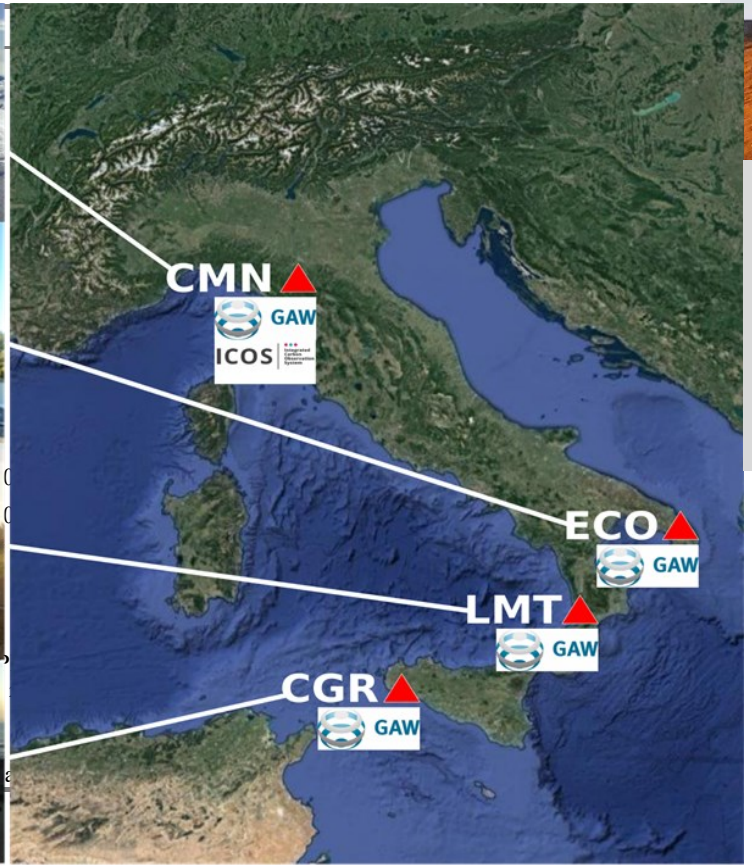
Mt. Cimone “O. Vittori” CNR Observatory (CMN)

Jgor Arduini, jgor.arduini@uniurb.it

44.0 °N, 10.7 °E, 2165 m a.s.l.

- The highest peak of the Northern Apennines
- Completely free horizon 360°
- Usually above PBL, except summer
- WMO-GAW Global Station
- CNR Observatory hosted by Italian Air Force



ACTRIS – Italy network / GAW stations

Monte Cimone (CMN) is the lonely station measuring and reporting NM-VOCs

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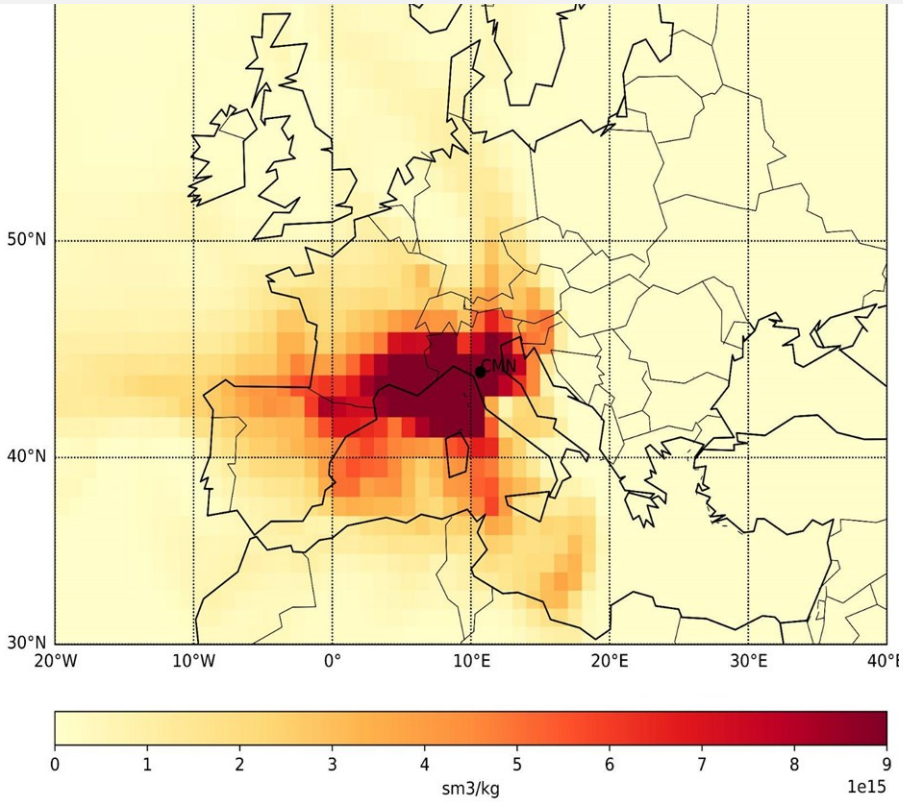
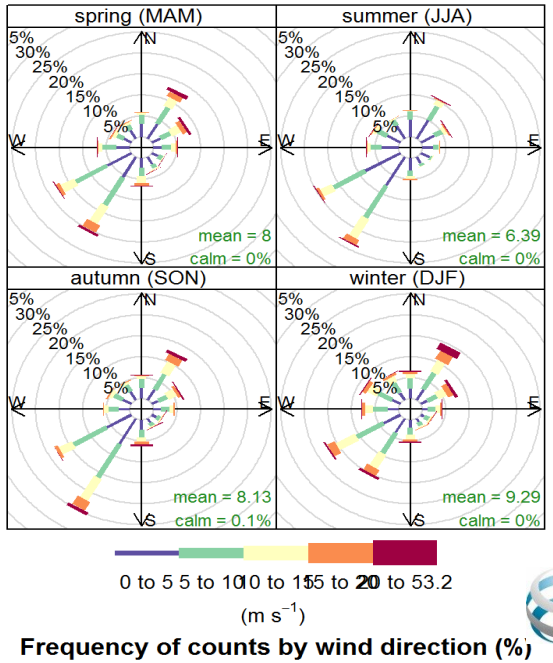
Typical transport pattern: annual footprint





