



Integrated  
Carbon  
Observation  
System

## Community News



### Achievements

A selection of new ICOS Ocean publications can be found at the bottom of this newsletter. Please send us more with a brief piece of text describing the main results - it's great to see ICOS Oceans data being published and it would be fantastic to announce newly published citing ICOS from the Atmospheric and Ecosystems stations.

A great paper published on the ICOS RI website discusses how COVID-19 has affected our atmosphere. 'Finding a hair in the swimming pool: The signal of changed fossil emissions in the atmosphere'. <https://www.ios-cp.eu/event/917>.

### Events

The next Oceans MSA meeting will be held virtually on 25th and the agenda and meeting link will be sent nearer the time.

### The 4th ICOS Science Conference

Due to Covid-19 the science conference will be organised virtually from 15-17th September 2020.

## UK ICOS National Network July Newsletter

### New Stations

Congratulations to Simon O'Doherty, PI for the Ridge Hill atmospheric station. Their station was announced at the last General Assembly meeting last November 2019. They are now formally members of the ICOS RI and we welcome you to our UK National Network.

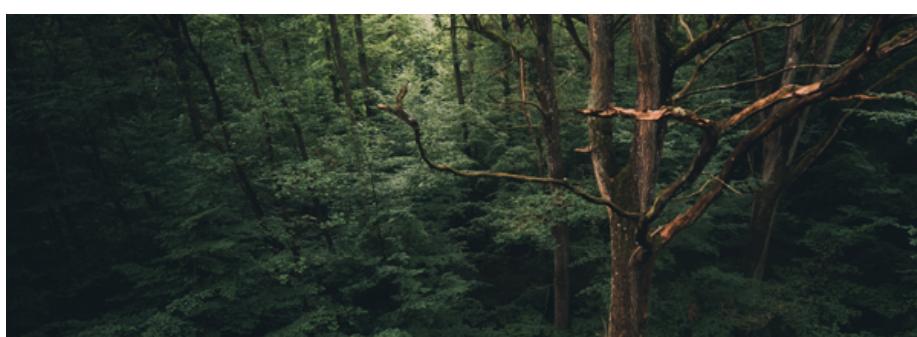
### Station updates

The Weybourne Atmospheric station has begun to submit radon data and are also sending meteorology data to the ICOS Atmospheric Thematic Centre (ATC).

The Ridge Hill atmospheric station, recently approved as an official ICOS station, announce that their data is visible on the ICOS ATC website.

The Auchencorth Moss terrestrial station announce that their core measurements are operational and have been successfully maintaining it during the COVID-19.

The PAP site ocean station inform us that all the UK ships are now in port at Southampton and are waiting for an update in September as to when they can bring the programme back on line. The intention is to use local research ships, for example, in the North Atlantic. Priority has been given to the PAP site but there are currently debates on the benefits of running the PAP site in October/November 2020 until 2021.



## Other News

### ICOS publicity materials

The ICOS Handbook helps to understand how we operate - how ICOS is organised, what and how we measure, and what the role of the Thematic Centres, and National Networks do. It also describes the technical and specifications of stations and the process of becoming a member. The handbook aims to give a comprehensive overview of ICOS both for the people already within our community and for countries considering membership.

We hope anyone interested in ICOS will find this handbook useful! You can find the handbook here: <https://www.icos-cp.eu/event/943>

You can also request from the ICOS communications team hard copies. Contact Katri Ahlgren at ICOS Head Office for further details. Alternatively you get in touch with Jess Thorn (J.L.Thorn@exeter.ac.uk) to request copies to be sent directly to you.

The next issue of the newsletter will be published in late September 2020. We are looking for articles from the community. Have you been on a cruise or field work expedition, published a paper, hosted a station exchange or summer school that you could tell us about? Please send text and images directly to Jess Thorn, [J.L.thorn@exeter.ac.uk](mailto:J.L.thorn@exeter.ac.uk).

Find us on Twitter: @ICOS\_UK

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Visit our website: [www.icos-uk.org](http://www.icos-uk.org)

## Press releases

**ICOS admitted as an observer to the UN Convention on Climate Change:** ICOS has been accepted as an Observer to the United Nations Framework Convention on Climate Change (UNFCCC). The aim of this UN organisation is to reach global consensus on actions to mitigate and to adapt to climate change as outlined in the Paris Agreement.

**ICOS ready to develop into a full-service provider of in situ greenhouse gas data, in line with the EU's "Green Report"**

**Event: Europe needs a more comprehensive ground-based monitoring of greenhouse gases, states the European Commission in its recently published "Green Report".** ICOS, the Integrated Carbon Observation System provides a major part of these required measurements already, and is fully prepared to develop into a full-service provider of in situ greenhouse gas data.

