Volcanic Eruptions and Dust

Successes and challenges in EO-base visualizations

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Volcanic Eruptions –
can tell their own story!

Copernicus + other data gives easy access to volcano imagery.

Online vis tools are a great starting point:

https://apps.sentinel-hub.com/eo-browser/

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

https://rammb-slider.cira.colostate.edu/

Data: Brockmann Consult / Copernicus

Copernicus Earth Observation
Data Visualisation Workshop Series
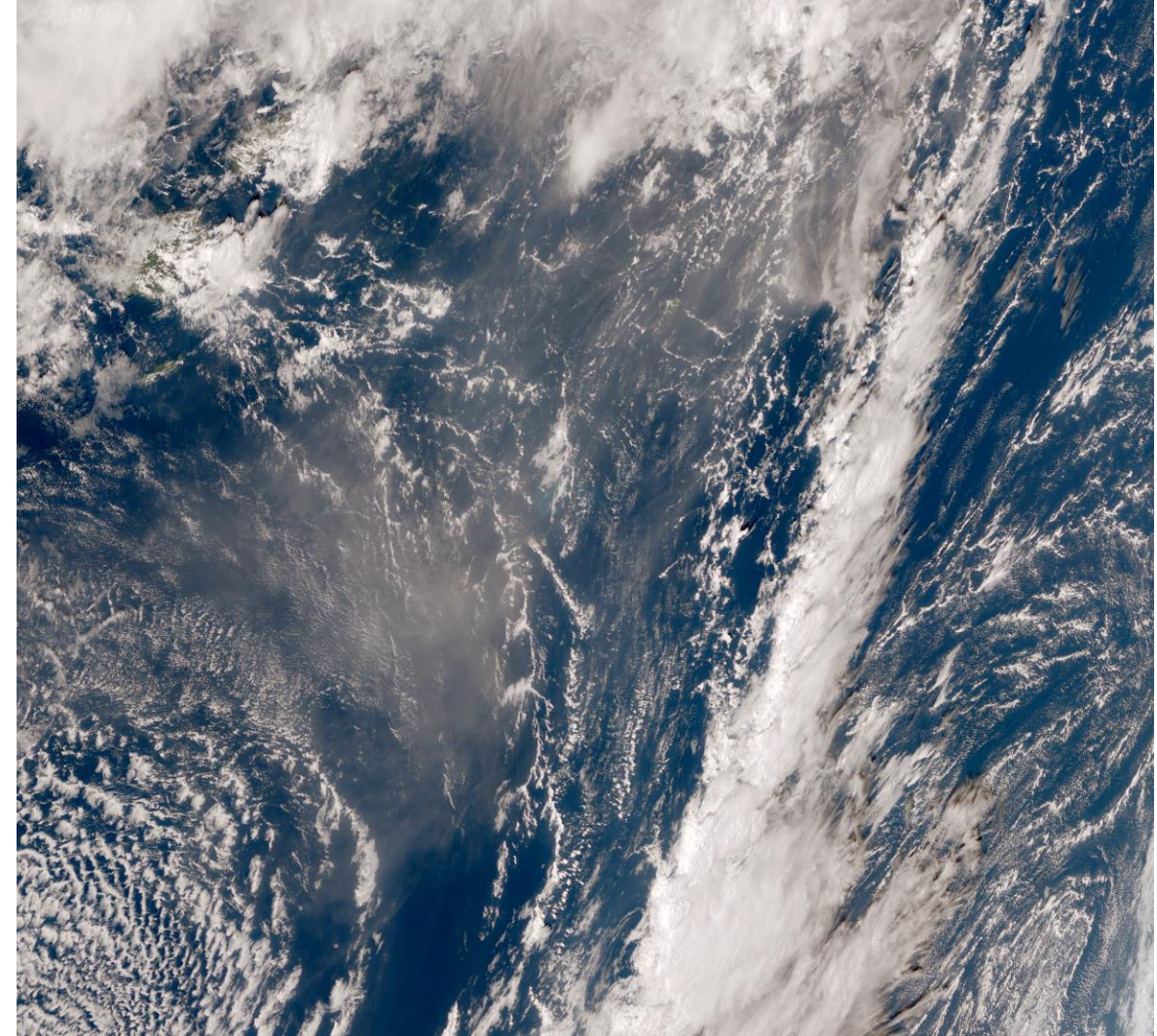
Air Quality & Wildfires

*Volcanic Eruptions –
can tell their own story!*

Hunga Tonga–Hunga Ha'apai in Jan 2022

Tallest eruption ever recorded, felt globally.

