NOx long-term measurements at SIRTA station (Paris region, France)

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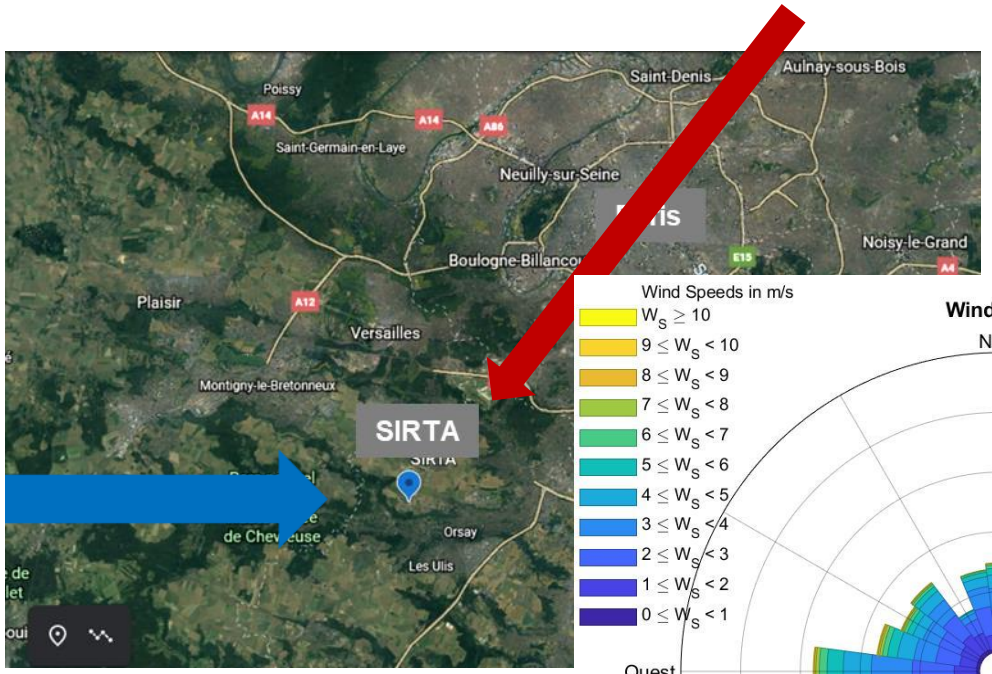
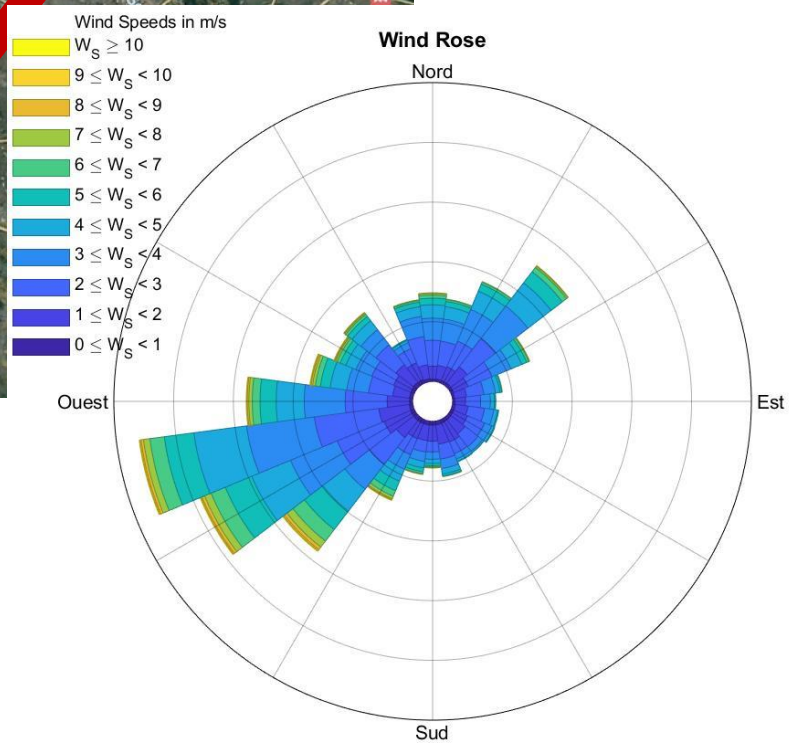
SIRTA station: peri-urban station in Paris area