ACTRIS Workshop, 17-19 April 2023

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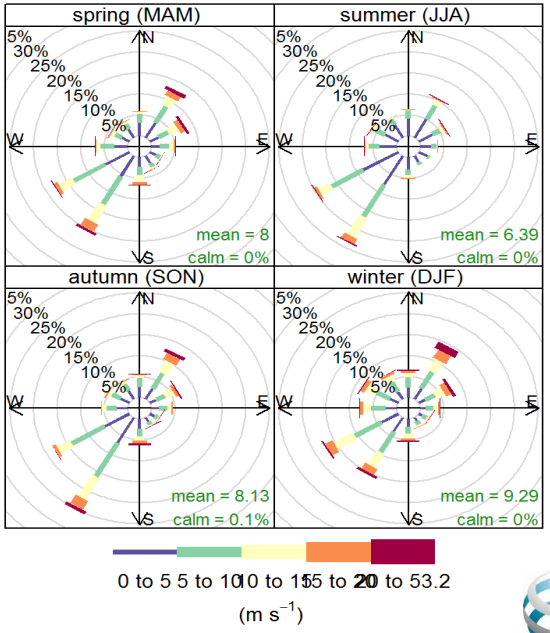
Observations	Start - End year	Lead institution
Surface O_3	1996	CNR-ISAC
NO,NO_2	2012	CNR-ISAC
SO_2	2014	CNR-ISAC
CO	2008	CNR-ISAC/Uniurb
CO_2	2018	CNR-ISAC
CH_4	2008	CNR-ISAC/Uniurb
N_2O	2008	Uniurb
SF_6	2008	Uniurb
CFCs, HCFCs	2002	Uniurb
HFCs	2002	Uniurb
Columnar NO_2	1993	CNR-ISAC
Aerosol size distribution (10 – 500 nm)	2005	CNR-ISAC
Aerosol size distribution (300 nm – 10 µm)	2000	CNR-ISAC
Aerosol scattering	2005	CNR-ISAC
Aerosol absorption	2005	CNR-ISAC
Equivalent BC	2005	CNR-ISAC
Aerosol chemistry (PM1 –PM10)	2005 – 2015	CNR-ISAC
Natural radionuclides (^{7}Be, ^{210}Pb, ^{222}Rn)	1998 - 2011	Unibo
Solar photometry	2016	CNR-ISAC
Meteorological parameters and solar radiation	1996	CNR-ISAC