Satellite data highlights scale

Data: Japan Meteorological Agency

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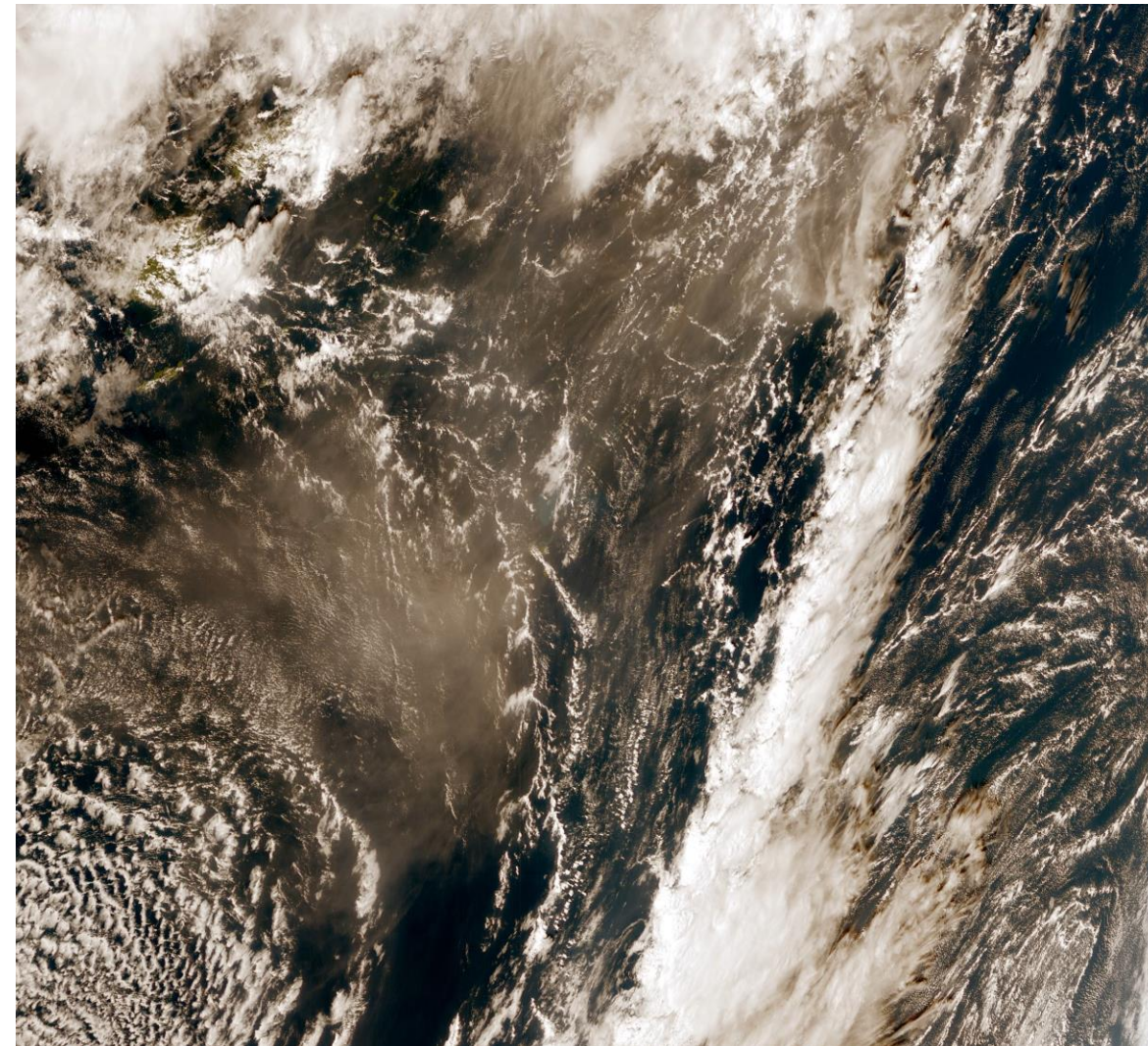
*Volcanic Eruptions –
Hidden insights*

Can combine day and night images

Highlights unseen events

Worth experimenting with combinations

Data: Japan Meteorological Agency

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Volcanic Eruptions –
Examining Detail

Copernicus Sentinel-2 and -3 allow local detail of eruptions.

