

NO_x long-term measurements at SIRTa station (Paris region, France)

Nicolas Bonnaire¹, Lorna Foliot¹, Valérie Gros¹, Marc-Antoine Drouin², Christophe Boitel², Aurélien Chauvigné³,

¹ Laboratoire des Sciences du Climat et de l'Environnement, LSCE, UMR CNRS-CEA-UVSQ, IPSL, Gif-sur-Yvette, France

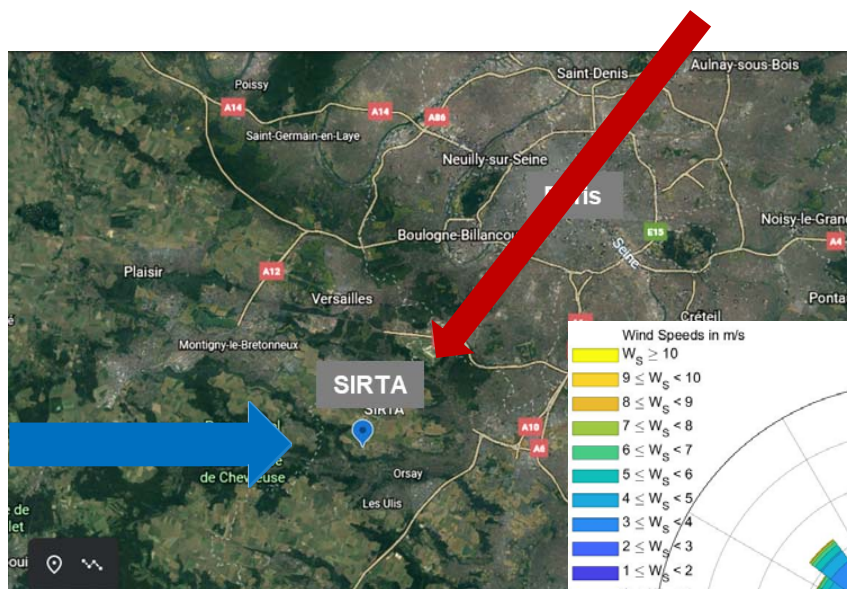
² Laboratoire de Météorologie Dynamique, LMD/IPSL, Palaiseau, France

³ Centre de Données et Services AERIS/ICARE - UAR 2877, 59650 Villeneuve d'Ascq

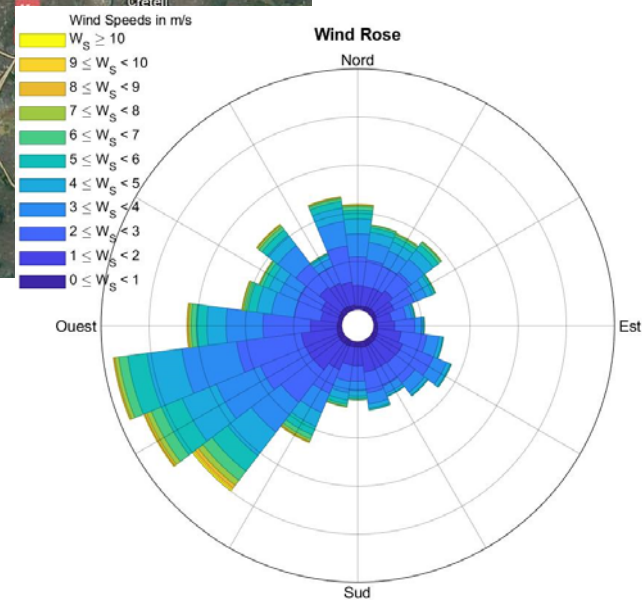
SIRTA station: peri-urban station in Paris area