ACTRiS

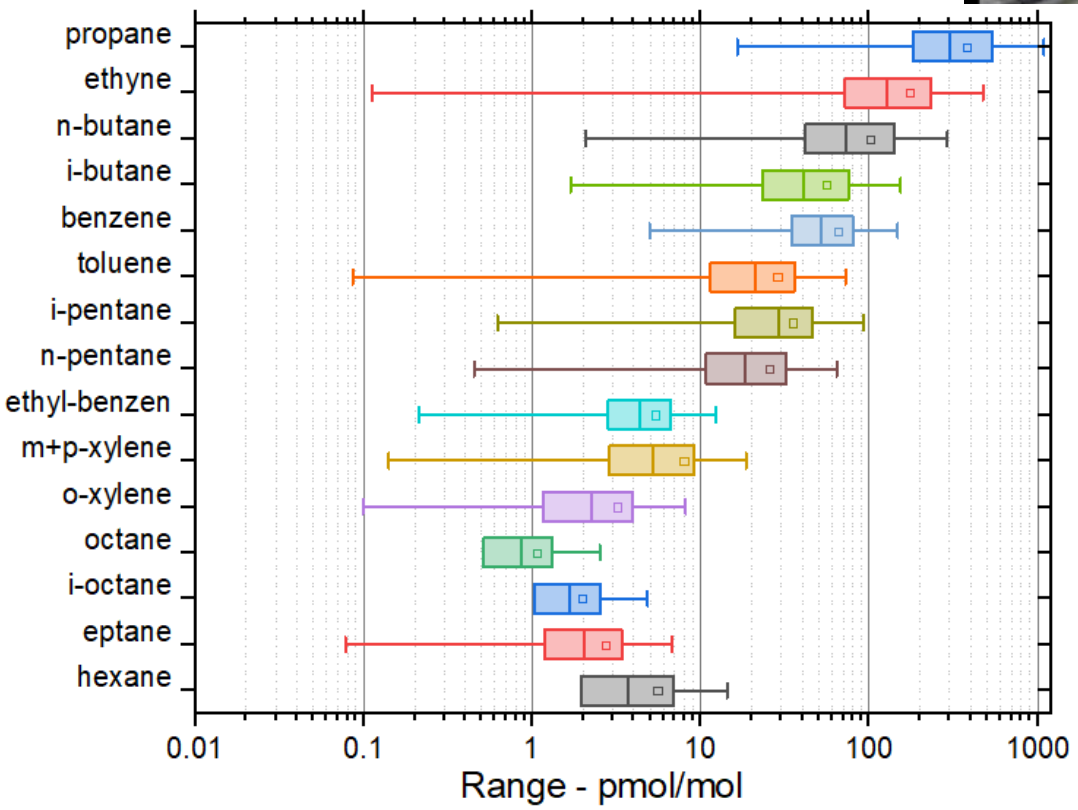
ICOS INTEGRATED CARBON OBSERVATION SYSTEM

GAW AGAGE

ISAC UNIVERSITÀ DEGLI STUDI DI URBINO CARLO BO

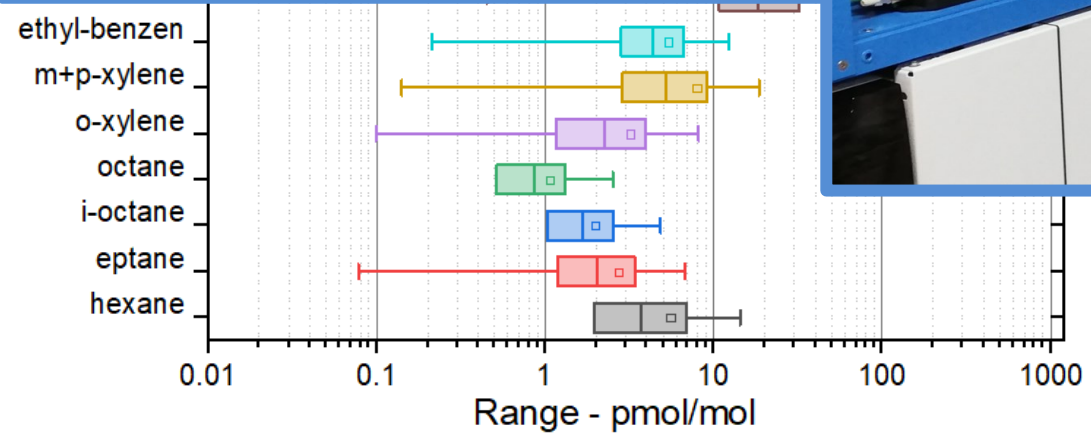
NM-VOCs Instrumental setup

-MARKES UNITY2 Thermal Adsorbtion/Desorbtion system (4 stages adsorbing trap, -30°C)
-NAFION drier used
- Analysis by GCMS Agilent 6820/5975C, separation on GC GasPro capillary column, SIM detection
- Calibration against whole air working std, regularly calibrated on NPL-UK O_3 precursor mixture ;
typical DL < 1ppt, precision < 3% , TU 10÷15 %
- Measurements available since 2010; samples acquired every second hour, bracketing with working standard runs (12 actual samples per day)



