EUFAR
European Facility for Airborne Research

EUROPEAN FACILITY FOR AIRBORNE RESEARCH FOR ENVIRONMENTAL AND GEO-SCIENCES

NEWSLETTER

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FUTURE OF THE FLEET

EUFAR Stratospheric Workshop

Rome, Italy, 4-5 May 2017

The EUFAR workshop on "Stratospheric Airborne Research" was held in Rome, at the CNR headquarters, from 4 to 5 May 2017. Its aims were to discuss the future research topics that may be tackled by a stratospheric research aircraft, and to provide suggestions on how to secure the availability of such an aircraft in Europe in the coming decade.

One topic under discussion concerned the scientific subjects for which the role of high-altitude aircraft observations is privileged or irreplaceable. In the debate, various themes were analyzed like the paramount importance of airborne measurements to study the role and the impact of high altitude clouds.

Although the use of high altitude aircraft is not best suited for a continuous monitoring of the upper atmosphere, which has indeed to rely on the satellites, airborne stratospheric observations are beneficial for satellite validation, with particular emphasis on products from limb viewing satellites, and for fast deployment of proof of concept instruments and retrieval and data fusion exercises. Moreover, aircraft observations may help to fill the future potential gap in limb sounding satellite instruments.

M55 - Geophysica aircraft operated by Myasishchev Design Bureau

The lively discussion well traced and summarized the science questions present in the current WCRP Stratosphere-troposphere Processes And their Role in Climate (SPARC) implementation plan, currently being worked out.

These were presented and summarized by N. Harris (U. Cranfield), again underlining the importance of airborne observations to assess the climatic effects of volcanic eruptions, to predict the evolution of tropopause layer cirrus, water vapor content and chemical composition of the stratosphere and their feedback on global climate, and to possibly study the regional impacts of stratospheric geoengineering activities.

The meeting continued with surveys on current activity and future developments in stratospheric air research at national level.

See more about the attendees and discussions here

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10th EARSeL SIG Imaging Spectroscopy Workshop

Zurich, Switzerland, 19-21 April 2017

The 10th EARSeL SIG Imaging Spectroscopy Workshop took place between 19-21 April 2017 at the University of Zurich in Switzerland.

250 hyperspectral remote sensing experts from all over the world joined the workshop, also to celebrate the 20th birthday of the EARSeL's Special Interest Group on Imaging Spectroscopy.

Besides many advancements in airborne hyperspectral image processing and analysis, planned hyperspectral satellite missions like EnMAP, PRISMA and FLEX and the HYPEX-2 Earth Explorer-9 proposal, were presented.

A drone flight at the University of Zurich park on the last day of the workshop demonstrated that lightweight hyperspectral imaging sensors have found their way to drone platforms.

Photo by Fabian Schneider

EUFAR's achievements for the "Hyperspectral Community" like the summer schools, tools for airborne hyperspectral images and LiDAR data, protocols, new airborne hyperspectral imaging sensors in EUFAR Transnational Access, … have been presented during the poster session by Stefanie Holzwarth (DLR) and Ils Reusen (VITO).

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

Every single evaluation of EUFAR was positive, and people are endorsing the continuation of EUFAR for this clearly growing "Hyperspectral Community".

As a follow-up of the 10th EARSeL SIG-IS Workshop, the organizers offer the opportunity to submit your research manuscript to the MDPI Special Issue "Recent Progress and Developments in Imaging Spectroscopy".

See more details here

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AIRBORNE RESEARCH CAMPAIGNS

OIR – Airborne magnetic and ice penetrating radar field campaign

Dome Fuji, East Antarctica, December 2016-January 2017

Let the oldest ice games begin!

At the end of 2016, European, American and Chinese institutes started to compete for the quest of the oldest continuous ice record on Earth in order to get 1 to 2 Ma of climate record. The first step was to select a site potentially containing such a record. The criteria to determine the most suitable site are thick ice sheet coupled with low snow accumulation rate, slow ice motion and low geothermal heat flow enabling low temperature at the bottom of the ice sheet. The area around the Dome Fuji in East Antarctica fulfilled these criteria. The second step consisted in an airborne campaign to map the thickness of the ice sheet, the topography of the bedrock and get an insight into its geological characteristics. To carry out the airborne survey in such a remote area, complex logistics were necessary to set up a temporary camp and to supply it with fuel to enable multiple flights, and supply engines and electricity. The camp was located at 30°E and 79°S, at an altitude of 3500m and at a 10-day traverse from the Kohnen summer station.

