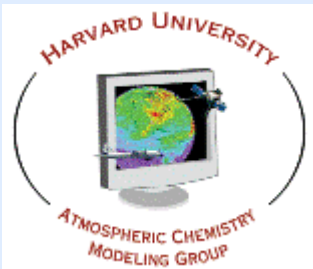


The new advection in GEOS-Chem and the next "chemistry" release

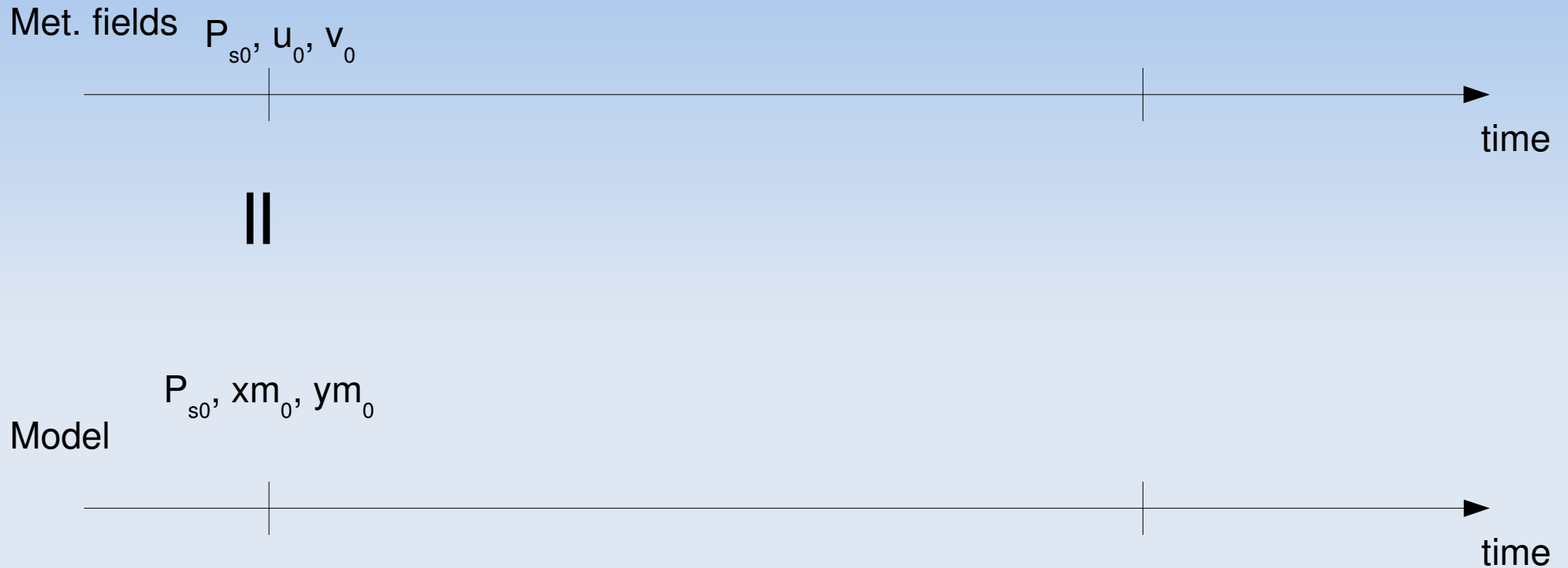
Claire Carouge



GEOS-Chem Meeting,
April 7-10 2009

