



Training event on Atmospheric Composition Data Exploitation Introduction Part2

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IR0000032 – ITINERIS, Italian Integrated Environmental Research Infrastructures System
(D.D. n. 130/2022 - CUP B53C22002150006) Funded by EU - Next Generation EU PNRR-
Mission 4 "Education and Research" - Component 2: "From research to business" - Investment
3.1: "Fund for the realisation of an integrated system of research and innovation infrastructures"



Training Pillars

Day #1

Day #2

Day #3

Lectures

Investigating case studies

Practical sessions

Case studies

Different case studies will be showed, but two main classes were identified as of interest for Mediterranean Region:

Forest Fires

Desert Dust

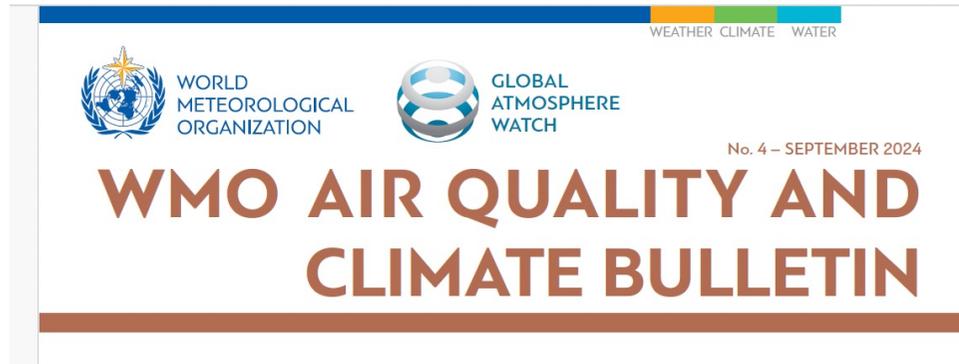
Forest Fires

The recent fires in California highlighted (if still needed) the fire hazard increase in a changing climate.



The screenshot shows the top of a website with a dark header. On the left, there is a hamburger menu icon and the text "Nonprofit & Nonpartisan News". In the center, the logo "CAL MATTERS" is displayed. On the right, there are links for "About Us", "Newsletters", a yellow "Donate" button, and a search icon. Below the header is a light gray navigation bar with links for "Politics", "Education", "Housing", "Economy", "Environment", "Inequality", "California Voices", and "Events". The main content area features a large, dramatic photograph of a firefighter in full gear, seen from behind, spraying water on a massive fire that is consuming a building. The fire is bright orange and yellow, with thick black smoke rising. Below the image, the word "EXPLAINERS" is written in small, white, uppercase letters. The main headline is "California infernos in January? Here's why wildfire season keeps getting longer and more devastating" in a large, bold, white font. At the bottom of the article preview, it says "BY JULIE CART JANUARY 8, 2025 UPDATED JANUARY 16, 2025" in small, white, uppercase letters.

Forest Fires



No. 4 – September 2024
<https://library.wmo.int/>

 ITINERIS

Key messages

- WMO Air Quality and Climate Bulletin highlights interlinkages
- Action against air pollution and climate change is win-win solution
- **Wildfire smoke harms human, ecosystem and crop health**
- **Wildfire emissions cross borders and entire continents**
- Particulate matter levels show differing regional trends

Forest Fires

Wild Fires have several impacts on human beings, ecosystem, civil infrastructures, transportation, agriculture ...

Climate change is expected to increase the **number**, the **intensity** and the **duration** of wild fires.

Among others, 2 main reasons:

- Higher temperature
- Dryer conditions



Canadian Fire – Summer 2023



- Unprecedented burning in Canada in Summer 2023

The screenshot shows a news article on The Guardian website. The article title is "Canada's 2023 wildfires released more greenhouse gases than most countries". The sub-headline reads: "Had fires been ranked alongside countries they would have been world's fourth-largest emitter, study finds". The article is dated "Thu 29 Aug 2024 16:46 CEST" and is attributed to "Reuters". A note indicates "This article is more than 4 months old". The main image shows a large plume of smoke rising from a forest fire. The text of the article states: "Wildfires that swept Canada's woodlands last year released more greenhouse gases than some of the largest emitting countries, a study found on Wednesday, calling into question national emissions budgets that rely on forests as carbon stores. At 647 megatonnes, the carbon released in last year's wildfires exceeded those of seven of the 10 largest national emitters in 2022, including Germany, Japan and Russia, the study published in the journal Nature found. Only China, India and the United States released more carbon emissions during that period, meaning that if Canada's wildfires were ranked alongside countries, they would have been the world's fourth-largest emitter." A "Most viewed" sidebar on the right lists other articles: "Trump suggests Palestinians leave Gaza and 'we just clean out' territory", "We're watching mass delusion happen: Trump's return to White House brings cascade of lies", "Donald Trump says residents of Greenland want to be part of US", and "Another convicted January 6 US Capitol attacker rejects Trump's pardon".