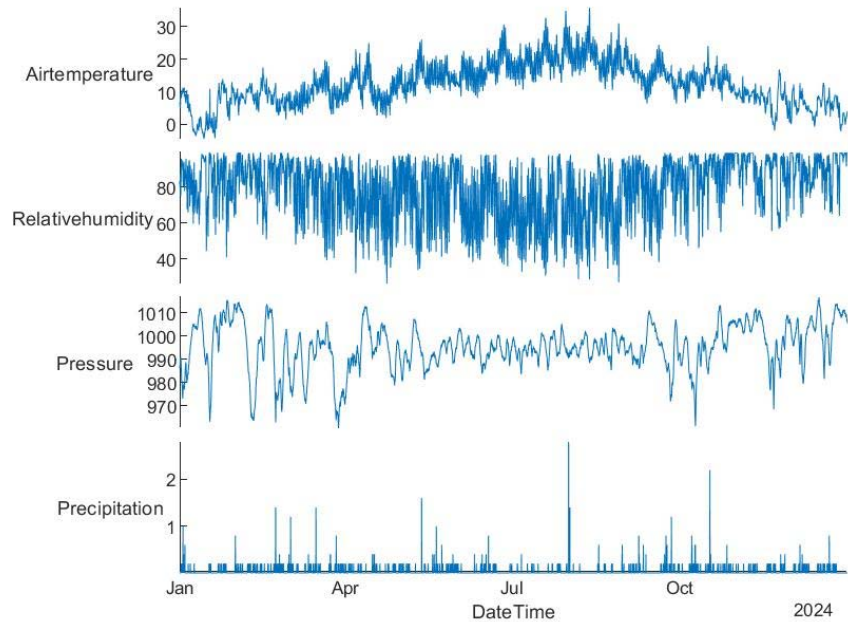
European and Paris plume



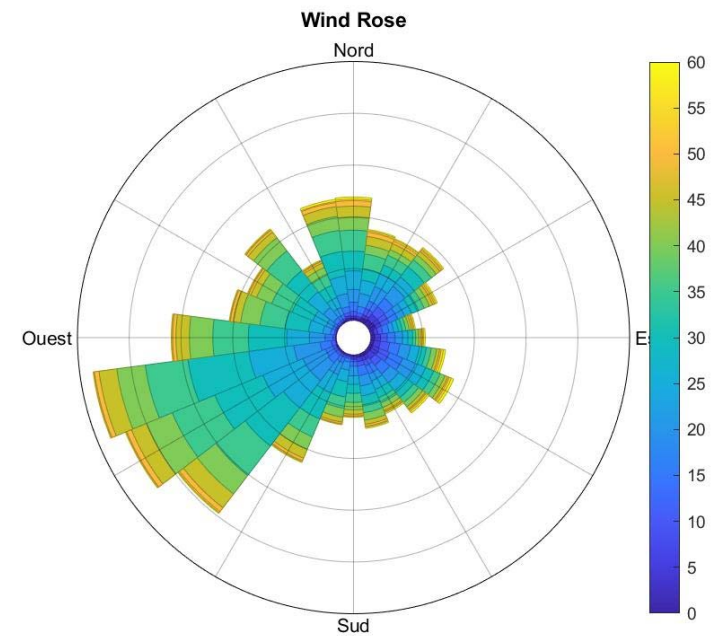
Regional background



Meteo & O3 (2024)



