14 years of IASI CO retrievals

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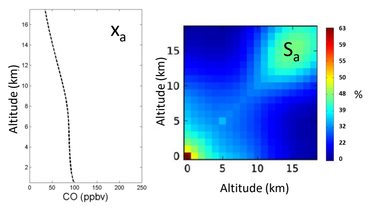
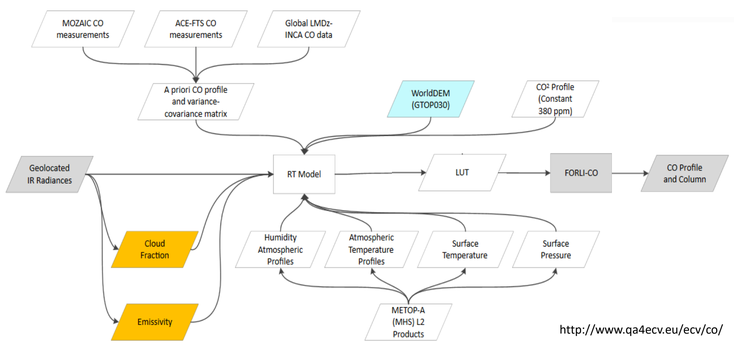
IASI FORLI CO

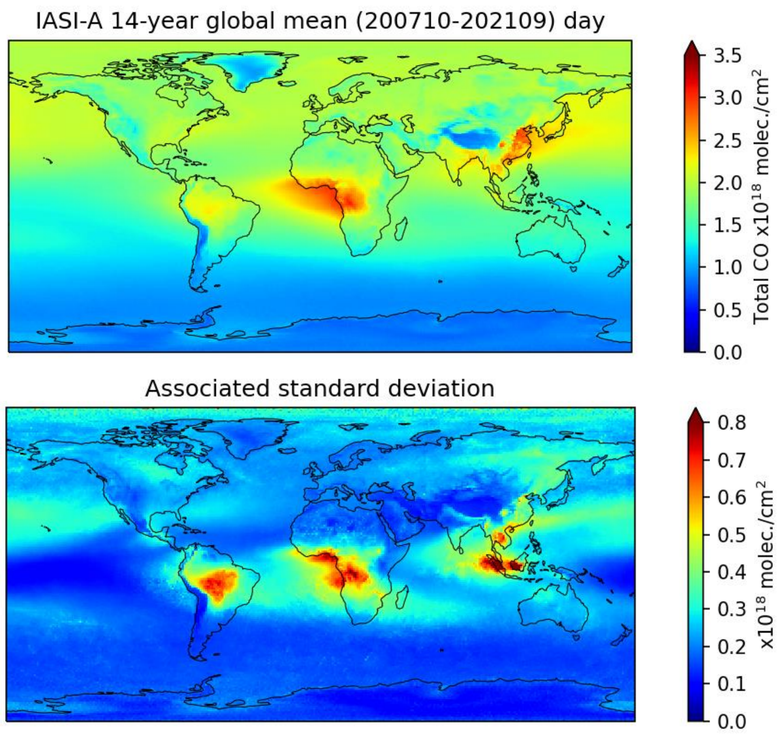
Carbon monoxide is operationally retrieved from the IASI spectra using the FORLI (Fast Operational Retrievals on Layers for IASI) algorithm[1]. It is based on the optimal estimation theory.

A single a priori profile is used, with a variance-coriance matrix allowing maximum variability close to the surface.

