EUFAR
European Facility for Airborne Research

EUROPEAN FACILITY FOR AIRBORNE RESEARCH FOR ENVIRONMENTAL AND GEO-SCIENCES

NEWSLETTER

DEC 2016, ISSUE 18

ICARE
International Conference on Airborne Research for the Environment

"Developing the infrastructure to meet future scientific challenges"

The 2nd International Conference on Airborne Research for the Environment (ICARE2017) will be held at the German Aerospace Research Centre - DLR, in Oberpfaffenhofen from 10 to 13 July 2017.

The conference will bring together both operators and users of research aircraft working in support of a broad range of environmental research interests together with representatives of relevant funding agencies and equipment suppliers. Airborne research has significantly contributed to our understanding of important environmental processes in the atmosphere, ocean and on the land surface. The ability to continue and develop this role will depend on the airborne research community adapting to the challenges of a world of increasingly restricted financial resources.

The conference will review the scientific drivers for future airborne measurements across a broad range of topics in environmental science. There will also be sessions devoted to a range of technical and support issues that are concerned with developing the aircraft operators' ability to address these science drivers.

Aerial shot of DLR premises, Oberpfaffenhofen. Photo credit: DLR (CC-BY 3.0)

DLR research aircraft parked at Oberpfaffenhofen. Photo credit: DLR (CC-BY 3.0)

It is expected that the programme will include sessions on the following topics:

1) Science drivers for future airborne science missions
- o Airborne support to future satellite missions
- o Polar research
- o Atmospheric science
  - > Clouds and precipitation
  - > Atmospheric composition – trace gases and aerosols
  - > Atmospheric dynamics
  - > Air-sea interaction
- o Oceans, lakes and inshore waters
  - > Primary productivity
  - > Water quality
  - > Mesoscale ocean dynamics
- o Land surface studies
  - > Land-atmosphere interaction
  - > Vegetation and forest studies
  - > Agriculture
  - > Soils and minerals

2) Organisation of future field campaigns
- o Access to airspace for measurement flights
- o Diplomatic and security restrictions
- o Coordination of multi-aircraft campaigns through separate funding streams

3) Developing future airborne science capabilities & platforms
- o Maintenance of capability range
- o Developing open access to airborne facilities
- o Broadening the scientific user base
- o Synergy of manned aircraft and UAVs

4) New developments in instrumentation and data
- o Exploitation of lightweight / low-power instruments
- o Unattended operation
- o Exploitation of real-time data for science planning, education and public engagement
- o Transferability between aircraft
- o Data formats and exchange – facilitating collaboration
- o Development of protocols for the conduct of airborne intercomparisons

The conference will consist of both plenary and parallel sessions with invited keynote speakers. We expect that a number of research aircraft will be exhibited during the conference. Further details of the science programme together with registration information will be made available in early February 2017. A Call for Abstracts inviting both oral and poster submissions for the conference programme will follow this.

The EUFAR2 project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 312609

NAWDEX - An airborne field campaign to improve jet stream forecasts over Europe

By John Methven (University of Reading)

It may seem bizarre that processes occurring within clouds near the USA, involving tiny ice crystals and water droplets, can have an influence on high impact weather events thousands of miles away in Europe, and our ability to predict these events days in advance. However, this is the fundamental nature of the atmosphere as a chaotic dynamical system. Information is transferred from one region to another in the atmosphere through wave propagation and transport of properties within the air, such as water vapour. Weather systems developing over the North Atlantic and hitting Europe are intimately related to large-amplitude meanders of the jet stream, known as Rossby waves. Characteristic weather patterns grow in concert with the waves, and the jet stream acts as a wave guide, determining the focus of the wave activity at tropopause-level (about 10km altitude). Rossby wave energy transfers downstream rapidly, amplifying the meanders and the weather events associated with them.

