

eSSENCE Project

High resolution atmospheric CO₂ inversions

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Mission

- The development of a mesoscale atmospheric CO₂ inversion system building upon e-Science tools
- An estimation of high resolution local (sub-national) CO₂ fluxes
- Establishing a working collaboration between the disciplines of Meteorology at UU and Ecosystem Science at LU.



Strategy

- Make use of atmospheric CO₂ concentrations at the ICOS station Norunda. ICOS is a world class research infrastructure and part of the European Strategy Forum on Research Infrastructures. It consists of a network of measurement stations.
- Simulate atmospheric CO₂ concentrations at the Norunda site using a meso-scale atmospheric transport model WRF and prescribed boundary conditions
- Invert the transport to optimise boundary fluxes at the surface using pre-calculated response functions



Partners & Key Personal

- At the Department of Physical Geography and Ecosystem Sciences, Lund University
 - Anders Lindroth, project manager for ICOS-Sweden: data provision
 - Marko Scholze, PI for this project: CO₂ and inverse modelling
 - NN, project PostDoc
- At the Department of Earth Sciences, Uppsala University:
 - Matthias Mohr: meso-scale atmospheric modelling
 - Hans Bergström: meso-scale atmospheric modelling



Collaboration & Outreach

- Main collaborators are
 - ICOS-Sweden for data provision
 - Max-Planck-Institute for Biogeochemistry, Jena, Germany, for help and knowledge exchange in meso-scale CO₂ transport modelling and inversions (e.g. providing global boundary conditions)
- Outreach will be based on
 - eSSENCE infrastructure
 - ICOS-Sweden facilities, which are embedded in the European wide ICOS

