Update on the protocol for the EUROCOM inter-comparisons

Summary of the decisions taken
during the EUROCOM meeting in Paris, Nov 21-22

The objective is to receive the final set of inversions in March 2018. This series of decisions should apply to this final set of inversions but the groups are encouraged to keep on running their present inversions and to send updates of their results until all the data promised below will be available. **When running the final inversions, the groups should start to focus on the period 2011-2015 and then target 2006-2010.**

Update on the atmospheric data

Some stations seem to be very difficult to simulate with >= 1 km resolution transport models.

Within the full list of stations available in the EUROCOM dataset (see the EUROCOM webpage), a subset of stations will be proposed, excluding all those where CHIMERE at 0.5° resolution and STILT (with fluxes at 0.25° resolution) have major issues to reproduce the data variability (analysis by LSCE, double checked by MPI-Jena): SETmax

The stations that have belonged to the CarboEurope, GHG-Europe and pre-ICOS projects should not raise problems, they will be gathered together in a subset of SETmax: SETmin

The groups are still free to select their dataset within the full list of stations available within EUROCOM but are encouraged to use SETmax or subsets of SETmax.

Update of the prior NEE products provided on the EUROCOM webpage

- **A recent version of VPRM** (including GPP and Resp; from MPI-Jena)
- **SiB CASA** (including GPP and Resp; from WU)
- **Update of ORCHIDEE** (with GPP and Resp, and with a field corresponding to the wood and crop harvest for the conversion between NEE and NBP, or with both NEE and NBP fields at 3-hour resolution) (from LSCE): the inversions should use the NBP as prior ecosystem flux; but the NEE can be used as the prior for sensitivity tests
- **LPJ-GUESS** (from UL): no update (it is already available on the EUROCOM website)

Update on the outputs

In addition to the **maps of prior and posterior monthly mean NEE on the selected 0.5° resolution grid over the 2006-2015 period** (see the details on

the first version of the protocol for the inter-comparison), each group is asked to provide:

- diagnostics of the **budgets of prior**[1]**, and, if possible, posterior uncertainties** at the annual and monthly temporal scales, and at the European and national spatial scales
    ⇒ budgets at national scales should be based on the masks provided on the EUROCOM webpage
- **Timeseries of the model prior and posterior hourly CO2 values** compared to the observations at all the stations that are used, and for the time when the data are assimilated; in complement: **timeseries of the hourly values of the PBLH and windspeed** from the meteorological forcing at the corresponding locations and time.
- A table with the **list of stations used and the time window for the selection of the data** to be assimilated at each of these stations
- Prior and posterior mean diurnal cycles for each season / 0.5° grid cells may be asked for in the course of the intercomparison
- At some points, the prior and posterior concentrations corresponding to the aircraft measurement profiles used for the evaluation of the inversions will be asked for

Aircraft evaluation data

CP2 partial columns along aircraft profiles considering the PBLH will be used for the evaluation of the inversions.
LSCE will check data available through ICOS-ATC.
MPI-Jena will check the data availability for BIK and from IMECC.

Miscellaneous

- Groups with fast systems (typically variational systems using pre-computed footprints) are encouraged to **run a wide range of inversions exploring the different available priors, options for the time selection of the data to be assimilated, different obs networks** (considering SETmax, SETmin and potentially the subsets of stations used by other groups) and potentially other estimates of the anthropogenic emissions.
    LSCE (running a relatively slow variational system using the forward and adjoint of CHIMERE for each minimization iteration) proposes to make a set of sensitivity tests over one year only.

- We should keep on using the same anthropogenic emission product. Other products can be considered for sensitivity tests.

- The treatment (control or not, prior or fixed values, prior uncertainties if they are controlled) of the ocean fluxes and the boundary conditions is still free

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[1] U. Bristol should be the only group which has not a direct access to the **B** prior uncertainty covariance matrix but it may have a solution to derive an estimate of the prior uncertainties

Timeline

- **December 15 2017**: provision of the new NEE products: VPRM (MPI-Jena), new ORCHIDEE (LSCE) and SiB-CASA (WU)

- **December 15 2017**: provision of SETmax (LSCE)

- **December 31 2017**: check of SETmax (MPI-Jena)

- **December 31 2017**: tables of SETmax and SETmin (UL/CP)

- **December 31 2017**: aircraft evaluation dataset (MPI-Jena, LSCE)

- **December 31 2017**: region and country masks available (LSCE and UL/CP)

- **End of January 2018:** inversions from all the groups with the final inversion configurations for 2011-2015

- **March 2018**: deadline for the submission of the final inversions for 2006-2015

- **April 2018**: first synthesis of the inter-comparison (and draft of publication)

- While running the present version or the final version of the inversions, all the groups are encouraged to submit and update regularly their results (and not wait for March) to allow for a regular improvement of the inter-comparison analysis (with potential feedback on the set-up of the inversions).