Combining visible and infrared data highlights lava flows.
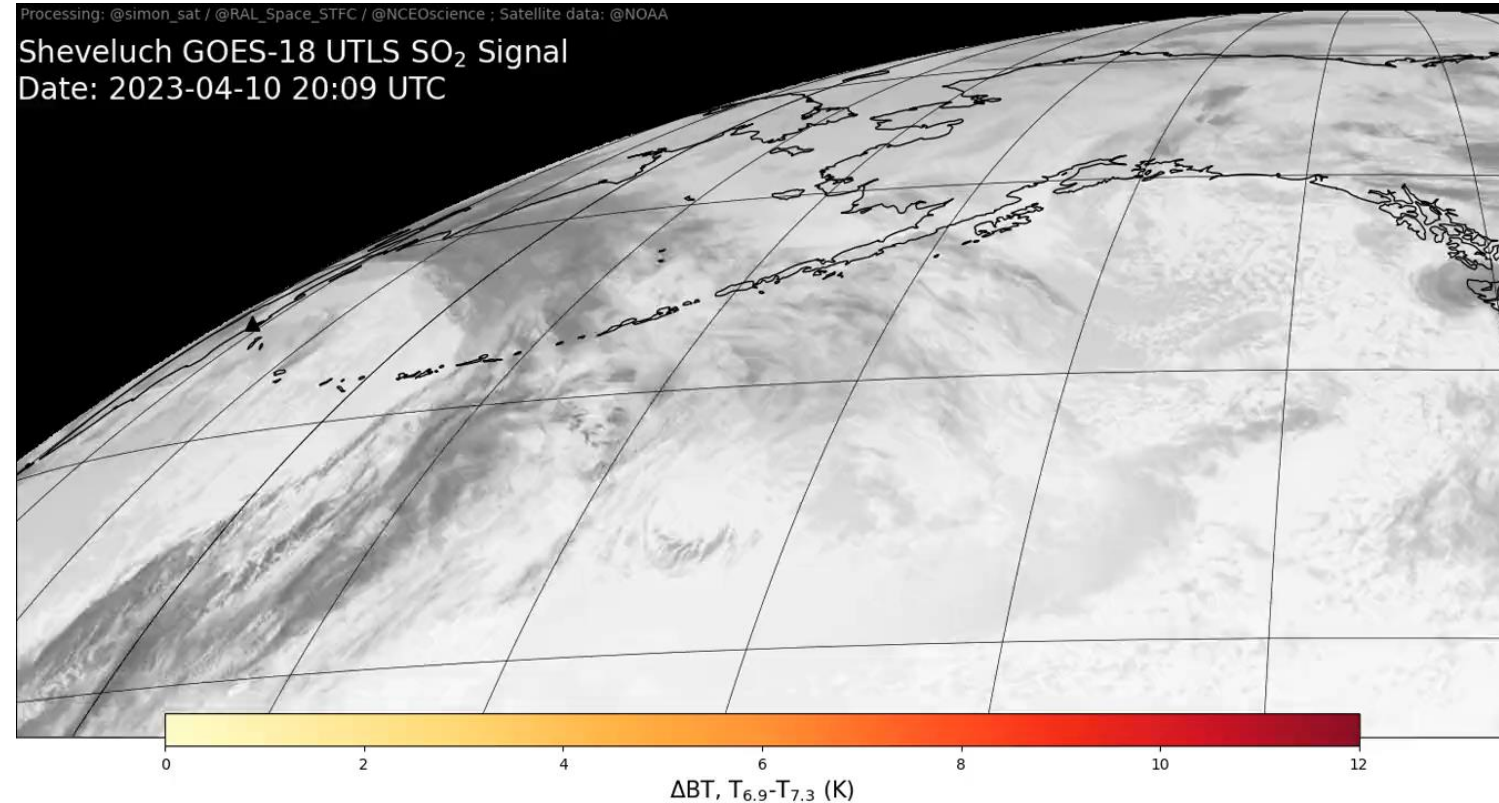
#EOData4Storytelling

Data: Copernicus Sentinel Data (2021) and ESA

Volcanic Eruptions – Visualising gases

Some important features of eruptions can't be seen with reflected sunlight.

Sulphur dioxide becomes obvious using infrared images.

