



UNIwersytet
Warszawski

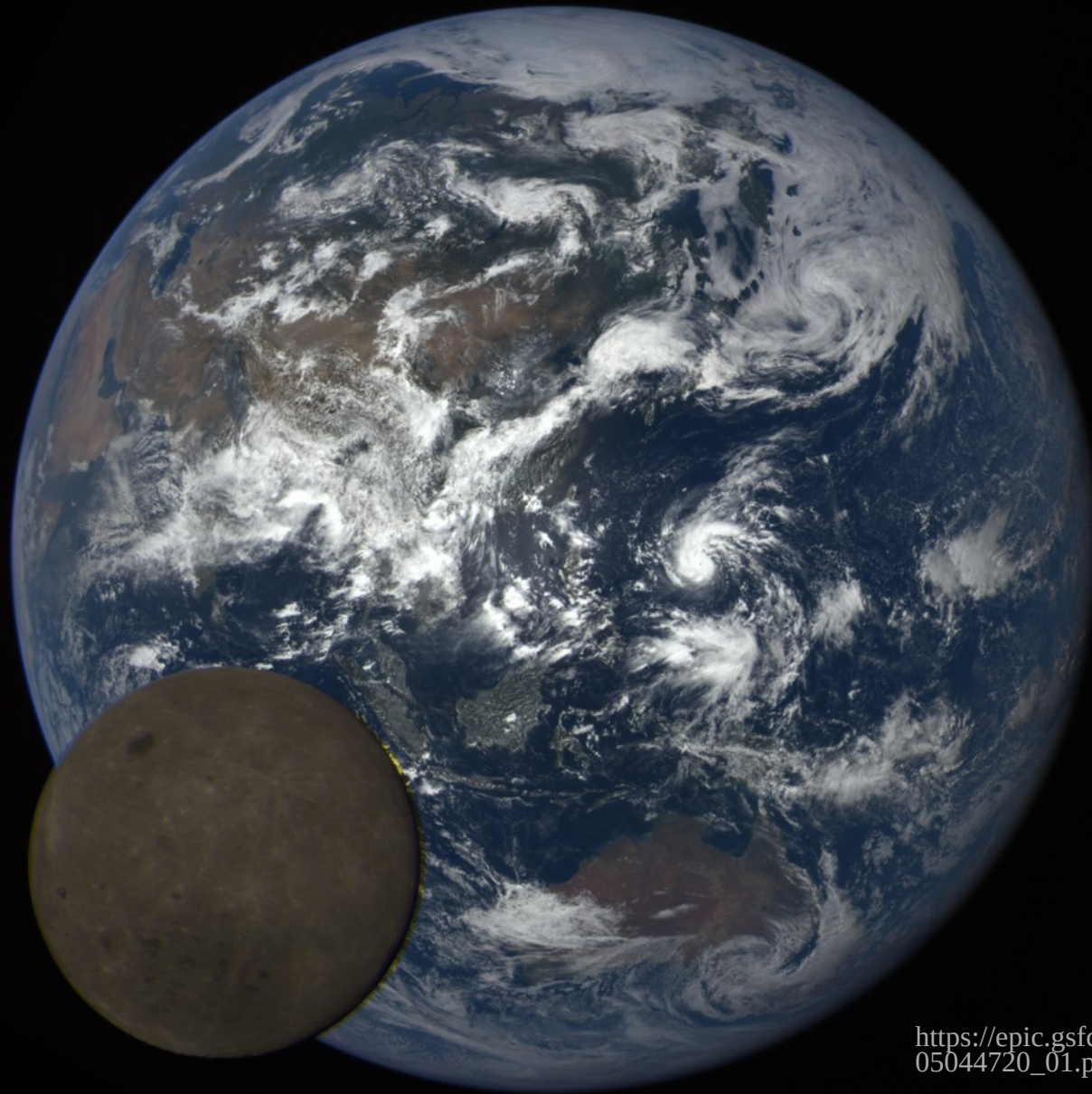


NAUKA O KLIMACIE
DLA SCEPTYCZNYCH

Pomiary i sieci pomiarowe

Szymon Malinowski
Wydział Fizyki Uniwersytetu Warszawskiego

2023-04-26



https://epic.gsfc.nasa.gov/epic-galleries/2016/lunar_transit/full/ep05044720_01.png

Rodzaje pomiarów

punktowe



„In situ”

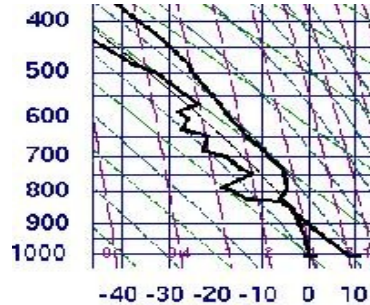


aktywne

powierzchniowe



„te trzecie”

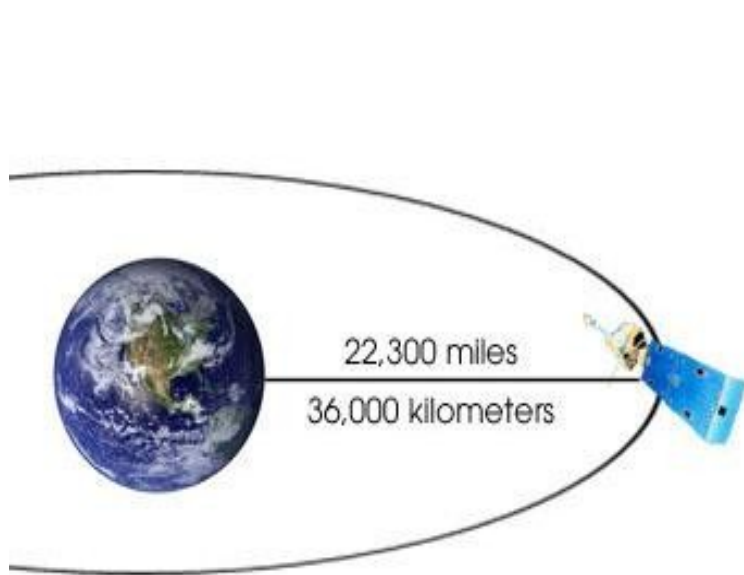


zdalne

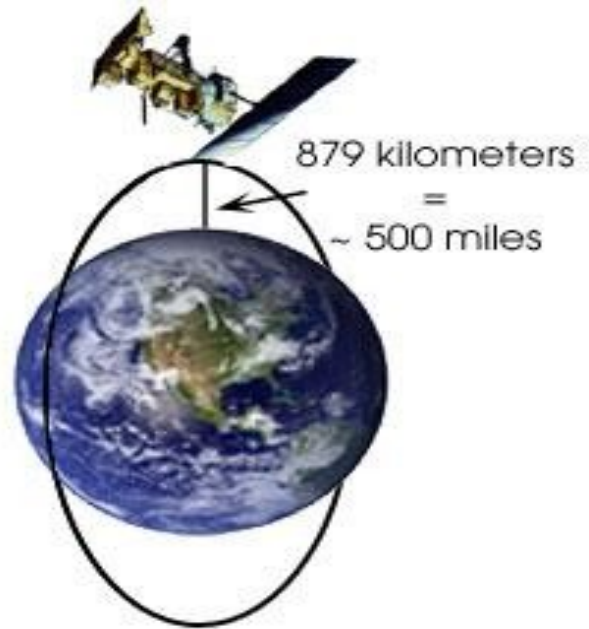


pasywne

Pomiary satelitarne – rodzaje satelitów



geostacjonarne



okołobiegunowe

Obserwacje i sieci obserwacyjne

1) Obserwacje i pomiary satelitarne

NASA's Earth Observing System
Project Science Office

Home Missions Data Communications People The Earth Observer Newsletter Search

Recent Imagery

You will be directed to the NASA Visible Earth webpage when you select Images by Mission below, or click on the images at right that are randomly generated to represent four out of all possible topics.

