

4D-var temporal resolution

Arjo Segers
Peter Bergamaschi
Matteo Corazza

European Commission Joint Research Centre, Institute for Environment and Sustainability, Climate Change Unit, I-21027 Ispra (VA), Italy



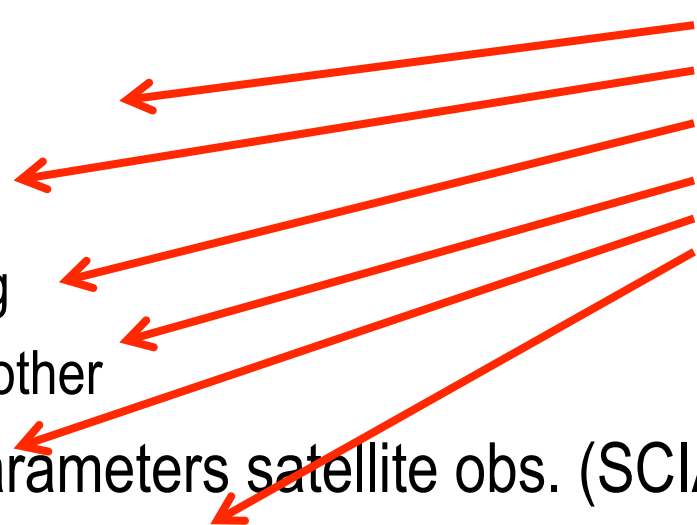
- control parameters:
 - ini.conc. : 3D
 - emissions : 2D
 - ocean
 - rice
 - biomass burning
 - anthropogenic, other
 - bias correction parameters satellite obs. (SCIA)
 - bias correction parameters ground obs. (N₂O)



- control parameters:

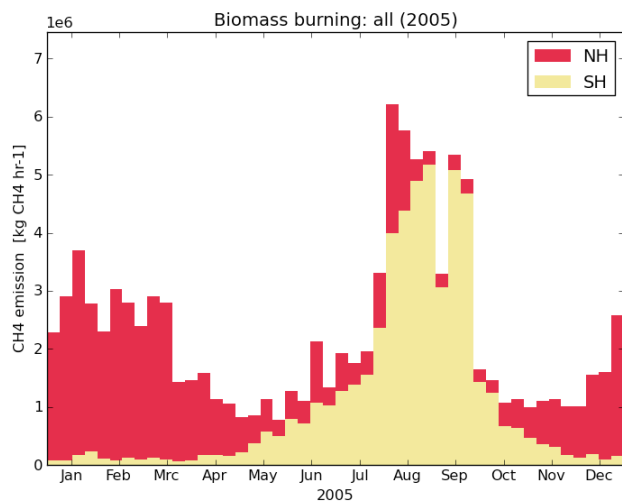
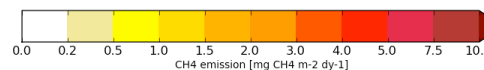
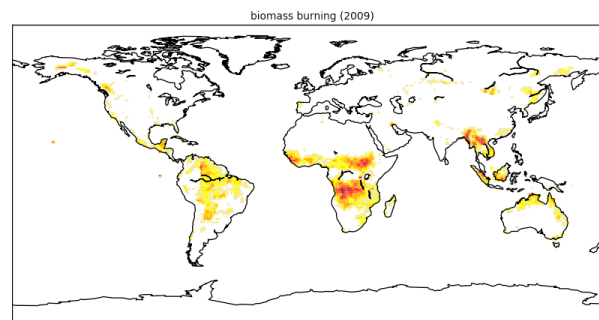
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all with the
same temporal
resolution
(monthly)

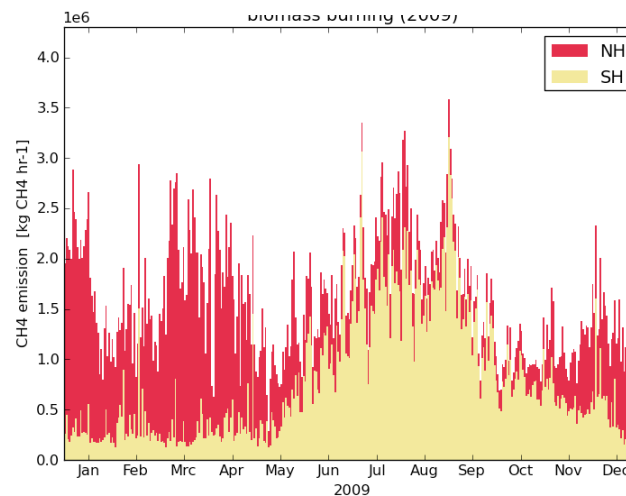




Biomass-burning available on higher resolutions than monthly:



GFED -v2 8-daily

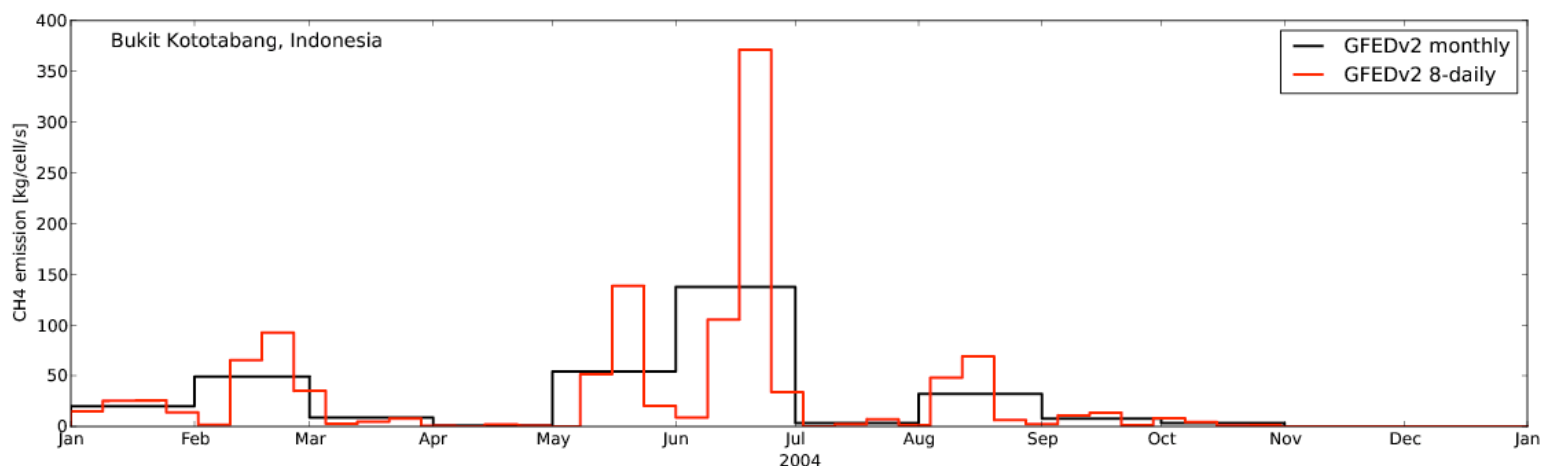


MACC daily CH4-fire
(based on hourly fields)



Previous:

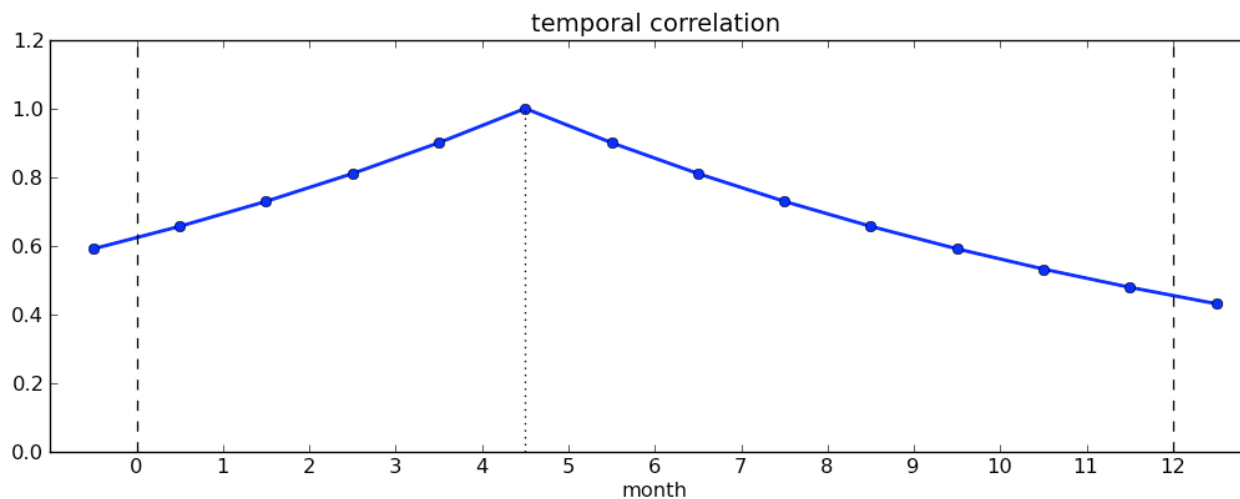
- default optimization on monthly averages
- add higher resolution profile on top of this
- **Example: 8-daily profile for biomass-burning:**