Sheveluch GOES-18 UTLS SO$_2$ Signal
Date: 2023-04-10 20:09 UTC
Processing: @simon_sat / @RAL_Space_STFC / @NCEOscience ; Satellite data: @NOAA

ΔBT, T$_{6.9}$-T$_{7.3}$ (K)

Data: National Oceanic and Atmospheric Administration

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Dust storms

Can be very challenging to visualise clearly…but sometimes it's easy!

Dust causes a lot of health problems – how can we effectively highlight its presence?

Data: NASA

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Dust storms - Iraq

An example: Dust in Middle East, 16th May 2022

- Very poor air quality.

- Flights cancelled.

- Respiratory problems.

- Road safety issues.

Pic: Reuters

Copernicus Earth Observation
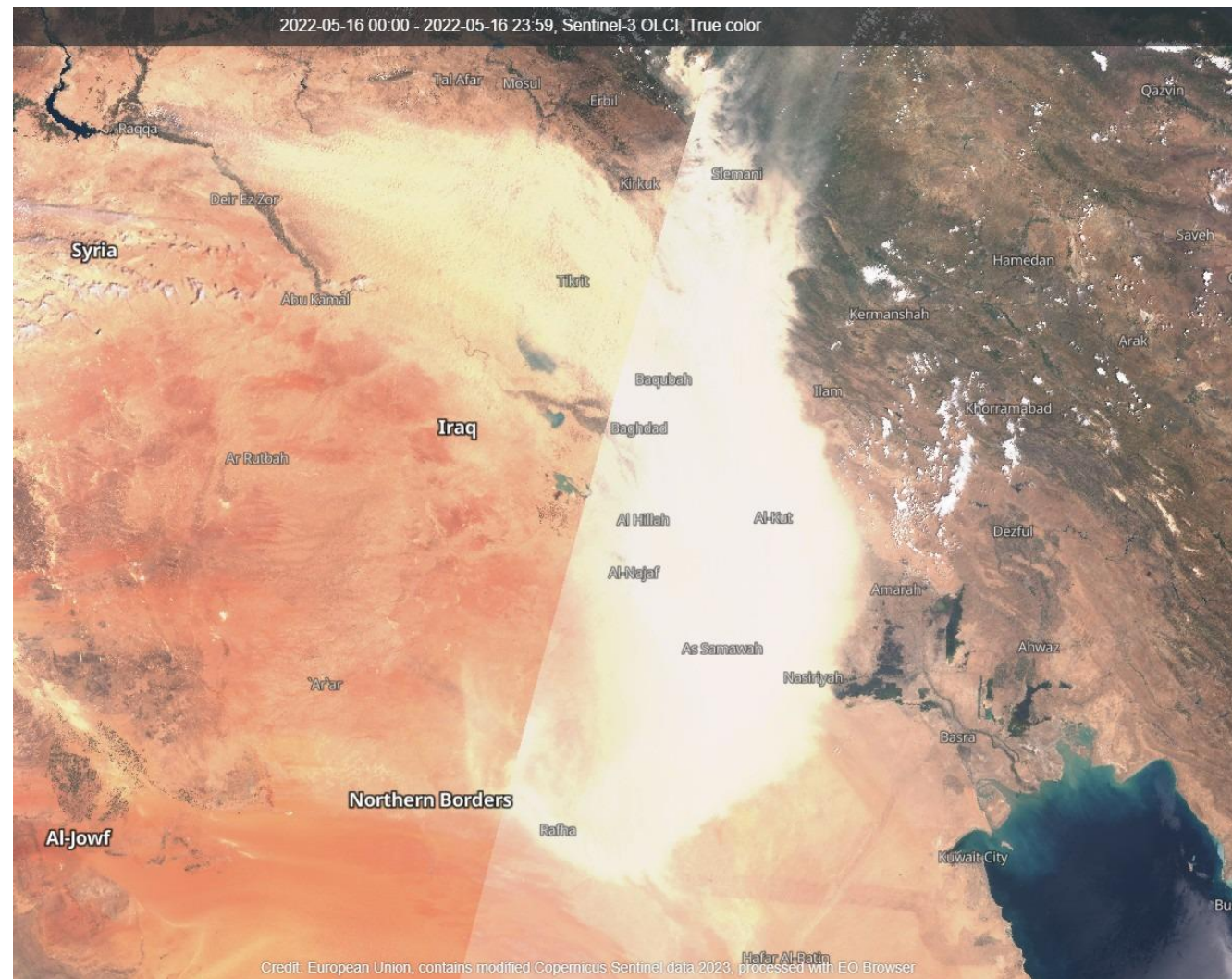Data Visualisation Workshop Series

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Dust storms - Iraq

An example: Dust in Middle East, 16th May 2022

But – hard to nicely visualise with EO data.