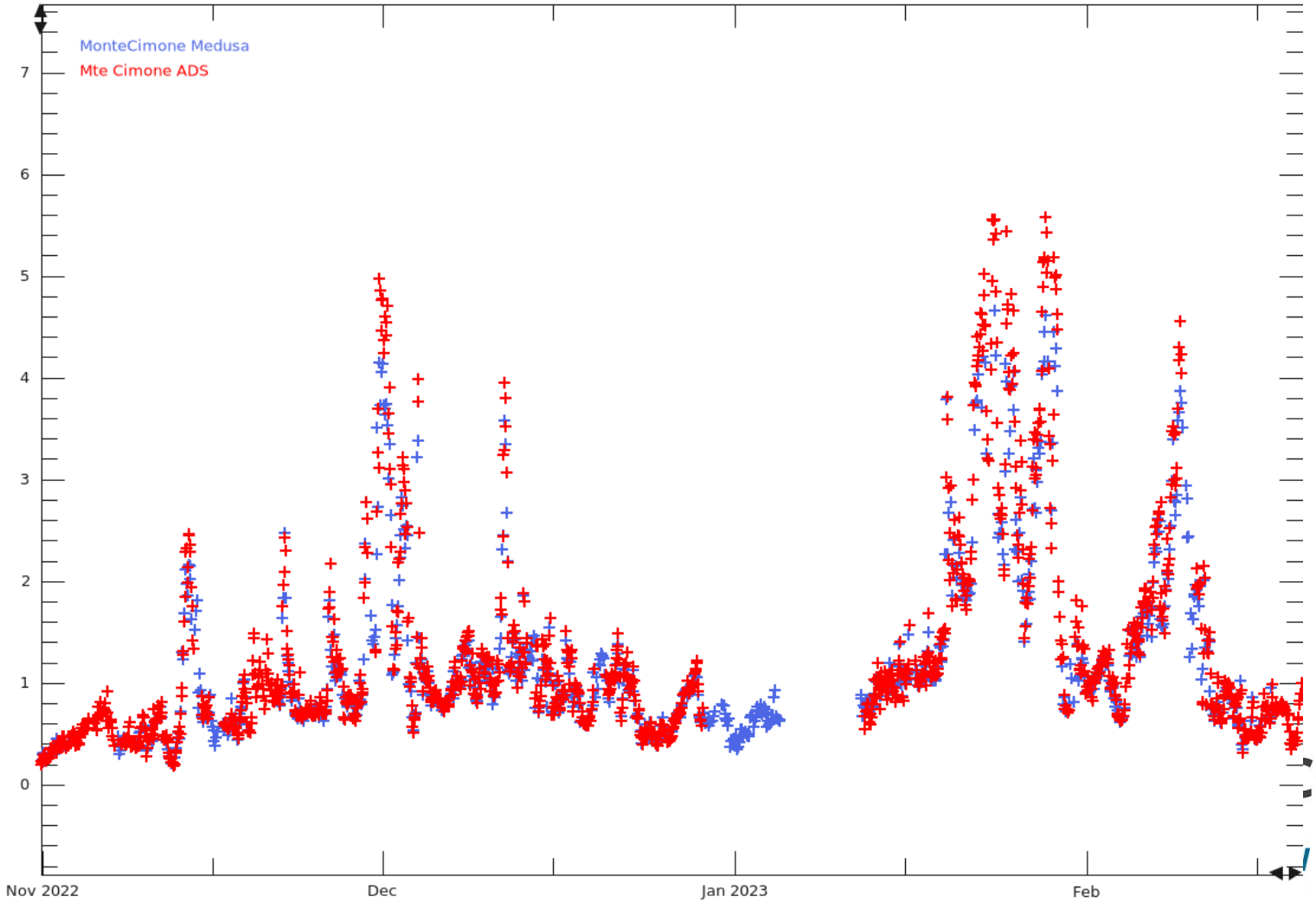
NM-VOCs Instrumental setup

- AGAGE Medusa in place since Oct 2022; two system running in parallel until next summer
- New compounds are available: Ethane, Ethene; **but** n-C6, n-C7, n-C8, i-C8, xylenes will be lost



