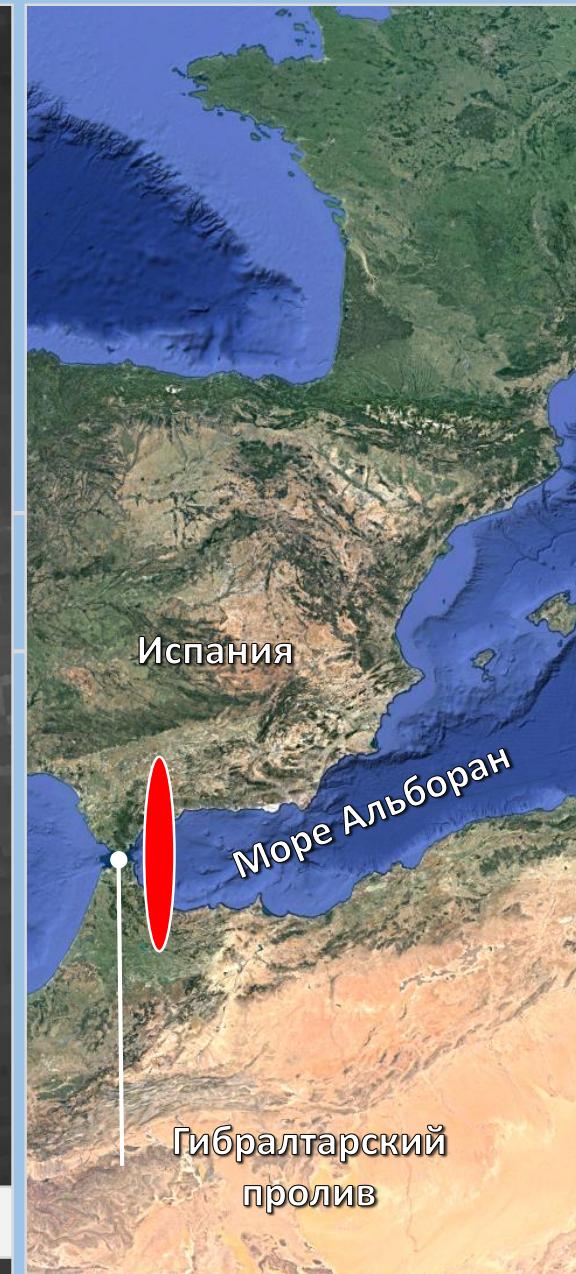
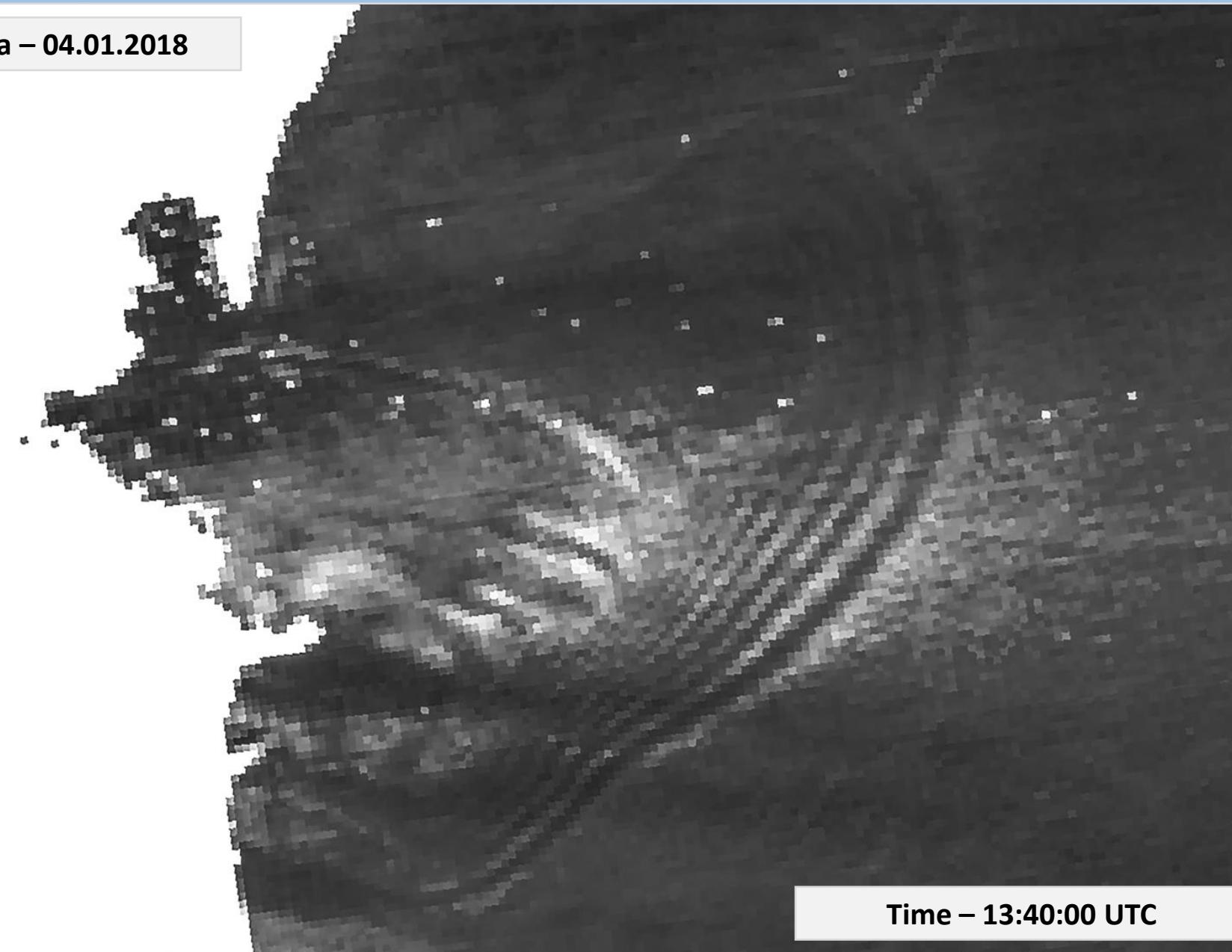
MSI Sentinel-2 – 04.01.2018