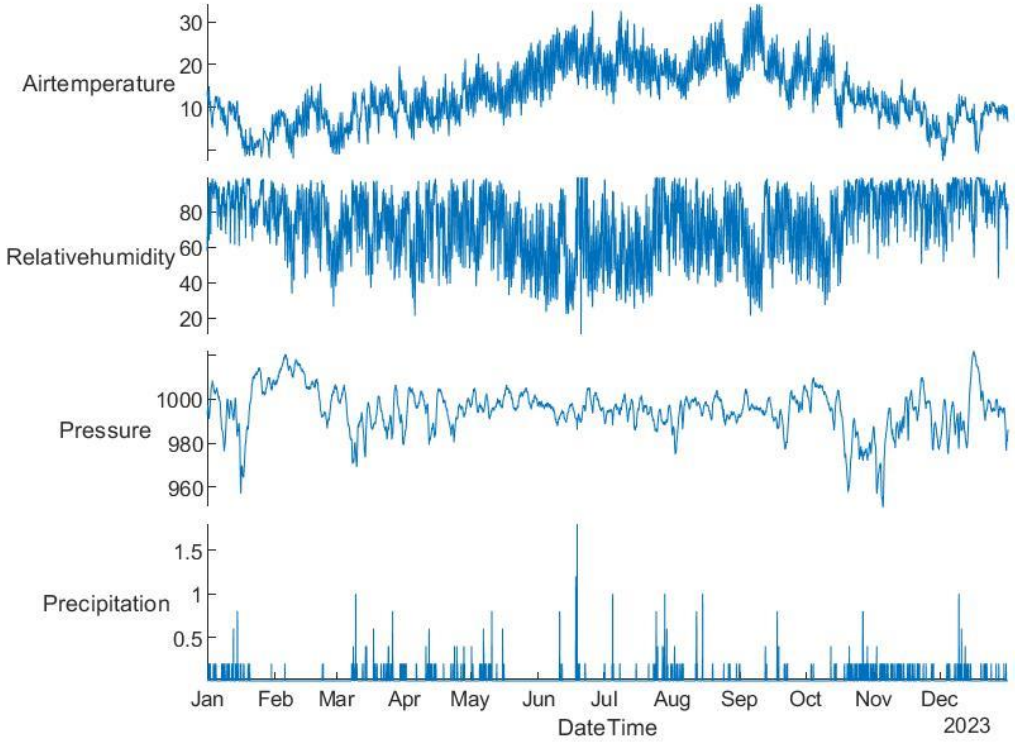
Regional background

European and Paris plume



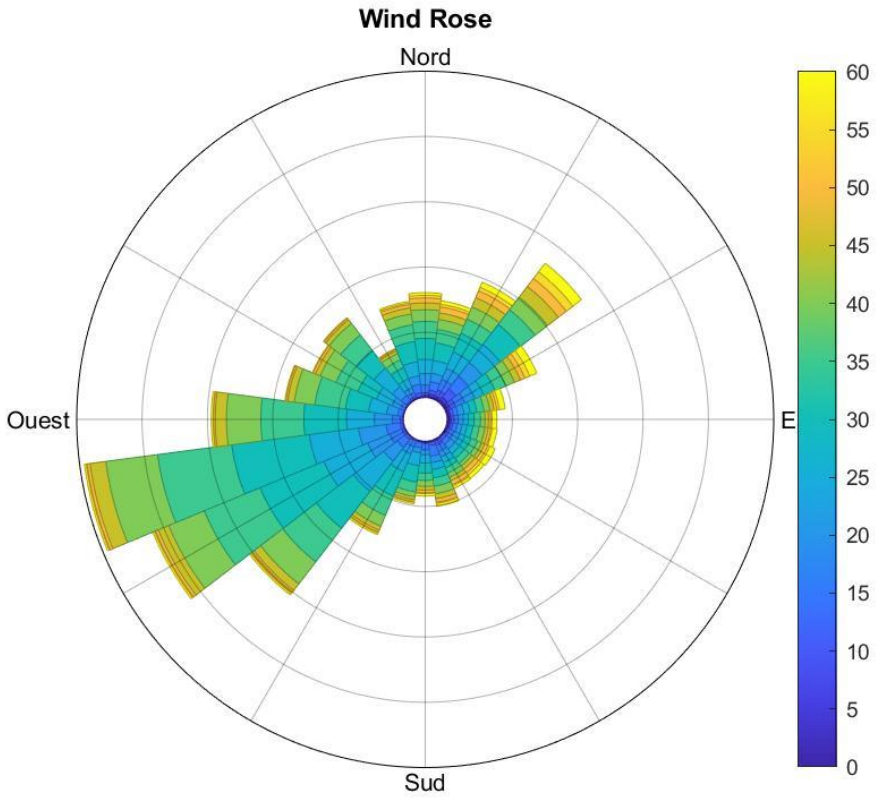


Meteo & O3 (2023)