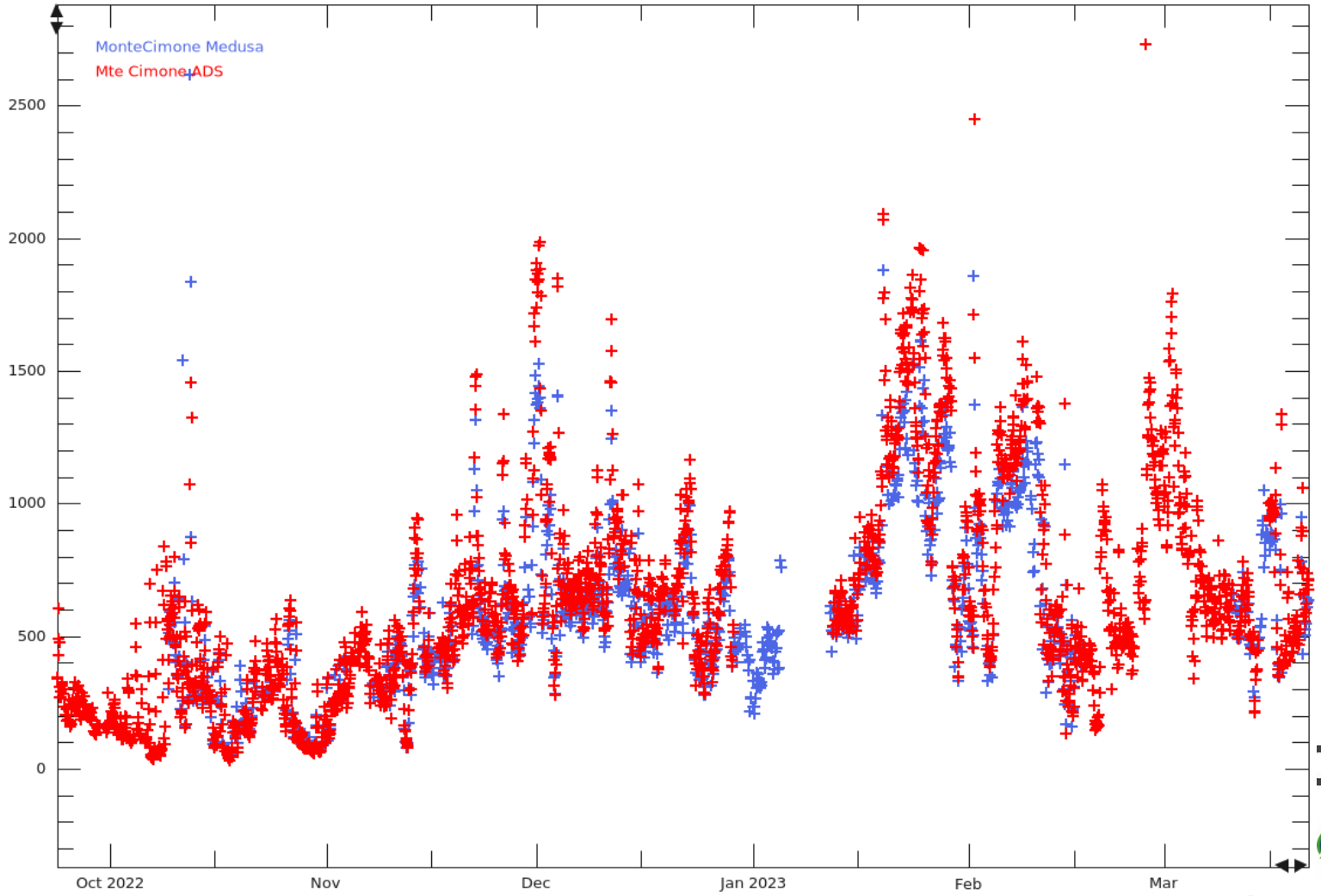
NM-VOCs old ADS and new Medusa instruments: preliminary comparison