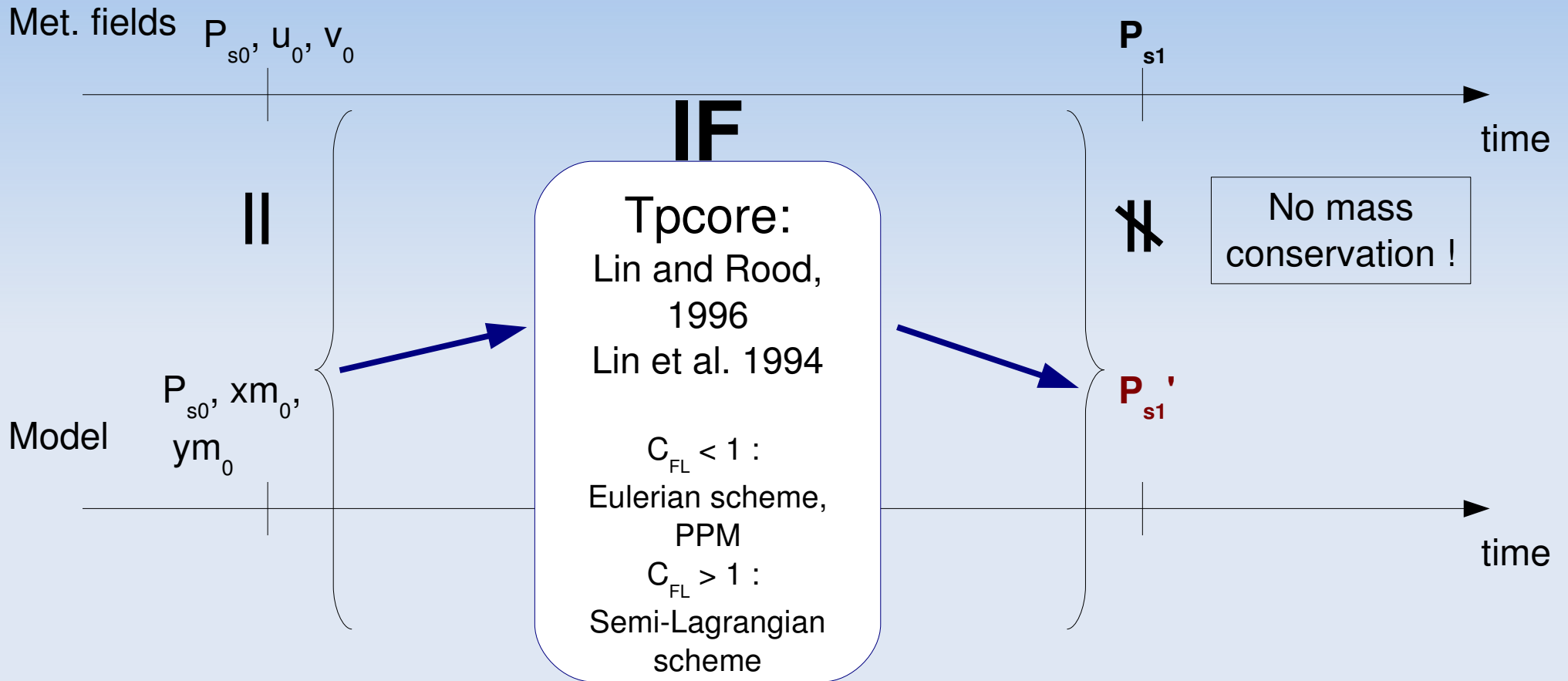


The advection in GEOS-Chem



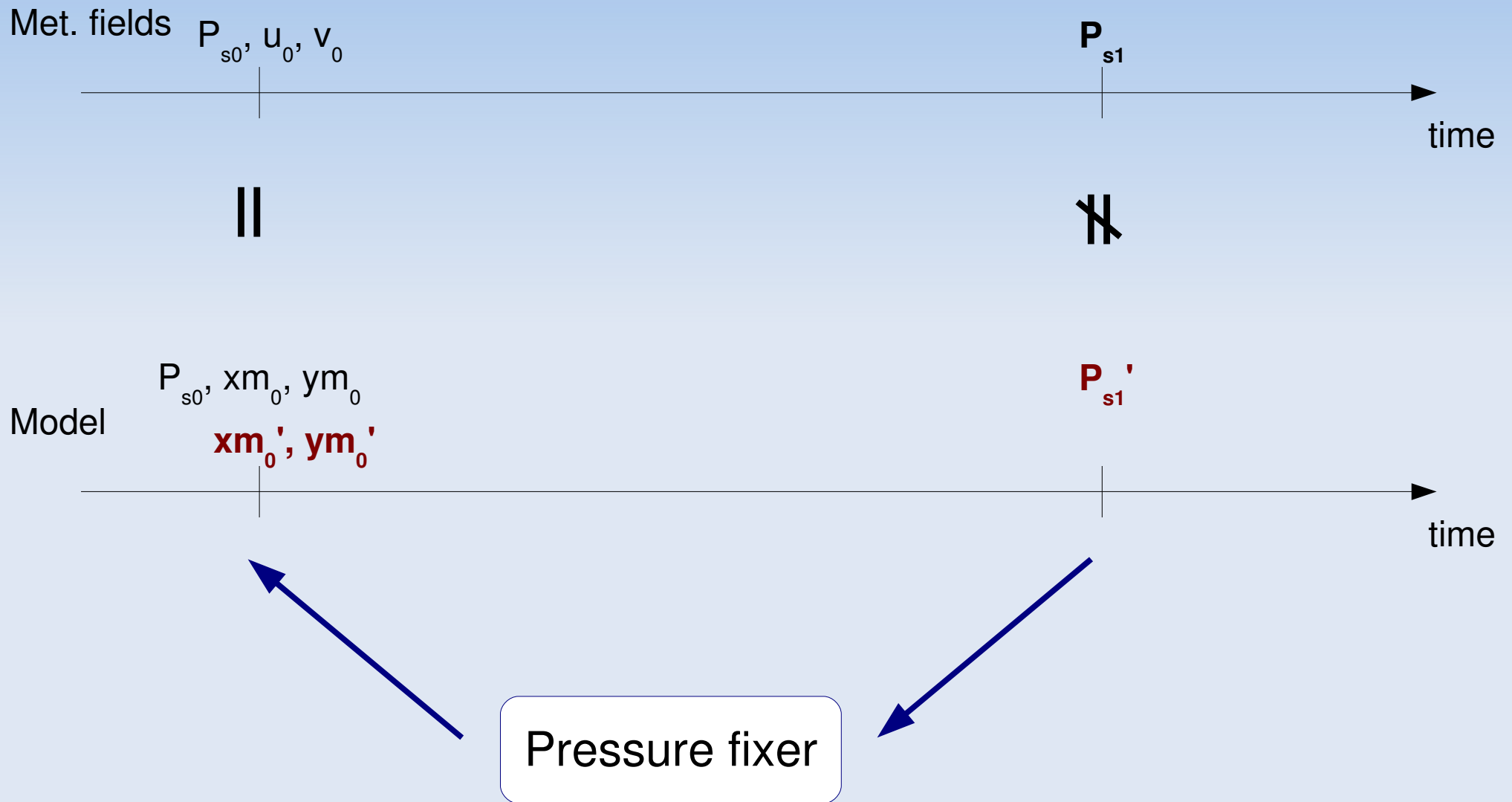
P_s : surface pressure, u & v : horizontal winds, xm & ym : horizontal mass fluxes

