Eurocom Inversion Protocol

Draft (version 29.06.16)

1 Products

Net surface-atmosphere CO2 exchange fluxes inferred from regional (meso-scale) atmospheric inversions including posterior uncertainties (see below). Global scale inferred CO2 fluxes will be used as diagnostics.

Domain:

- Spatial: at least 15°W-35°E by 33°N-73°N
- Temporal: at least 2006 – 2015

2 Participants

Groups committed to contribute (model system) and contact:

- LSCE (PYVAR-CHIMERE): Gregoire Broquet / Matthew Lang
- LU (TM5-FLEXPART): Marko Scholze / Guillaume Monteil
- MPI-BGC (TM3-STILT): Christoph Gerbig
- UWageningen (CTE): Wouter Peters, Ingrid v.d. Laan-Luijkx
- VUA (EnKF-RAMS): Han Dolman / Antoon Meesters

Interested groups:

- NILU (FLEXINVERT): Rona Thompson
- EMPA (COSMO-FLEXPART?): Stephan Henne
- UBristol (NAME?): Matt Rigby / Emily White
- FMI (SILAM): Rostislav Kouznetsov

3 'Free' Experiment

The aim is to get the full range of fluxes inferred by the various inversion systems as a proxy to the uncertainty on these fluxes. Each system is to use its "best" set-up based on the following guide-lines.

3.1. Prior fossil fuel emissions

This is the only **mandatory** requirement, which aims at making the NEE comparisons a lot easier: EDGAR v4.3 with TNO time profiles, the data will be distributed by the Carbon Portal (CP)

3.2. Other prior fluxes

- Ocean fluxes: free, CP will distribute data by CP i.e. SOCOM ?
- Land fluxes: free, CP may be able to provide eddy-covariance constrained fluxes from ORCHIDEE (LSCE) as well as from LPJ-GUESS (LU)
- Lateral fluxes: open to individual groups whether to treat them or not

3.3. Data

An obspack will be prepared (in close cooperation with LSCE) and distributed by CP and will include:

- usual obspack data
- the ATC data from projects such as CarboEurope, GHG Europe, which contain a lot of time series, not up-to-date but easy to use (no need to contact each PI)
- the data from ICOS-PP and extended, which are updated time series and for which the ATC will contact the PIs
- ICOS data

Participating groups will define a set of stations contained in this obspack to choose from for the inversion.

3.4. Other input

Boundary conditions and meteorology are free.

3.5. Prior uncertainties and correlations

They are free but it is necessary to check that the annual error budgets are not too small (criterion relative to each system).

3.6. Posterior uncertainties

Participating groups are encourage to calculate posterior uncertainties on a montly time scale for predefined large regions -> still need to be defined

4 'Fixed' experiment

According to the results and analysis of the free experiments, it may be necessary to ask for an experiment with common prescribed inputs and errors to treat particular scientific questions then arising. Such experiments would probably deal with shorter time periods than the free ones.

5 Validation data

Aircraft data and FLUXNET data.

6 Time-line

The Eurocom project ends at the end of 2018, therefore we suggest the following rough time-line:

- Ancillary data at CP ready: June 2017
- First inversions ready: September 2017
- Final inversions ready: March 2018
- End of Eurocom project Dec 2018

7 Technical submission of results

By using the uploading system of CP, which will ask for a minimum standard (probably netcdf with the Geocarbon example as a guide-line).

Provisional list of required fields (to be update by the participants):

- Land-sea mask (on grid)
- Prior / posterior fluxes (on grid)
- Any pre-subtracted fluxes (fossil, lateral, biomass burning, …) (on grid)
- Uncertainties (as discussed above)
- Simulated / observed CO2 (at station)
- …