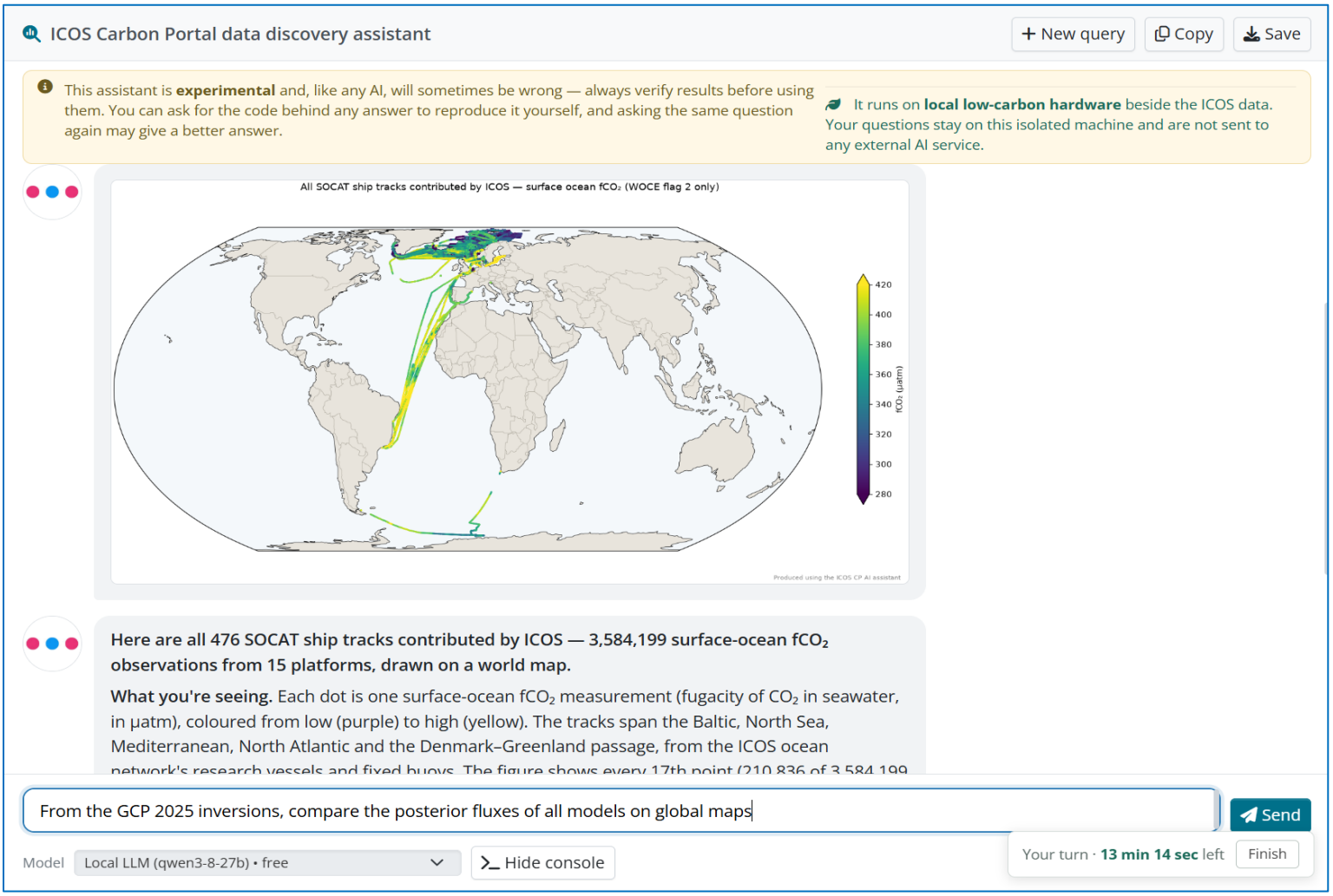
Ask ICOS — the Carbon Portal data-discovery assistant

A prototype you can try at SC2026_lund.

Fifteen minutes, your own questions, and we want to hear what you think.



What it is

An AI assistant that finds, reads and analyses ICOS data for you. You ask in plain language — a station, a variable, a period, a comparison — and it searches the ICOS Carbon Portal, opens the data, runs the analysis, draws the figure and hands you the result **with the citation and the license of the data it used**.

It is not a chatbot that talks *about* ICOS. Every number it reports comes from data it retrieved during your conversation; every figure was drawn by code it wrote and ran; every citation is copied from the dataset's own metadata. If it cannot find the data, it says so.

Under the hood it runs on a language model hosted by the Carbon Portal itself — your questions and the data stay on ICOS infrastructure and are not shared.

https://ai-portal.icos-cp.eu/

ICOS Integrated Carbon Observation System

This assistant is **experimental** and, like any AI, will sometimes be wrong — always verify results before using them. You can ask for the code behind any answer to reproduce it yourself, and asking the same question again may give a better answer.

It runs on **local low-carbon hardware** next to the ICOS data servers and is (apart from the user interface) completely isolated from the internet. Your questions stay on this isolated machine and are not sent to any external AI service.