The advection in GEOS-Chem



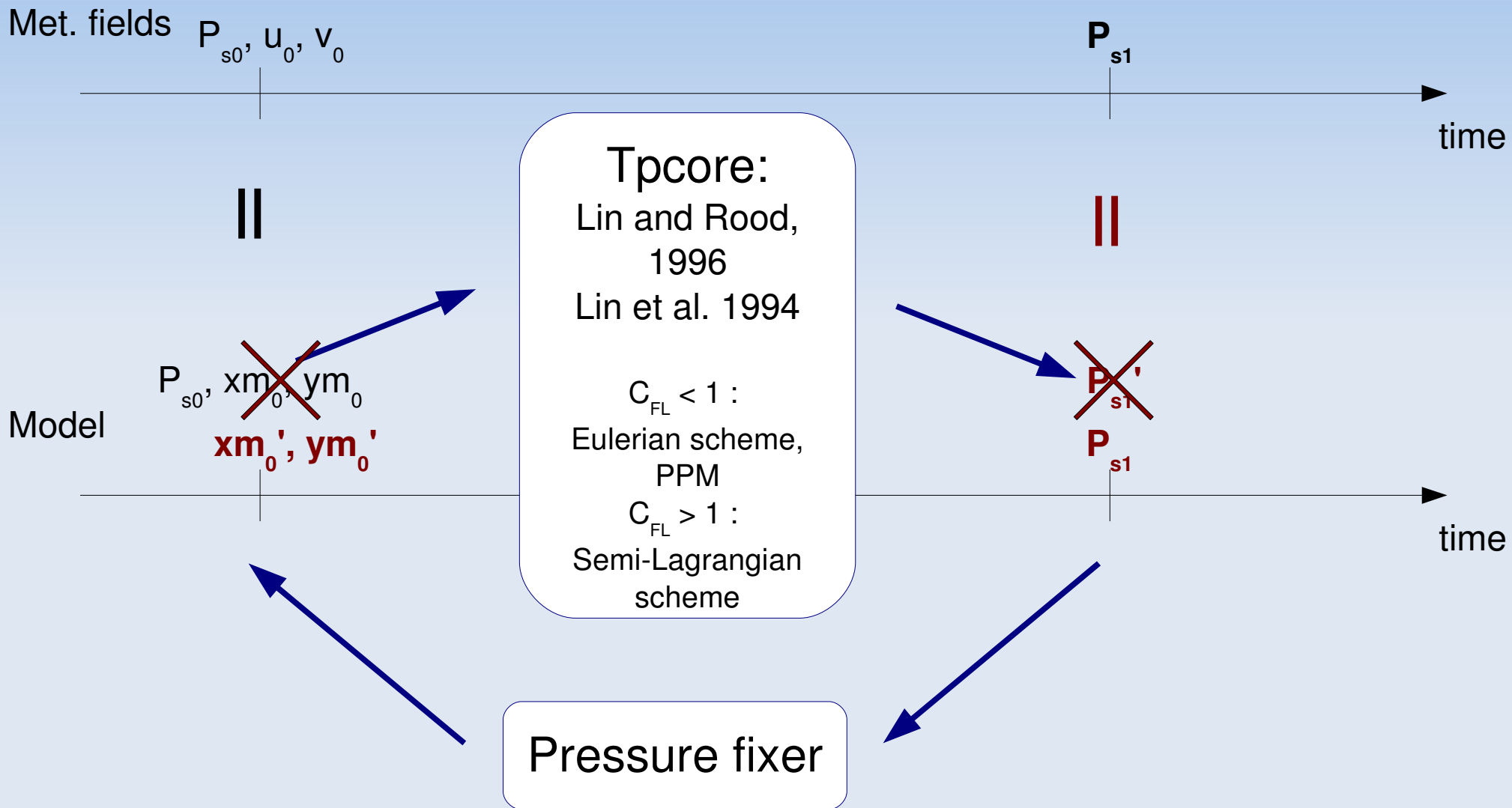
P_s : surface pressure, u & v : horizontal winds, xm & ym : horizontal mass fluxes

The advection in GEOS-Chem