Images by Mission

Announcements and Highlights

- AAS 2023 Hyperwall Schedule
- NASA's Science Communication Support Office Annual Report 2017
- Understanding Earth: Our Ocean

Current Issue
The Earth Observer

Science Presentations Hyperwall
NASA Hyperwall

The Earth Observer
September - October 2022, Volume 34, Issue 5
Over Thirty Years Reporting on NASA's Earth Sciences Program
After nearly 30 years as a NASA print publication, The Earth Observer is going green.
January - February 2022, Volume 34, Issue 1

Going Green.

Subscribe today!

CYGNSS: Five Years and Counting is Going Green

The Cygnus mission celebrated the fifth anniversary in orbit on December 15, 2021. The longevity of the mission—which was designed to last 24 months—has allowed for a major expansion of the scientific scope of the mission beyond its original focus on the measurement of our hurricane winds. New areas of investigation include tropical and extratropical convective systems over ocean, soil moisture and freeze/thaw state over land, and the mapping of inland water bodies in dynamic seasonal wetlands and due to flood inundation. Turn to page 5 of the Jan-Feb issue of *The Earth Observer* to learn more about the scientific and engineering achievements of this remarkable constellation of eight microsatellites after five years in orbit.

Read More

1 of 5



<https://worldview.earthdata.nasa.gov>

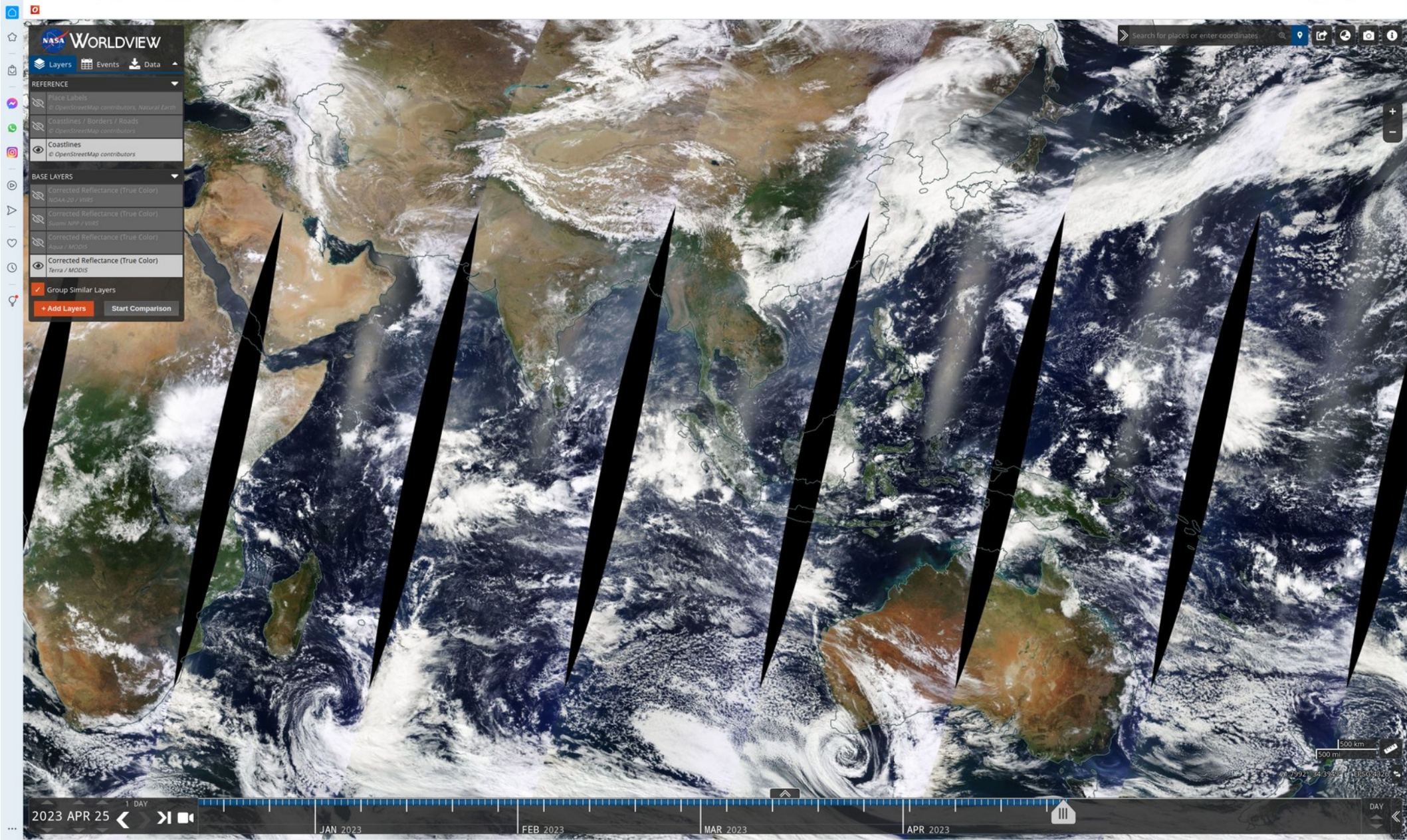
Obserwacje i sieci obserwacyjne

1) Obserwacje i pomiary satelitarne

The screenshot displays the ESA website's 'Observing the Earth' section. The header features the ESA logo and a search bar. The main banner is a satellite image of a river delta with the text 'Observing the Earth' and 'APPLICATIONS'. Below this is a 'Latest' section with a filter menu (ALL, STORIES, VIDEOS, IMAGES) and a grid of seven article cards. Each card includes a thumbnail, a category label, a title, a date, view count, and a 'READ' or 'PLAY' button.

Thumbnail	Category	Title	Date	Views	Links	Action
Europe's next radar satellite tip-top for flight	APPLICATIONS	Europe's next radar satellite tip-top for flight	07/02/2023	20 views	0 links	READ
Chile battles raging wildfires	APPLICATIONS	Chile battles raging wildfires	07/02/2023	221 views	19 links	VIEW
Earth from Space: Kolkata, India	APPLICATIONS	Earth from Space: Kolkata, India	03/02/2023	3695 views	126 links	VIEW
Iceberg larger than London breaks off Brunt	APPLICATIONS	Iceberg larger than London breaks off Brunt	23/01/2023	2729 views	100 links	PLAY
Giant iceberg breaks away from Antarctic ice shelf	APPLICATIONS	Giant iceberg breaks away from Antarctic ice shelf	25/01/2023	10632 views	154 links	READ
ESA and the European Commission uniting on Earth observatio...	APPLICATIONS	ESA and the European Commission uniting on Earth observatio...	24/01/2023	970 views	29 links	READ
Future-proofing ice measurements from space	APPLICATIONS	Future-proofing ice measurements from space	19/02/2023	2447 views	73 links	READ

At the bottom, there is a cookie consent banner with 'ACCEPT ALL COOKIES' and 'ACCEPT ONLY ESSENTIAL COOKIES' buttons, and a 'See our Cookie Notice' link. The URL in the address bar is https://www.esa.int/ESA_Multimedia/Videos/2023/01/iceberg_larger_than_London_breaks_off_Brunt.