Data: Copernicus Sentinel-3 (from Sentinel-Hub)

Copernicus Earth Observation
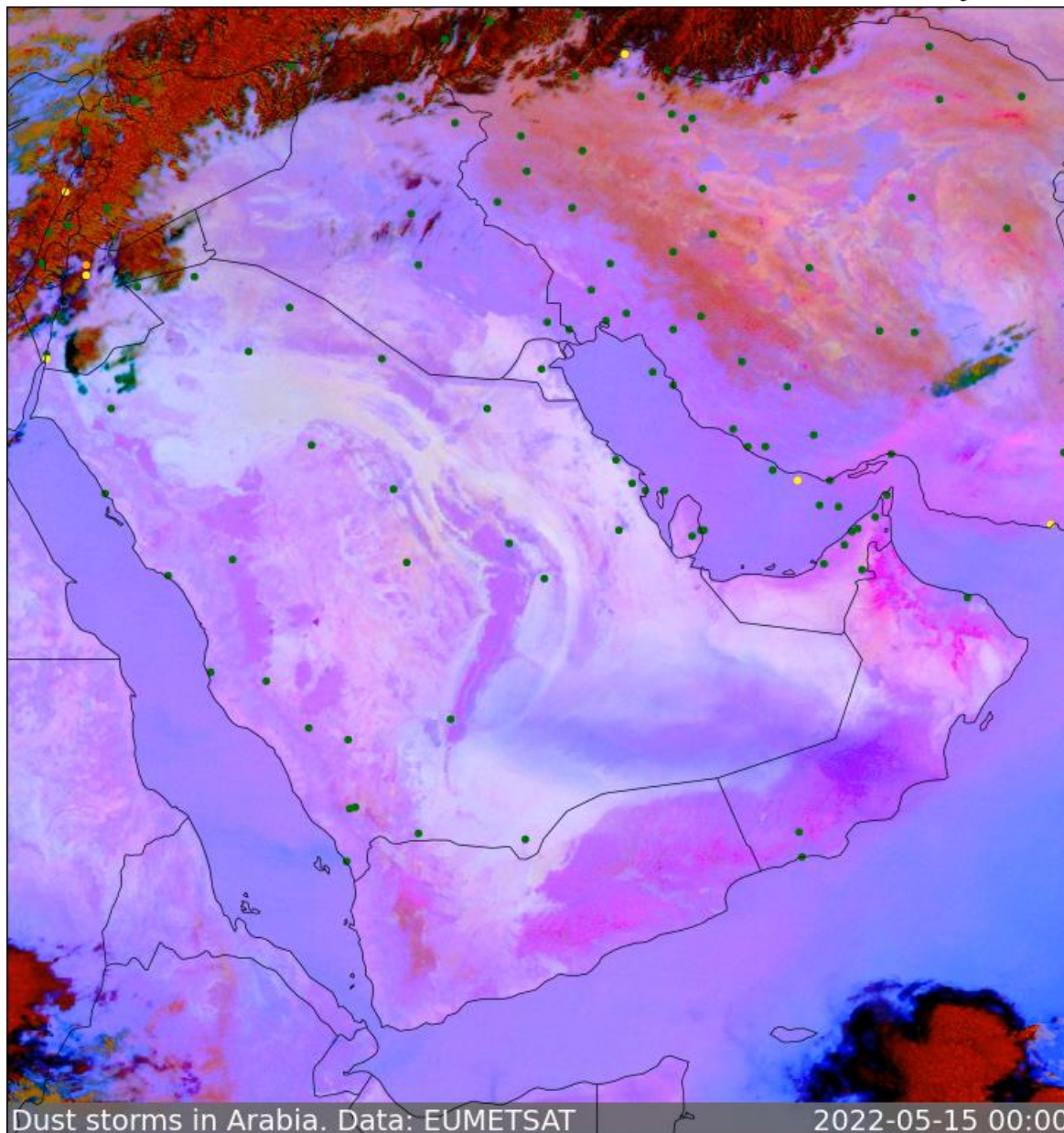Data Visualisation Workshop Series
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Dust storms - Iraq

An example: Dust in Middle East, 16th May 2022

Combining EO and other information can help a lot.