From 16 September to 18 October 2016, the international experiment NAWDEX (The North Atlantic Waveguide and Downstream Impact Experiment) took place examining the jet stream and its downstream consequences for the prediction of weather across Europe. Recent research has shown that forecast busts (where skill is much lower than usual) for Europe share a common precursor 5-6 days beforehand; there is a distinct Rossby wave pattern with a more prominent ridge (northwards displacement of the jet stream) across the eastern USA. The reasons for these forecast busts are not known, but it is hypothesised that diabatic (cloud and radiative heating) processes, over the USA and Atlantic, increase the forecast uncertainty in this situation. Visit the NAWDEX website for more details.

Four research aircraft – the German HALO and Falcon 20 from DLR, the French SAFIRE Falcon 20 aircraft and UK FAAM BAe-146 aircraft – were equipped with lidar, radar and dropsondes for measuring high-resolution cross-sections of winds, temperature, humidity and cloud during 15 Intensive Operational Periods (IOPs).

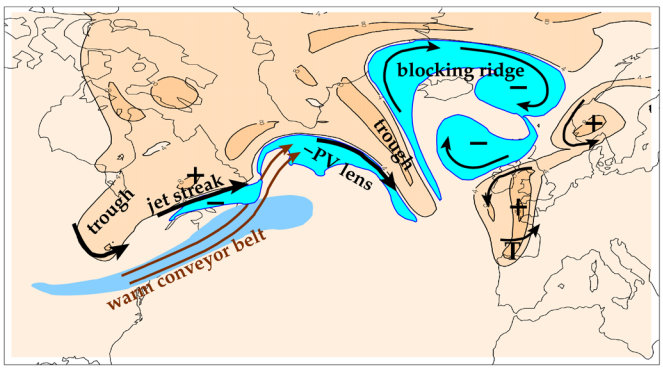


Illustration of phenomena on the jet stream related to downstream propagation of wave activity and high impact weather
Image credit: John Methven

The aircraft were based from Keflavik, Iceland and the UK to intercept developing weather systems crossing the North Atlantic, while the NOAA SHOUT programme were dropping sondes into tropical cyclones near the USA east coast as they tracked into mid-latitudes. A comprehensive network of ground-based radar and lidar profiling stations ran continuously in the UK and France, plus 584 additional radiosondes were launched across northern high latitudes (40-80N) from Canada to Western Europe.

The focus of the EUFAR funded project "NAWDEX-Influence" was to fly the DLR Falcon aircraft across the jet stream using its two wind lidar instruments to measure the detailed structure of wind across the jet. The aim was also to connect the aircraft observations with continuous monitoring of the wind profile by the ST radar wind profiler on South Uist (an island northwest of Scotland) as well as the radiosonde launches from the UK. It is hypothesized that the sharpness of the jet stream, in terms of peak strength and width, and the associated sharpness of the tropopause adjacent to the jet, matters to Rossby wave dynamics and therefore to the accuracy of weather forecasts across Europe.

A golden opportunity emerged during the second week of the NAWDEX campaign, as tropical storm Karl moved northwards from the Bahamas and was forecast to interact with the jet stream with highly uncertain outcomes in terms of high impact weather for Europe 5-6 days later. The Global Hawk was first to the scene with a comprehensive coverage of dropsondes on the night of 22/23 September (part of the SHOUT experiment). Tropical storms move slowly and Karl was sampled again off the east coast of the USA on the 24/25 Sept. Then there was a dramatic change as Karl interacted with the jet stream on the 26th undergoing a process called "extratropical transition" when the cyclone also intensified. The German HALO aircraft was able to reach the centre of the storm during this critical stage from its base in Iceland.