- Dry winter
- Hot year but not scorching heat events

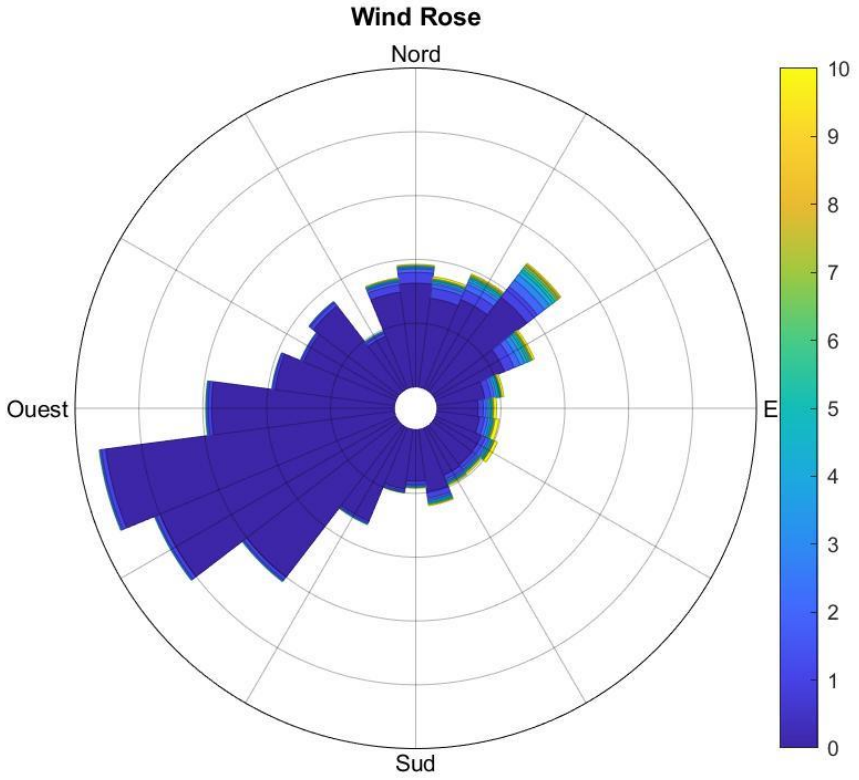
Ozone



O_3 less dependent of wind direction
20 ppb < O3 < 55 ppb

Meteo : Wind (2023)

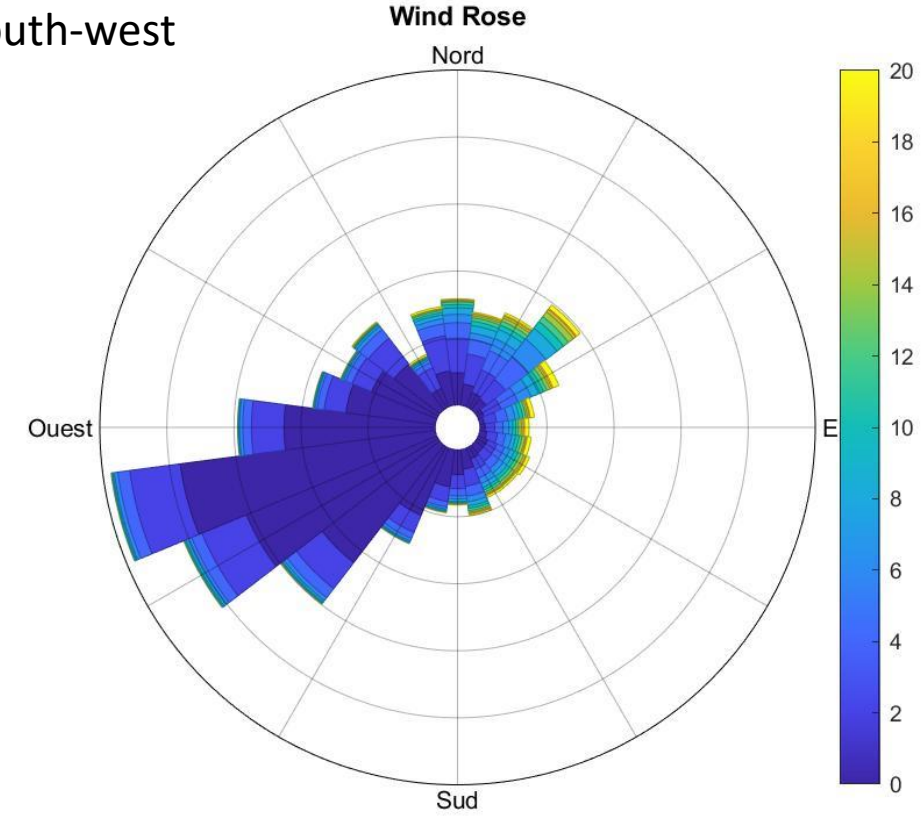
NO



- South-west : < 1 ppb
- North-East until 10 ppb

- Higher mixing ratio : North-East wind
- Most frequently wind : South-west

NO_2



- South-west : < 4 ppb
- North-East until 20 ppb

Instrumentation

Instrumentation :