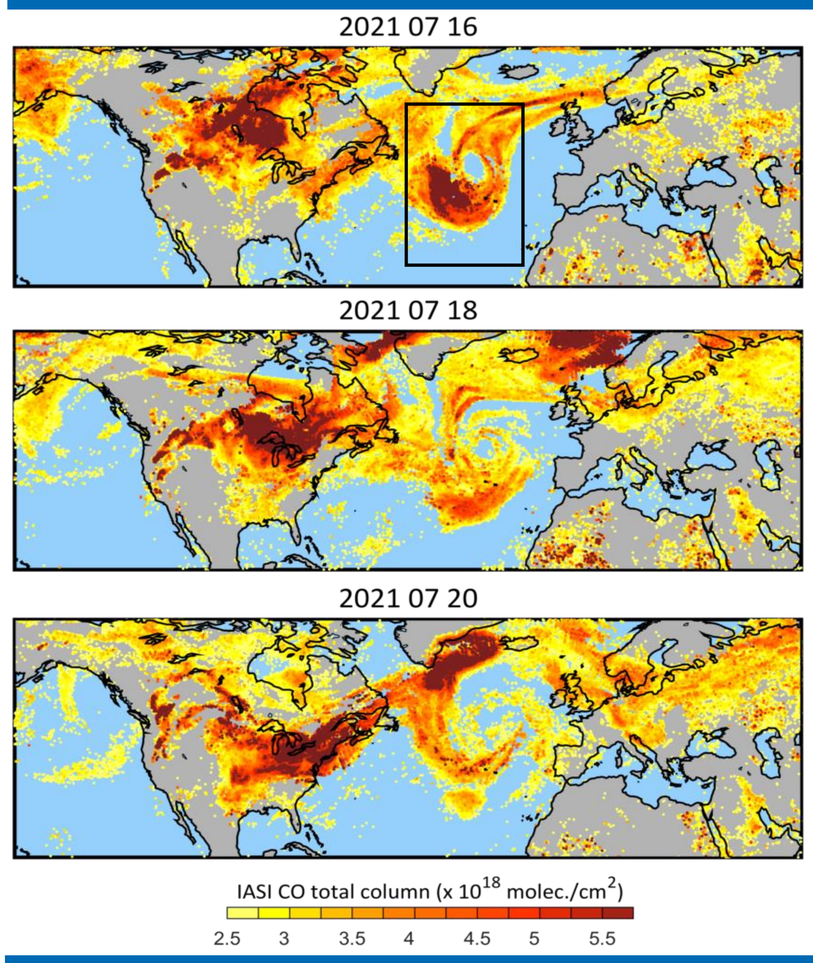




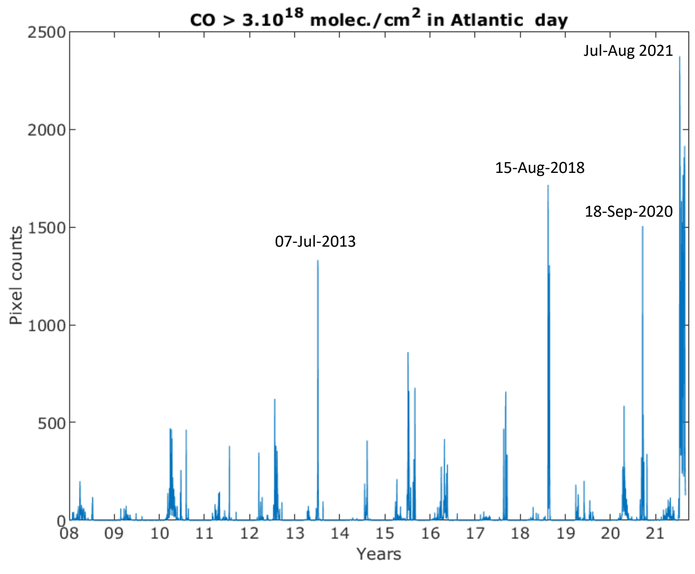
http://www.qa4ecv.eu/ecv/co/



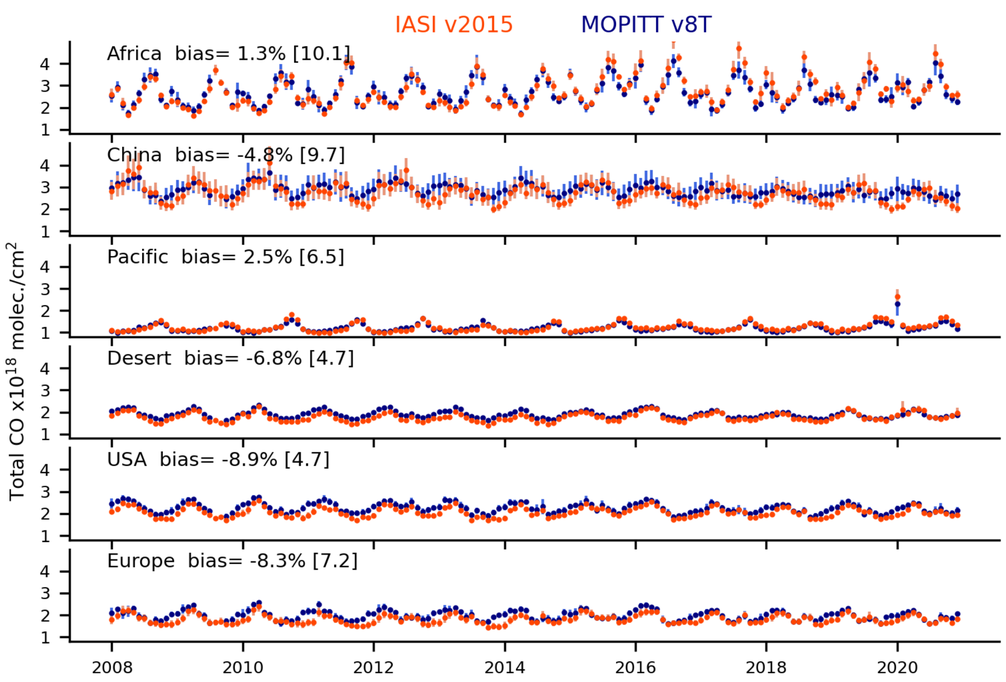
Fire events



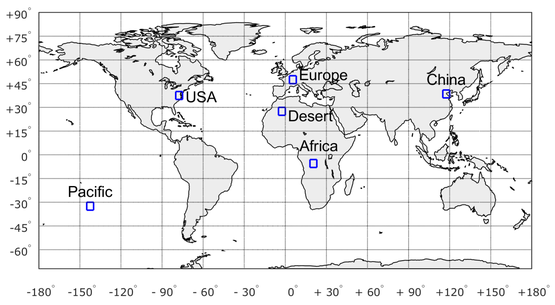
CO plumes coming from California fires crossed the Atlantic to reach Europe in July 2021 but it happened before : see plot with occurrences of pixels with COTC > 3 x 10^{18} molec./cm² in the region represented by the black rectangle :