NASA WORLDVIEW

Layers Events Data

REFERENCE

- Place Labels
OpenStreetMap contributors, Natural Earth
- Coastlines / Borders / Roads
OpenStreetMap contributors
- Coastlines
OpenStreetMap contributors

BASE LAYERS

- Corrected Reflectance (True Color)
NOAA-20 / VIIRS
- Corrected Reflectance (True Color)
Satellite NPP / VIIRS
- Corrected Reflectance (True Color)
Aqua / MODIS
- Corrected Reflectance (True Color)
Terra / MODIS

Group Similar Layers

+ Add Layers Start Comparison

Search for places or enter coordinates

2023 APR 25 1 DAY

JAN 2023 FEB 2023 MAR 2023 APR 2023

500 km 500 mi

29.7931, 154.39599, 1 FEB 2023


- THEMATIC AREA**
- Agriculture
 - Atmosphere
 - Biosphere
 - Climate
 - Cryosphere
 - Human Dimensions
 - Land Surface
 - Oceans
 - Solid Earth
 - Space Weather
 - Sun-Earth Interaction
 - Terrestrial Hydrosphere

- MISSIONS**
- Aeolus
 - ALOS-1
 - Aura
 - Biomass
 - COSMO-SkyMed
 - COSMO-SkyMed Second Generation
 - CryoSat
 - DMC First Generation
 - EarthCARE
 - Envisat
 - ERS
 - ERS-1
 - ERS-2
 - FFSat
 - FLEX
 - GeoEye-1
 - GOSAT

- INSTRUMENTS**
- Active Remote Sensing
 - Passive Remote Sensing

All Categories | Data | News | Missions | Events | Tools | Activities | Instruments | Campaigns | Documents

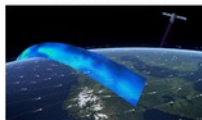
News - Thematic area articles



Remote sensing data map impacts of natural hazards

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News - Operational News



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News - Maintenance News



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News - Events and Proceedings



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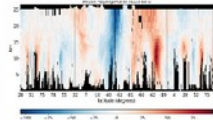
News - Success Stories



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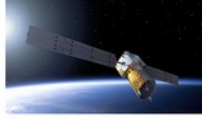
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News - Maintenance News



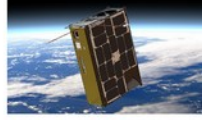
ESA EO Dissemination Systems

News - General News




An overview of the Aeolus

News - Data Release news



New collection open to users: FFSat hyperspectral products

News - Operational News



Swarm Bravo: Scalar magnetic field data available

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[ACCEPT COOKIES](#)

[ACCEPT ONLY ESSENTIAL COOKIES](#)

Obserwacje i sieci obserwacyjne

2) Obserwacje i pomiary naziemne

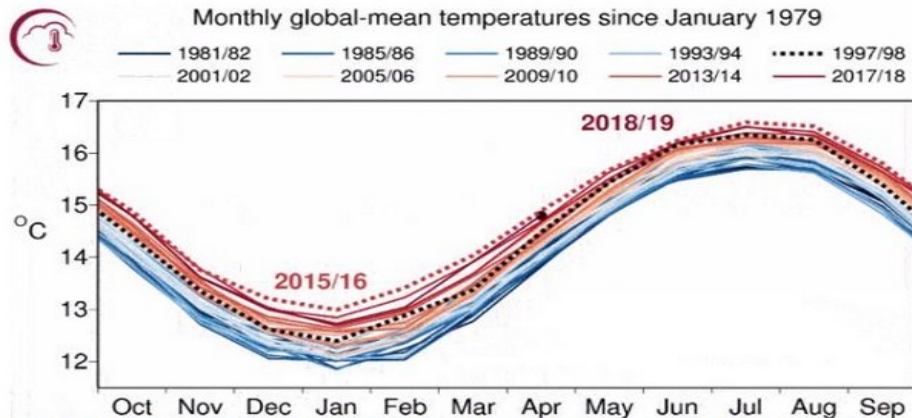
Sieci pomiarów in-situ

Sieci pomiarów zdalnych

Bazy danych pomiarowych

Systemy informacji o danych pomiarowych

Programy obserwacji, pomiarów, wymiany danych



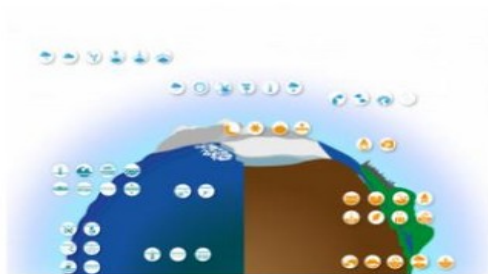
Monthly global average surface air temperatures from 1979 to 2019 provided by the Copernicus Climate Change Service (C3S), implemented by the European Centre for Medium-Range Weather Forecasts (ECMWF).

Global Climate Observing System (GCOS)

The Global Climate Observing System (GCOS) is co-sponsored by the World Meteorological Organization (WMO), the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO), the United Nations Environment Programme (UN Environment), and the International Science Council (ISC). It regularly assesses the status of global climate observations of the atmosphere, land and ocean and produces guidance for its improvement.

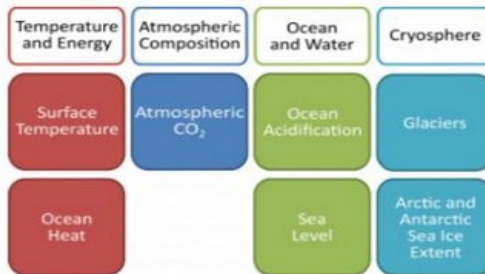
GCOS expert panels maintain definitions of Essential Climate Variables (ECVs) which are required to systematically observe Earth's changing climate. The observations supported by GCOS contribute to solving challenges in climate research and also underpin climate services and adaptation measures.

GCOS works towards a world where climate observations are accurate and sustained, and access to climate data is free and open.



ECV Public Consultation

Public...



Global Climate Indicators

The Global Climate Indicators are a set of ...



The Global Observing System For Climate: Implementation Needs

This plan was published in 2016 and describes...



Global Atmosphere Watch Programme

[WMO Programmes](#)

Tags: [Research](#) [Environment](#) [Atmosphere](#)

GAW

Contact: gaw@wmo.int

Addressing atmospheric composition on all scales: from global and regional to local and urban.

Changes in Earth's atmospheric composition are a serious cause of concern for humanity as they impact weather and climate, human and ecosystem health, water supply and quality, agricultural production, and many socio-economic sectors. The most pressing of the related problems include:

- > climate change - due to steadily increasing amounts of greenhouse gases, especially carbon dioxide;
- > the ozone hole - depletion of the protective stratospheric ozone layer due to chlorofluorocarbons (CFCs) and halons has increased ultraviolet radiation, which in turn is increasing incidences of skin cancer and other diseases; and
- > urban air pollution, especially fine particles, is affecting human health.