### Outcome of the May 2020 General Assembly meeting.

ICOS General Assembly meeting in late May was held virtually, and thus it was shorter than normally. For that reason, not all matters were decided during the meeting: they were either put to a written decision or postponed to the autumn meeting.

All new country stations were approved. The Chair of the General Assembly was nominated to continue and the Director General was appointed to continue his role.

The General Assembly was updated on the Science Facilitation Plan and Management Plan under development. The Science Facilitation plan will describe various ways how ICOS RI is facilitating the high-level science made in the community, while the Management Plan will describe the various practices, processes and agreements that RI has in place to ensure smooth operation.

## Monitoring Station Assemblies Update

Ecosystem and Atmosphere Measurement Station Assemblies (MSA), both gathered over 70 scientists and operators from the stations in their virtual meetings in early June. Both MSAs discussed if raw data could be made available from the Carbon Portal as well, with similar terms than the quality-controlled data. However, as the matter concerns the whole ICOS RI, it will need a thorough discussion across the domains and a formal decision, possibly made by the General Assembly.

## New chairs for Ecosystem MSA: Janne Rinne and Lucas Siebicke

The Ecosystem MSA elected Janne Rinne from Lund University as the new Chair of the MSA, and Lukas Siebicke from Georg-August University of Göttingen as the Vice Chair. The Ecosystem MSA as well as the whole ICOS community extends the warmest thank you for the now "Chair-Emerita", Corinna Rebmann. The MSA heard the latest developments from the ETC, Carbon Portal and from the Head Office and discussed on 'Coordinating satellite validation of ICOS stations', as being introduced by Christophe Lerebourg from Ground-Based Observation Validation Services of Copernicus.

## Atmosphere MSA gathered 70 scientists for a 3-day virtual meeting

In the Atmosphere MSA, the station operators met with the ATC, the Calibration laboratories, the Carbon Portal and the Head Office to discuss topical matters. More specifically, latest progress in the flask sampling operation was presented, the update of the ICOS Atmospheric Station Specifications Document was discussed, and data were commonly reviewed in preparation for the next data release.

## Ridge Hill Atmospheric Station News

The University of Bristol's Atmospheric Chemistry Research Group (ACRG) has been awarded £100k from the National Environmental Research Council (NERC) to investigate the effect of COVID-19 restrictions on UK greenhouse gas emissions.

In the UK, and across the globe, restrictions to limit the spread of coronavirus have led to an unprecedented decline in travel, economic output, and energy demand. This slowing of activity has resulted in noticeable changes in air quality around the world, with several cities reporting the clearest conditions in decades during lockdown, and evidence has shown that emissions of carbon dioxide around the world have declined as well (e.g. Le Quéré et al 2020, *Nature*).

In 2012, the ACRG established the UK Deriving Emissions linked to Climate Change (DECC) network. Consisting of five stations situated across the British Isles, it is capable of making precise measurements of over 40 greenhouse gases in the air. Using sophisticated computer models that simulate the transport of greenhouse gases through the atmosphere, the measurements are used to infer the UK's emissions. The UK has pioneered this measurement-based approach along with Switzerland and Australia, using the atmospheric data to add credibility to the reports on the UK's greenhouse gas emissions, which are submitted to the United Nations.

The new funding will help ACRG scientists explore the impact of lockdown restrictions on the UK's greenhouse gas emissions. As restrictions are gradually eased, will emissions rebound to previous levels? Perhaps they might even increase to levels greater than those observed prior to lockdown, as the government seeks to kickstart economic growth. The planned near real-time approach will provide answers to these questions. Careful and timely monitoring of emissions will be essential to ensure that economic recovery does not come at the cost of failure to meet emission reduction targets set in the Paris Climate Agreement, or in the UK Climate Change Act. For further details, contact: [matt.rigby@bristol.ac.uk](mailto:matt.rigby@bristol.ac.uk)

### Recent Papers published from the UK National Network

This is a short non comprehensive overview of recent ICOS relevant papers. We always like to hear about new research that uses ICOS station data so if you'd like to use this forum to publicise your work then please get in touch!

PAP (Porcupine Abyssal Plain) ocean station: The National Oceanography Centre, in collaboration with the University of Exeter recently published a paper based on high frequency observational datasets derived from underway pCO<sub>2</sub> (carbon dioxide partial pressure) instruments on ships of opportunity (SOO) and a fixed-point mooring (PAP) between 2002 and 2016.

**Impact of physical and biological processes on temporal variations of the ocean carbon sink in the mid-latitude North Atlantic,**  
<https://doi.org/10.1016/j.pocean.2019.102223>

### Other papers from the UK ocean stations are;

Sue Hartman, the PI of the PAP site ICOS station and vice chair of the MSA recently lead a key paper focussed on collating over 1500 samples for nutrient and carbonate chemistry measurements over the NW European continental shelf in 2014-5.

The level of variability they document was unprecedented and as a result of their efforts we now have a really comprehensive description of how this key shelf sea environment operated in the mid 2010's.