Following transition, the jet stream on the southern flank of cyclone Karl became much stronger and the whole system was stretched out and advanced very rapidly towards the north of Scotland – a perfect situation for the NAWDEX-Influence goals. The DLR Falcon aircraft flew from Iceland to Torshavn (Faroe Islands) before a transect southwards across the jet stream to the South Uist radar. A major bonus was that the UK FAAM aircraft was able to join the Falcon on the same section across the jet dropping 22 sondes. This enabled us to measure static stability and humidity at high resolution in the vertical to complement the wind observations. Above the Scottish north coast the jet maximum was observed to be 89 m/s (200 mph) which is unusually strong for the time of year and was associated with severe winds below across northern Scotland. I was lucky enough to be on the FAAM flight. So was BBC science correspondent, David Shukman, who reported on his experience on BBC TV and website. The jet streak (a locally intense section of the jet stream) moved into Norway and was followed by two days of persistent heavy rainfall and flooding as a moist air stream from the mid-Atlantic was drawn northwards to meet the jet stream on the Norwegian coast. *(Continued on page 3)*

This is the first time that the jet stream and associated weather systems have been observed from one side of the Atlantic to the other with measurements that have high resolution coverage in altitude. It is hypothesized that the sharpness of the jet stream and the vertical structure in humidity, cloud and temperature matters to large-scale wave dynamics. The observational dataset collected during the month-long NAWDEX campaign will provide unique insight into that structure and the processes associated with the triggering, propagation and downstream impact of disturbances along the North Atlantic waveguide.

For more information contact j.methven@reading.ac.uk.

View from inside the DLR Falcon-20 cabin with the instruments in operation, APSOWA flight campaign, July 2016

Air pollution from shipping and oil/gas platform emissions observed during the airborne EUFAR-APSOWA campaign

By Valery Catoire & Gisele Krysztofiak (CNRS- Université Orléans)

The "Atmospheric Pollution from Shipping and Oil and gas platforms of West Africa" (APSOWA) project led by LPC2E (CNRS-Université Orléans, France) in collaboration with IPA (DLR, Oberpfaffenhofen, Germany) seeks to characterise gaseous and particulate pollutants emitted by these sources off the coast of the Gulf of Guinea. The APSOWA campaign was clustered with the DACCIWA research campaign, a major project funded by the European Union (FP7), with partners from Germany, France, UK, Switzerland, Ghana and Nigeria, which deployed three research aircraft (SAFIRE's ATR-42, DLR's Falcon-20 and NERC BAS Twin Otter). The DACCIWA campaign in June/July 2016 undertook a range of activities ranging from airborne measurements, to running complex numerical models of the composition of the atmosphere, and APSOWA seeks to enrich the findings of DACCIWA.

The growth of the oil industry and increase in maritime traffic, and subsequently their emissions along the Guinean Coast contribute to the increase of anthropogenic emission sources. Questions regarding the interactions between those anthropogenic sources and natural emissions (e.g. biomass burning emissions also measured during the campaign) remain unanswered.

This is the first time such a large campaign was performed in this region, despite its growing population and rapid economic development.

The EUFAR-funded APSOWA campaign took place from 7 to 14 July with fully-funded flight hours on board DLR's Falcon-20. Our French instrument SPIRIT (from CNRS-Université Orléans) was installed in the aircraft for our campaign and the rest of the DACCIWA flight campaigns. Our flight campaign consisted of 4 flights:

- 7 July: Sampling of shipping emissions in an area with heavy shipping activity south of Tema, near Accra (Ghana)
- 10 July: Sampling of off-shore oil platform (FPSO) emissions off the coast of Ghana, south west from Takoradi
- 11 July: Characterisation of the Espoir oil platform emissions, south west from Abidjan (Ivory Coast)
- 14 July: Sampling of off-shore oil platform (Jubilee) emissions and the shipping corridor around the 4.5°N latitude

In particular, rapid (< 10 s) online measurements of NO_2, CO, O_3, SO_2 volume mixing ratios and total particle density were performed using infrared lasers (SPIRIT, LPC2E), UV and fluorescence spectrometers (IPA-DLR), and a condensation particle counter (IPA-DLR). The set of these trace gases can be used to fingerprint different sources of local air pollution. Moreover, emissions of individual sources can be quantified by combining the measurements with a nested-grid regional scale Lagrangian particle dispersion model (FLEXPART, Stohl et al, Atmos. Chem. Phys. 2005).

