A series of TransCom webinars, #4
07:00 – 09:30 UTC, April 7, 2026.

Transport models and associated errors in inverse modelling II

Meeting agenda

Time (UTC)*	Presentation title	Presenter name
07:00 – 07:05	Introduction and starting up	Organisers
07:05 - 07:35	Effect of transport model resolution on long-lived gases simulation	Prabir Patra
07:35 - 08:05	The Community Inversion Framework as an operational tool for inverse modelling: towards robust, streamlined, and automatized intercomparisons of transport models and top-down estimates	Joel Thanwerdas
08:05 - 08:15	Break	
08:15 - 08:45	Ranking the performance of CO_2 transport in global transport models associated with prescribed surface fluxes	Chiranjit Das
08:45 - 09:30	Discussion	

* The reserved presentation time includes Q & A for at least 5 minutes.

Short description presentations

Effect of transport model resolution on long-lived gases simulation

Presenter: Prabir Patra (Research Institute for Global Change, JAMSTEC, Yokohama)

I will show some results of a few tracers simulation using MIROC4-ACTM at JAMSTEC. Model is run at T42 (~2.8x2.8 deg) and T106 (~1.1x1 deg). Clear differences are seen between the two simulations when sites are located near the source regions for chemical tracers without chemical loss, and other transport related effects, e.g., stratosphere-troposphere exchange, are seen in N2O simulations. (Separate model simulations using WRF-Chem suggest something 1x1 km or finer resolution is needed reduction of site representation error in the city areas; Bisht et al., https://doi.org/10.1029/2025jd043589)

The Community Inversion Framework as an operational tool for inverse modelling: towards robust, streamlined, and automatized intercomparisons of transport models and top-down estimates

Presenter: Joel Thanwerdas (Empa, Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland)

After several years of development and the coupling of CIF with a wide range of transport models used by the inversion community, we present the first intercomparison study conducted with CIF. This exercise focuses on Europe and aims to refine CO_2 natural emissions for the year 2019, following a strict protocol. It involves five transport models (CHIMERE, ICON-ART, LMDz, STILT, and WRF-CHEM) and two inversion algorithms (variational and ensemble-based). Two additional transport models, TM5 and FLEXPART, will be incorporated in the near future. The results show a good agreement, both across transport models, and inversion algorithms. It paves the way towards using CIF as an operational tool for intercomparison studies. It also highlights its strong potential to support the systematic derivation of GHG budgets with multiple transport models, enable a proper and easy quantification of the modelling uncertainty, and improve the robustness of emission estimates, for any relevant atmospheric species, at any scale.

Ranking the performance of CO_2 transport in global transport models associated with prescribed surface fluxes

Presenter: Chiranjit Das (LSCE, Laboratory for Climate and Environmental Sciences, France)

This study evaluates atmospheric CO_2 transport in multiple global transport models driven by prescribed surface fluxes through comparison with surface, aircraft, and AirCore observations. We evaluate the performance of model simulations of CO_2 using a range of statistical metrics that capture variability, bias, and timing, and use these to rank model performance. Results reveal systematic differences in model performance across latitude and vertical levels, highlighting the role of both prescribed surface fluxes and transport differences. Some models demonstrate consistent skill across observational platforms, while others show persistent biases. This study is a coordinated efforts of model evaluation under Carbon Atmospheric Tracer Research to Improve Numerical schemes and Evaluation (CATRINE) project by the European Union. More results with greater details will be presented.