Comparison with MOPITT v8T data

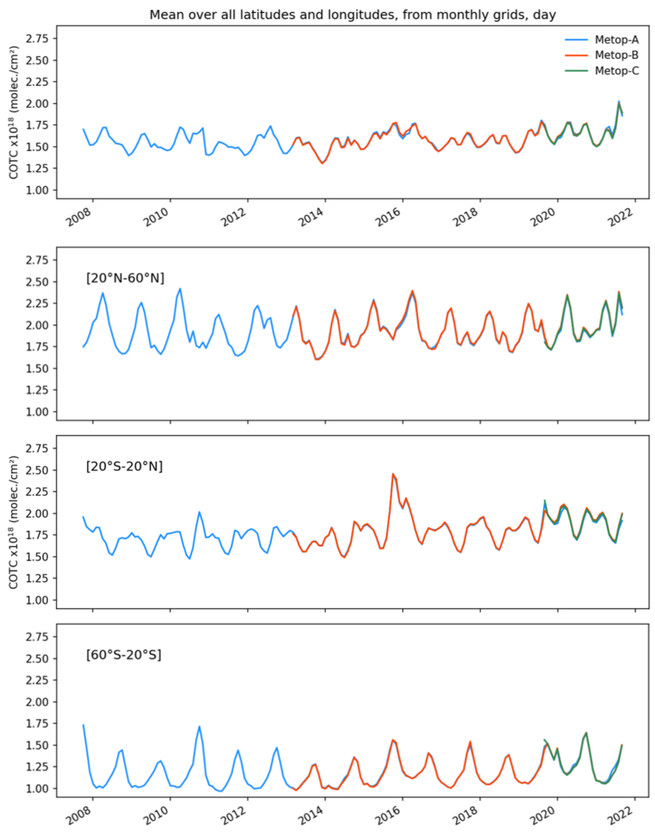


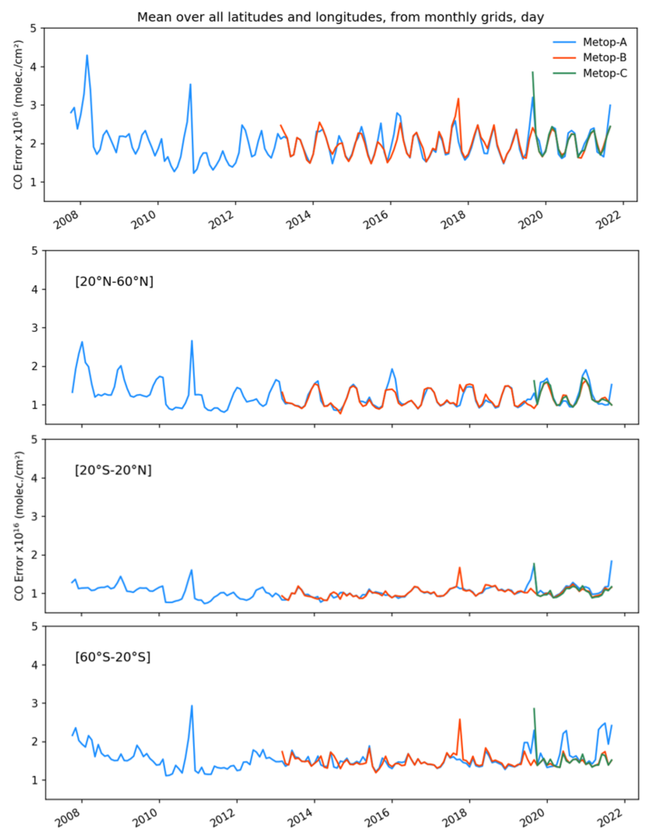
For this comparison, L3 daytime data are used for both IASI and MOPITT[2]. For each month, averages are performed in 5°x5° boxes. The agreement between the two instruments is excellent. Seasonality is well captured for all the regions. Mean biases range between -6.8 and 2.5%.



Consistency between A, B and C

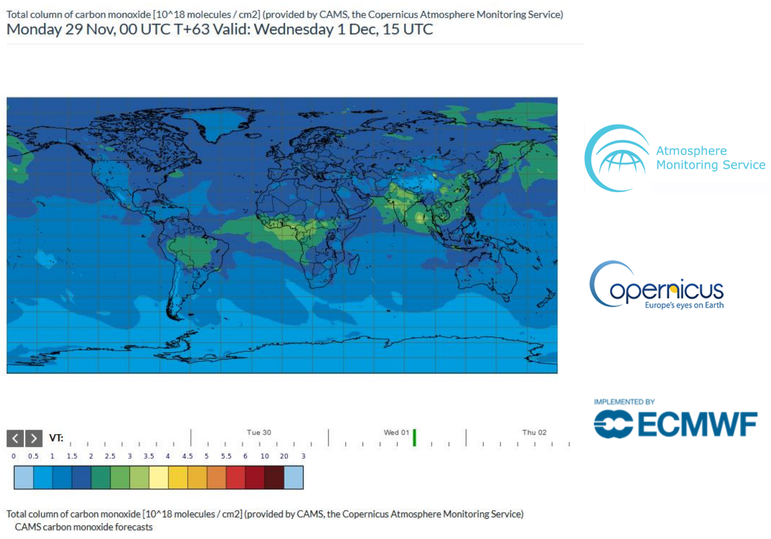
For the following plots, means are performed with v2015 L3 data, available on https://iasi.aeris-data.fr/co/





Assimilation in CAMS

IASI and MOPITT are currently both being assimilated in the Copernicus Atmospheric Monitoring Service (CAMS) to generate CO pollution forecasts[3].



https://atmosphere.copernicus.eu/charts/cams/carbon-monoxide-forecasts

References

1. Hurtmans et al., FORLI radiative transfer and retrieval code for IASI, J. Quant. Spectrosc. Ra., 2012.
2. Buchholz et al., Air pollution trends measured from Terra: CO and AOD over industrial, fire-prone, and background regions, Remote Sens. of Env., 2021.
3. Inness et al., The MACC reanalysis: an 8 yr data set of atmospheric composition, Atmos. Chem. Phys., 2013

FORLI CO is the official IASI CO product since March 2017.

Note that validation against groundbased NDACC data is performed at BIRA within the AC SAF : http://cdop.aeronomie.be/validation/valid-results