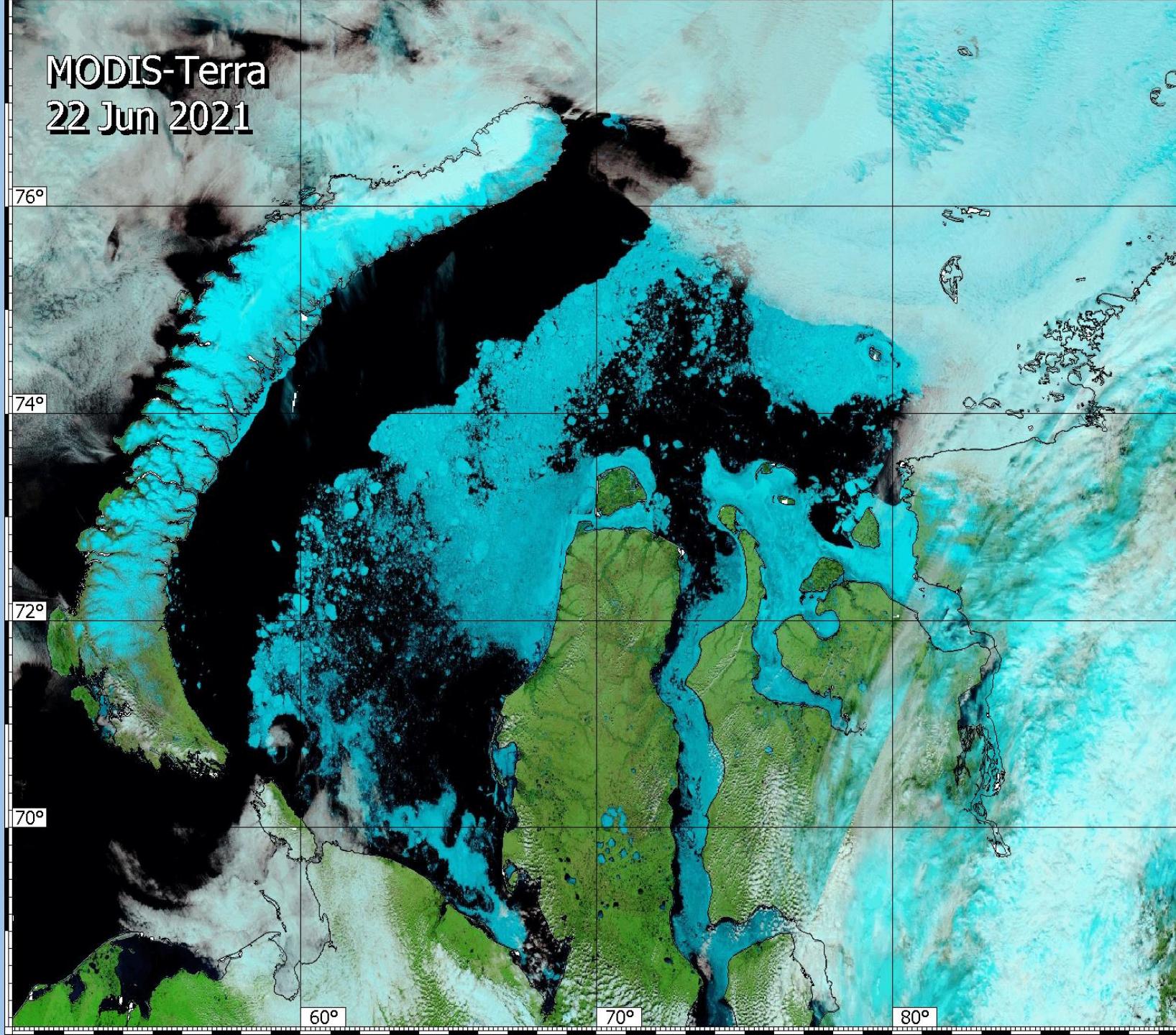
ВНУТРЕННЯЯ ВОЛНА В ГИБРАЛТАРСКОМ ПРОЛИВЕ