Global Atmosphere Watch studies the variability and trends in atmospheric composition and related physical parameters, and assesses the consequences thereof. Advancing scientific understanding in order to address these challenges remains critical. Global Atmosphere Watch also focuses on service delivery in a number of application areas where its data brings added value.

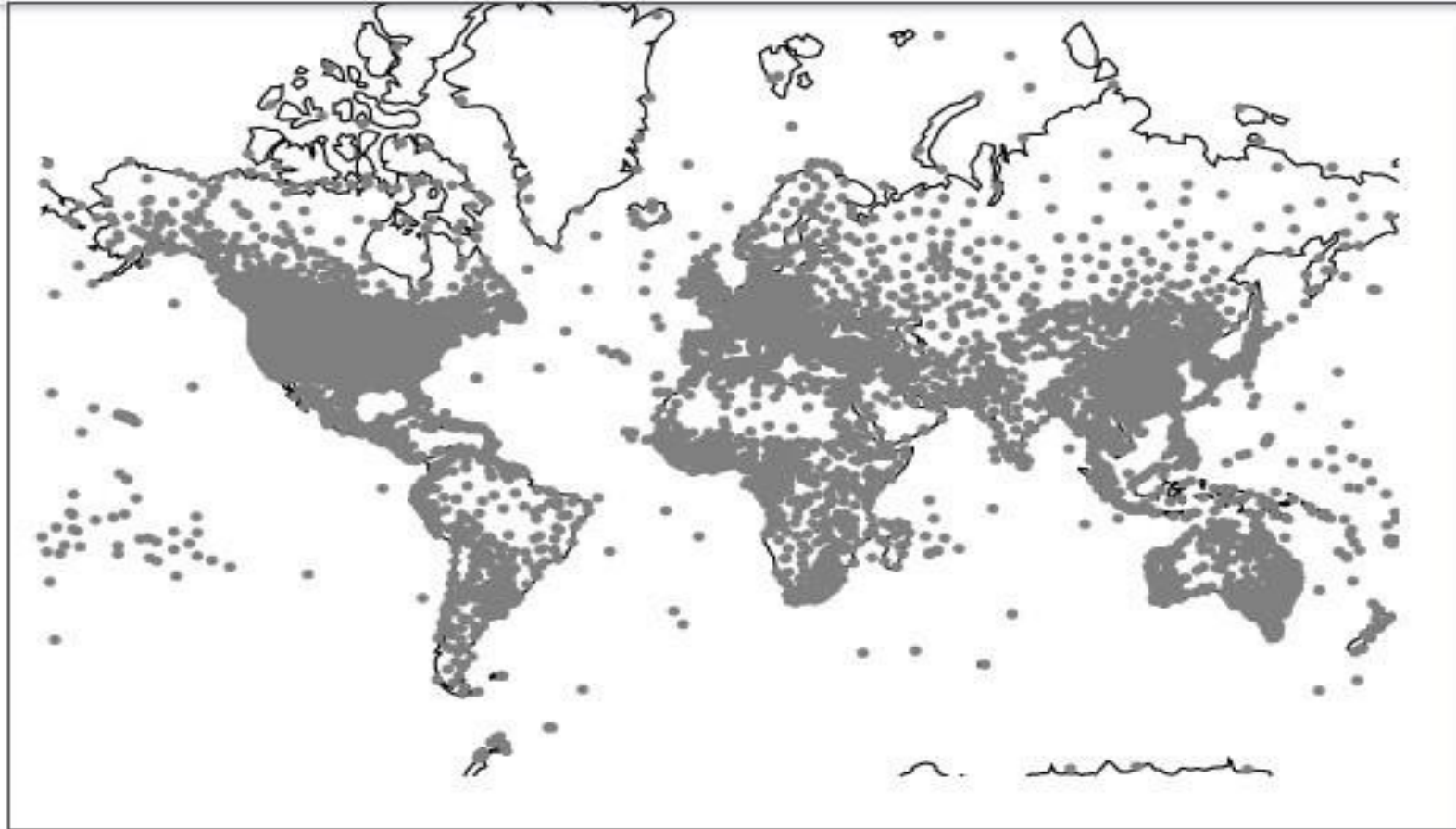
One major aspect of the Global Atmosphere Watch mission is to organize, participate in and coordinate assessments of the chemical composition of the atmosphere on a global scale. In this way, the Global Atmosphere Watch provides reliable scientific information for national and international policymakers, supports international conventions on stratospheric ozone depletions and monitors climate change and long-range transboundary air pollution. Global Atmosphere Watch data are used in the following assessments:

- > [WMO/UNEP Scientific Assessment of Ozone Depletion](#)
- > [Global Precipitation Chemistry Assessment](#)

Data from the Global Atmosphere Watch feed several bulletins all available in the online [WMO Library](#) and/or on the WMO/GAW Extranet webpage:

- > [WMO Arctic and Antarctic ozone bulletins](#)
- > [Greenhouse gas bulletins](#)
- > [Aerosol bulletins](#)

Naziemne stacje meteorologiczne



<http://climatemodels.uchicago.edu/timeseries/>

Welcome to WDCGG!

- About WDCGG
- Data (surface/mobile)
- Data (satellite)
- Current State of GHGs
- Publications
- Manuals
- Statistics
- 日本語版 (Japanese)

About WDCGG

The World Data Centre for Greenhouse Gases (WDCGG) is a World Data Centre (WDC) operated by the Japan Meteorological Agency (JMA) under the Global Atmosphere Watch (GAW) programme of the World Meteorological Organization (WMO). WDCGG collects, archives and distributes data provided by contributors on greenhouse gases (such as CO₂, CH₄, CFCs, N₂O) and related gases (such as CO) in the atmosphere and elsewhere.

This website is operated by the JMA in collaboration with WMO.

▶ ▶ [Read more](#)

Data Archive

The WDCGG data archive provides observation data on greenhouse gases and related gases along with basic associated information known as metadata.

▶ ▶ [Click here for details.](#)

This website has a user registration function to help support contributors.

Many contributors face difficulties with ongoing monitoring due to economic and other limitations. Information on the timing and usage of data provided may help to validate the effectiveness of such work.

This information can also be used to improve services provided to users and contributors and to facilitate the fair use of data.

Against this background, WDCGG kindly invites users to register. User registration is free and easy, and is required for data file downloads.

[Sign up now!](#)

Contributors

Contributors are institutes or organizations that collect and submit observation data.

▶ ▶ [List of Contributors](#)

To submit data, refer to [the WDCGG Data Submission Manual](#) and [sign up](#) for an account. We look forward to working with you.

What's new

See what's new in WDCGG. Also refer to "[Data Update Information](#)."

25 Mar. 2021

This website has started providing NetCDF format data files and issuance of DOI. Please see the following page for the details: [WDCGG DOI Policy](#)

23 Nov. 2020

[WMO Greenhouse Gas Bulletin](#) No. 16 is released.

19 Nov. 2020

[WMO WDCGG Data Summary](#) No. 44 is released.

[See more news...](#)

ATTENTION
Reactive gases measurement data (except for CO) have been agreed to be transferred under the responsibility of the newly established [GAW World Data Centre for Reactive Gases \(WDCRG\)](#) hosted by the Norwegian Institute for Air Research (NILU). Reactive gas data submitted to WDCGG before 1 January 2016 have been migrated to WDCRG.