Images: Meteosat 'dust rgb'

Circles: Airport visibility data

Credit: European Union, contains modified Copernicus Sentinel data 2023, processed with EO Browser
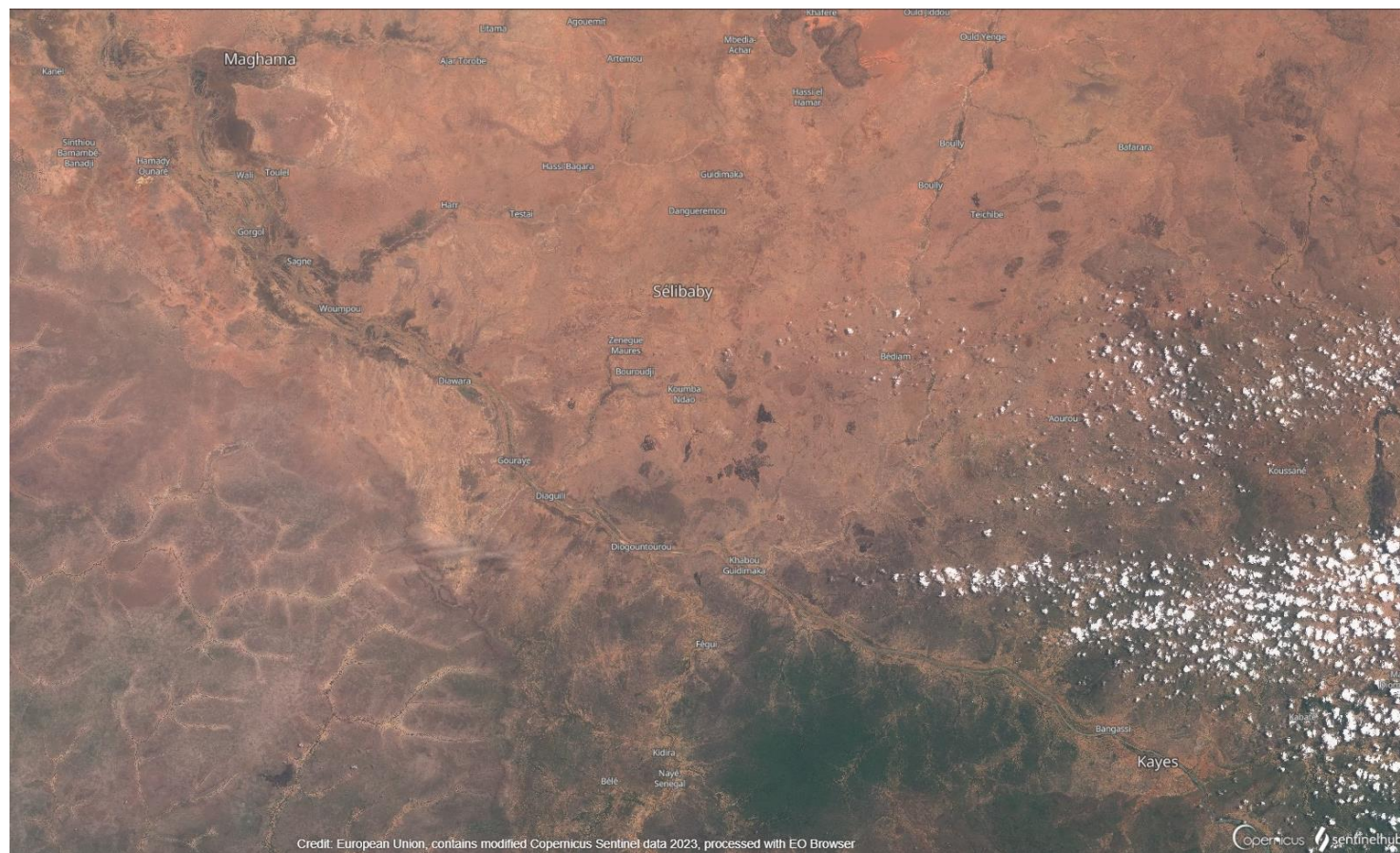
Dust storms - Detail

Sentinel satellites help with local view.