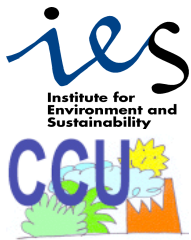


- **complicated coding**
- **complicated output**

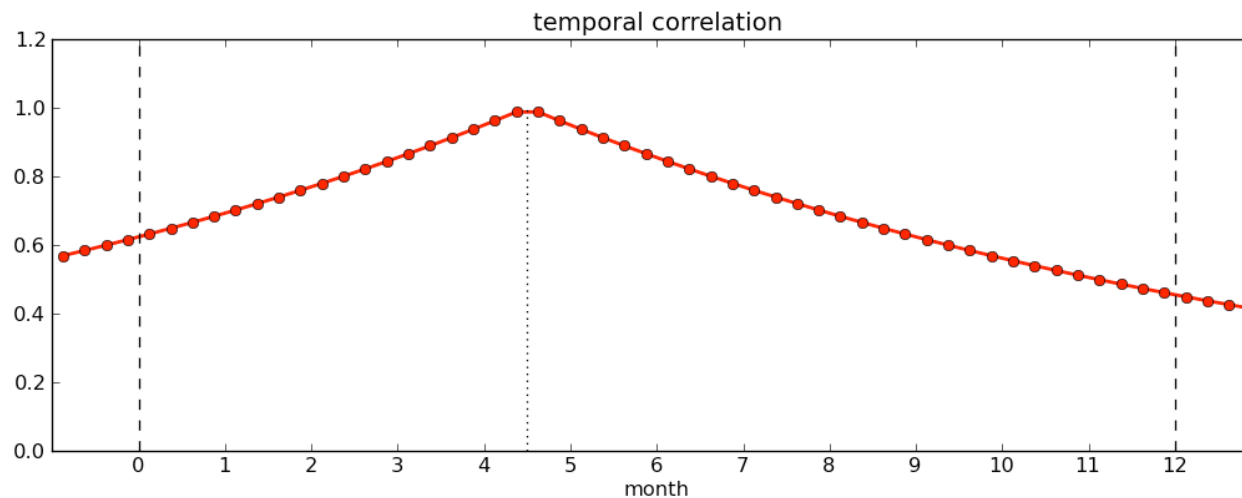


- new: flexible temporal resolution
- for each control variable:
 - interval length: **monthly**, 8-daily, daily, ...
 - time correlation shape: **exponential**, gaussian, ...
 - time correlation length: **9.5 months**, 1 month, ...