Ps : surface pressure, u & v: horizontal winds, xm & ym: horizontal mass fluxes

The advection in GEOS-Chem



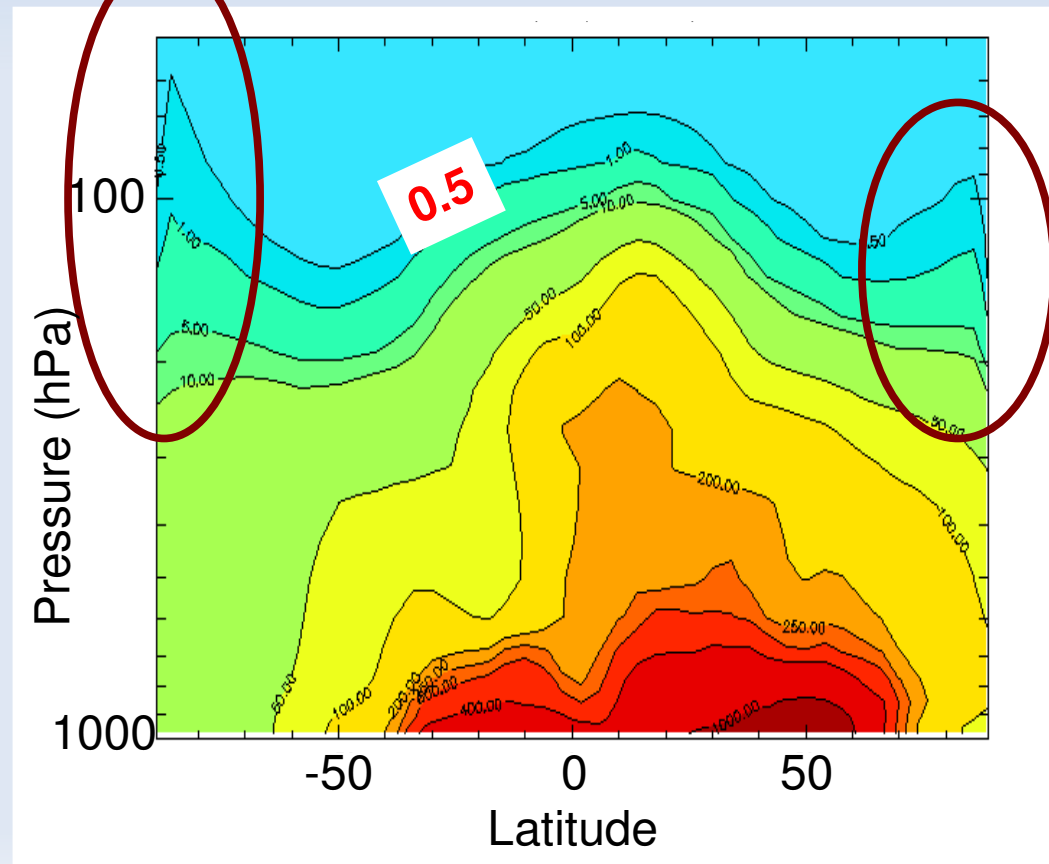
P_s : surface pressure, u & v : horizontal winds, x_m & y_m : horizontal mass fluxes