**Hartman, S. E., et al., (2019) Seasonality and spatial heterogeneity of the surface ocean carbonate system in the northwest European continental Shelf Progress in Oceanography (177), 101909** <https://doi.org/10.1016/j.pocean.2018.02.005>

Vlad Macovei, a graduate student working with Sue Hartman at the National Oceanography Centre, who is now at HZG in Hamburg merged data from 3 different RIs (ICOS, EMSO and Argo) to give us an unprecedented time series of uptake estimates from the NE Atlantic. CO<sub>2</sub> uptake from the atmosphere increased over the observing period, despite biological processes being relatively constant.

**Macovei, V et al., (2020) Impact of physical and biological processes on temporal variations of the ocean carbon sink in the mid-latitude North Atlantic (2002–2016) Progress in Oceanography (180) 102223** <https://doi.org/10.1016/j.pocean.2019.102223>.

Some recent papers from the Ridge Hill Atmospheric Station, with thanks from Simon O'Doherty from Bristol University.

## Publications 2020

Derwent, R., Parrish, D., Simmonds, P. G., O'Doherty, S. J. and Spain, T. G.: Seasonal cycles in baseline mixing ratios of a large number of trace gases at the Mace Head, Ireland atmospheric research station, *Atmos. Environ.*, 233(March), 117531, doi:10.1016/j.atmosenv.2020.117531, 2020.

Droste, E. S., Adcock, K. E., Ashfold, M. J., Chou, C., Fleming, Z., Fraser, P. J., Gooch, L. J., Hind, A. J., Langenfelds, R. L., Leedham Elvidge, E., Mohd Hanif, N., O'Doherty, S., Oram, D. E., Ou-Yang, C.-F., Panagi, M., Reeves, C. E., Sturges, W. T. and Laube, J. C.: Trends and emissions of six perfluorocarbons in the Northern Hemisphere and Southern Hemisphere, *Atmos. Chem. Phys.*, 20(8), 4787–4807, doi:10.5194/acp-20-4787-2020, 2020.

Kuyper, B., Wingrove, H., Lesch, T., Labuschagne, C., Say, D., Martin, D., Young, D., Khan, M. A. H., O'Doherty, S., Davies-Coleman, M. T. and Shallcross, D. E.: Atmospheric Toluene and Benzene Mole Fractions at Cape Town and Cape Point and an Estimation of the Hydroxyl Radical Concentrations in the Air above the Cape Peninsula, South Africa, *ACS Earth Sp. Chem.*, 4(1), 24–34, doi:10.1021/acsearthspacechem.9b00207, 2020.

Stanley, K. M., Say, D., Mühle, J., Harth, C. M., Krummel, P. B., Young, D., O'Doherty, S. J., Salameh, P. K., Simmonds, P. G., Weiss, R. F., Prinn, R. G., Fraser, P. J. and Rigby, M.: Increase in global emissions of HFC-23 despite near-total expected reductions, *Nat. Commun.*, 11(1), 397, doi:10.1038/s41467-019-13899-4, 2020.

Western, L. M., Sha, Z., Rigby, M., Ganesan, A. L., Manning, A. J., Stanley, K. M., O'Doherty, S. J., Young, D. and Rougier, J.: Bayesian spatio-temporal inference of trace gas emissions using an integrated nested Laplacian approximation and Gaussian Markov random fields, *Geosci. Model Dev.*, 13(4), 2095–2107, doi:10.5194/gmd-13-2095-2020, 2020.

Yu, D., Yao, B., Lin, W., Vollmer, M. K., Ge, B., Zhang, G., Li, Y., Xu, H., O'Doherty, S., Chen, L. and Reimann, S.: Atmospheric CH<sub>3</sub>CCl<sub>3</sub> observations in China: Historical trends and implications, *Atmos. Res.*, doi:10.1016/j.atmosres.2019.104658, 2020

## Recent papers from the Plymouth Marine Laboratory, **Western Channel Observatory**.

Vas Kitidis, the PI of the Plymouth Marine Laboratory Western Channel Observatory recently lead a landmark paper in Nature Scientific reports focussed on the carbon budget of the N Sea in 2015. It combines data from a large fraction of the North Sea ICOS Oceans network and from a special one-off survey of the North and Irish Seas supported by the UK Natural Environment Research Council and merges these with satellite information in what must be one of the largest efforts of its type in recent years. The headline message that outgassing in estuaries compensates for uptake in the shelf seas pump suggests that a future important focus for research is likely to be the outer estuary plume zone where we have rather few observations.

Kitidis, V et al., (2019) Winter weather controls net influx of atmospheric CO<sub>2</sub> on the north-west European shelf. *Scientific Reports* volume 9, Article number: 20153 <https://doi.org/10.1038/s41598-019-56363-5>