Ethyne - ppb



NM-VOCs old ADS and new Medusa instruments: preliminary comparison

Propane - ppt



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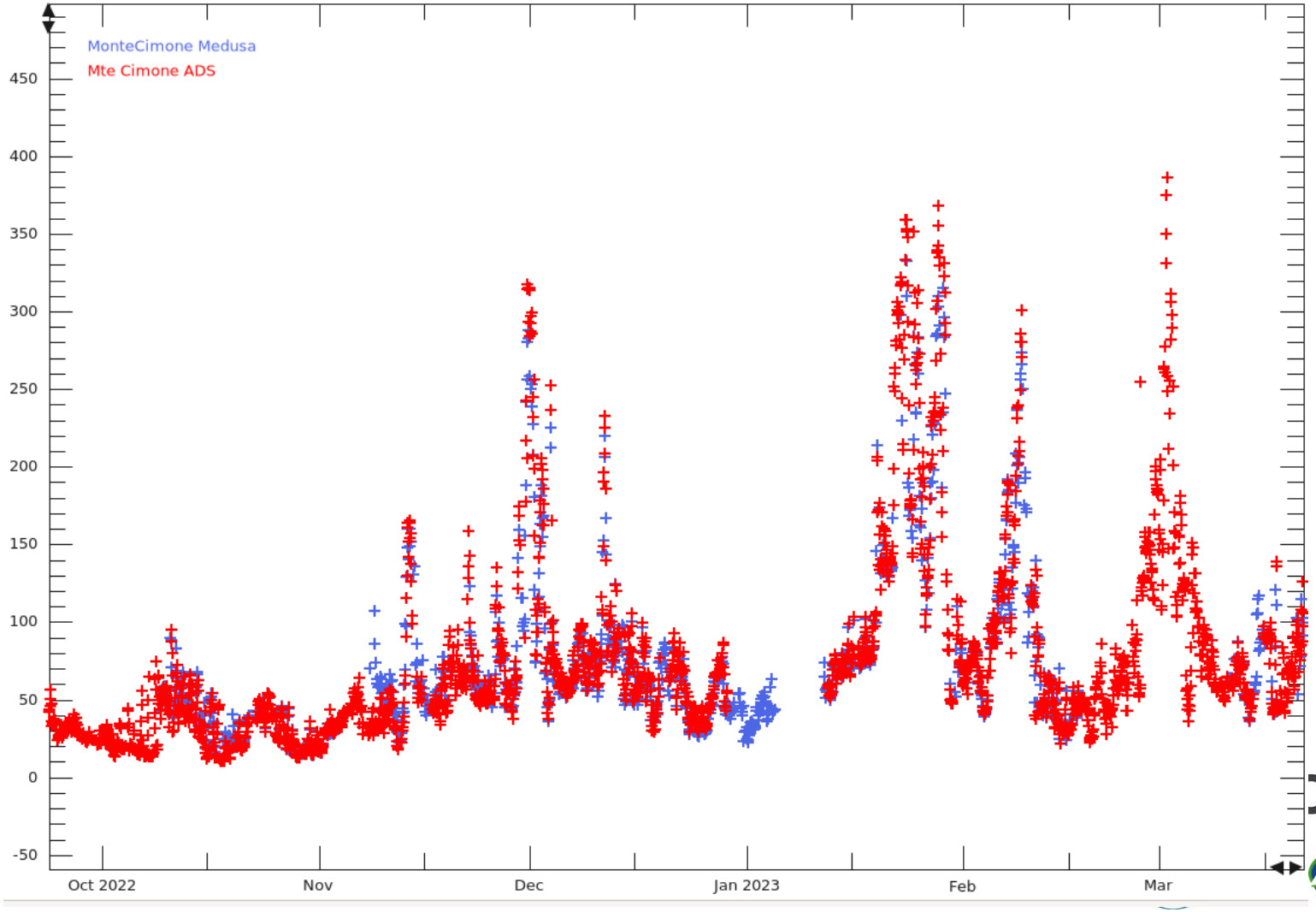
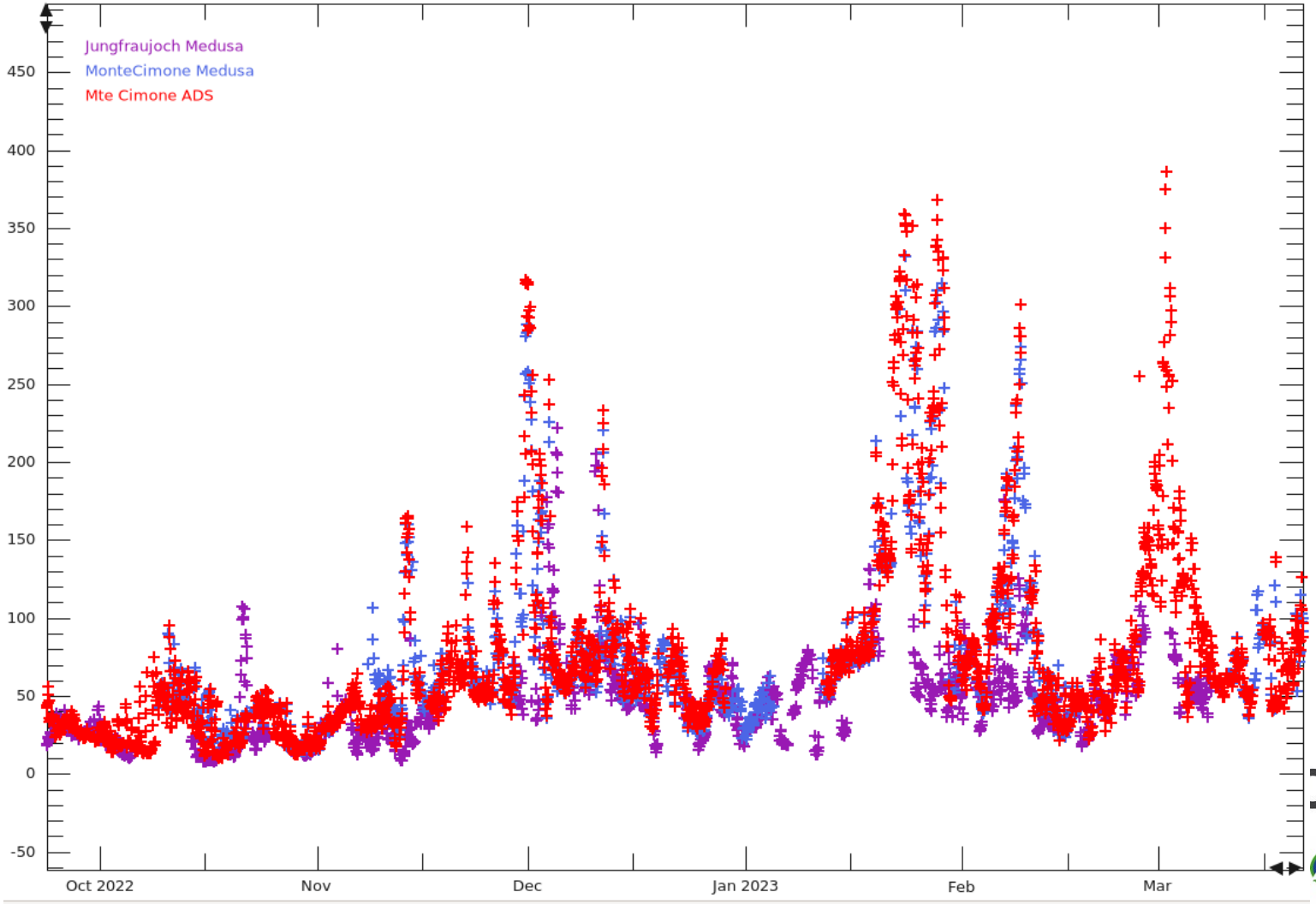
Benzene - ppt