Strat-Trop. exchange

- Transport was too strong across the tropopause

Radon for September 2004 with GEOS4 (mBq/cm²)

GEOS-Chem: v8-01-02



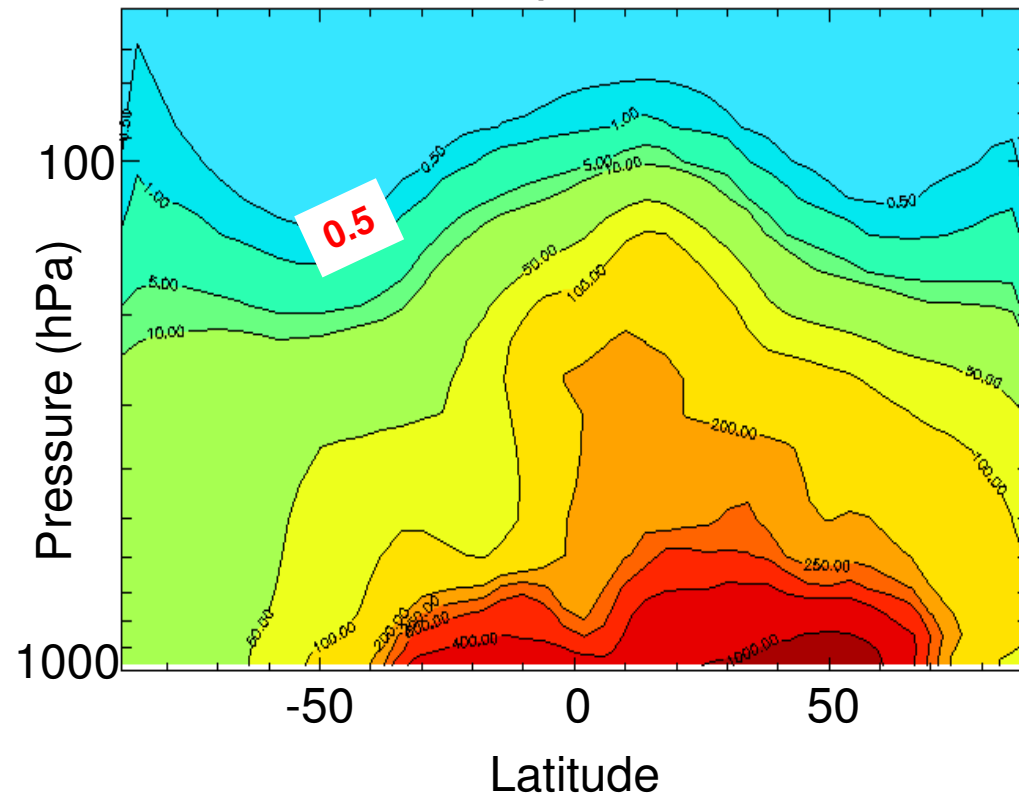
Problem due to discrepancies between pressure fixer and tpcore

- Implementation of a new P-fixer from GMI (by P. Cameron-Smith)
- Problem with special handling of the poles:
 - Polar cap of 1 latitude cell wide in GEOS-Chem vs. 2 in GMI.
- Solved by:
 - Implementing the tpcore from GMI
 - Switching the polar cap from 1 to 2 latitude cells.