- THEMATIC AREA**
- Agriculture
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 - Cryosphere
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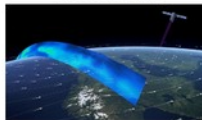
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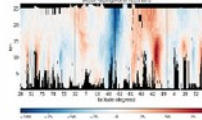
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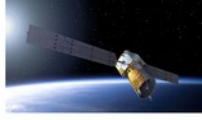
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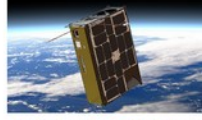
ESA EO Dissemination Systems

News - General News




An overview of the Aeolus

News - Data Release news



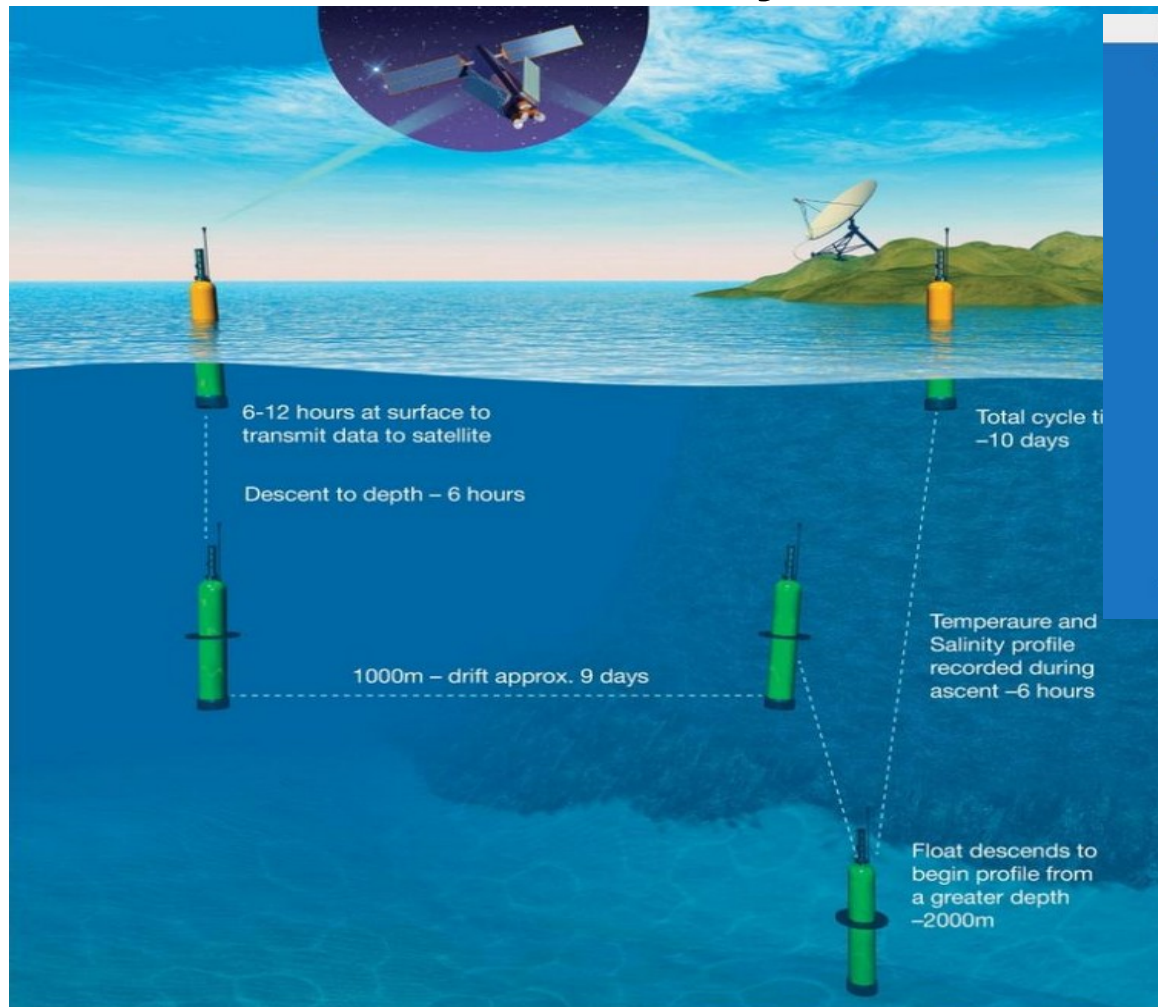
New collection open to users: FFSat

News - Operational News



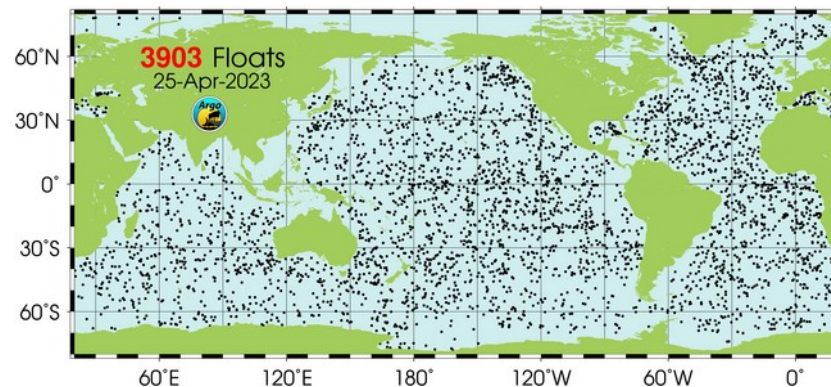
Swarm Bravo: Scalar magnetic field data

Pomiary w morzu – projekt Argo

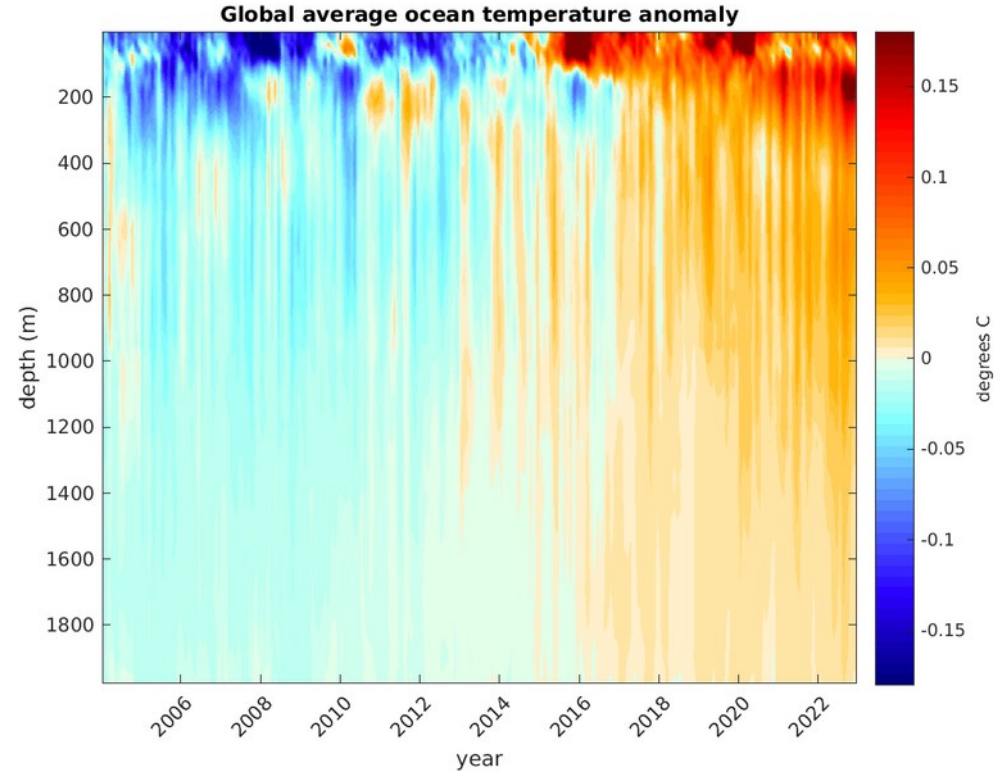
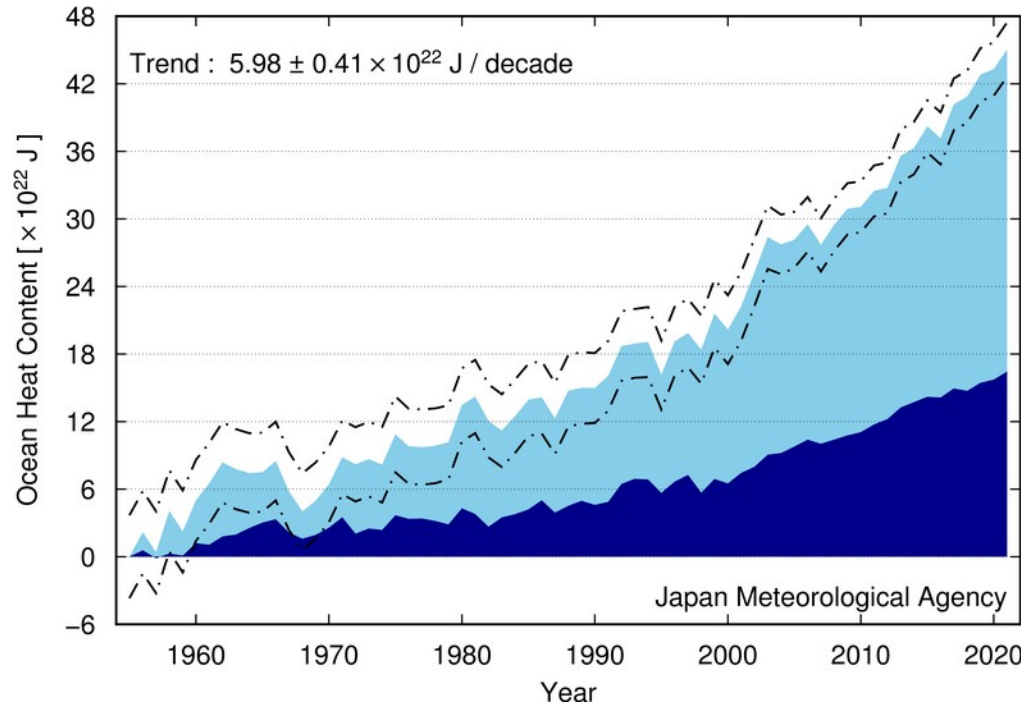


The screenshot shows the homepage of the Argo project website. The URL is www.argo.net. The page features a globe with a grid of float locations and a diagram of the float cycle. The text on the page includes:

- National Argo Websites: Australia Canada China France Germany India Japan Mexico Netherlands Norway South Korea Spain UK USA ...more...
- Argo Regional Centres: Pacific Ocean North Atlantic Ocean South Atlantic Ocean Indian Ocean Southern Ocean
- ARGO.NET
- WELCOME TO THE INTERNATIONAL ARGO PROJECT HOME PAGE
- Argo takes the pulse of the oceans, collecting and distributing temperature and salinity observations from a fleet of 3000 underwater robots.
- Argo Project Office
- Argo Information Centre
- Argo Data
- FLASH version (Please click on picture above to start animation)
- HTML version
- Contact Credits



Dodatni bilans energii – prawie cała nadwyżka energii (96%)
gromadzi się w oceanie.





GODDARD SPACE FLIGHT CENTER

+ Visit NASA.gov

AERONET

AEROSOL ROBOTIC NETWORK



+ AEROSOL OPTICAL DEPTH

+ AEROSOL INVERSIONS

+ SOLAR FLUX

+ OCEAN COLOR

+ MARITIME AEROSOL

Web Site Feature

[AERONET Data Synergy Tool](#) - Access Earth Science data sets for AERONET sites

-Home

Home

+ AEROSOL/FLUX NETWORKS

+ CAMPAIGNS

+ COLLABORATORS

+ DATA

+ LOGISTICS

+ NASA PROJECTS

+ OPERATIONS

+ PUBLICATIONS

MISSION

