



## *Supplement of*

# **How a European network may help with estimating methane emissions on the French national scale**

**Isabelle Pison et al.**

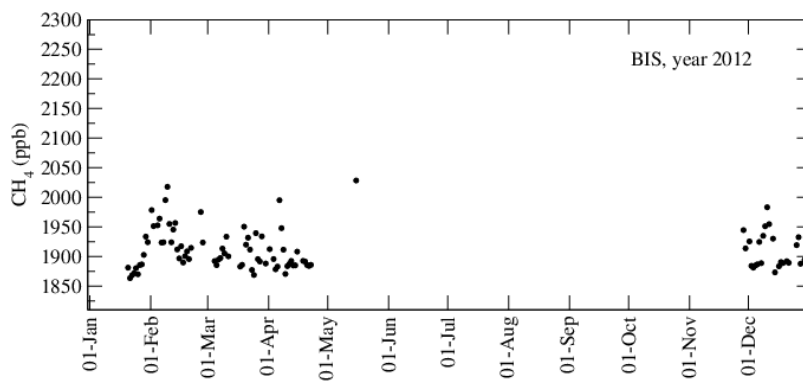
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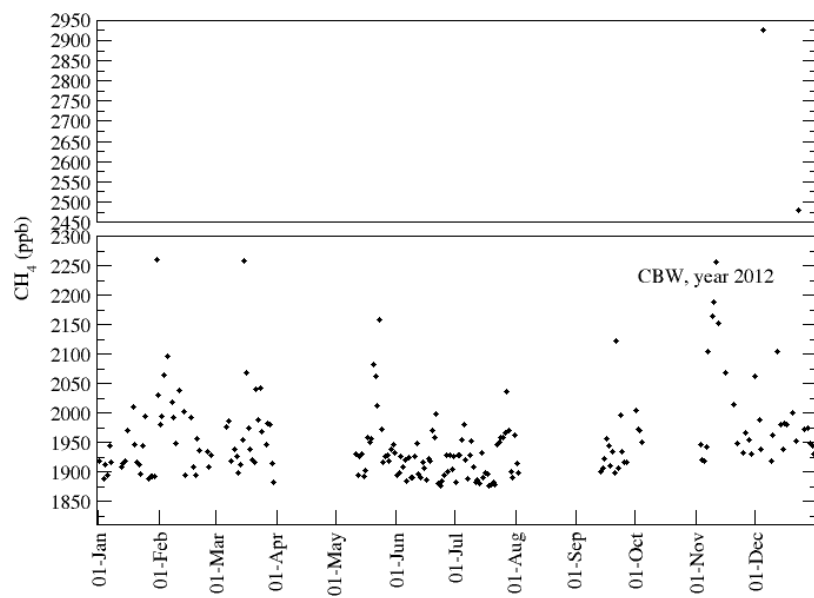
## Supplementary material

### S.1 Time series of the afternoon (14 h-18 h) hourly data at the stations in 2012

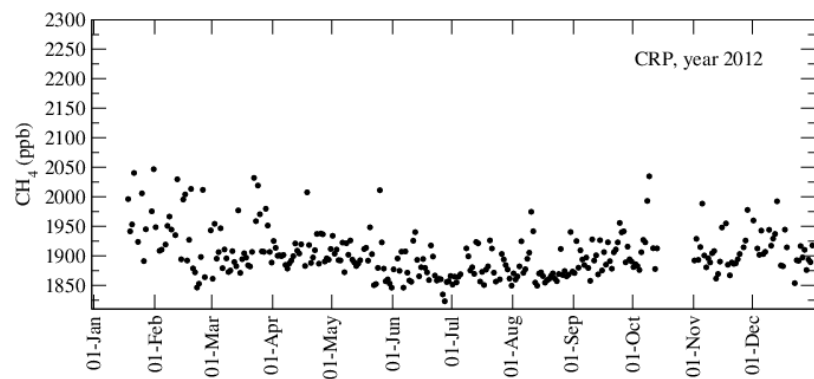
Only the data selected for assimilation is shown here i.e the 14 h-18 h hourly means when the boundary layer height is higher than 500 m in the model, at the highest available level for sites with several levels.



