CarbonTracker Europe and related efforts

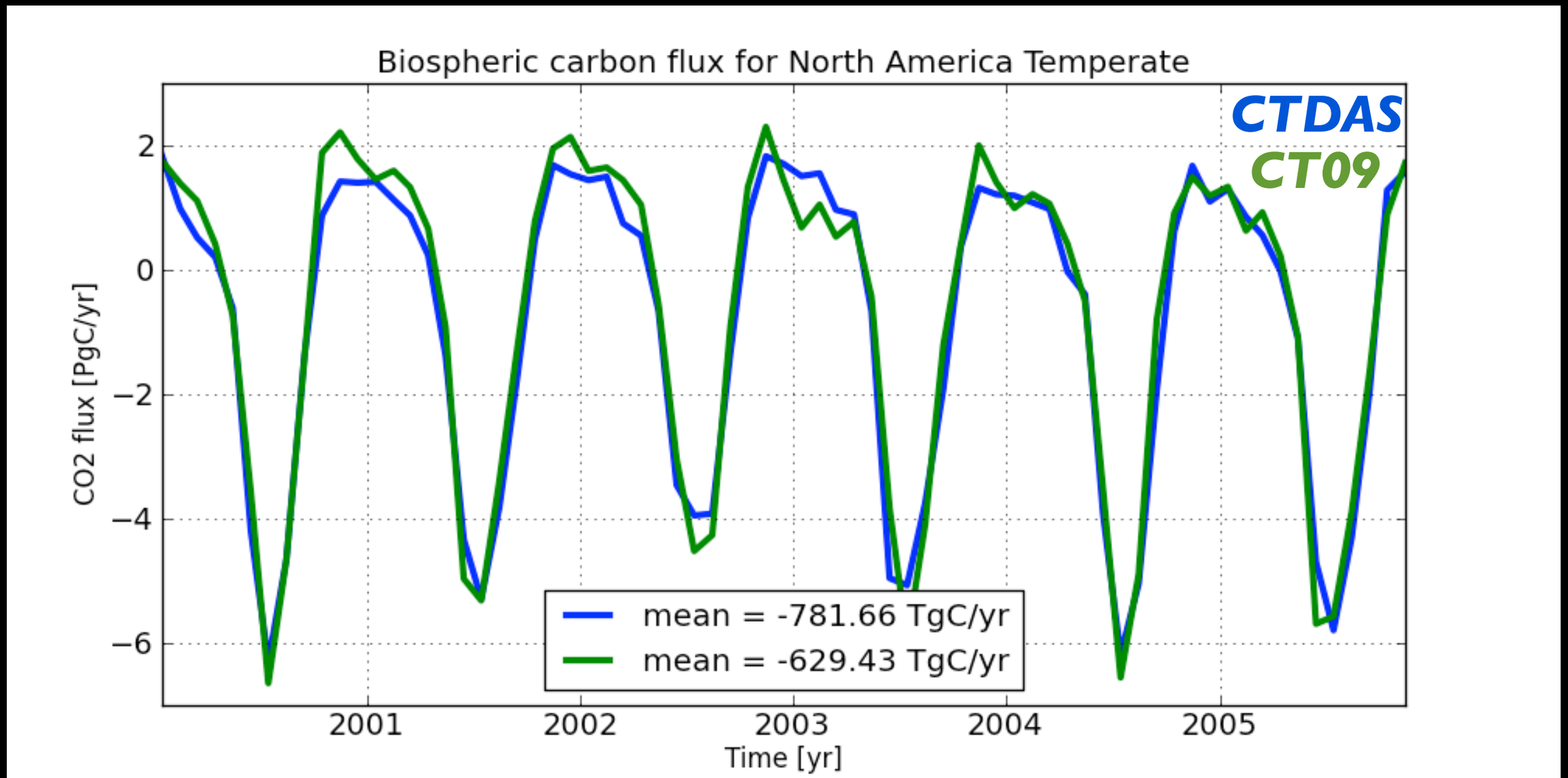
CTDAS

- CarbonTracker based on a python ensemble Kalman filtering shell
  - see previous TM5 presentations
- Used in Wageningen and Nanjing U., China
  - Gave training in Beijing in August 2011
- Planned use in Finland (Leif Backman+Aki Koyama, CH_4)
- Planned use in Germany (A. Butz, Arne Babenhauserheide), CO_2+CH_4+ 4d-var
- Proposed in Switzerland (Nikki Gruber)