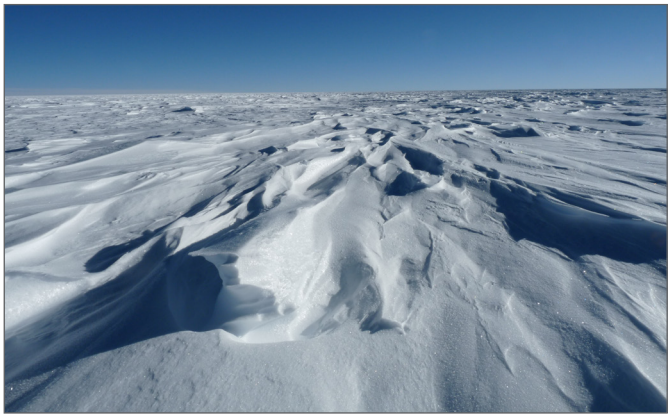
The crew and the scientists of the OIR project in front of AWI's Polar 6 aircraft

From December 2016 to January 2017, the "Oldest Ice Reconnaissance Dome Fuji" (OIR) airborne magnetic and radar survey was performed in the vicinity of Dome F in order to characterize a possible drilling site where the oldest ice is supposed to remain.

The project was led by the Alfred Wegener Institute (AWI). In total, data were acquired during 24 flights around the Dome F. At the end, the airborne survey covered an area of ~170 000km^2 and resulted in ~23 000km of lines, northeast of the OIR temporary camp..

Apart from the thickness of the ice sheets and the topography of the bed rock provided by radar survey, knowledge of the crustal magnetic field is very valuable for determining local geology. As most of the Antarctica continent is covered by ~1500m of ice in average, the acquisition of magnetic data is one of the only possibilities to access the geology. The magnetic dataset is required to get an insight on the crustal structures of the bedrock which allows a general understanding of the regional geology around Dome F. An airborne regional magnetic survey was already performed by Soviet Antarctic expeditions in the 60-70's in the OIR project area but at higher altitude (2500 m above the ice) and with larger line spacing.

The OIR magnetic data is of higher resolution and, after processing in the coming months, we expect that it will improve knowledge of the geology of the bedrock for this parts of the continent as for example the enhancement of possible contacts and sutures within the area.



Typical surface of the ice sheet sculpted by the wind in the vicinity of the Dome Fuji and the OIR camp

The OIR camp

For more information, please visit the website of the European project "Beyond EPICA oldest ice" here

EUFAR Training Courses

EASI - Exploring Air Sea Interaction via airborne data

Shannon, Ireland, 25 June - 4 July 2017

Funded by EUFAR and jointly organised with CNR-ISAC, the primary goal of the EASI summer school was to teach and train participants on the use of a research aircraft, and on the experimental possibilities it opens for atmospheric sciences research. This implied providing participants with a complete overview of airborne and remote sensing experimental techniques, and of specific features of collection and analysis of airborne measurements. In addition, EASI aimed to transfer consolidated knowledge on and recent advancements in specific topics related to air-sea interaction, and near coastal boundary layer structure and dynamics. 4 flights with the instrumented ATR42 aircraft (operated by SAFIRE) from the Shannon airport and a visit to the Mace Head Atmospheric Research Station were operated. Click here, to download the flyer and the photobooks

EUFAR EASI Summer School working session on board ATR42 (SAFIRE)

EUFAR EASI Summer School students and trainers

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

Bavarian Forest National Park, Germany (3 - 9 July 2017)

DLR Oberpfaffenhofen, Germany (10 -14 July 2017)

Organised by EUFAR, the University of Twente and DLR, the training course presented special skills required for processing the new generation of airborne hyperspectral, thermal, and LiDAR data for retrieving essential biodiversity variables in forest ecosystems. The ground data collection that was performed during the first week of the training course at the Bavarian Forest National Park aimed to provide participants with know-how on tools (field spectroscopy, thermal spectrometry and terrestrial LiDAR) and measurement techniques to collect different vegetation variables.

In addition, an airborne campaign with a NERC Twin Otter was organised for the concurrent acquisitions of hyperspectral imaging data in visible, near-infrared, shortwave infrared and longwave-infrared wavelengths as well as LiDAR data. Furthermore, during the second week, participants attended certain sessions of the ICARE 2017 conference that was held simultaneously at DLR (10 -13 July).

Click here, to download the RS4forestEBV flyer and photobooks

EUFAR RS4forestEBV Summer School students and trainers

The BAS Twin Otter at Straubing Airport for EUFAR RS4forestEBV flight

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

University of Cambridge & Cranfield airport (UK)
26 June - July 2017

The STANCO training course, financed by EUFAR and jointly organised with DiSPUTER of the University "G. d'Annunzio" of Chieti-Pescara, aimed to provide an overview of measurement techniques, data analysis and specifics of airborne measurements of species relevant in the atmosphere. Emphasis was on new instruments and emerging techniques for aircraft observations. During the course, a visit to the Facility for Airborne Atmospheric Measurements at Cranfield airport was organised to provide a first overview of the BAe-146 and of the instruments installed on board the aircraft. The lectures were integrated with three mission flights using the BAe-146 aircraft where students had the opportunity to have hands-on training on conducting airborne measurements.