Desert Dust

North Africa with Sahara and Sahel is the most relevant source of mineral dust. Such particles lifted by wind can travel the Atlantic Ocean and reach American Continent.



Desert Dust

Manyfold impacts of the desert dust



The infographic is a wide horizontal banner divided into three main sections: Deserts (left, orange background), Oceans (middle, blue background), and Land (right, green background). Each section contains text boxes with lines pointing to specific elements in a background image of a dust storm. The background image shows a massive dust storm over a city, with a satellite in space, a train, and a cityscape. The text boxes describe various impacts: Haboobs, solar irradiance, cloud condensation, mechanical damage to planes, remote sensing errors, crop yields, PM exposure, dust deposition on snow, fertilisation of ecosystems, and solar panel efficiency. At the bottom, there are three columns of text corresponding to the sections: Deserts (Weather, climate and ecosystems; Aviation and ground transportation; Solar energy), Oceans (Weather, climate and ecosystems; Aviation; Fisheries), and Land (Weather, climate and ecosystems; Agriculture; Solar energy; Astrophysics and teledetection; Health and air quality; Aviation).

Haboobs are extreme and short-lived sand and dust storms caused by strong winds resulting in a "wall of dust" that occur fairly regularly in isolated desert regions

Dust interferes with the incoming solar irradiance which has a direct consequence in solar energy production

Extreme events affect infrastructures by abrasion, and visibility reduction increases artificial lighting and electricity consumption

Visibility reduction can close airports, disrupt ground transport services and cause traffic accidents

Dust can contribute to cloud condensation and ice nucleation, affecting cloud formation and consequently altering precipitation patterns

Dust can cause mechanical damages in planes during flight

Dust introduces errors in remote sensing measurements from telescopes and satellites

Sand and dust storms have negative impacts on agriculture: reducing crop yields by affecting seedlings, causing loss of plant tissue, reducing photosynthetic activity and increasing soil erosion

Exposure to moderate levels of particulate matter (PM) can cause respiratory and cardiovascular diseases

Dust deposition on ice and snow surfaces of Earth (the cryosphere) can reduce the amount of sunlight reflected (albedo), affecting climate

Iron and phosphorous in mineral dust favors fertilisation of marine and continental ecosystems

Dust deposition over solar panels reduces their efficiency

Deserts

Oceans

Land

Weather, climate and ecosystems
Aviation and ground transportation
Solar energy

Weather, climate and ecosystems
Aviation
Fisheries

Weather, climate and ecosystems
Agriculture
Solar energy

Astrophysics and teledetection
Health and air quality
Aviation

<https://cost-indust.eu/media-room/resources>

Desert Dust



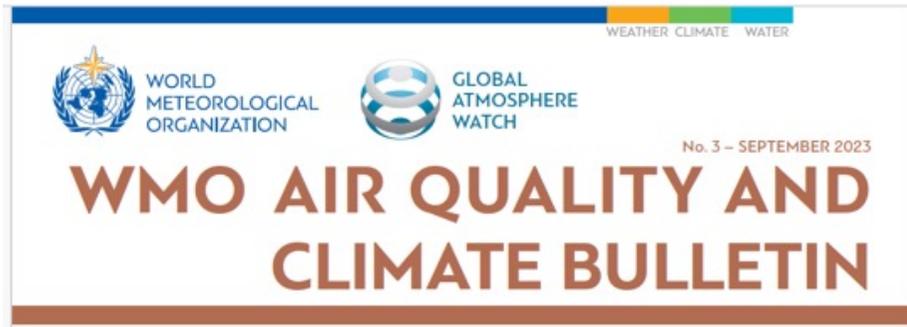
No. 8 – July 2024
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Key messages