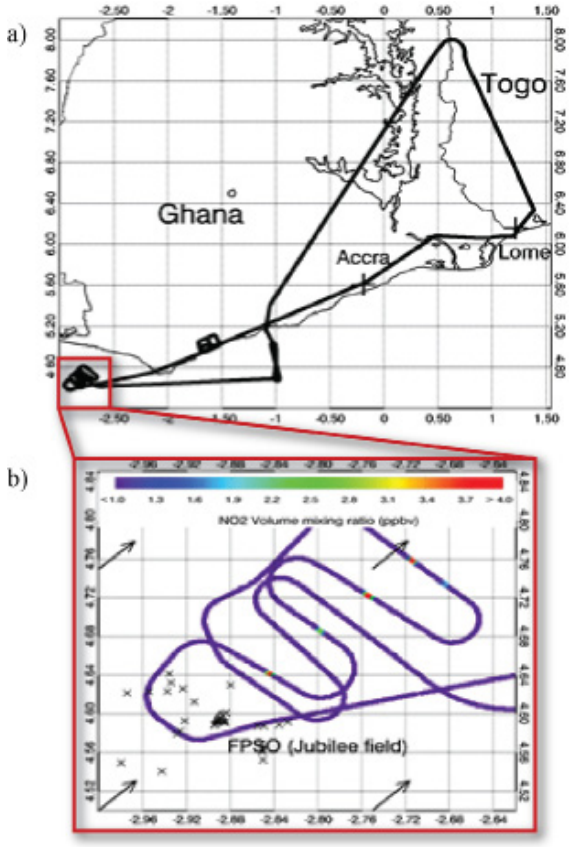


Figure a: Entire map of the aircraft trajectory on 10 July 2016, from Lomé and back
Figure b: Zoomed map (°E-°N) showing aircraft trajectory around the oil platform (FPSO) and NO_2 mixing ratios peaks downwind

As an example, the flight on 10 July 2016 is presented in the following Figures. During this flight, the Falcon-20 aircraft circled a Floating Production Storage and Offloading (FPSO) oil vessel and meandered in the plume direction at 300m above sea level allowing the measurement of downwind peaks of NO_2 and aerosols. Preliminary trajectory simulations by FLEXPART for NO_2 release from the FPSO location can reproduce the NO_2 increases and confirm the origin of the pollution. Tests still need to be conducted to effectively reproduce the intensity of all the peaks by modifying the plume injection height and/or the time period of release. Thereafter, tests will allow to quantify the emissions flux from the FPSO platform and to evaluate the current emission inventories.

For more information, contact ***valery.catoire@cnrs-orleans.fr****.*

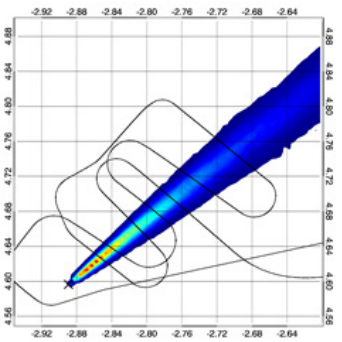


Figure c: NO2 plume simulated by FLEXPART, in agreement with the NO2 aircraft sampling

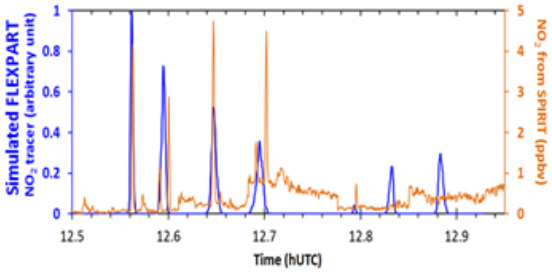


Figure d: NO2 peaks vs. time measured by aircraft in agreement with simulations by FLEXPART model

Aircraft and Instruments (TA and non-TA)

All aircraft operators participating in EUFAR's transnational access scheme have been requested to check and, where necessary, update the information on their instruments and aircraft, as well as their aircraft planning information on the EUFAR website to make it easy to identify key opportunities for training and the clustering of TA proposals. Visit the FAQ section on aircraft and instruments.