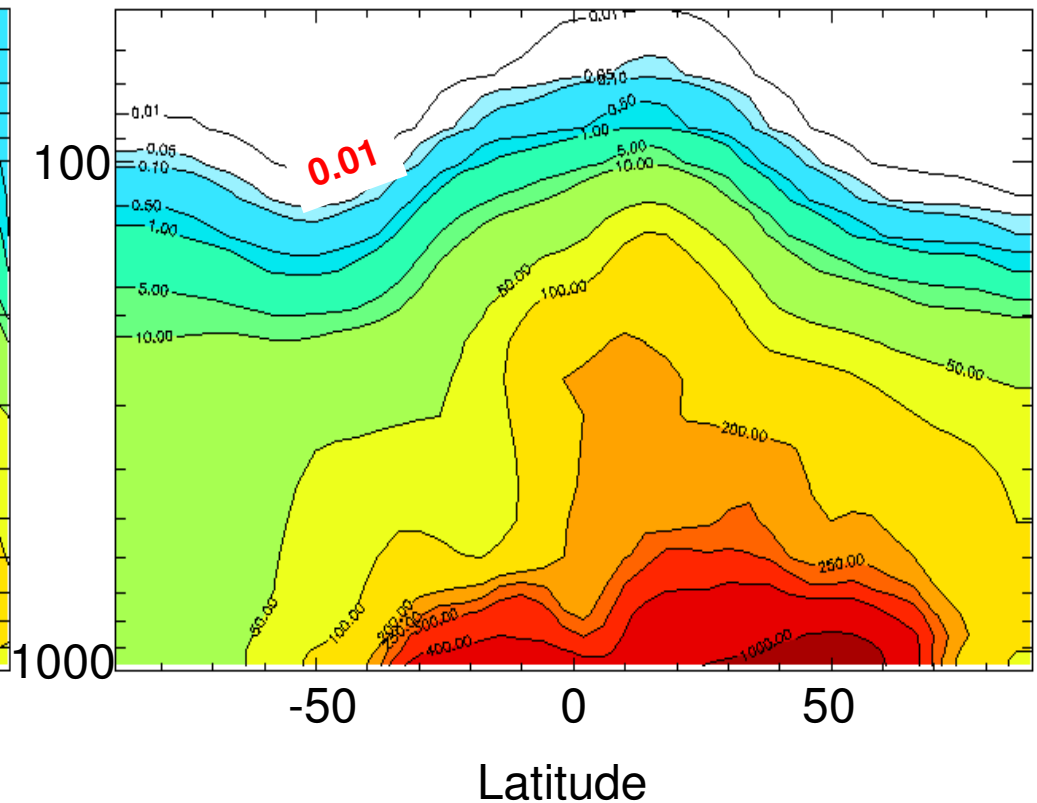
Using tpcore from GMI greatly reduces strat-trop exchange, eliminates polar problem

Radon for September 2004 with GEOS4 (mBq/cm²)

GEOS-Chem with "old"
tpcore



GEOS-Chem with GMI
tpcore



Large differences in the stratosphere and not in the troposphere

See also Dave McKenzie's talk (10:20 today) about the improvement for strat. O₃

Fixing the slowdown resulting from OpenMP parallelization of GMI version of tpcore

- Change from // of each small loop in each subroutine to // the tracer loop in the main routine of tpcore.
- Move the loop over vertical levels outside the subroutines for horizontal transport.
- 1 week run, with 43 tracers and no chemistry on 4 processors, resolution 4x5.

v8-01-02 "old" tpcore	v8-01-03 GMI tpcore	v8-01-03 (+patch) optimized GMI tpcore
8 min	15 min	8 min

To get the patch, see

http://wiki.seas.harvard.edu/geos-chem/index.php/GEOS-Chem_versions_under_development#v8-01-04

GEOS-Chem v8-02-01: "Chemistry release"

- Updates contained in this version
 - Glyoxal chemistry (T-M. Fu)
 - HO₂ uptake (L. Jaeglé)
 - Updated reaction rates (J. Mao, D. Millet, Palmer group)
 - Updated J(O¹D) cross sections (L. Zhang, J. Mao)
 - Updated dust single scattering albedo (R. Martin)

- Status
 - Currently in debugging & testing
 - http://wiki.seas.harvard.edu/geos-chem/index.php/GEOS-Chem_versions_under_development#v8-02-01
 - This will be a "public" release (i.e. web & docs rewritten, etc.)