CTDAS

- Nanjing (Jing Chen): build CT China with zoom over Asia and local CO_2 observations (?!) ingested
- Finland (L. Backman): build CT for CH_4 at high latitudes
- Germany (A. Butz) : comparison between 4d-var and EnKF of satellite+FTS column CO_2 data
- Wageningen (W. Peters): system development, application in geocarbon, VIDI research, ICOS-NL (?)
  - status: ready for beta tests

CTDAS



Differences:
TM5 cy3 vs cy2, "sample after v," Fraserdale out,
fixed minor bug in ct09 optimizer, ...

CTDAS

- Planned use in GEOCARBON (EU-FP7)
  - reanalysis of recent global C-cycle
  - 4 different CO_2 inverse systems
  - use CO_2 + other constraints (^{13}C, biomass,...)
  - PostDoc position open (2+ years)
- New PhD (Marie Combe): Develop CT crop modeling for C-cycle

CarbonTracker Data Assimilation Shell

Chapter 1: Configuring CTDAS to run an experiment

In which you will learn to modify the three primary files that together control a CTDAS experiment

Modify the two primary rc-files

When you checkout CTDAS from the subversion server, there are two example rc-files that you need to modify.

1. The `das.rc` file, which describes your CTDAS configuration with respect to experiment name, time period, and lag
2. The `carbontracker.rc` file, which describes your CTDAS configuration with respect to observations and statevector

Note

The example files are found in the da/examples/ directory of your CTDAS tree. You are encouraged to create copies of these primary rc-files before modifying them. The rc filenames are specified to the system before running CTDAS and thus you can use a different copy of these files for different experiments and purposes. You can even create a sub-directory with the settings of all your experiments if you like.

You can open these in any text editor and replace the values of each key with appropriate settings for your experiment. For example:

```
dir.da_run            : ${HOME}/tmp/test_da
```

can be replaced by:

```
dir.da_run            : /scratch/${USER}/my_first_ctdas_run
```

Which, as you have likely guessed, will change the location where CTDAS creates a directory structure and places input/output files for your simulation.

Where the `das.rc` file is rather self-explanatory, the `carbontracker.rc` file has keys that refer to the inner workings of CTDAS, such as:

```
ocn.covariance  : ${datadir}/oif_p3_era40.dpco2.2000.01.hdf
```

CarbonTracker
Data Assimilation Shell

Tutorial

The CTDAS tutorial is written to provide some guidance for common tasks when running, extending, or modifying CTDAS for you purpopes.

Warning

It is not a basic course in data assimilation techniques, nor in the use of python, object-oriented programming, or UNIX.

The descriptions assume that you are familiar with these. It also assumes that you have successfully compiled and run a transpor (usually TM5), that can serve as observation operator for your CTDAS runs. Instructions on how to obtain, compile, or write such are not included here. We refer to the *installation* section for further help with those steps.


```
ocn.covariance  : ${datadir}/oif_p3_era40.dpco2.2000.01.hdf
```

CTDAS

- Large contribution to *ICOS-NL*: if funded...
  - Infrastructure project for carbon cycle observation + interpretation, 5 years
  - 8M€ for measurements, 8M€ for interpretation
  - Support for operational TM5 + CTDAS
  - Support for research TM5 + CTDAS + WRF
  - CO_2 + CH_4 + N_2O
  - Carbon Portal:
    - collection, dissemination, and assimilation of all ICOS greenhouse gas information

Enterprise Service Bus (IBM+SARA NCF)