As EUFAR is a network reuniting all users and providers of airborne research all over Europe, new operators are invited to contact the EUFAR Office if they wish to have their aircraft and instruments published on the EUFAR website. For more information please contact olivier.henry@meteo.fr.

EUFAR's achievements

Visit EUFAR's achievement page to see how EUFAR's current project has progressed so far, by clicking **here**.

Visit the website & apply for fully-funded flight hours

Open Calls for Proposals for Transnational Access to EUFAR aircraft are accessible via the website on the **TA Application page**.

Calls for the use of small, low-cost aircraft, for earth-observation studies and for applications of airborne in-situ measurements are open until 31 May 2017. Proposals will be reviewed as soon as possible, and accepted subject to their meeting overall standards through peer-review and whilst sufficient funding remains within the available budget. Proposals can only be accepted where their planned flights can be completed by October 2017.

We encourage applications that are linked to multi-disciplinary research activities supported through the Transnational Access programmes of other environmental research infrastructures such as **ACTRIS** and **ENVRIplus**. Applicants should describe such linkages clearly in their applications. Potential applicants are reminded that they can also submit a short Expression of Interest via the **website** at any time.

EUFAR TOOLS & SOFTWARE

The EUFAR Flight Finder (EFF)

The EFF is a geospatial-temporal search interface to locate flight data within the EUFAR data archive at BADC and can be found at http://flight-finder.ceda.ac.uk/. Flights from FAAM, NERC-ARSF and SAFIRE aircraft are currently included - more will be added shortly.

All comments and feedback are welcome, by emailing: support@ceda.ac.uk.

ASMM & EMC

Check out the new versions of the ASMM (Airborne Science Mission Metadata) and EMC (EUFAR Metadata Creator) tools developed by EUFAR's standards & protocols team, available via the following links:

- emc.eufar.net
- asmm.eufar.net

For more information, click here.

HYLIGHT tools

Under EUFAR's Joint Research Activity - HYLIGHT dedicated to the integration of airborne hyperspectral imagery and laser scanning data to improve image processing and interpretation, a number of tools have been prototyped, tested and developed by the working group. Most of the tools are available together with their installation guides and user manuals on the EUFAR website.

Contact – ils.reusen@vito.be, for more information.

EXPERT WORKSHOPS

EUFAR expert workshop on hyperspectral remote sensing for soil applications

GFZ, Potsdam, 27 - 29 September 2016

By Sabine Chabrillat (GFZ)

How can emerging remote sensing technologies support the digital mapping and monitoring of soils? To find answers on this question, experts in Hyperspectral Remote Sensing, under the framework of EUFAR's Expert Working Groups activity, met to discuss "Implementation of Soil Spectroscopy for digital mapping and monitoring of soils: Towards space applications and Technology Transfer Office activities". Held at the GFZ German Research Centre for Geosciences (Potsdam, Germany) from 28 to 29 September 2016, the workshop was organised jointly by the GFZ section Remote Sensing unit and the Tel-Aviv University (Israel), with funding and logistical support from EUFAR.

Hyperspectral imagery - a technology that collects and processes information from across the electromagnetic spectrum, bears a large potential for the characterisation of soil properties and the generation of comprehensive soil maps. This potential has not yet been fully exploited due to limitations in data availability and availability of adequate software tools.

The workshop gathered 35 young scientists and experts in the field of hyperspectral remote sensing of soils, from 24 institutes representing 15 countries, to discuss new potentials for the development and standardisation of soil spectral libraries. Further topics addressed during the workshop included spatial mapping applications from upcoming hyperspectral satellites, and commercial applications of technologies. The discussions were supported by lectures from worldwide leading experts in the field and demonstration exercises with new instrumentation, data analyses, and image processing software.

