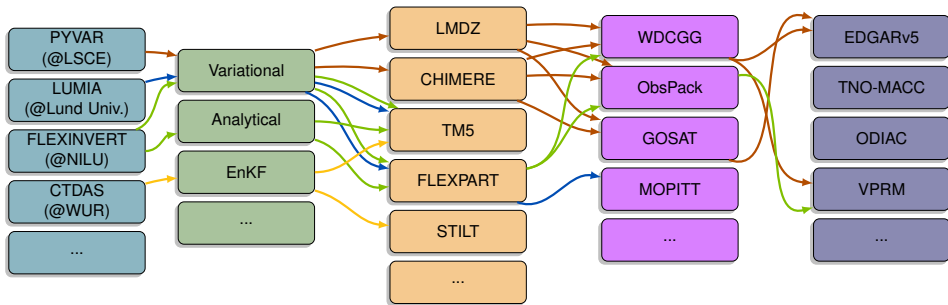


Inversion community background



Disclaimer: not comprehensive figure

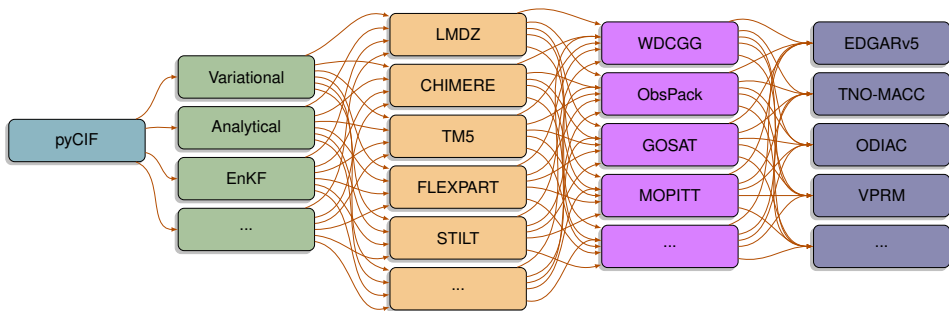
Pros

- ✓ dynamic community
- ✓ necessary and fruitful diversity

Cons

- ✗ redundant developments
- ✗ loss of efficiency to propagate new developments
- ✗ lack of inter-comparability

T5.3 tool: the Community Inversion Framework (CIF)



Objectives

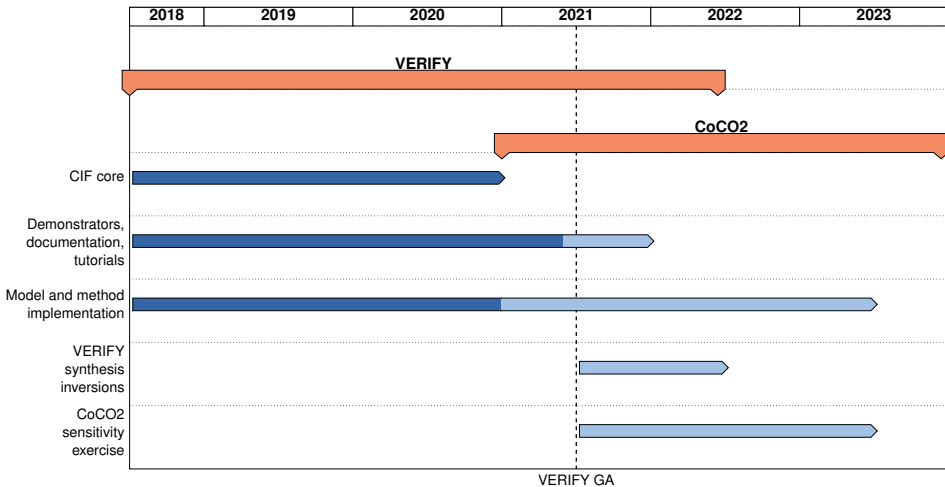
- ✓ rationalize efforts
- ✓ foster cross-compatibility

Means

- common standard
- single programming framework

Developed during VERIFY

CIF timeline in VERIFY and CoCO2



Current status: implemented models and functions

Several running modes implemented

- forward simulations
- test of the adjoint
- footprints
- variational inversions

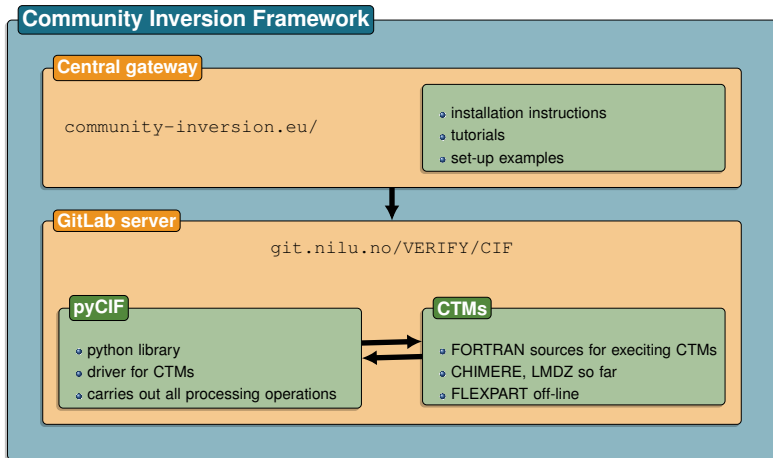
Transport models plugged to the CIF

- ✓ LMDZ
- ✓ CHIMERE
- ✓ FLEXPART
- ~ TM5
- ✗ STILT
- ✗ others

Other features

- ✓ satellites and in-situ observations
- ✓ covariance matrices
- ✓ pre-processors (reprojection, etc.)
- ✗ more elaborated state vectors (CCFFDAS, etc.)

CIF organization



Dedicated developments

- CHIMERE, LMDZ, FLEXPART models implemented; TM5 (**VUA**) and STILT (**MPG**) in progress; WRF-Chem and LOTOS-EUROS to be interfaced
- variational, analytical and EnKF implemented; EnKF to be improved and generalized (**FMI**)
- interfacing chosen input data streams (inventory, obs., etc.)

Case study

- CO₂, and possibly CH₄ over Europe
- in-situ network + CO2M
- short period of time to compute numerous different set-ups
- ⇒ for each model and each inversion method, compute a test
- ⇒ use ensemble of IFS weather-forecast simulations as transport constraints when possible (**ECMWF**)

- Definition of test study with partners
- Objective of simulating the full VERIFY inversion period with the CIF with at least FLEXPART and CHIMERE
- Draft protocol to be shared with partners (here)

Groups involved to run/develop the CIF

- LSCE: CHIMERE, core system
- NILU: FLEXPART, core system
- VU: TM5
- Empa: FLEXPART
- MPI: STILT