To download the STANCO flyer and photobook, click here.

On board FAAM Aircraft- EUFAR STANCO Summer School

EUFAR Future

EUFAR conducts Joint Research Activities (JRA)

These activities are directed towards the advancement of airborne environmental science observations and their exploitation by the research community. Information on current and previous JRAs can be found here

EUFAR invites Expressions of Interest (EoI) in future Joint Research Activities (JRA) relating to aspects of airborne research in environmental and geo-sciences. The general nature of such activities is that they should involve multiple partners in a number of European countries - these partners may include, but are not in any way limited to, members of the present EUFAR consortium. They should aim to deliver outcomes that benefit a broad cross-section of the airborne environmental research community, including both the in-situ study of atmopsheric processes and remote-sensing of land or water surfaces.

We envisage that EoIs may fall into one of two broad categories:

> Activities connected to the improvement of data quality, the development of novel data products from existing airborne instrumentation or the development of improved calibration techniques or equipment. The current JRAs of the EUFAR consortium are in this category

> Activities leading to the development of novel measurement devices or systems for airborne environmental science in both of the broad areas of in-situ measurement and remote-sensing. This could include the development, testing and intercomparison on manned aircraft of devices or systems capable of future use on UAVs.

Proposed JRAs should be capable of commencement in early 2018 or 2019 and to be completed within a timescale of between 2 and 4 years. Whilst no financial detail is required at this stage, they may have an indicative budget of up to €750k when all the required personnel time is included. They should involve a minimum of 3 partner organisations from different countries. These organisations can include, but are not restricted to, members of the present EUFAR consortium.

EoIs should be no longer than the equivalent of 4 sides of A4. It would be helpful if they could include some general background information, a general description of the project and some indication of proposed or potential partner organisations. Whilst there is no formal closing date for submission, those submitted by the end of September 2017 may be discussed at a EUFAR meeting planned for early October.

They may be submitted online using this web-form.

Past Events

European Geosciences Union (EGU) General Assembly 2017

23-28 April 2017, Vienna, Austria

EUFAR held a stand and presented a poster at the session dedicated to airborne measurements at the annual EGU General Assembly 2017, the largest and most prominent European geosciences event to disseminate information on EUFAR and draw interest to EUFAR's activities.

Upcoming Events

ICARE 2017 CONFERENCE "Developing the infrastructure to meet future scientific challenges"

The 2nd International Conference on Airborne Research for the Environment (ICARE 2017) will be held at the German Aerospace Research Center - DLR, in Oberpfaffenhofen from 10 to 13 July 2017. Mainly funded by EUFAR (under the EC's FP7 framework programme), the conference will also receive significant in-kind and cash contributions from DLR and ESA respectively.

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 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)

Publications

Interesting Investigation of Turbulence Parametrization Schemes over the Aegean Sea

A thorough Investigation of Turbulence Parametrization Schemes with reference to the Atmospheric Boundary Layer Over the Aegean Sea During Etesian Winds was published in May 2017 in the Boundary-Layer Meteorology (Volume 163, 2017). This research publication was realized by 7 European researchers in the frame of EUFAR Transnational Access (TA) project financed by EUFAR-AEGAN GAME2.

Click here to access the online abstract

EUFAR REFLEX campaign and training course in ACTA GEOPHYSICA

3 research articles were published in a special issue of ACTA GEOPHYSICA dedicated to the EUFAR REFLEX campaign and training course.

> An overview of the regional experiments for land-atmosphere exchanges 2012 (REFLEX 2012) campaign. AUTHORS: Wim Timmermans, et al. REFERENCE: Acta Geophysica 63, 1465-1484, 2015. DOI: 10.2478/s11600-014-0254-1

> Relating Hyperspectral Airborne Data to Ground Measurements in a Complex and Discontinuous Canopy. AUTHORS: J. F. Calleja, et al. REFERENCE: Acta Geophysica 63, 1499-1515, 2015. DOI: 10.2478/acgeo-2015-0036

> A New Method for the Estimation of Broadband Apparent Albedo Using Hyperspectral Airborne Hemispherical Directional Reflectance Factor Values. AUTHORS: J. F. Calleja, et al. REFERENCE: Remote Sensing 8, 183, 1-29, 2016. DOI:10.3390/rs8030183

Click here to access the full online articles on the EUFAR website

Focus on EUFAR aircraft fleet

The FAAM BAe 146-301 Large Atmospheric Aircraft (the ARA), owned by the Natural Environment Research Council and, via a support contract with BAE Systems, operated for them by Airtask, available for transnational access to fully funded flight hours under the EUFAR TA framework

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

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.

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