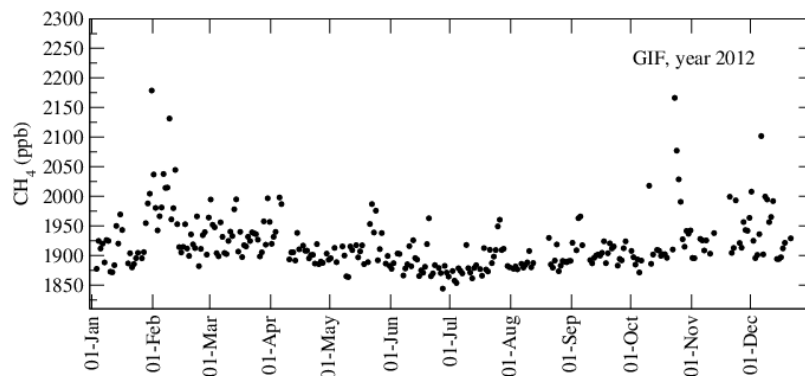
**Figure S.1.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Biscarosse (France) in 2012.



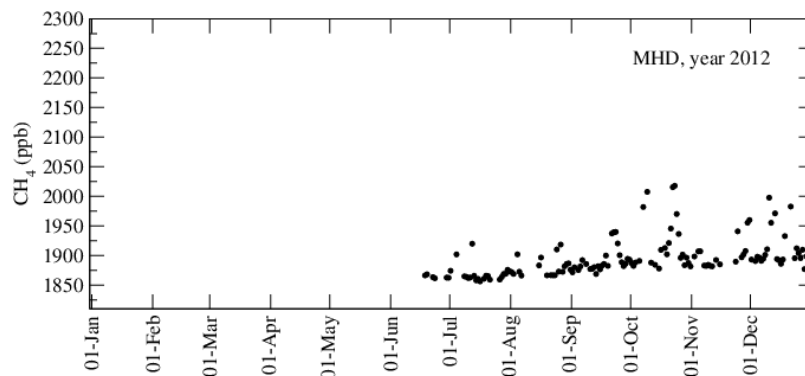
**Figure S.2.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Cabauw (The Netherlands) in 2012.



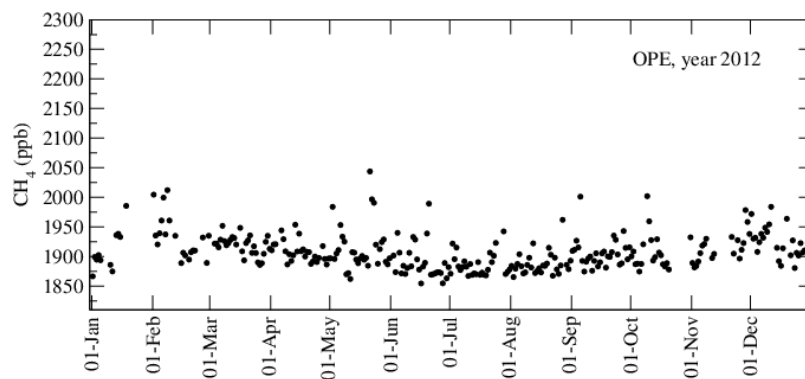
**Figure S.3.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Carnsore Point (Ireland) in 2012.



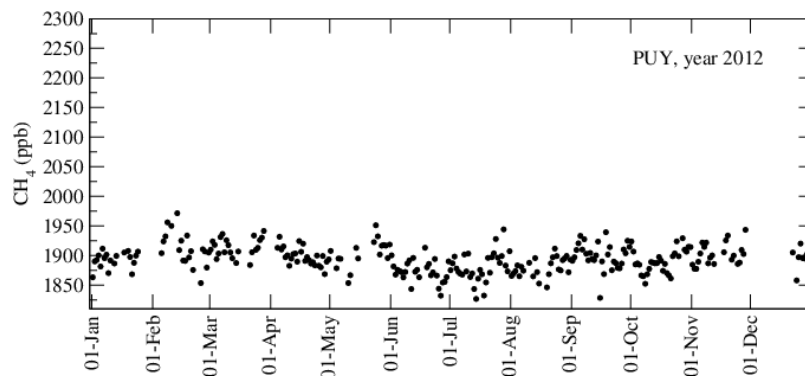
**Figure S.4.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Gif-sur-Yvette (France) in 2012.