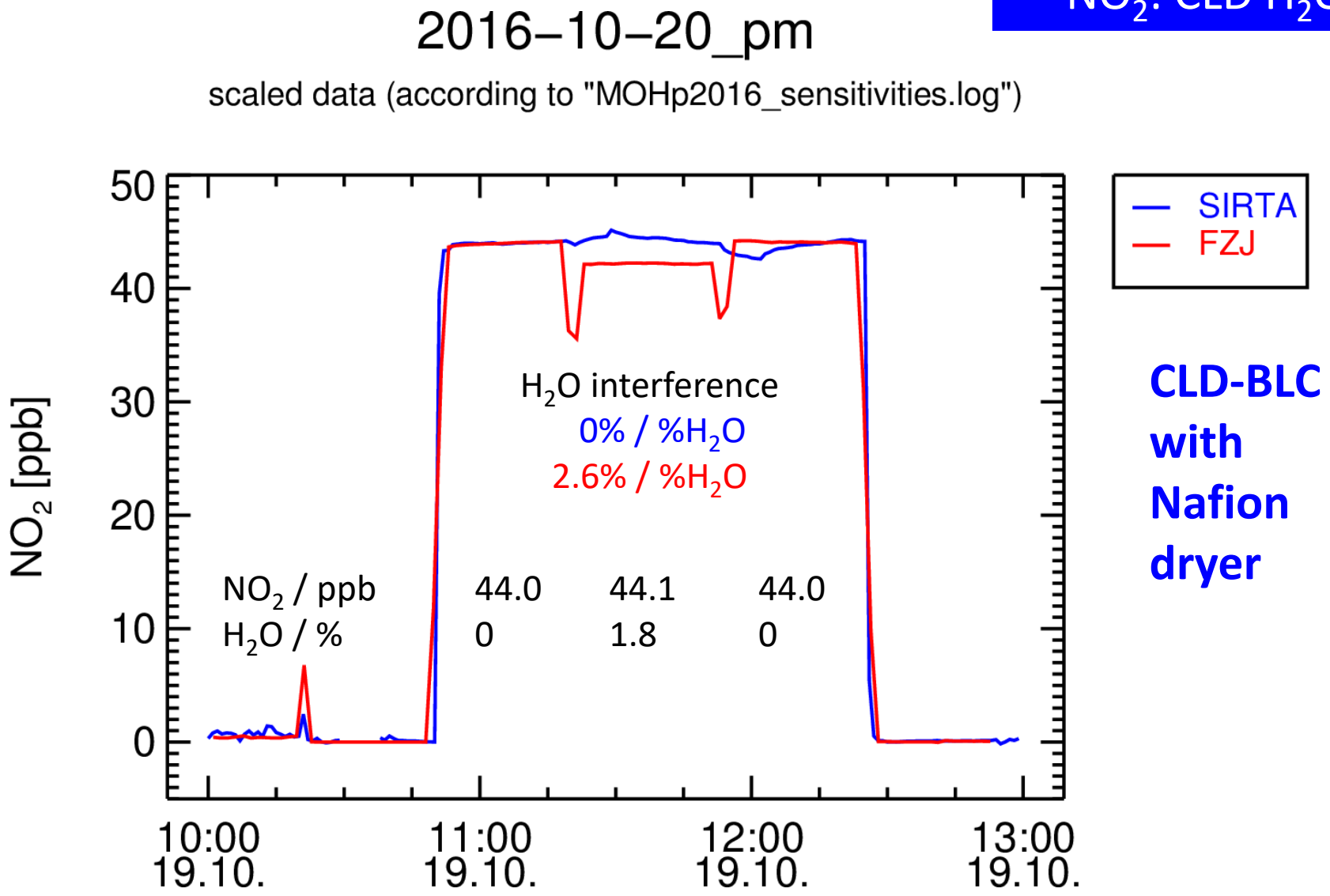
NO & NO_2 : API TELEDYNE T200UP, NO by ozone induced chemiluminescence detection (O_3-CLD) and measurement of NO_2 by photolytic conversion of NO_2 to NO followed by chemiluminescence detection (BLC-O_3-CLD)

maintenance / QA during measurement :

1/month : calibration with 30 ppb NO (dynamic dilution & GPT)
4/year : converter efficiency, near of 40 %
May 2023 : Lamp of BLC was changed and leak issue on the BLC
1/year linearity of analyzer
Scale : NPL # 1635, NO = 10,00 ± 0,06 ppm in N_2 (Since April 2014)
Every two week : filter change
Automatic download each day of parameters for Offline checks (chamber temp, pressure, flow, O_3-supply)
laboratory journal