For more information, please contact Sabine Chabrillat (chabri@gfz-potsdam.de) and Eyal Ben Dor (bendor@post.tau.ac.il).

EUFAR Training Opportunities

Apply to participate in the design of a research campaign, join an existing campaign, or visit an aircraft/instrument operator by clicking **here**.

EUFAR ESA Workshop on Atmospheric Correction of Remote Sensing Data

Harnack Haus, Berlin, 26 - 28 October 2016

By Thomas Ruhtz (FUB)

The workshop on atmospheric correction of remote sensing data took place at the Harnack Haus of the Max-Planck Society in Berlin-Dahlem from 26 to 28 Oct. 2016. It was co-funded by EUFAR and the European Space Agency and hosted by the Freie Universität Berlin. 30 scientists and experts of remote sensing applications coming from more than 10 different European and other international countries attended the workshop and exchanged their knowledge and expertise on this specific topic. The workshop was divided into different parts to cluster the various aspects ranging from radiative transfer models, aircraft and satellite remote sensing applications to their atmospheric correction data processing methods.

A welcome and introduction was given by the EUFAR Expert working group leader (Atmospheric Radiation and Remote Sensing Measurements) - Thomas Ruhtz (FUB). He explained what difficulties still exist to derive representative information about the status of the atmosphere and showed recent vertical profile measurements of the aerosol optical depth in the vicinity of urban areas like Berlin and Bucharest. The high variability of the vertical and horizontal aerosol distribution in such areas with high anthropogenic sources is one of the main difficulties in characterising the atmosphere. The aim of airborne measurement campaigns is to derive NO_2 maps. The retrieval schemes depend strongly on valid information of the atmosphere and the characterisation of the ground albedo.

In summary, the workshop gave a good overview of the topic and field of research with the presentation and discussion on a lot of detailed information. The participating researchers and PhD students were able to collect new ideas and information on how current state-of-the-art atmospheric correction schemes work for airborne and satellite applications and what improvements are possible in future. The general feedback was that such specialised workshops are much more intense and efficient in forming networks and exchanging knowledge and expertise compared to larger conferences. As an outcome of this workshop a special issue in an open access journal was initiated and will be open to all participants and researchers, available here. All the workshop presentations, the workshop report and the participants list are available on the EUFAR website via the event page.

For more information, contact thomas.ruhtz@fu-berlin.de.

EUFAR SUMMER SCHOOLS 2017

EASI - Exploring Air Sea Interaction via airborne data

- **Lead Researcher:** Dr. Alessadra Lanotte (CNR, ISAC, Italy)
- **When:** 25 June - 4 July 2017
- **Where:** Shannon (Ireland)
- **Visit to:** Mace Head Atmospheric Research Station
- **Student flights:** 4 flights with instrumented aircraft ATR42 (operated by SAFIRE) from Shannon airport

Objective

The primary goal of the EASI summer school is to teach and train participants on the use of a research aircraft, and on the experimental possibilities it opens for atmospheric sciences research. This implies providing them with a complete overview of the airborne and remote sensing experimental techniques, and on specific features of collection and analysis of airborne measurements. In addition, EASI aims to transfer consolidated knowledge on and recent advancements in specific topics related to air-sea interaction, and near coastal boundary layer structure and dynamics.

RS4forestEBV - Airborne remote sensing for monitoring essential biodiversity variables in forest ecosystems

- **Lead Researcher:** Prof. Andrew Skidmore (University of Twente, the Netherlands)
- **When:** 3 - 14 July 2017
- **Where:** Bavarian Forest National Park (3 - 9 July 2017) and DLR Oberpfaffenhofen (10 -14 July 2017)
- **Instrumented aircraft:** TBC

Objective

Forest management requires the use of comprehensive remote sensing data which enable the monitoring of biodiversity changes. Biophysical and biochemical vegetation parameters can characterise changes in biodiversity through changes in ecosystem structure and function.