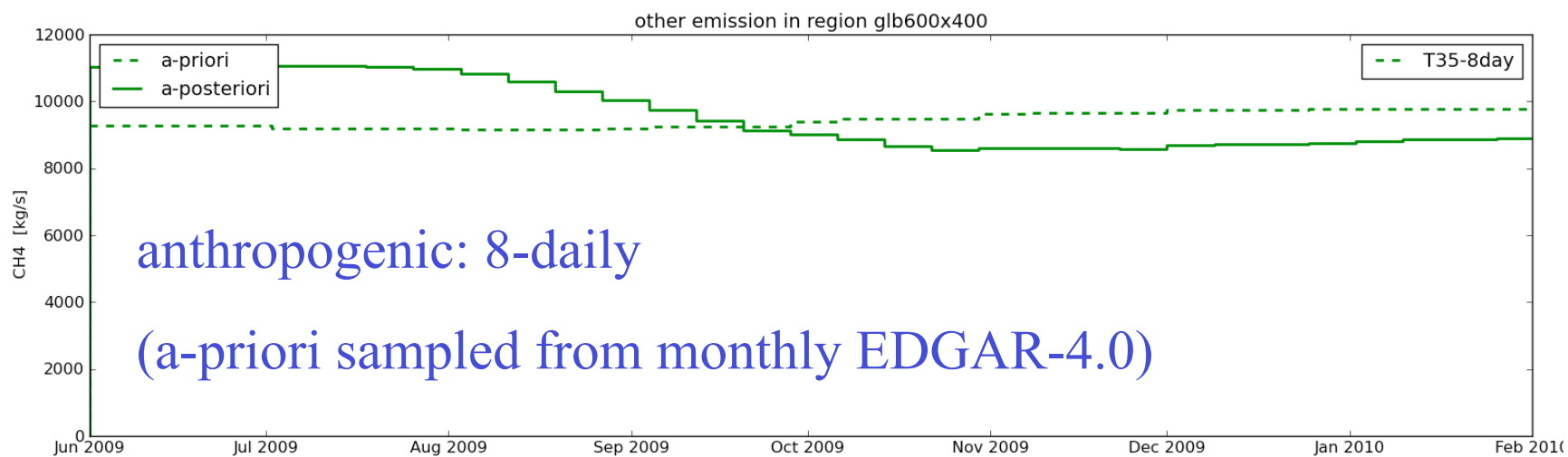
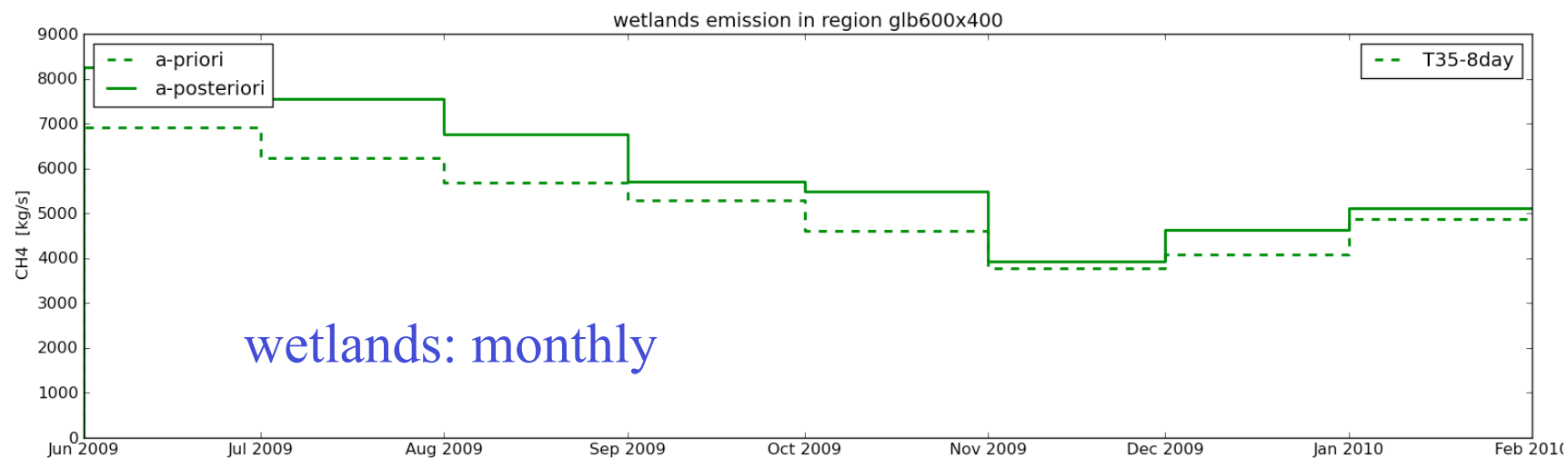


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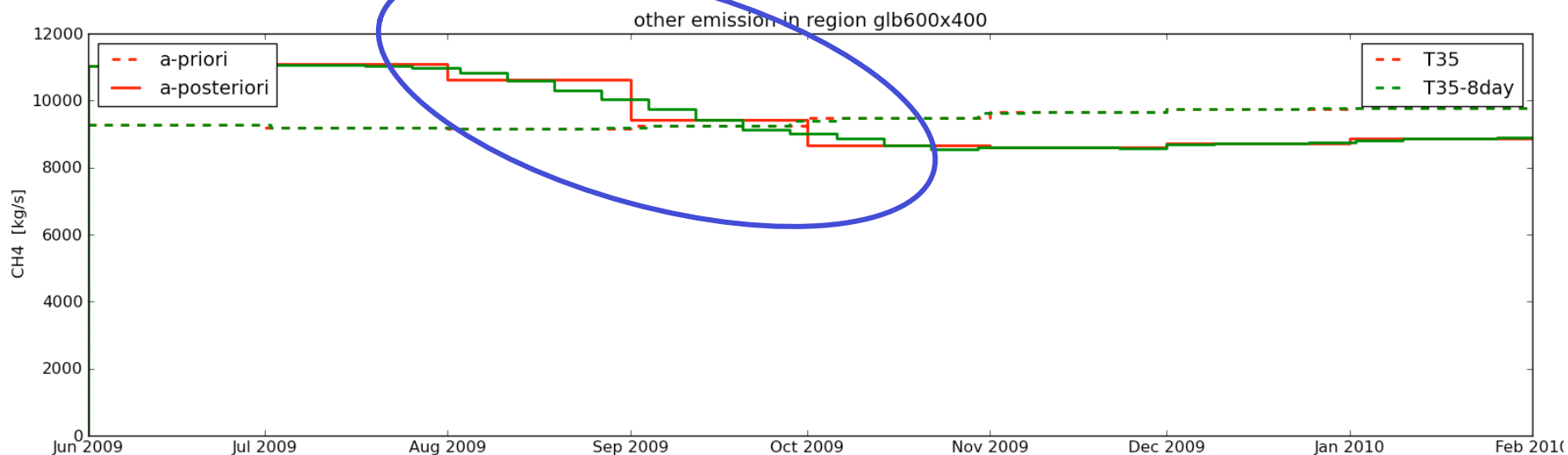