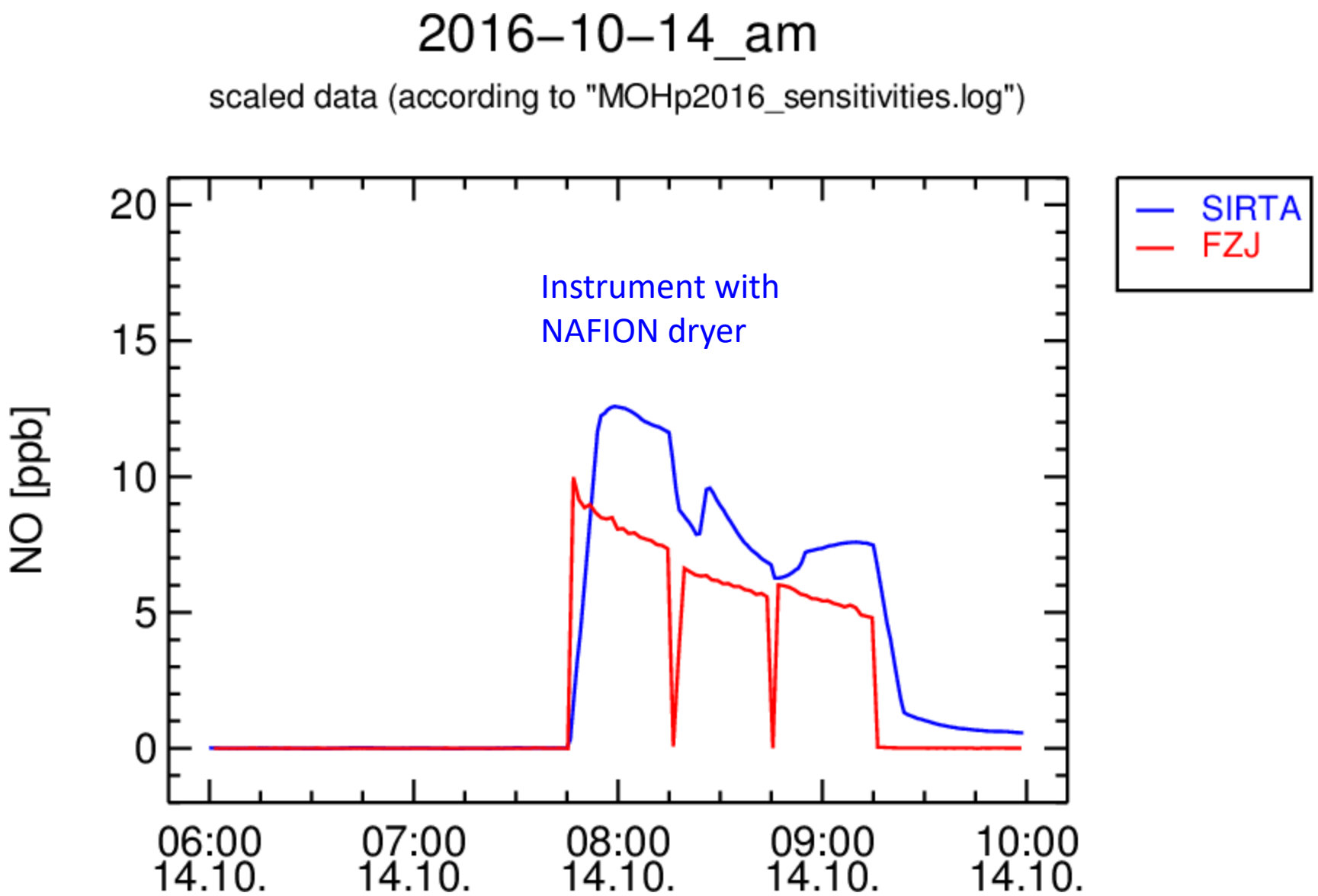
Problem : leak on the UV lamp (O_3 generator)) in the calibrator (No excess NO)

