



Intercomparing data sets through their projection onto a model grid

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HEGIFTOM workshop, November 29th 2021



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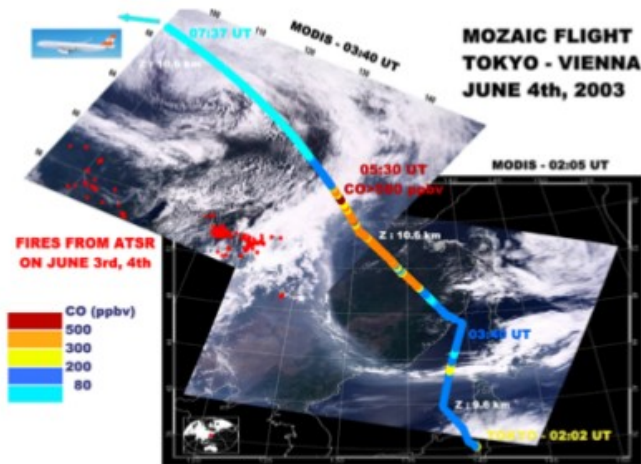
LSCE

Initial purpose: Bridge between observations and models

IAGOS

— Resolution:

- ▶ Horizontal: 1 km
- ▶ Vertical: < 30 m
- ▶ Temporal: 4 s



Nédélec et al., 2005 (GRL)

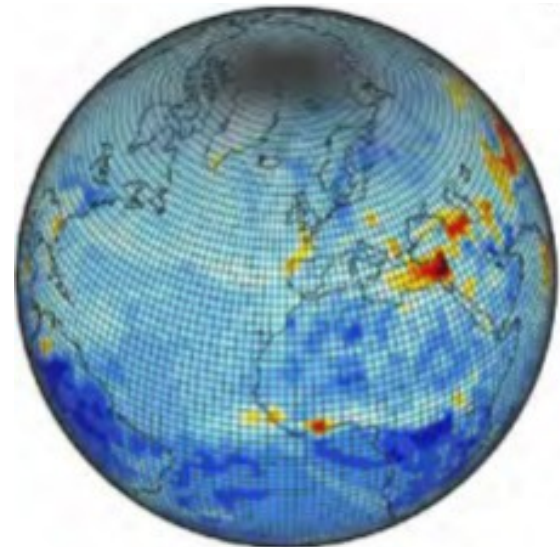
⇒ Comparison: need a common format

⇒ Gridding IAGOS data: Interpol-IAGOS software (Cohen et al., 2021, GMD)

LMDz-OR-INCA (39 levels)

— Resolution:

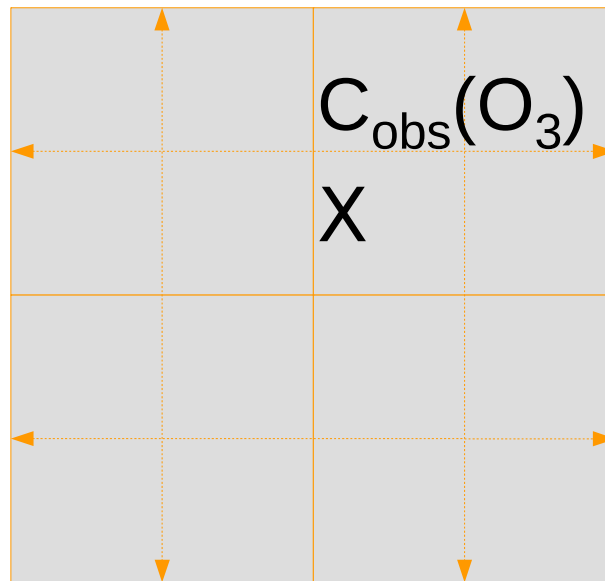
- ▶ Horizontal: $2.75^\circ \times 1.25^\circ$
- ▶ Vertical: ~ 1 km



Gridding methodology

Comparison IAGOS – INCA

- Averaging IAGOS data on INCA grid
- Linear extrapolation: 1 observation distributed on 8 gridcells (3D)

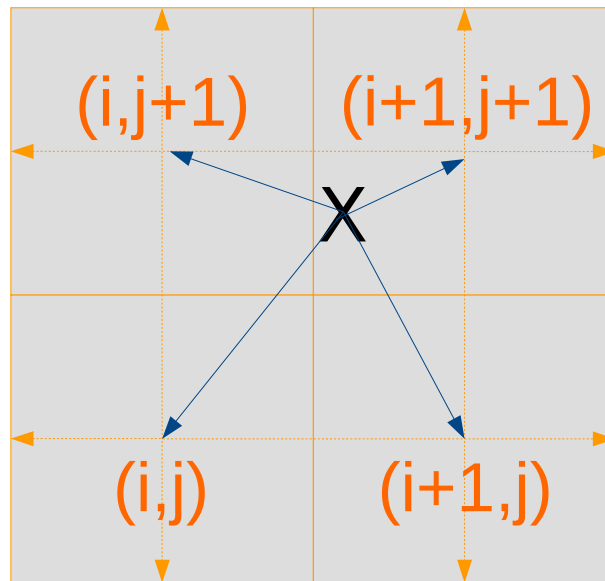


2D example

Gridding methodology

Comparison IAGOS – INCA

- Averaging IAGOS data on INCA grid
- Linear extrapolation: 1 observation distributed on 8 gridcells (3D)