Ozone



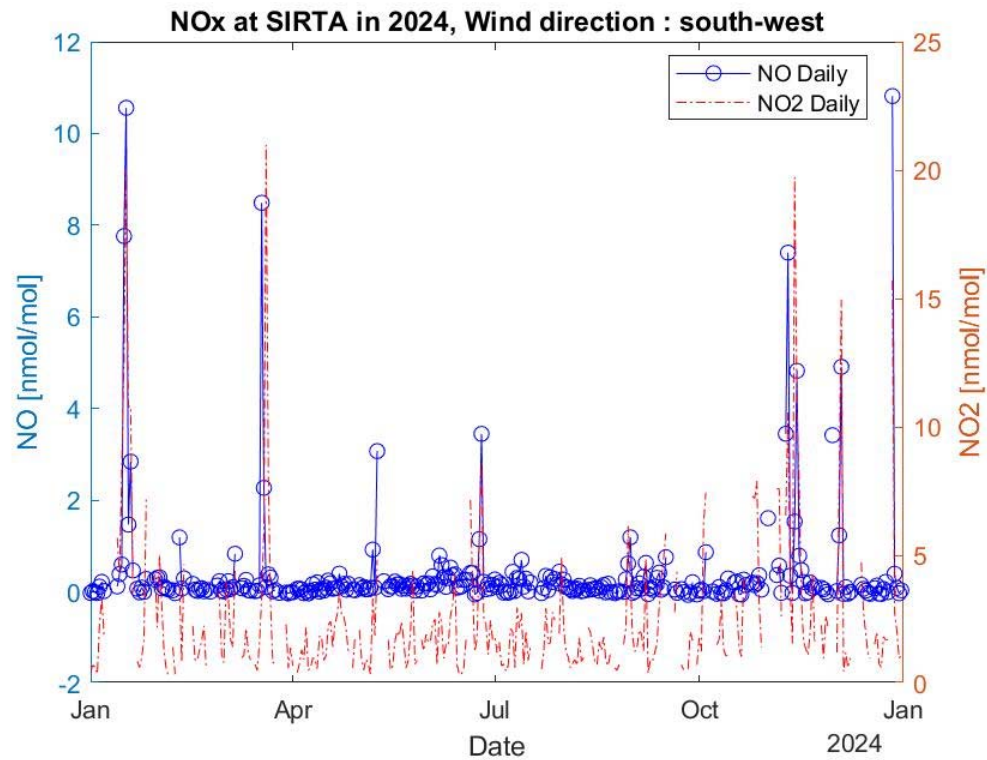
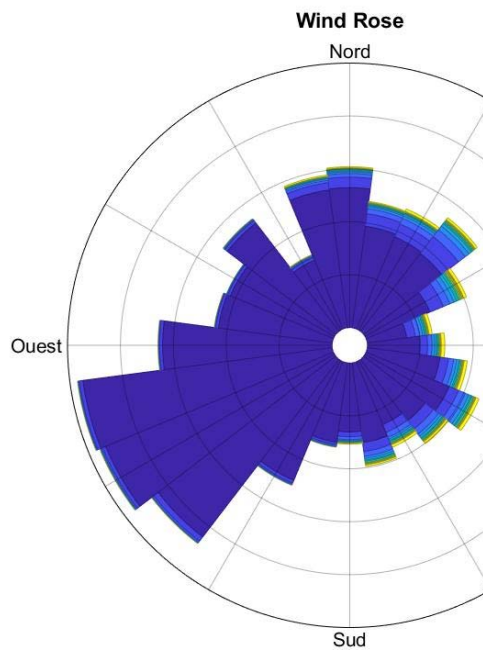
- a rainy year
- Hot year but not scorching heat events

O_3 less dependent of wind direction
 $20 \text{ ppb} < O_3 < 55 \text{ ppb}$

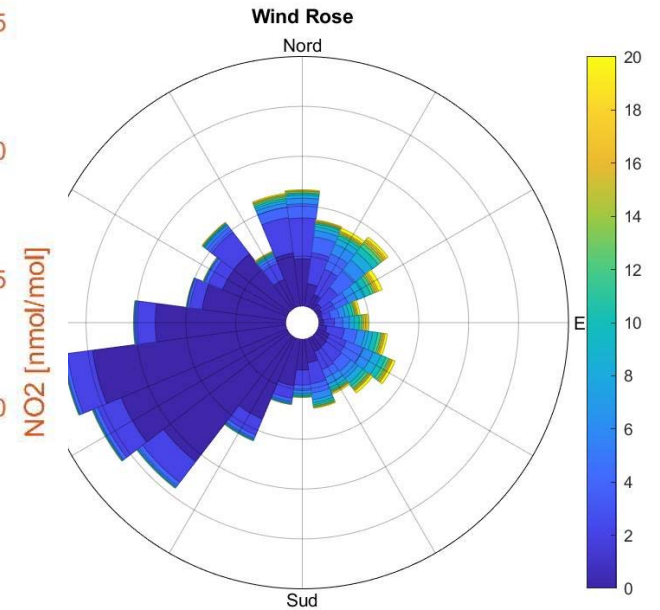
NOx Versus Wind (2024)