How to use it

1. **Sign in** at **https://ai-assist.icos-cp.eu** with an e-mail address or any identifying name (only used to name your place in the queue — it is not stored) and the password on the stand.
2. **Accept the ICOS data licence** (CC BY 4.0). Everything the assistant retrieves is open data, and it will always tell you whom to credit.
3. **You get a 15-minute slot.** Four people can be on at once; if the stand is busy you see your place in the queue. You can pause your slot.
4. **Say "yes" to the opening offer** — a world map of all ICOS ship tracks coloured by fCO_2. It is a good first look at what a single question can produce, and it shows you how long a big plot takes on this hardware (about 40 seconds).
5. **Then ask your own questions.**

Questions that work well

- *What was the mean CO_2 at Cabauw at 207 m in January 2023?*
- *What is the CO_2 growth rate at Izaña over the last 15 years?*
- *Plot annual mean CO_2 at Izaña, Cabauw and Hegyhátsál.*
- *Plot the 2024 tracks of the Finnmaid coloured by pCO_2. Plot*
- *Create a table of monthly NEE at Hyltemossa for 2018–2024.*
- *Show the trend of annual NEE for coniferous forests in Europe.*
- *Is the CO_2 growth rate at the end of the Izaña series significantly different from the start?*
- *Make a map of Europe with the ICOS atmospheric stations.*
- *Which gridded products have NEE for 2020–2025?*
- *From the GCP 2025 inversions, compare the posterior fluxes of all models on global maps.*

Level 1 near-real-time files, phenocam images and the full station list are found and linked, and it will tell you when something is *not* in ICOS (SITES and ICOS Cities are separate repositories and are not covered by this prototype). What is also there are all Level 2 data products and the most important Level 3 products (model, elaborated data, so you can for example try to compare FLUXCOM, LPJ and CTE NRT fluxes with station data.

Getting the most out of it

- **Be specific**: a station or region, a variable, a period. "Cabauw 207 m, CO_2, January 2023" gets an answer in 25 seconds; "tell me about CO_2" gets a question back.

- **Follow up.** It remembers the conversation: "same for Izaña", "now as a correlation plot", "add the 12m inlet". Follow-up on numbers already on screen is quick.
- **Ask for the code.** "Give me the code you used" returns the exact Python it ran — take it home and run it against the same open store yourself. You can try to ask for R or Julia code as well.
- **Read the quality-control line.** Every answer says which flags were applied and how many points were excluded. That is the difference between a number and a result.
- **Check what it tells you.** It is a prototype: it can misread a request, pick a short record when a longer one exists, or compare two products in different units. Its answers are grounded in retrieved data, but *you* are the reviewer. If something looks wrong, say so in the chat — and in the feedback form.
- **Big plots take time.** Anything over millions of points runs 20–60 seconds; the page tells you it is still working.

What it will not do

Interactive maps; data from the current year for ecosystem sites (those are Level 1 near-real-time files on the portal, which it will point you to); anything outside ICOS; and it will not hand you a data file — it shows you where the file lives and how to get it.

What it can reach

	Where the data lives	What you can ask
Atmosphere	The European ObsPack compilation: CO_2, CH_4, N_2O, CO, $^{14}CO_2$, radon and meteorology from 170+ station–inlet records, some back to 1972, updated to yesterday	means, trends, growth rates, seasonal cycles, vertical gradients, station comparisons
Ecosystem	FLUXNET-processed ICOS Level 2 archives: NEE, GPP, respiration, energy and water fluxes, meteorology, half-hourly to yearly, for 42 sites	seasonal and annual carbon balances, site comparisons, flux–climate relationships
Ocean	The ICOS contribution to SOCAT: 4.7 million surface fCO_2 observations from 15 ships and fixed stations	cruise tracks on a map, fCO_2 along a route, regional and seasonal patterns
Gridded and model products	Level 3 products on the portal: FLUXCOM, VPRM and LPJ fields, GCP inversions and budgets, emission inventories	maps of fluxes, model ensembles and their spread, comparisons with stations
The catalogue	Every ICOS dataset and station	"which stations measure N_2O in Finland?", "is there phenocam imagery?", "which products have NEE?"

We love your feedback!

This assistant exists to make ICOS data findable and usable also by people who are not ICOS insiders. Whether it succeeds is decided by the questions *you* bring. After your session, please take a few minutes to share your feedback with us:

https://www.icos-cp.eu/form/ask-icos-feedback

We would especially like to know:

1. **What data were you looking for?** Did it find it? If not, what did it find instead?
2. **What scientific question did you want answered with ICOS data** — the real one, from your own work — and did the answer help?
3. **Which answer did you not trust, and why?** A wrong number, a missing citation, a plot that did not show what you asked?
4. **What would you have asked next** if you had thirty minutes instead of fifteen?
5. **What data or products should ICOS make reachable this way** that it does not yet?

Your questions are recorded (without your e-mail address) and read by the team after the event; they are the material from which the next version is built.

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*ICOS Carbon Portal · Lund University · [contact: **info@icos-cp.eu**] ·*
The assistant, its prompts and evaluation will be published open source using a GPL v3 license