The AERONET (AERosol RObotic NETwork) program is a federation of ground-based remote sensing aerosol networks established by NASA and PHOTONS (PHOtométrie pour le Traitement Opérationnel de Normalisation Satellitaire; Univ. of Lille 1, CNES, and CNRS-INSU) and is greatly expanded by networks (e.g., RIMA, AeroSpan, AEROCAN, NEON, and CARSNET) and collaborators from national agencies, institutes, universities, individual scientists, and partners. For more than 25 years, the project has provided long-term, continuous, and readily accessible public domain database of aerosol optical, microphysical and radiative properties for aerosol research and characterization, validation of satellite retrievals, and synergism with other databases. The network imposes standardization of instruments, calibration, processing and distribution.

AERONET collaboration provides globally distributed observations of spectral aerosol optical depth (AOD), inversion products, and precipitable water in diverse aerosol regimes. Version 3 AOD data are computed for three data quality levels: Level 1.0 (unscreened), Level 1.5 (cloud-screened and quality-controlled), and Level 2.0 (quality-assured). Inversions, precipitable water, and other AOD-dependent products are derived from these levels and may implement additional quality checks.

The AERONET - Ocean Color (AERONET-OC) is another component of the AERONET program, provides the additional capability of measuring the radiance emerging from the sea (i.e., normalized water-leaving radiance) with sun-photometers installed on offshore platforms like lighthouses.

AERONET
AEROSOL ROBOTIC NETWORK

+ AEROSOL OPTICAL DEPTH + AEROSOL INVERSIONS + SOLAR FLUX + OCEAN COLOR + MARITIME AEROSOL

+ Home

Aerosol Optical Depth

+ AEROSOL/FLUX NETWORKS

+ CAMPAIGNS

+ COLLABORATORS

- DATA

+ LOGISTICS

+ NASA PROJECTS

+ OPERATIONS

+ PUBLICATIONS

+ SITE INFORMATION

+ STAFF

+ SYSTEM DESCRIPTION

AERONET DATA ACCESS

DATA SYNERGY TOOL

+ Data Display

AEROSOL OPTICAL DEPTH (V3)- SOLAR

+ Data Display

+ Download Tool

+ Download All Sites

+ Climatology Tables

+ Web Service

AEROSOL INVERSIONS (V3)

+ Data Display

+ Download Tool

+ Download All Sites

+ Web Service

SOLAR FLUX

+ Data Display

OCEAN COLOR

+ V3 Data Display

+ V3 Web Service

+ Download All Sites



AERONET Aerosol Optical Depth Data Display Interface **Version 3 Aerosol Optical Depth**

Site: **Warsaw_UW** - Additional Site Information

DISCLAIMER
The following data are automatically cloud cleared and quality assured with pre-field and post-field calibration applied.