NO_2: CLD H_2O interference

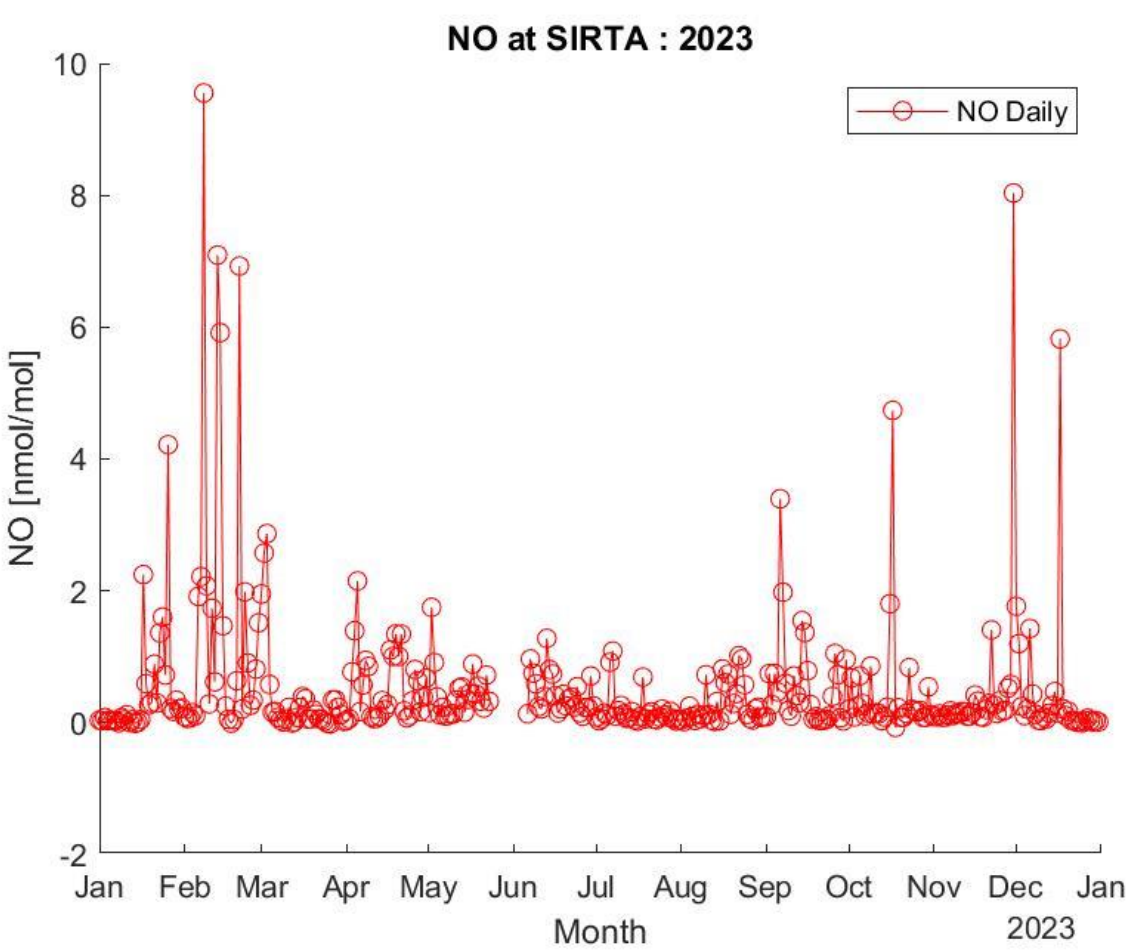


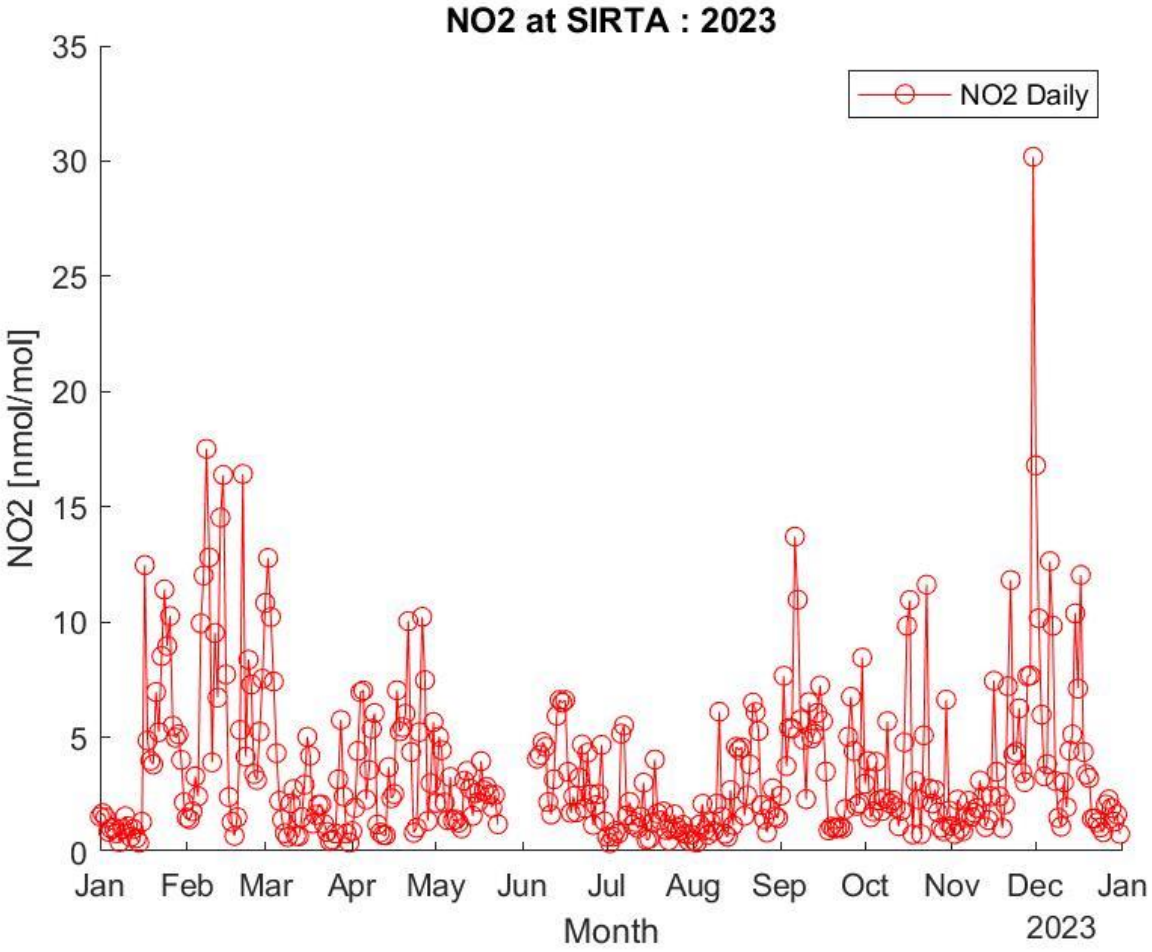
CLD-BLC with Nafion dryer

HONO interference test

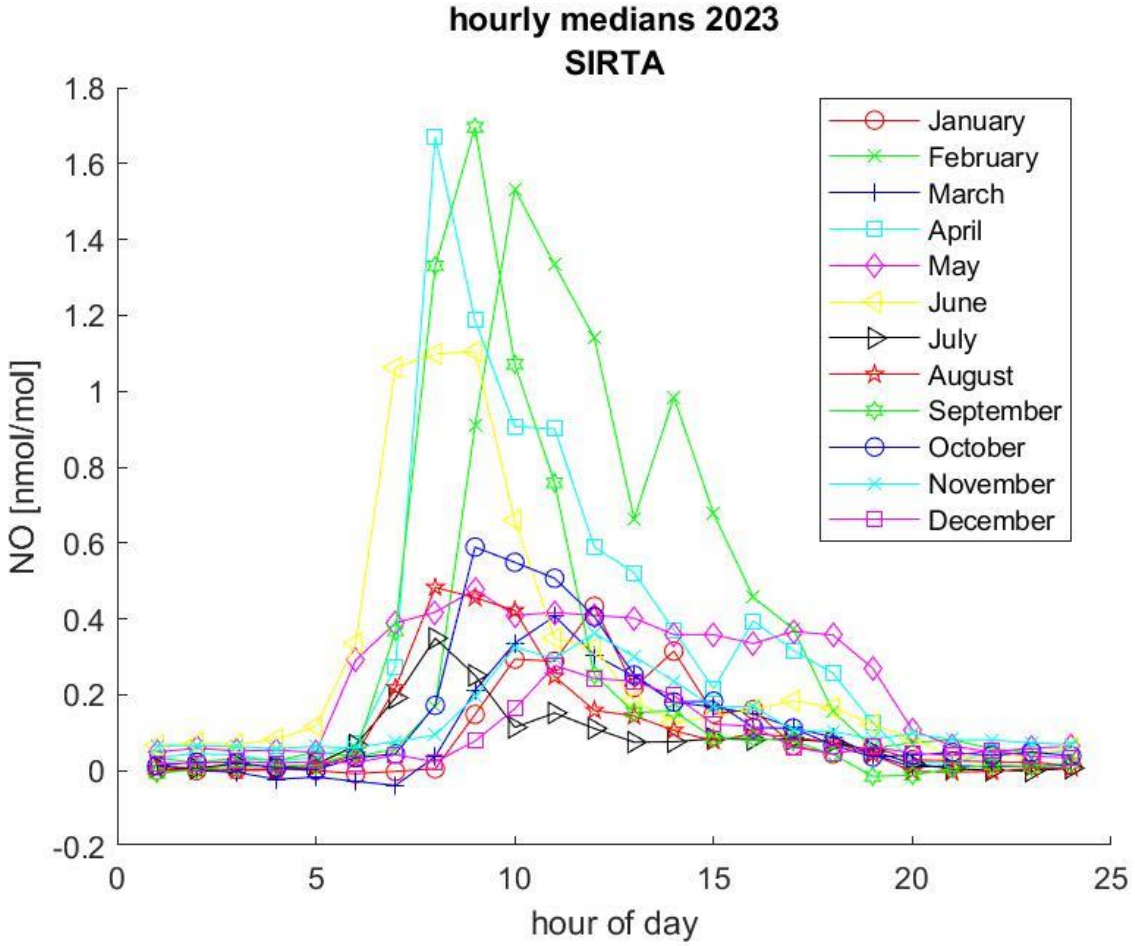


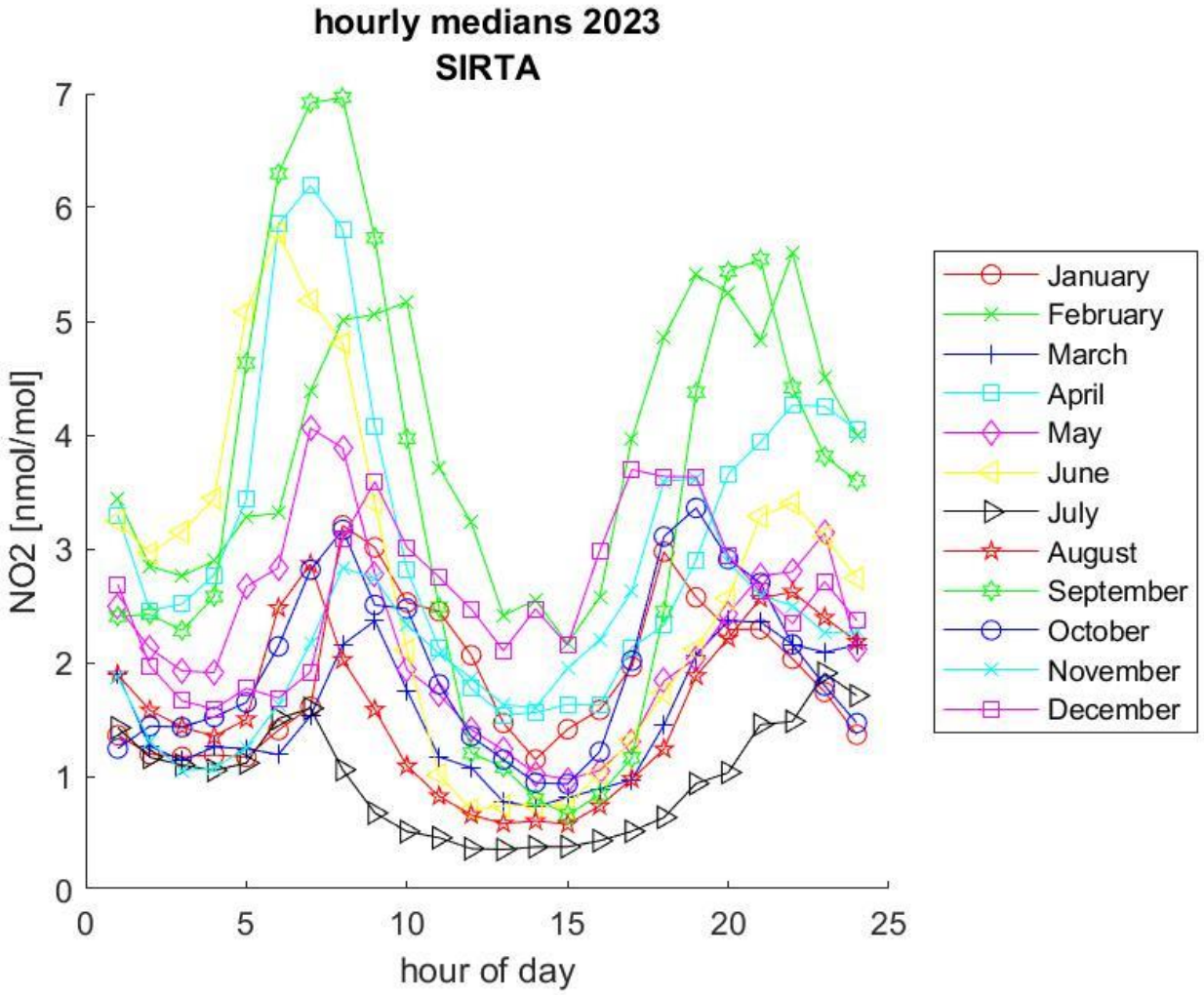
Yearly-Plots : NO & NO_2 , 2023 (daily mean)





Daily-Plots : NO & NO_2 , 2023 (hourly medians)





2023 Data information

- Level 0a & 1a submitted

- Level 0a : need raw counts and sensibility of NO ((pmol/mol)/cps) but it is impossible to get these parameters with Teledyne device

- The Ozone generated as part of the photolytic process back titrates the converted NO. This phenomenon is non-linear and leads to a situation where the calculated CE value is less at higher concentrations of NO_2. So in Teledyne device there are two converter efficiency (For SIRTA station at 16 and 70 ppb)

- Data need to be resubmitted (since Juin), to apply a new converter efficiency