emissions with mixed temporal resolution:





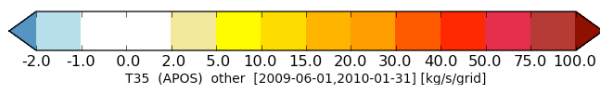
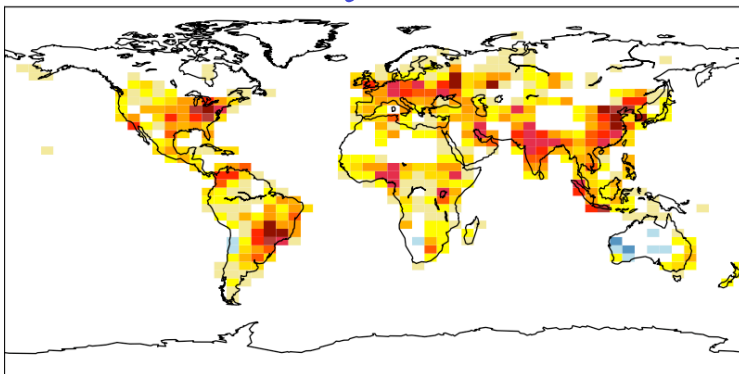
- similar correlation ? similar results!
- but smoother transitions in optimal emissions



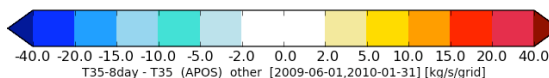
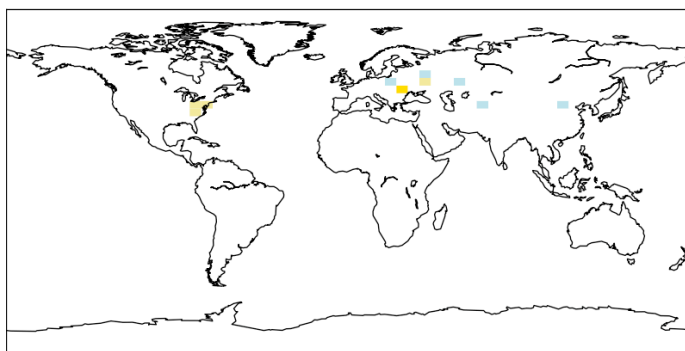
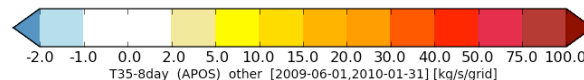
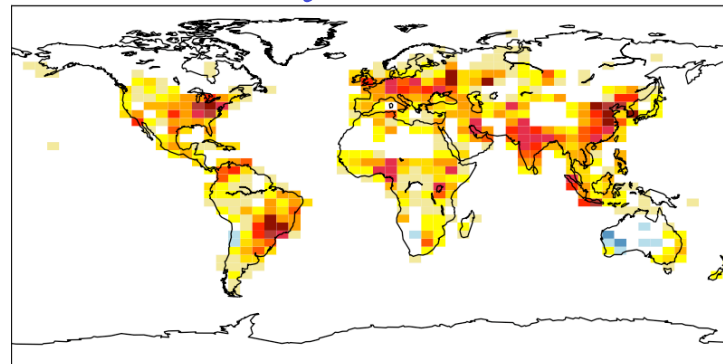


- total "other" emissions:

monthly resolution



8-daily resolution



minor difference !



Outlook

- current version:
 - JRC TM5-var4d “T35”
 - many changes: emission structure, loop order, ...
 - compatible with previous runs ? **yes**
 - “minor” issue: hdf errors for daily resolution over long period (maximum file size exceeded ?)
- upcoming real-life tests:
 - CH4 inversions (Peter)
 - N2O inversions (Matteo)