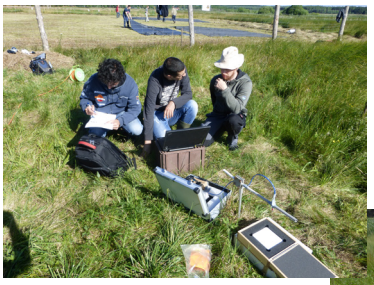
In this training course, special skills will be presented required for processing the new generation of airborne hyperspectral, thermal, LiDAR and RADAR data for retrieving essential biodiversity variables in forest ecosystems.

The ground data collection that will be performed during the summer school at the Bavarian Forest National Park aims to provide participants with knowhow on tools (field spectroscopy, thermal spectrometry and terrestrial LIDAR) and measurement techniques to collect different vegetation variables. In addition, an airborne campaign for concurrent acquisitions of hyperspectral, thermal, LiDAR and RADAR data will be organised during the summer school if weather conditions allow.

The school will enable the participants to achieve the following learning objectives:

- To map different vegetation parameters using hyperspectral visible/NIR /thermal, LiDAR and RADAR data
- To understand the advantage of each data source and the best combinations of them for retrieving vegetation parameters
- To understand data processing chains
- To understand the challenge of collecting and integrating forest field data with remote sensing imagery

Furthermore, during the second week, participants will be able to attend certain sessions of the ICARE2017 conference that will be held simultaneously at DLR (10-13 July).



Photos from the EUFAR SWAMP summer school on Spectrometry of a Wetland And Modelling of Photosynthesis with Hyperspectral Airborne Reflectance and Fluorescence, held in Obrzycko-Rzecin, 6-16 July 2015

STANCO - School and Training on Aircraft New and well-established techniques for Atmospheric Composition Observation

- **Lead Researcher:** Dr. Piero Di Carlo (Uni. "G. d'Annunzio" of Chieti-Pescara, Italy)
- **When:** 26 June - 6 July 2017
- **Where:** University of Cambridge & Cranfield airport (UK)
- **Student flights:** 3 - 4 flights with instrumented aircraft BAe146 (operated by FAAM) from Cranfield airport

Objective

The main objective is to provide participants with an overview on measurement techniques, data analysis and specifics of the airborne measurements of species relevant in atmospheric trace gases. Emphasis will be on new instruments and emerging techniques for aircraft observations. The lectures will include an introduction on atmospheric composition focusing on pollution transport, vertical distribution of atmospheric compounds and links between air pollution and climate changes. *(Continued on page7)*

Air pollution and climate changes are global problems and the species responsible of these environmental issues are emitted essentially by the same processes: fossil fuel burning. Observations of these compounds on aircraft platforms are worthwhile because usually most of them have high dependence with the altitude and a big horizontal variability. Moreover, aircraft allow in-situ measurements that help to identify and track emission plume of atmospheric trace gases.

The lectures will cover the technical, engineering and safety aspects of the airborne measurements, not specific issues of one particular aircraft but the general aspects related to most aircraft platforms used for atmospheric studies. Other lectures will focus on general aspects of the atmospheric composition, trace gases transport and chemistry.

EUFAR Summer School Application Procedure

More information regarding the application procedures and applications for each summer school will be shared early next year via the newsletter and the EUFAR website.

Eligibility Criteria

Early-stage researchers (PhD students and post-docs) and university lecturers working in an institution established in a EU Member State or Associated State are eligible to apply to join a EUFAR summer school and apply for travel & subsistence support through EUFAR.

Early-stage researchers (PhD students and post-docs) and university lecturers working in non-EU or non-EU Associated State institutions may apply but if accepted will have to finance their own travel and accommodation.

EUFAR Website At Your Service!

Archive of Publications on Airborne Measurements

Search for publications related to airborne research for environmental and geo-sciences in Europe and beyond in the EUFAR depository of published journal articles, by clicking here.