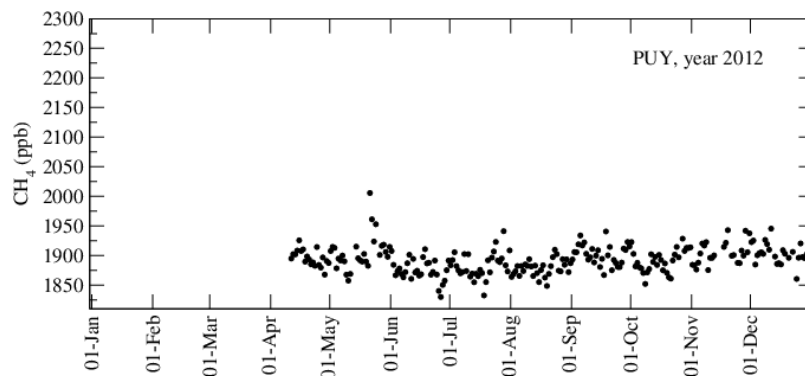
**Figure S.5.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Mace Head (Ireland) in 2012.



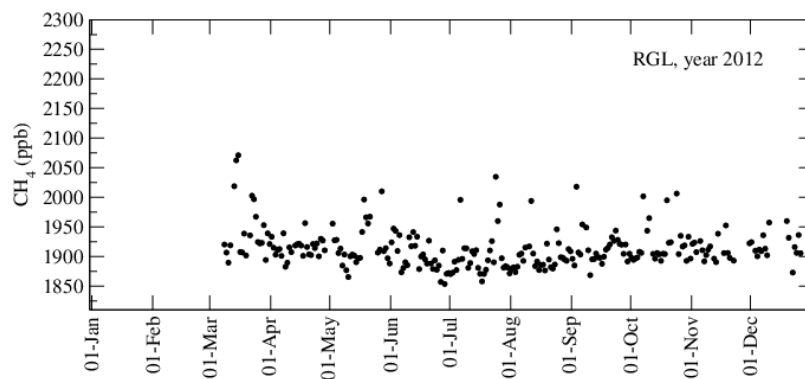
**Figure S.6.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at the Observatoire Pérenne de l'Environnement (France) in 2012.



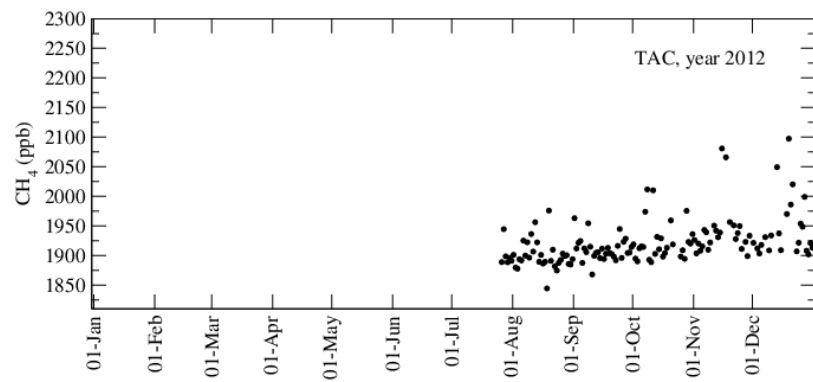
**Figure S.7.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Puy-de-Dôme (France) by a gas-chromatograph in 2012.