The latest principal investigator(s) and co-investigator(s) of the 'Warsaw_UW' site:
Iuona_S_Stachlewska

If you intend to use the following data please contact principal investigator(s) and co-investigator(s) via e-mail:
iuona.stachlewska@fuw.edu.pl

Please see "Additional Site Information" above for the latest and historical PI contact details

[Return to the World Map](#) | [Switch to Version 3 Inversion](#)

Operational Time at 'Warsaw_UW' Site
 1561 Days [4.277 Years]
 Start Date: 23-NOV-2017; Latest Date: 17-APR-2023

Total Processed Data [Years represent total data equivalent]
 Level 1.0 AOD: 1048 Days [2.871 Years]
 Level 1.5 AOD: 873 Days [2.392 Years]
 Level 2.0 AOD: 641 Days [1.756 Years]

Data Display Controls

AERONET AOD Data Product:
 AOD:
 Water Vapor:
 440-870 Angstrom:
 SDA Fine/Coarse AOD:
 SDA Fine Mode Fraction:

AOD Level (2023): Level 1.0 Level 1.5 Level 2.0

Data Format: All points Daily averages

Triplet Variability (All Points Only): Off On

Related Product Availability for Warsaw_UW (select each day below):
 Show Terra MODIS Show Aqua MODIS

SELECT CHARTS FOR LARGER IMAGES

Choose year:

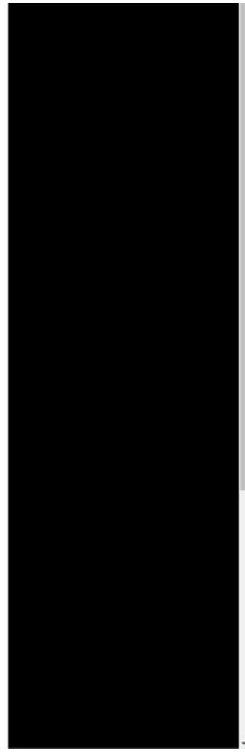
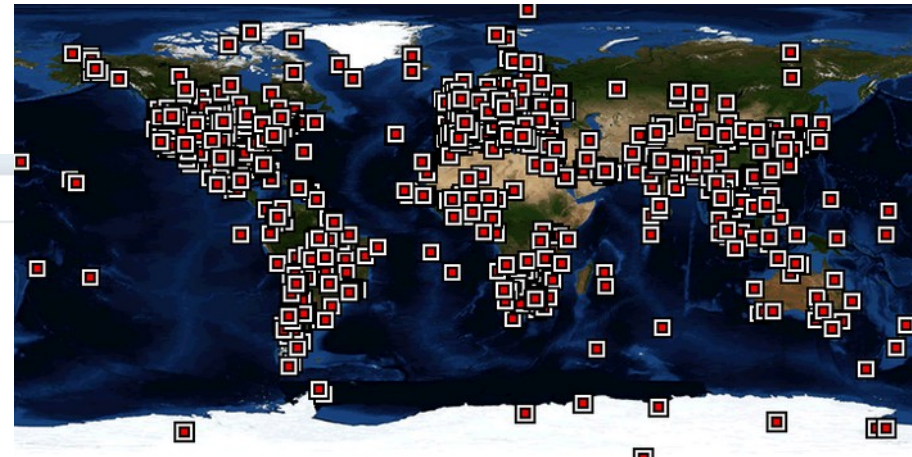
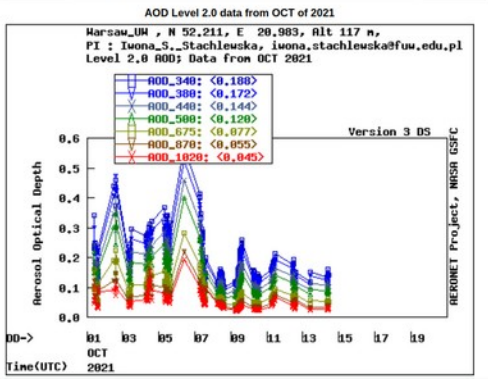
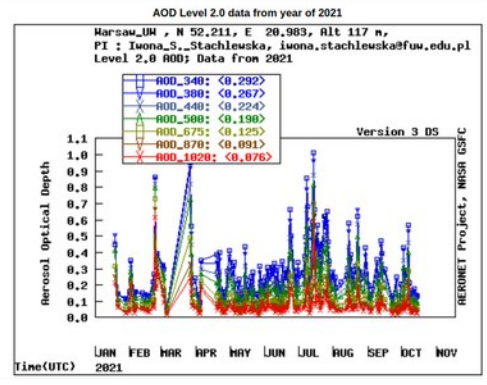
2017	2018	2019	2020	2021
JAN	FEB	MAR	APR	MAY

Choose month of 2021:

JUN	JUL	AUG	SEP	OCT
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Choose day of OCT 2021:

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31					





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Approach

EARLINET will continue to build a quantitative comprehensive statistical database of the horizontal, vertical, and temporal distribution of aerosols on a continental scale. The goal is to provide aerosol data with unbiased sampling, for important selected processes, and air-mass history, together with comprehensive analyses of these data. The objectives will be reached by operating a network distributed over most of Europe, using advanced quantitative laser remote sensing to directly measure the vertical distribution of aerosols, supported by a suite of more conventional observations.

EARLINET measurements must meet stringent stability and absolute accuracy standards to achieve the desired confidence in aerosol radiative forcing needs; thus, the network has developed a rigorous quality assurance program addressing both instrument performance and evaluation of the algorithms. These operational pillars have been developed to ensure instrument standardization and consistent lidar retrievals within the network in a standardized data exchange format. For the full harmonization of data analysis and data traceability, the EARLINET Single Calculus Chain (SCC), a tool for the automatic analysis of lidar measurements has been developed.

A major part of the measurements is performed according to a fixed schedule to provide an unbiased statistically significant data set. Additional measurements are performed to specifically address important processes that are localised either in space or time. Back-trajectories derived from operational weather prediction models are used to characterise the history of the observed air parcels, accounting explicitly for the vertical distribution.

EARLINET is a key component of the ACTRIS infrastructure, which represents a big step towards a better coordination of the atmospheric observations in Europe towards the establishment of the European component of an Integrated Atmospheric Global System as part of GEOSS, the Global Earth Observation System of Systems (GEOSS, 2005). EARLINET is also a contributing network to the GAW Programme.