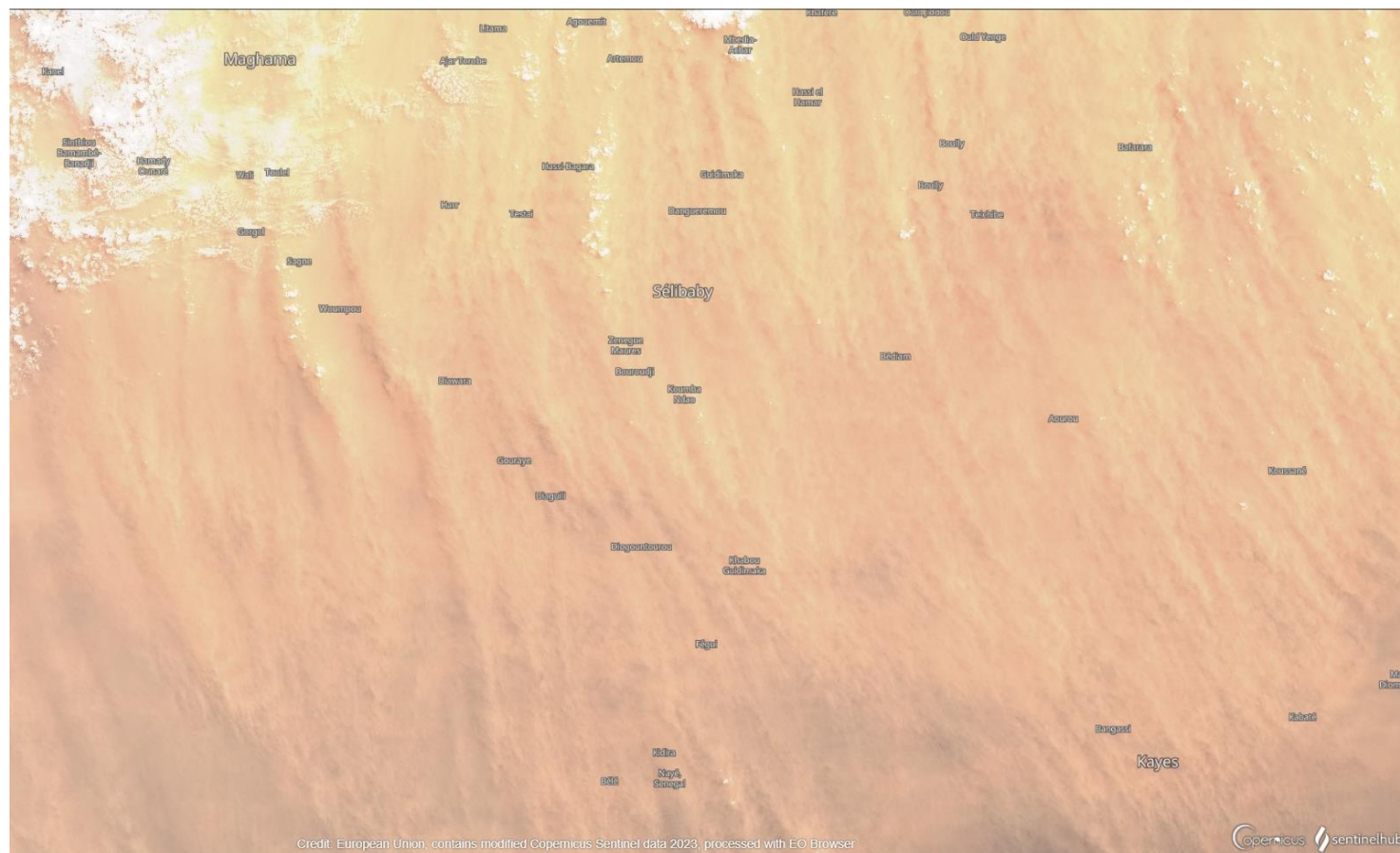In some cases, can provide excellent example of the severity of dust storms.

Here: West Africa July 2021

Data: Copernicus Sentinel-3

Copernicus Earth Observation
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Air Quality & Wildfires

Credit: European Union, contains modified Copernicus Sentinel data 2023, processed with EO Browser

Dust storms - Detail

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Concluding thoughts:

Don't stick to visible (sunlight) data like true color. Try infrared.

Combining EO and other data can improve the story.

Experiment with different satellites and image types.

Geostationary weather sats can enable stunning animations.

EO community very open – can always ask for help or advice.

🐦 @simon_sat

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