**Figure S.8.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Puy-de-Dôme (France) by a Picarro instrument in 2012.

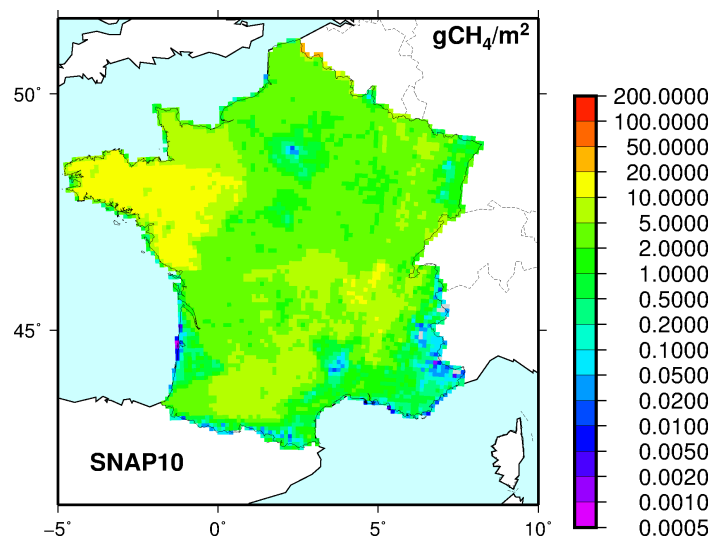


**Figure S.9.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Ridge Hill (United Kingdom) in 2012.

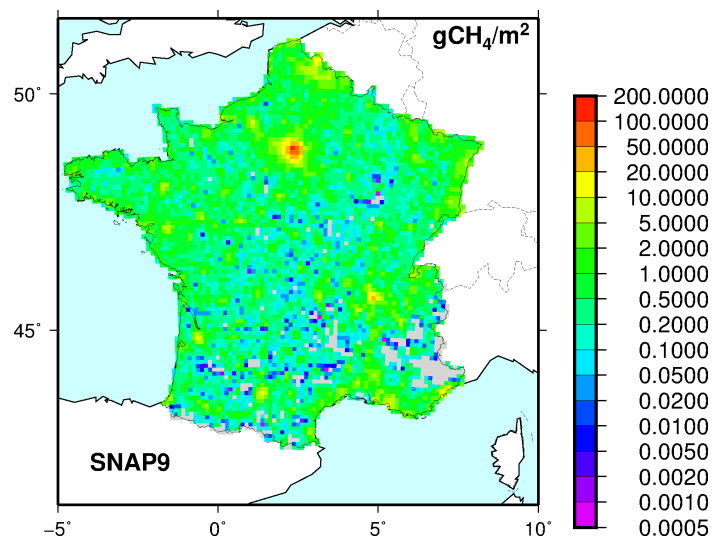


**Figure S.10.** Afternoon hourly means of  $\text{CH}_4$  mixing ratios at Tacolneston (United Kingdom) in 2012.

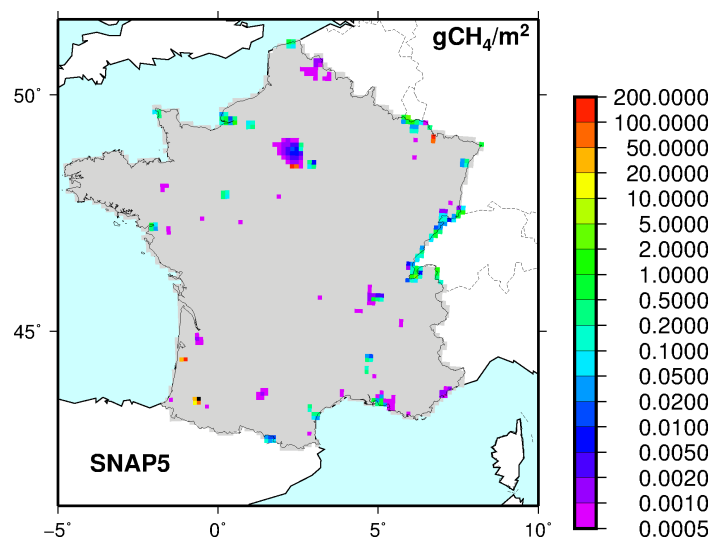
## S.2 Prior maps of CH<sub>4</sub> emissions by IER



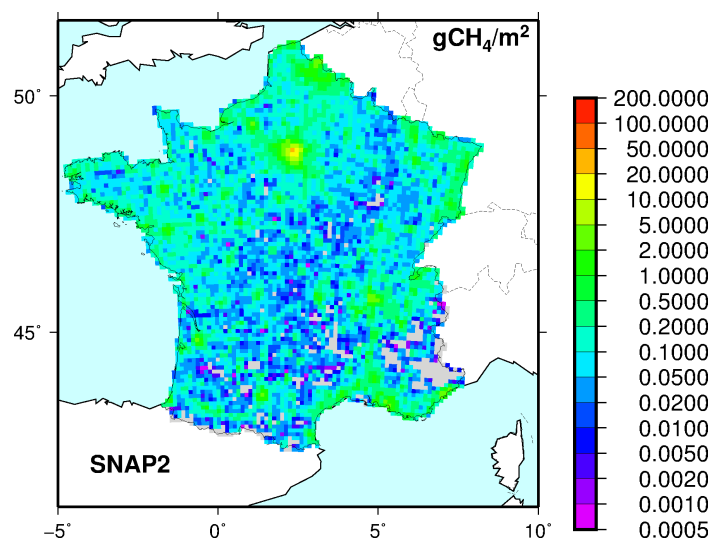
**Figure S.11.** SNAP 10: agriculture, yearly total in France in 2012: 2356 Gg.