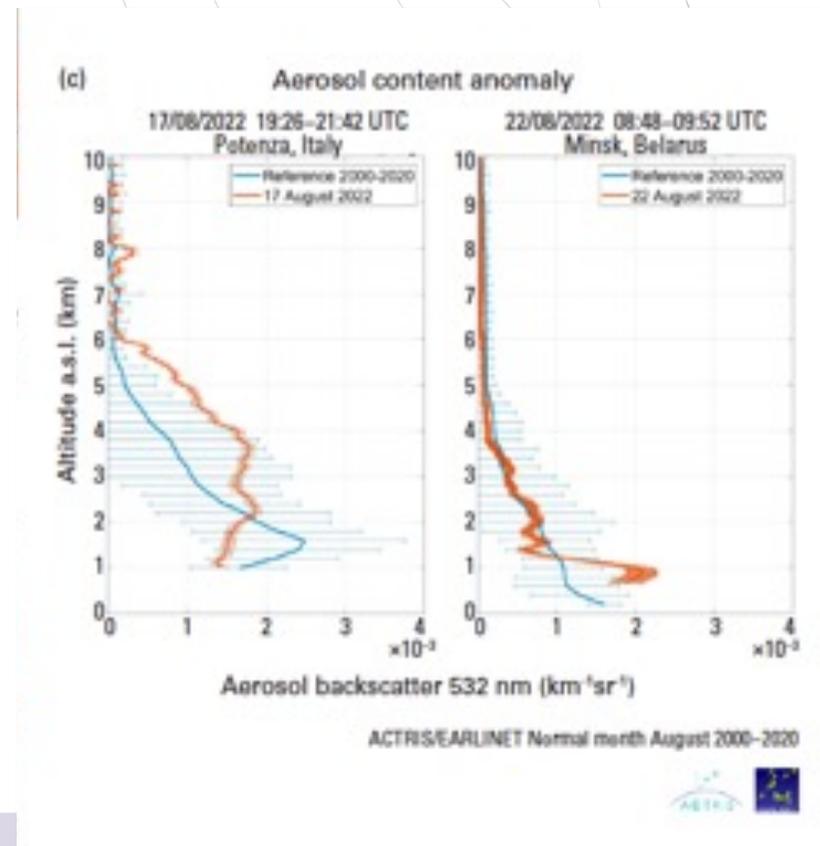
- Sand and dust storm activity in 2023 above long-term average
- Sand and dust storms have **major environmental, economic and health impacts**
- Poor land and water management aggravate the problem
- Improved monitoring and forecasting strengthens early warnings

Desert Dust



No. 3 – September 2023
<https://library.wmo.int/>

- Heat Waves in Southern Europe often associated to severe dust events
- Higher PM + higher temperature and humidity conditions pose risk for health



Desert Dust – Winter 2024

- Huge amount of dust in the sky of Europe up to Germany



A screenshot of a news article from THE LOCAL de. The article is titled "Saharan dust cloud hangs over Germany" and is categorized under "Weather". It was published on 30 Mar, 2024 CET and updated on Sat 30 Mar 2024 17:16 CET. The article includes a satellite-style map of Europe showing a large area of red and orange, indicating dust. Below the map, there is a photograph of a cityscape with a thick layer of dust in the sky. The article also features social media sharing options (Facebook, X, Email) and a "LIVE" button in the top right corner. The website's navigation menu includes "NEWS", "PODCAST", "ESSENTIALS", "LEARN ABOUT GERMANY", "HOMES", "JOBS", and "LOCAL DIRECTORY".

Methane leakage

- Keeping an eye on our gaseous environment can support spotting no natural anomalies

A screenshot of a news article from The Telegraph. The article title is "Putin accused of sabotage over Nord Stream gas pipeline explosions". The sub-headline reads "Ships warned to stay away from five-mile exclusion zone around Nord Stream 1 and 2 pipelines on bed of the Baltic Sea". The author is James Crisp, Europe Editor, with Rachel Millard and Joe Barnes as Brussels correspondents. The article is dated 27 September 2022 at 10:00pm BST. A video player is embedded in the article, showing a satellite view of the ocean with a play button in the center. The video title is "Nord Stream pipelines suffers 3 gas leaks in one day". The article has 691 comments and a "Gift this article free" button. The Telegraph logo and navigation menu are visible at the top of the page.

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Putin accused of sabotage over Nord Stream gas pipeline explosions

Ships warned to stay away from five-mile exclusion zone around Nord Stream 1 and 2 pipelines on bed of the Baltic Sea

James Crisp Europe Editor.
Rachel Millard, Joe Barnes
BRUSSELS CORRESPONDENT

Related Topics
Nord Stream 2, Russia-Ukraine war, Germany, Denmark, Sweden, Europe

27 September 2022 10:00pm BST

691

Gift this article free

Nord Stream pipelines suffers 3 gas leaks in one day

TO CONTINUE...

Training Pillars

Day #1

Intro

**Ground based
data
ACTRIS &
ICOS**

Day #2

**Models
data
WMO &
Copernicus**

Day #3

**Satellite
data
ESA &
EUMETSAT**



THANKS!

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