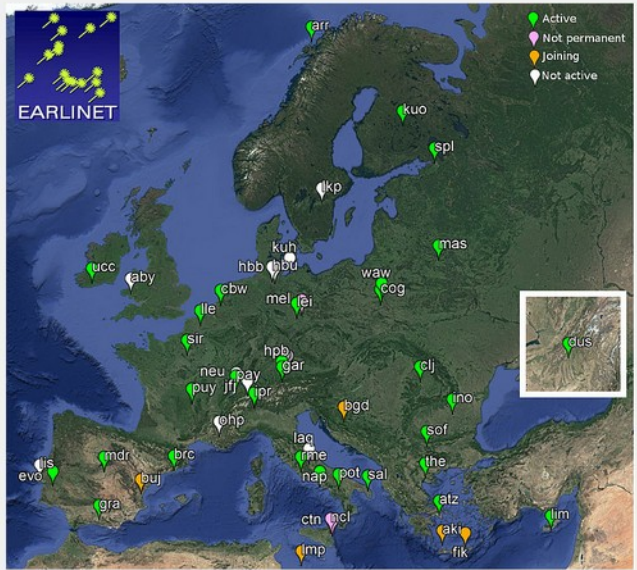
Currently, EARLINET, in the frame of ACTRIS, is supported by two different EC-projects: ACTRIS-2 (funded by the European Union – Research Infrastructure Action under the H2020 specific programme for "Integrating and opening existing national and regional research infrastructures of European interest" under Grant Agreement n°654109 (1 May 2015 - 1 May 2019) and ACTRIS Preparatory Phase Project (PPP) (a EU Horizon 2020 Coordination and Support Action (grant agreement No 739530, started on 1 January 2017 for a period of 3 years)). The former revolves around the on-going research, coordinating efforts of partner organisations and producing observations and data, while the latter is a project aiming to establish a research infrastructure with its own legal entity and operational structure that will carry on the work done by ACTRIS-2.

Lidar Calibration Centre (LiCal)

In the frame of ACTRIS-2 project, the Lidar Calibration Centre (LiCal) has been created (see LiCal in ACTRIS-2). LiCal offers a wide range of services to test and calibrate lidars and ceilometers, starting from the characterization and optimization of single components, to the assessment of the whole system's performance, and training of instrument operators. LiCal is a multi-installation facility located in Romania (INOE), Germany (LMU), and Italy (CNR-IMAA).

For more information about LiCal, visit the [LiCal website](#).

At present, 31 active stations distributed over Europe are part of the network.

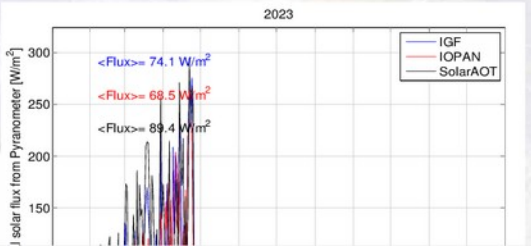
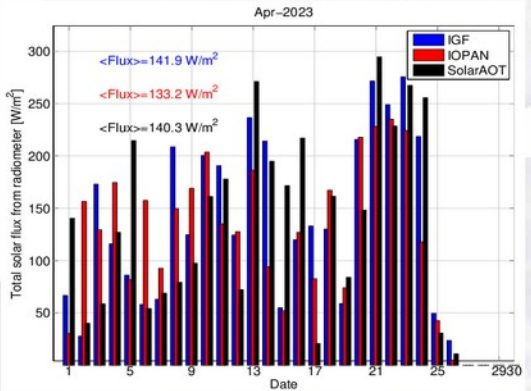
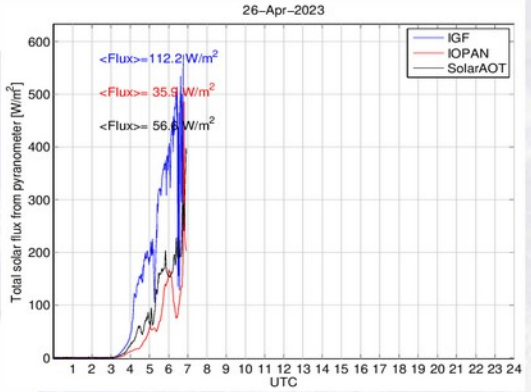


AEROZOLOWA SIĘĆ BADAWCZA POLAND-AOD

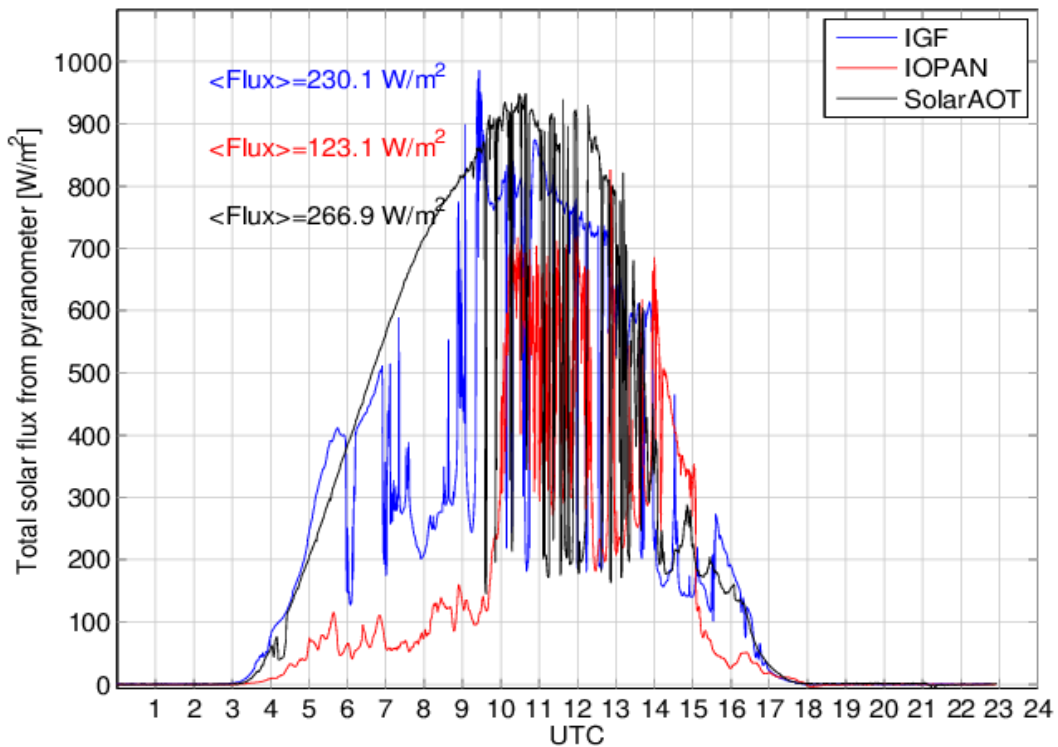
Stacje badawcze: Warszawa Sopot Strzyżów Toruń Rzecin Dąbrzyzna Wrocław Berucino Bełk Racibórz

- Sieć pomiarowa
- Konsorcjum PolandAOD
- Działalność badawcza
- Projekty badawcze
- Grant Norweski
- Przyrządy pomiarowe
- Baza Danych
- Informacje dla Mediów
- Programy komputerowe
- I Konferencja 2013 r.
- II Konferencja 2015 r.
- III Konferencja 2017 r.
- IV Konferencja 2020 r.
- Warsztaty zimowe 2016 r.
- Szkola letnia 2017 r.
- Warsztaty zimowe 2018 r.
- Warsztaty zimowe 2023 r.
- PolandAOD dla szkół
- Studia Doktoranckie
- Ogłoszenia o pracy

STATIONS: All stations | PARAMETERS: Solar Flux - pyranometer | DATA LEVEL: Lev. 1.5 | DATE: 2023-04-26 | CALENDER NAVIGATION: Wed 26 Apr 2023



24-Apr-2023



25-Apr-2023