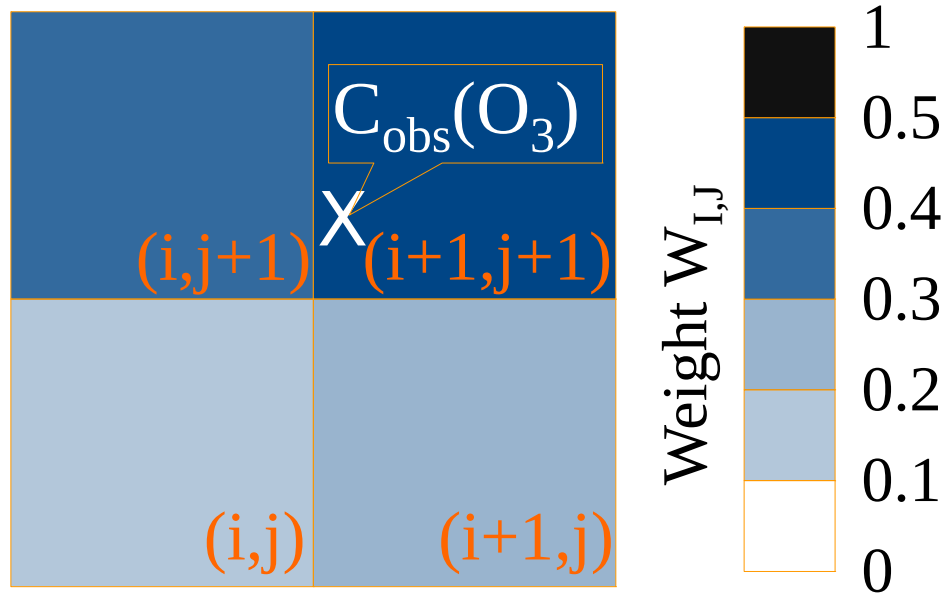


2D example

Gridding methodology

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Gridding methodology

Comparison IAGOS – INCA

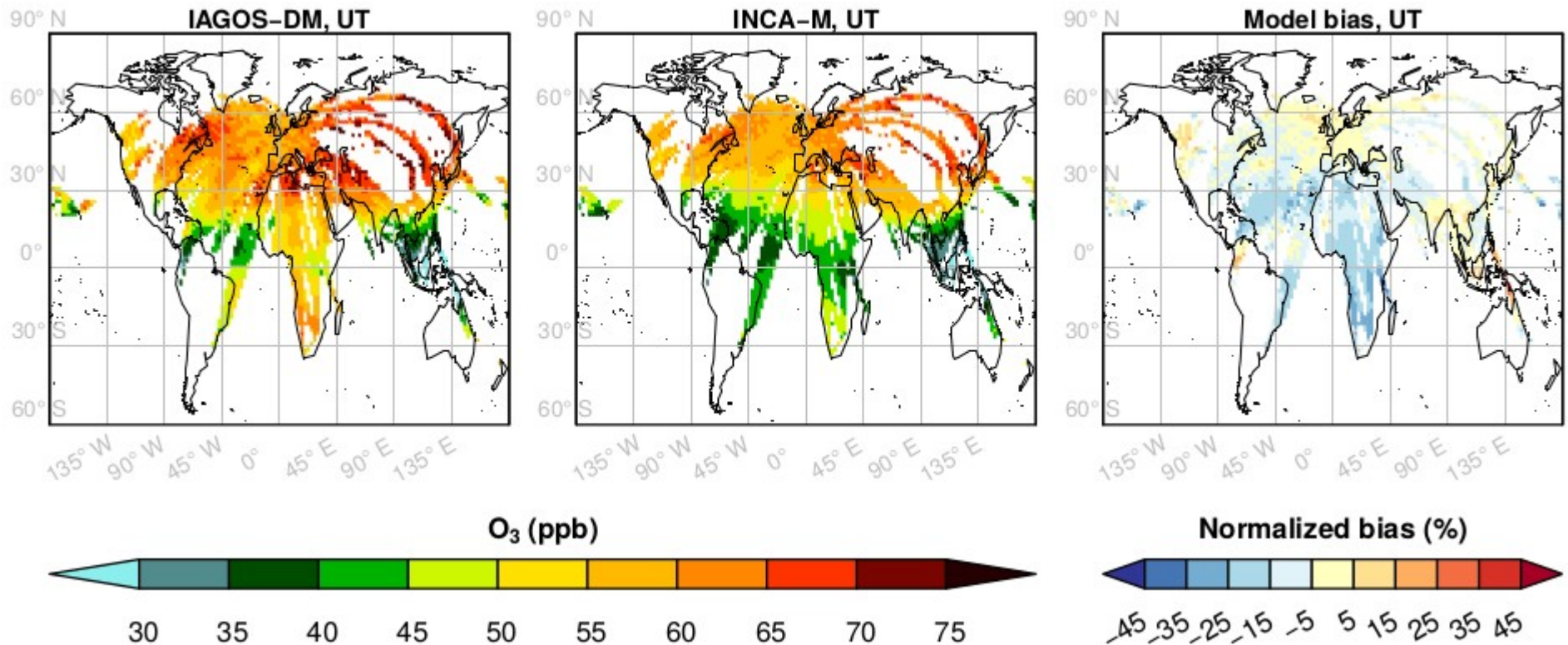
- Averaging IAGOS data on INCA grid
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Monthly mean at a given (i,j,k) gridcell:

$$C_{i,j,k}(O_3) = \frac{\sum_{\text{obs}} W_{i,j,k} \cdot C_{\text{obs}}(O_3)}{\sum_{\text{obs}} W_{i,j,k}}$$

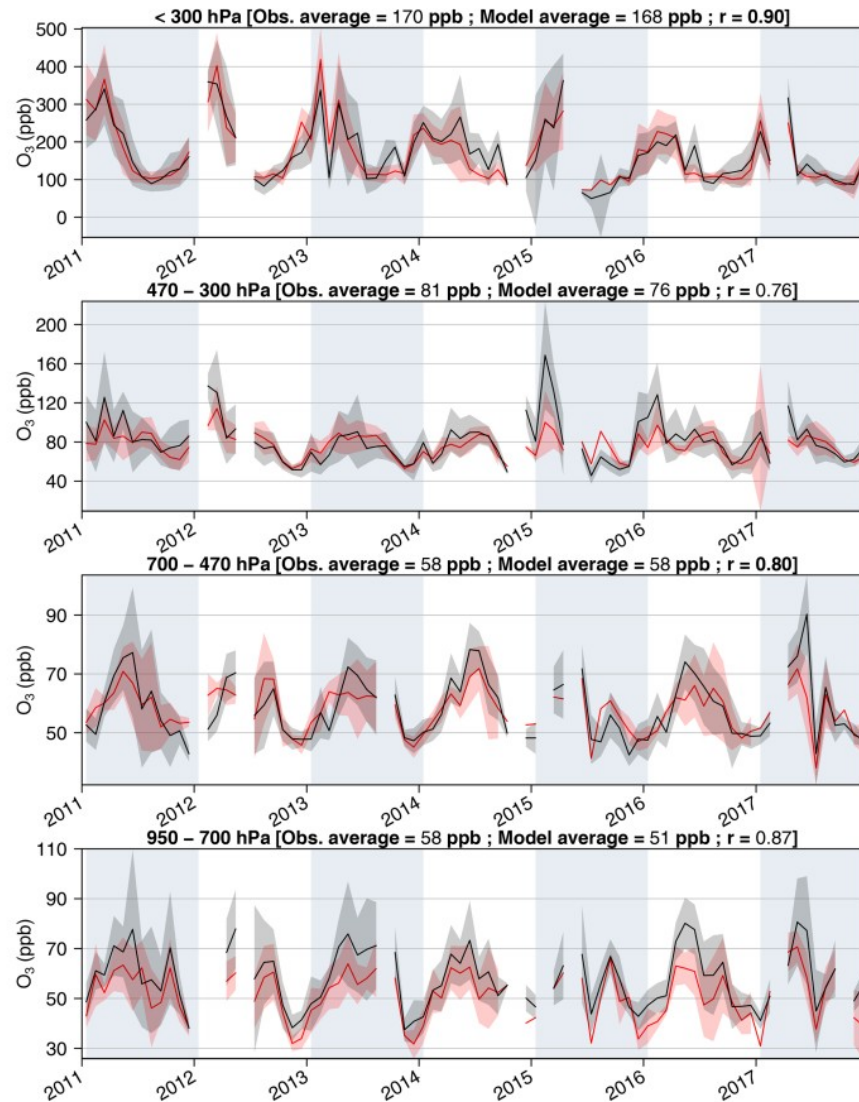
Some applications: climatologies in the UTLS

3D gridcells \Rightarrow « partial columns »



Some applications: time series in the troposphere

« Partial columns » above East Asia, from vertical profiles



> 9 km

~ 6 – 9 km

~ 3 – 6 km

~ 0 – 3 km

— IAGOS-DM — INCA-M

Dufour et al. (2021, ACP)

Useful for intercomparisons?

Comparison IAGOS – other measurements

- Averaging IAGOS and other obs. data sets onto a model grid
- ⇒ Gridded observations, less resolved but in a directly comparable format

⇒ Interpol-IAGOS software: potentially useful here? If yes, how?