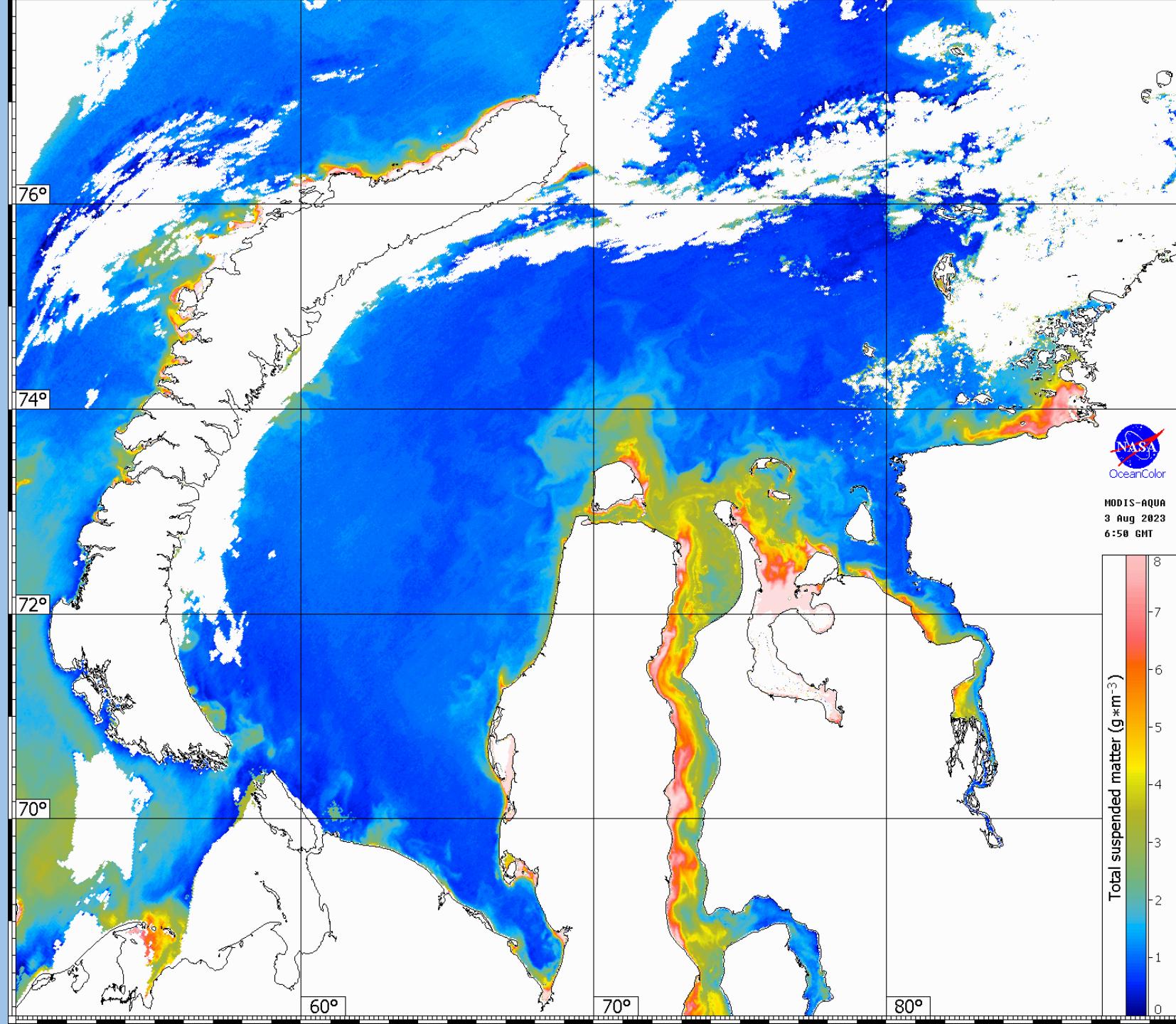
37

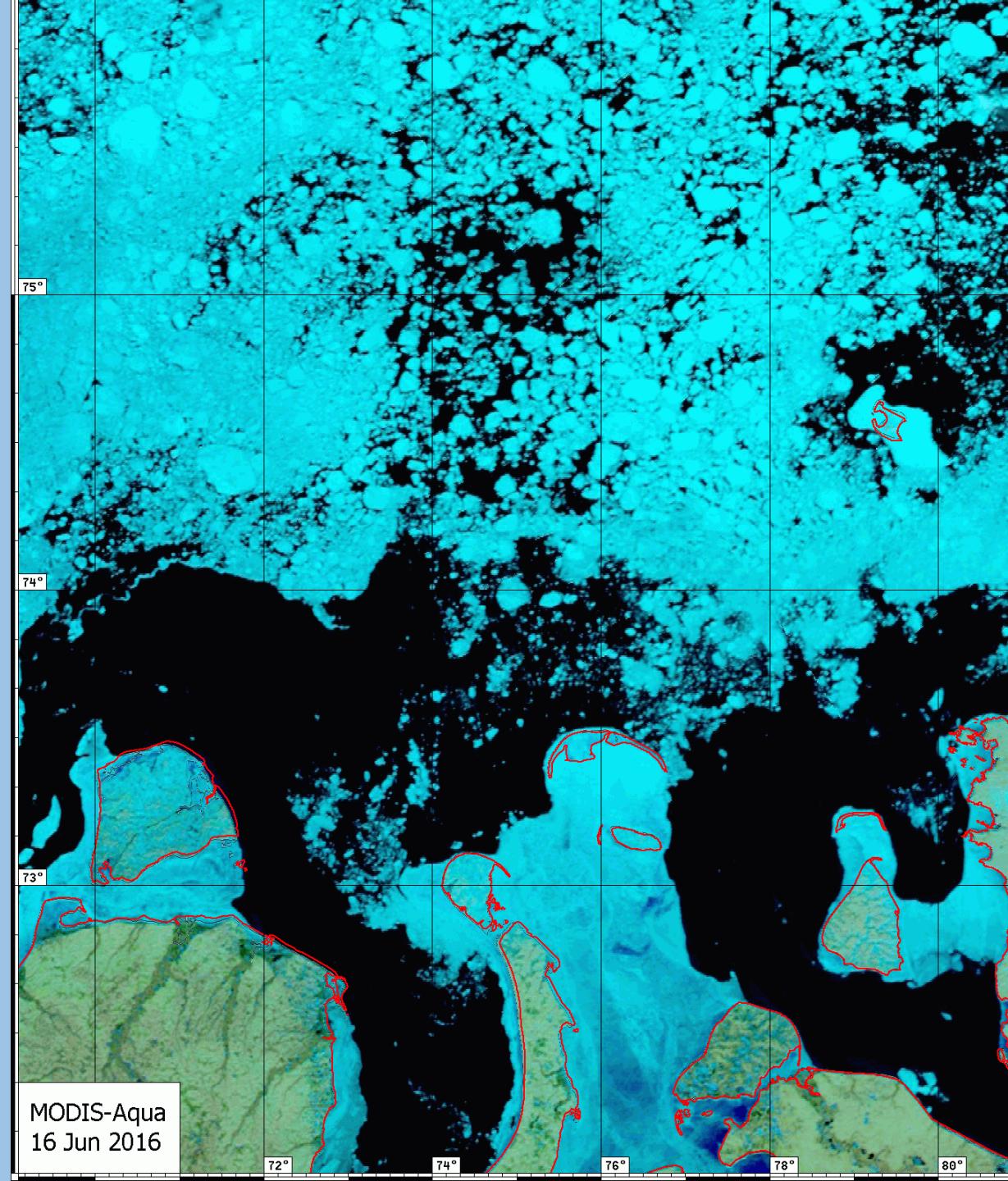
MODIS Aqua – 04.01.2018