- Higher mixing ratio : North-East wind
- In NordEast high mixing ratio (10 ppb NO and 20 ppb NO₂)
- Most frequently wind : South-west

NO



NO₂



Instrumentation

Instrumentation :

NO & NO₂ : API TELEDYNE T200UP, NO by ozone induced chemiluminescence detection (O₃-CLD) and measurement of NO₂ by photolytic conversion of NO₂ to NO followed by chemiluminescence detection (BLC-O₃-CLD)

New device T200UP SN220 (Since February 2025), same device with a new BLC with higher efficiency (90%), in test, should replace the old instrument

maintenance / QA during measurement :

1/month : calibration with 30 ppb NO (dynamic dilution & GPT)

4/year : converter efficiency, near of 60 %

1/year linearity of analyzer

Scale : NPL # 1635, NO = 10,00 ± 0,06 ppm in N₂ (Since April 2014)

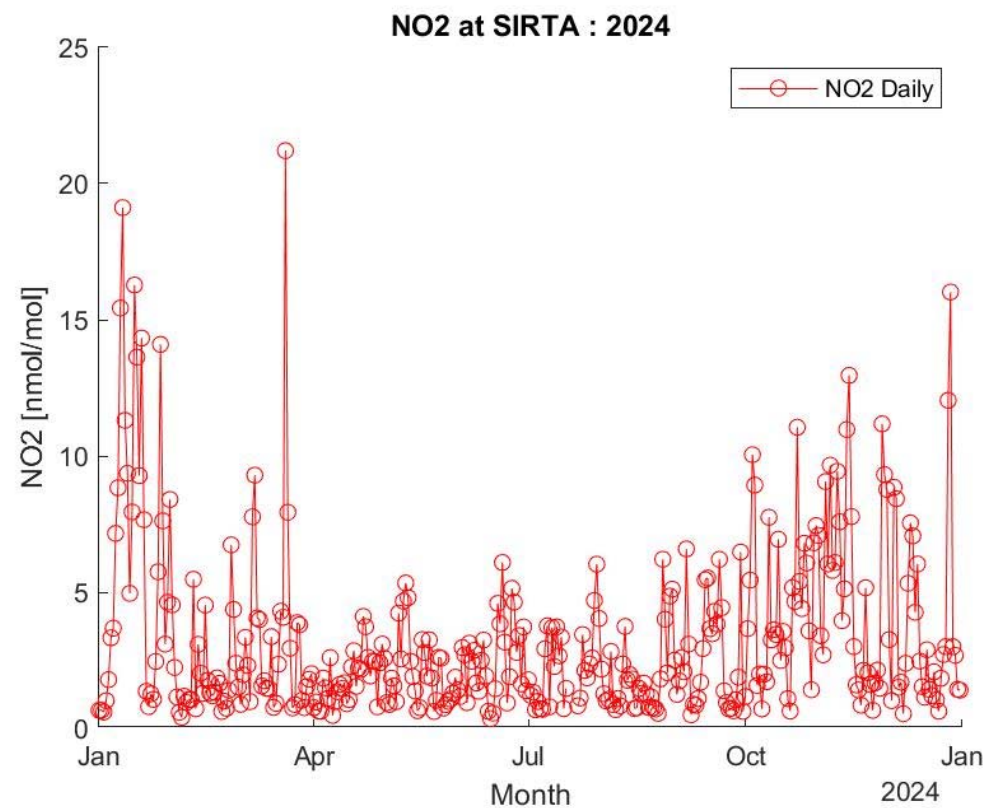
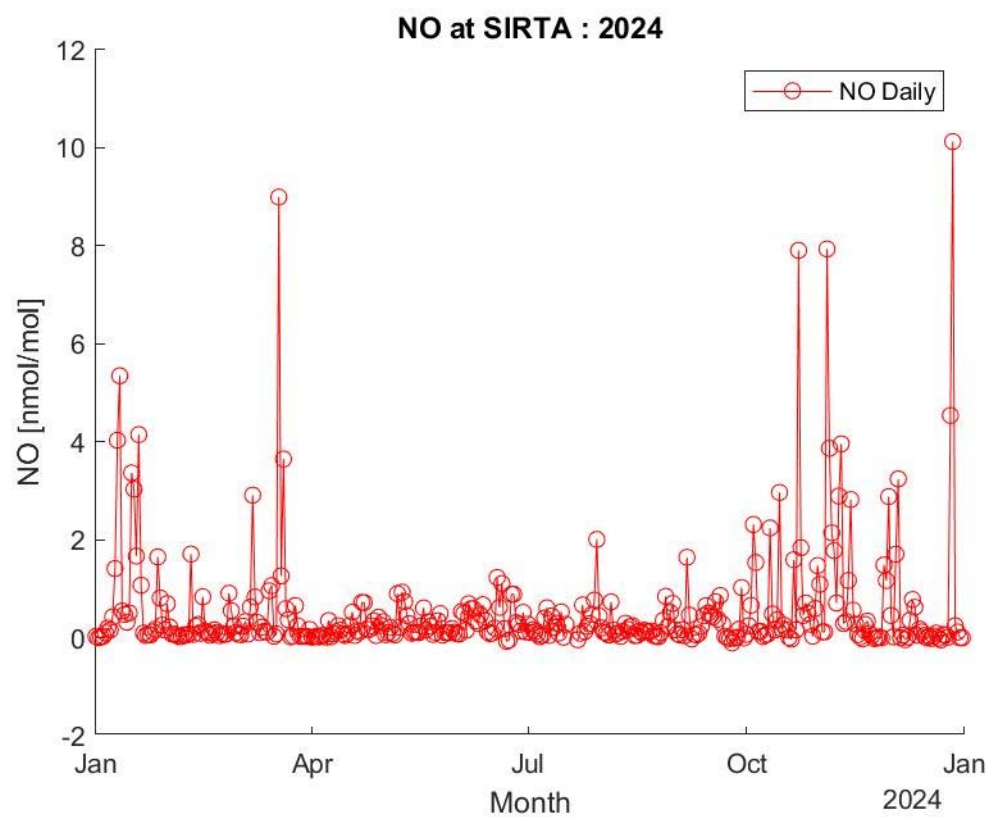
New Scale : NPL #D180541 NO = 5,00 ± 0,05 ppm in N₂ (Since September 2024)