EUFAR website development - Register for Event

A new website module has been integrated into the EUFAR website, presenting the possibility to create events on the EUFAR website, and collect and evaluate applications for the event via the website.

If you are interested in holding an event related to airborne research and would like to use the EUFAR event application, please contact bureau@eufar.net.

Strategy & European Integration

Constitution of the EUFAR AISBL

EUFAR is currently seeking to establish itself as an AISBL (an international not-for-profit international association under Belgian law) by mid-2017 to ensure its existence and operations beyond January 2018 when our present EC funding comes to an end. The objectives of the EUFAR AISBL will include continuing to develop the integration of the research aircraft community in Europe and also its links with other environmental research infrastructures, such as the umbrella ENVRIplus research infrastructure and the ENVRI community of research infrastructures. Another objective will be to continue to broaden access to research facilities beyond that supported solely by national funding streams so that EUFAR better approaches the status of a European open research infrastructure. Together with the implementation of an Open Access scheme by means of resource-sharing envisaged in late 2017, such a sustainable structure will contribute substantially toward broadening the user base of existing airborne research facilities in Europe and mobilising additional resources to this end.

EUFAR as a new member of the ENVRIplus BEERi

As part of EUFAR's drive to increase links with other research infrastructures and projects that may have overlapping interests in airborne environmental measurements, EUFAR requested to become a member of the ENVRIplus Board of European Environmental Research Infrastructures (BEERi). The response was positive following a BEERi meeting on 18 November. EUFAR, as one of the multipurpose platforms filling in as an important missing component of the ENVRIplus organisation, will be involved in addressing research infrastructures' current issues and in the design of the future European environmental research infrastructure landscape.

EC's positive response to the EUFAR Mid-Term Review

Following the Mid-Term Review (MTR) of the EUFAR project in April 2016, and an evaluation of EUFAR's results to date and detailed response to the MTR assessment report, the European Commission positively recognised the work accomplished and officially approved the remaining work plan until the end of the current contract in January 2018. A big thank you to all those involved in EUFAR's operations and activities, and continued support.

Upcoming Events

EUFAR Assembly General 04

Warsaw, Poland, 14 – 17 February 2017

The 4th EUFAR2 General Assembly will take place in mid-February next year and will be hosted by EUFAR partner University of Warsaw. The meeting aims to bring together EUFAR's 24 partner consortium and activity leaders to discuss progress of each activity and its implementation plan for the remaining lifetime of the current contract.

There will be a special session dedicated to the technology transfer activity open to the TTOs of each partner as well as sessions on ICARE2017 preparation and the future strategy of EUFAR.

10th EARLSel SIG Imaging Spectroscopy workshop

Zurich, Switzerland 19 - 21 April 2017

EARSeL's Special Interest Group on Imaging Spectroscopy aims at encouraging interdisciplinary discussions among specialists working with innovative Earth Observation methods and technologies.

Imaging spectroscopy is increasingly finding its way into transdisciplinary research aiming to integrate state-of-the-art methods and data analysis concepts in response to today's key environmental and societal challenges. Besides the discussion of advanced technologies for spectroscopy data processing and analysis, as well as next generation platforms and sensors, the workshop will particularly address integrated approaches in Earth System Science using spectroscopy across all spheres, including the anthroposphere.

EUFAR submitted an abstract entitled - Achievements for the "Hyperspectral Community" - in the hope of making a giving an overview of all achievements for the hyperspectral research community in Europe's biggest network of airborne Earth Observation during the conference.

Click here, for more information.

The ERA Sky Arrow, a small tropospheric propeller aircraft, operated by **CNR - ISAFORM**, available for transnational access to fully funded flight hours under the EUFAR TA framework.

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EUFAR Handbook
Reference: Manfred Wendisch & Jean-Louis Brenguier (Eds.) Airborne Measurements for Environmental Research: Methods and Instruments, Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany, 2013
ISBN: 978-3-527-40996-9, 655pp.

Visit the website & register today!
www.eufar.net

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