**Figure S.12.** SNAP 9: waste treatment and disposal, yearly total in France in 2012: 522 Gg.



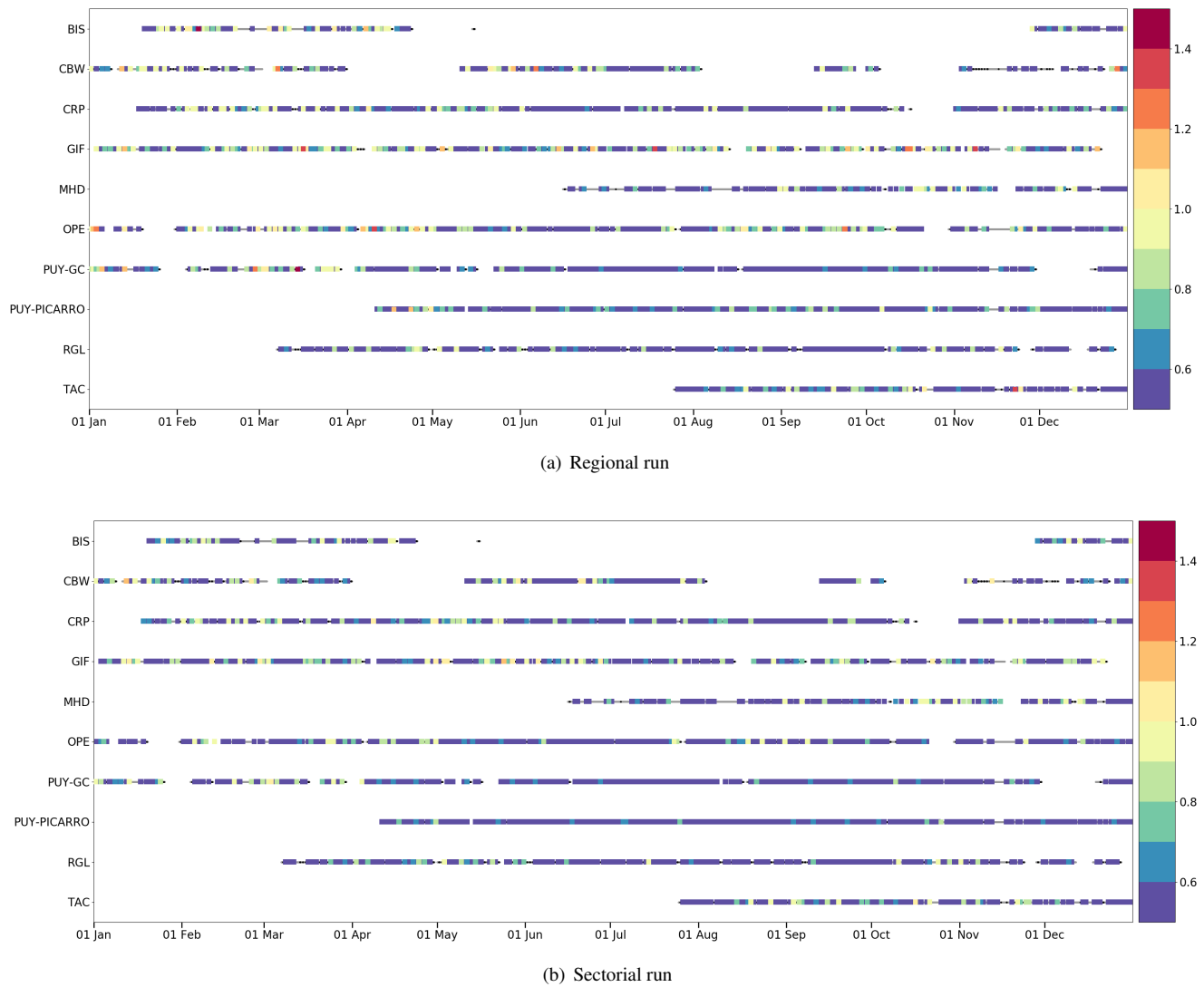
**Figure S.13.** SNAP 5: distribution of fossil fuel, yearly total in France in 2012: 94 Gg.



**Figure S.14.** SNAP 2: non-industrial combustion plants, yearly total in France in 2012: 107 Gg.



### S.3 Information used at the measurement sites in 2012



**Figure S.15.** Available hourly means of  $\text{CH}_4$  mixing ratios and contribution of each site to the inversion of  $\text{CH}_4$  emissions: available data in grey; selected data (between 14 h and 18 h UTC when the boundary layer height is higher than 500 m in the model) in black; on the colour scale, data actually used by the inversion i.e after filtering out plume situations and under-constrained areas: the value gives the information brought each day (from 0 to a maximum of 5 for the 5 hourly means between 14 and 18 h included); it is computed from the diagonal terms of the sensitivity matrix. A value of 1 means that the data assimilation system uses the equivalent of one hourly mean.