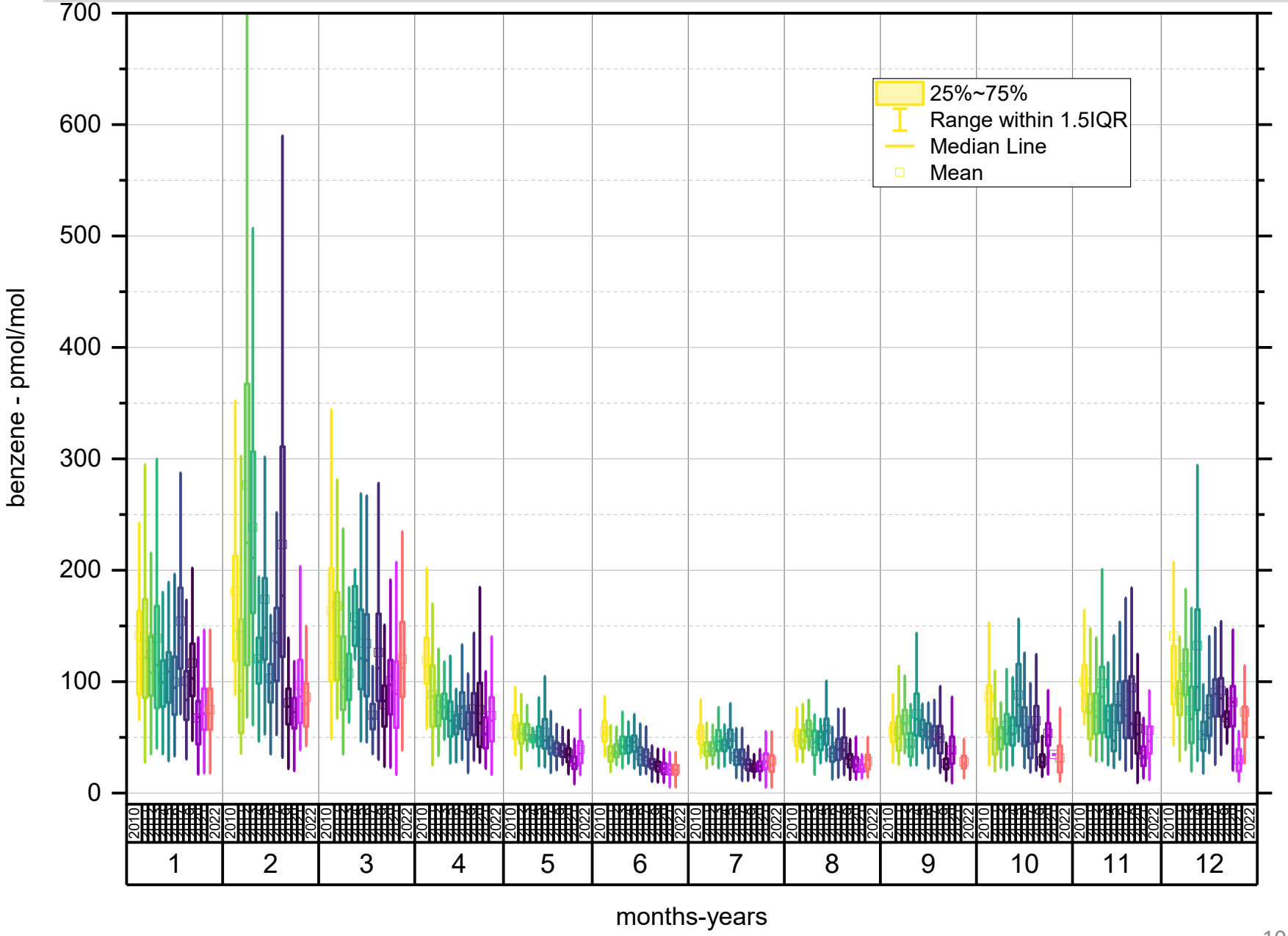


NM-VOCs old ADS, new Medusa and Jungfraujoch Medusa comparison

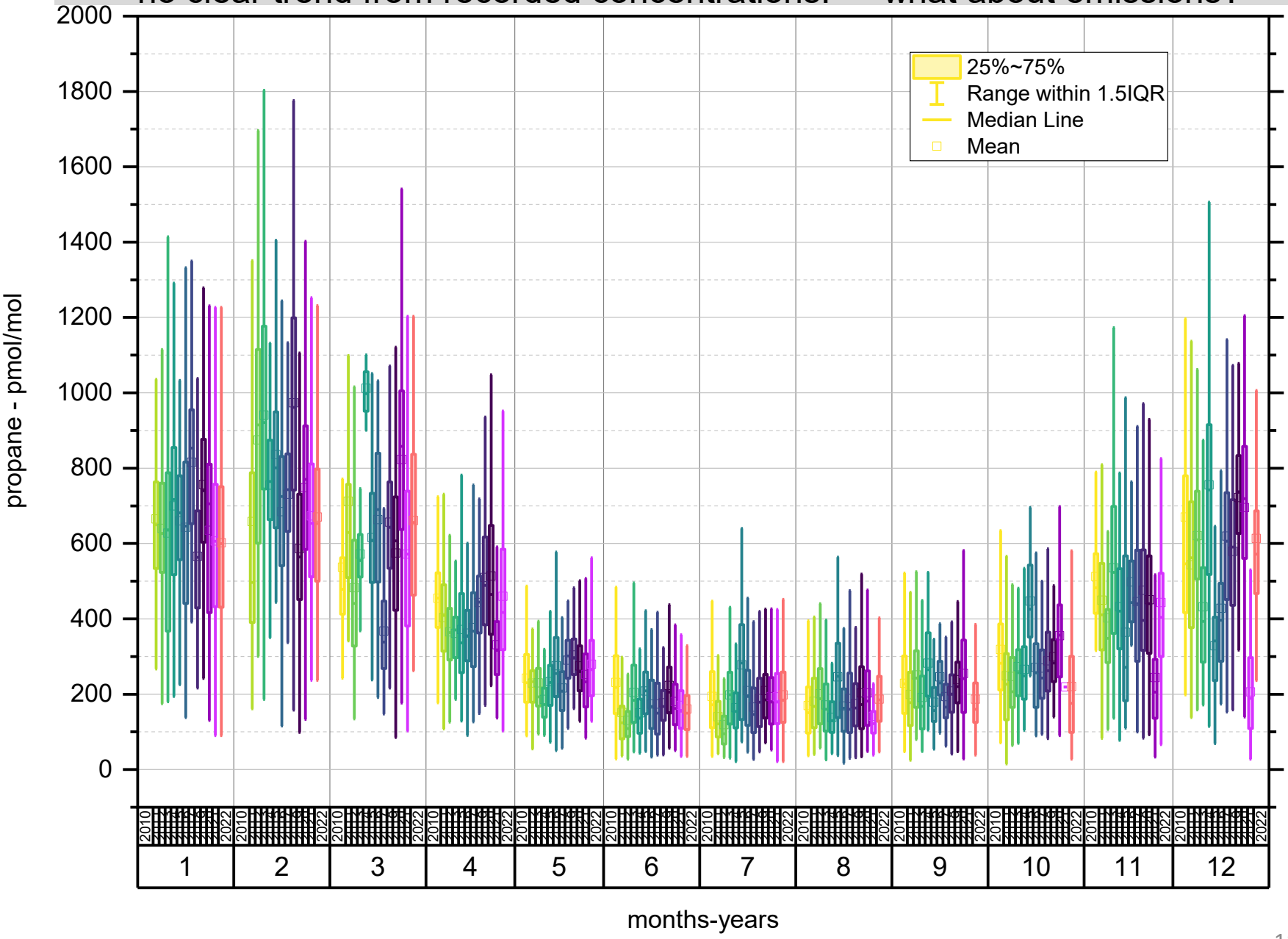
Benzene - ppt



Benzene time series 2010-2022 (by months)
decline on recorded concentrations: -> decline on emissions?



Propane time series 2010-2022 (by months)
no clear trend from recorded concentrations: -> what about emissions?



Thank you!