big issue :

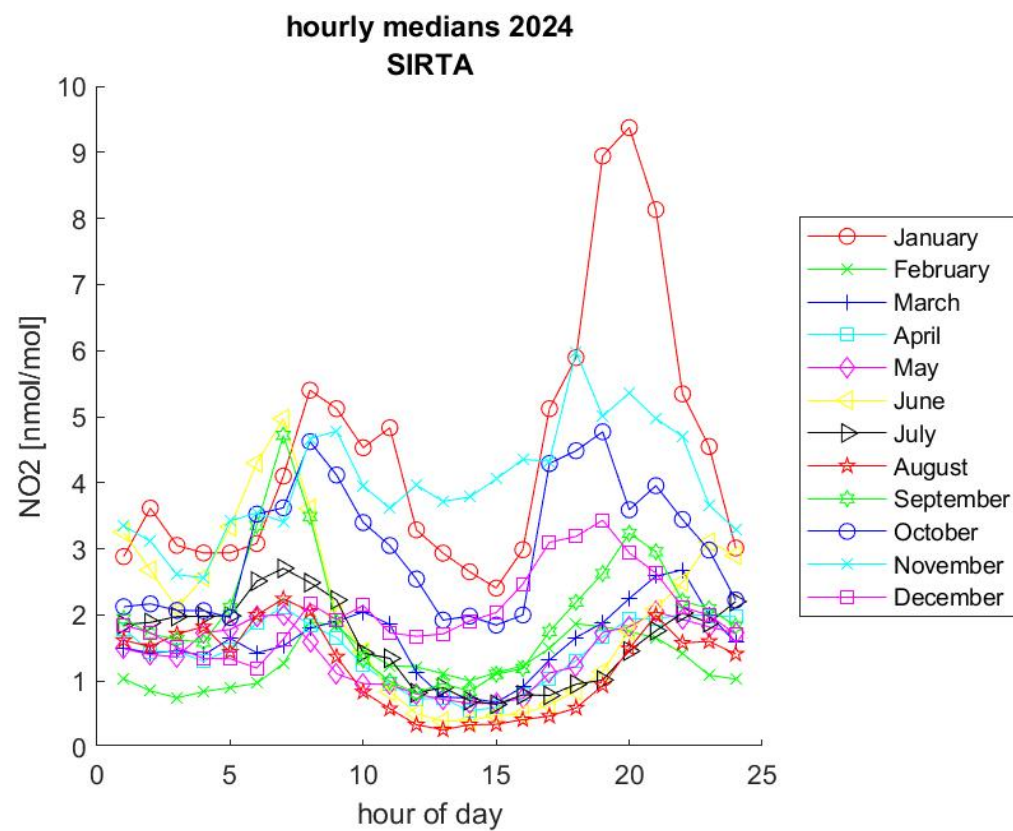
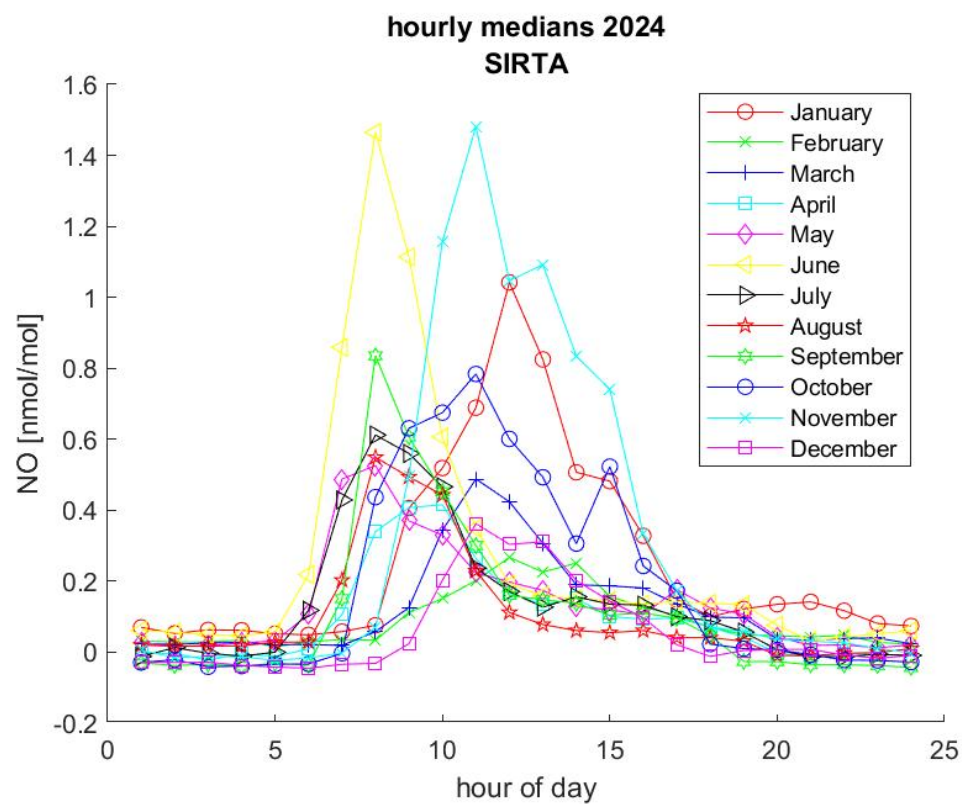
regulator breakage in October



Yearly-Plots : NO & NO₂ , 2024 (daily mean)



Daily-Plots : NO & NO₂ , 2024 (hourly medians)



2024 Data information

- Level 0a & 1a submitted
- Meteorological variables (T, P, RH and wind) are measured at Sirta Z5 (in-situ) now, since the end of 2024.
- Upgrade plan for ACTRIS labelling:
 - The new instrument should replace the historic device, as soon as we have validated the tests, hopefully within 1 or 2 months.
 - The historic NPL standard will continue to be used as the working standard, and the new standard as the primary standard.