MODIS-Terra
22 Jun 2021









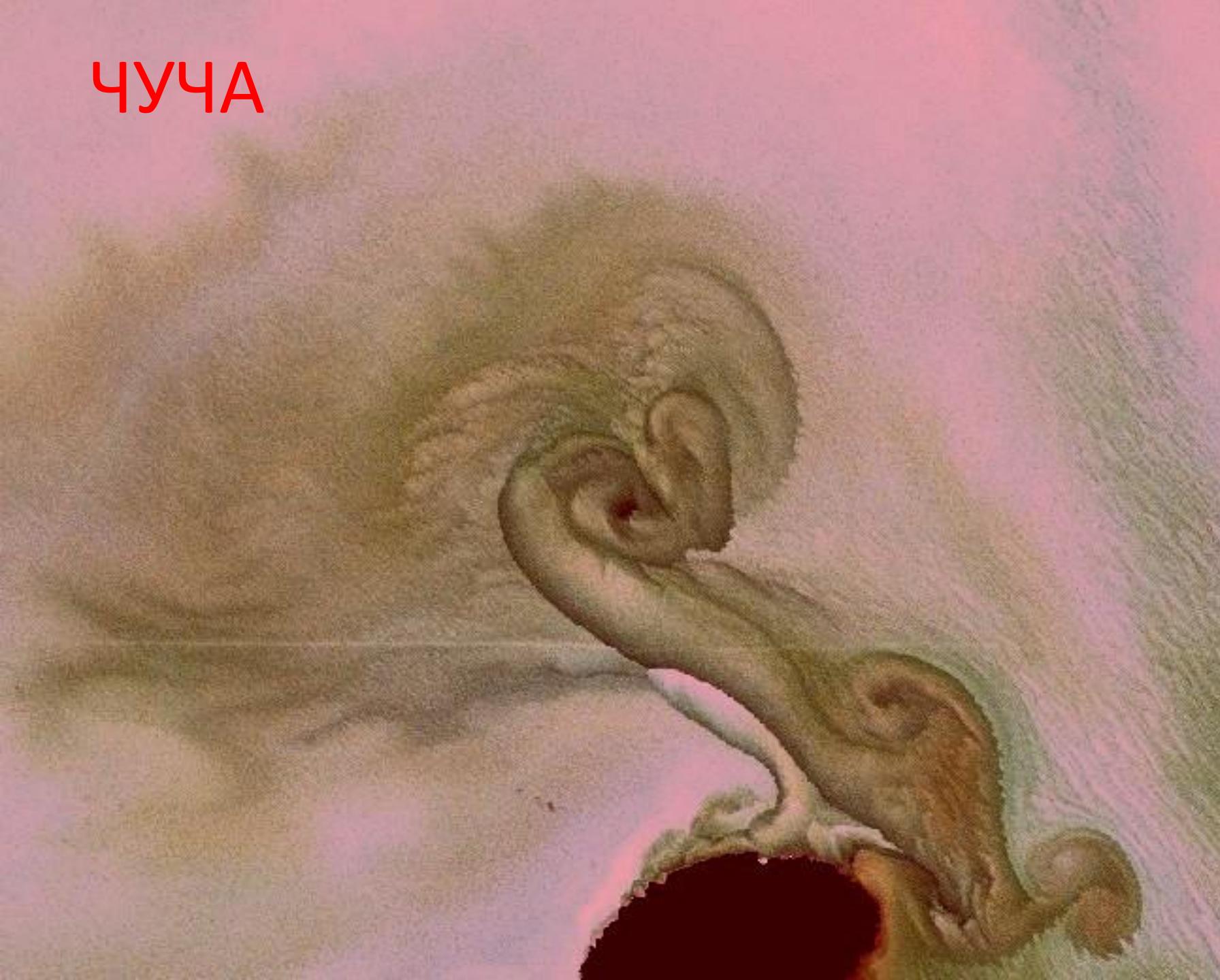
2000



2025

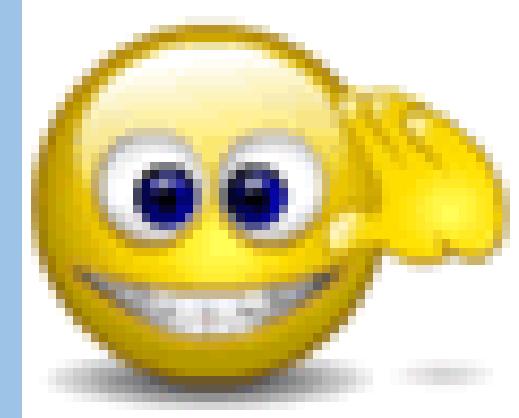
Земля меняется ,
а MODIS работает!

ЧУЧА



СПАСИБО!

Работаем, коллеги!



sstanichny@mail.ru

