



## FUTURE OF THE FLEET

### EUFAR ICARE Conference

DLR, Oberpfaffenhofen, Germany, 10 - 13 July 2017



### Large success of the ICARE 2017 conference !

The 2nd International Conference on Airborne Research for the Environment (ICARE 2017) was held at DLR - the German Aerospace Research Center, in Oberpfaffenhofen near Munich (Germany), from 10 to 13 July 2017. The conference was organised in collaboration with the airborne research community in the USA, including both NASA and the National Center for Atmospheric Research (NCAR). Mainly funded by EUFAR (under the EC's FP7 Framework Programme), the conference also received significant in-kind contributions from DLR. The European Space Agency (ESA) provided funding to support the attendance of a number of early-career scientists.

"Developing the infrastructure to meet future scientific challenges" was the theme of this 4-day event. More than 175 leading participants across Europe, the United States and beyond, including expert scientists, aircraft operators and instrument developers have made this event a great opportunity to exchange expertise and experience and review the scientific issues for future airborne measurements.



ICARE 2017- Group photo of all attendees

There were plenary and parallel sessions covering four principal subject areas:

- > Science drivers for future airborne science missions
- > Organisation of future field campaigns
- > Developing future airborne science capabilities and platforms
- > New developments in instrumentation and data

The program included a total of 20 invited keynote speakers (find the list [here](#)) and 41 contributed presentations with a further 25 posters presented during a dedicated session.



ICARE 2017- Plenary sessions

Benefiting from welcomed sunny weather conditions, a tour organised by DLR enabled the participants and press to visit several European research aircraft that were brought to the event by their operators.



ICARE 2017- Examples of exhibited European research aircraft

ICARE 2017 conference was a great success thanks to the wide participation within and beyond Europe, high level of airborne research expertise, good weather for the aircraft exhibition and impeccable service rendered by DLR, the hosting organisation. We are looking forward to bringing together again key players in the airborne research community.

Discover the ICARE videos below (teaser and interviews)





Press coverage, videos, photos galleries, flyer...available [here](#)

## EUFAR TRAINING COURSES

### EASI - Exploring Air Sea Interaction via airborne data

Shannon, Ireland, 25 June - 4 July 2017

Click [here](#) to access all presentations

The Institute for Atmospheric Sciences and Climate (ISAC) of the Italian National Research Council (CNR) organised in Shannon, Ireland, a 10-day training programme summer school (June 25-July 4, 2017), funded by EUFAR. The summer school hosted 20 students from more than 12 nationalities and working in 10 EU member states. They were trained on the use of a research aircraft, and on the experimental possibilities this opens for atmospheric physics and chemistry research. Students attended lectures on atmospheric turbulence, on airborne measurements of aerosols and clouds, on the structure of marine and coastal boundary layers, on coastal meteorology. Moreover, they were trained on the specific features of airborne measurements and their analysis. Organised in four working groups of five students each and coordinated by an experienced tutor, participants planned a flight strategy and then performed airborne measurements over the coastal region of Shannon, at the interface between land and sea.

During flight experiments on the French SAFIRE aircraft ATR42, dynamical, thermodynamical, microphysical and radiometry measurements were performed and later analysed. Lectures and flight time were alternated with working group sessions on instrument calibration, safety issues and data analysis. Participants also spent one day visiting the Mace Head Atmospheric Research Station, where they could meet researchers and experts in the field of aerosols physics and chemistry.

The organising committee was led by Alessandra S. Lanotte and Francesco Cairo (CNR- ISAC, IT), and included Ils Reusen (VITO, BE), Marcello Miglietta (CNR- ISAC, IT), Lilian Diarra (Météo-France/ EUFAR Office, FR), Bruno Piguet (Météo-France, FR), Jean-Christophe Canonici (SAFIRE, FR), Szymon Malinowski (Univ. of Warsaw, PL), Dariusz Ceburnis (Univ. Galway, IR) and Ian Faloon (Univ. California Davis, USA).

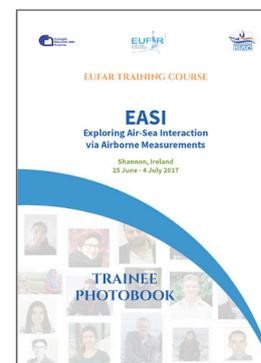
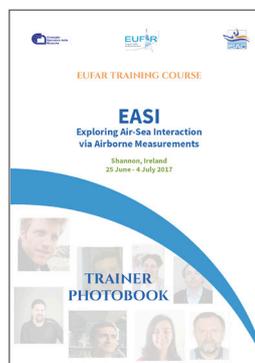


EUFAR EASI Summer School students and trainers



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

Click [here](#) to access the full gallery.



EUFAR EASI Summer School photobooks

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

University of Cambridge & Cranfield airport, England, 26 June - 6 July 2017

Click [here](#) to access all presentations

University "G. d'Annunzio" of Chieti-Pescara (DiSPUTER), Italy, organized a 2-week summer school which was held at the University of Cambridge (UK) and at FAAM in Cranfield (UK), and was funded by EUFAR. The summer school offered to 19 PhD students and Post-Doc from 10 nationalities working in 9 EU

member states, the background on atmospheric chemistry, aerosols, climate change and all technical skills required for measuring the main atmospheric trace gases. The students learned also about instrument fitting on aircraft platforms and processing with airborne chemical and aerosol data. In the first week of the summer school, participants attended lectures given by experts on aircraft measurements, chemistry and aerosol modelling and aircraft operation. They also visited the **BAe-146 research aircraft** in Cranfield, where the FAAM team showed all the instruments installed on the research aircraft and helped students to plan the flights of the airborne campaign.



On board FAAM Aircraft- EUFAR STANCO Summer School

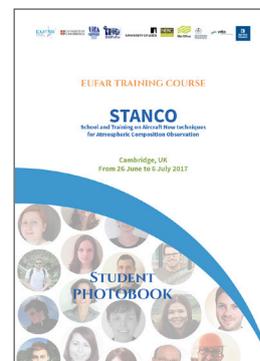
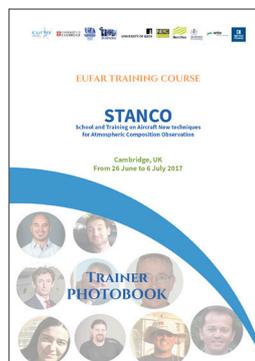
In the second week, participants were divided in three groups to fly on the BAe-146 with the aim to train them with trace gases and aerosol measurements on board of an instrumented aircraft. The flights were planned to acquire measurements of the emissions of London area and ships, in connection with the **EMERGE campaign** that involved also DLR aircraft. In parallel with the airborne measurements, sessions of data analysis were organized to train students on data retrieval and interpretation. After the end of the summer school, participants will still be in touch to finalize the data analysis and to report the main scientific results of the airborne campaign.



EUFAR STANCO Summer School working session on board FAAM Aircraft

Click [here](#) to access the full gallery.

The organising committee was comprised of Piero Di Carlo (**University 'G. d'Annunzio' of Chieti-Pescara**, Italy), Jim McQuaid (**University of Leeds**, UK), IIs Reusen (EUFAR ET coordinator, **VITO**, Belgium), Lilian Diarra (**Météo-France/ EUFAR**, France), Radovan Krejci (**Stockholm University**, Sweden).



EUFAR STANCO Summer School photobooks

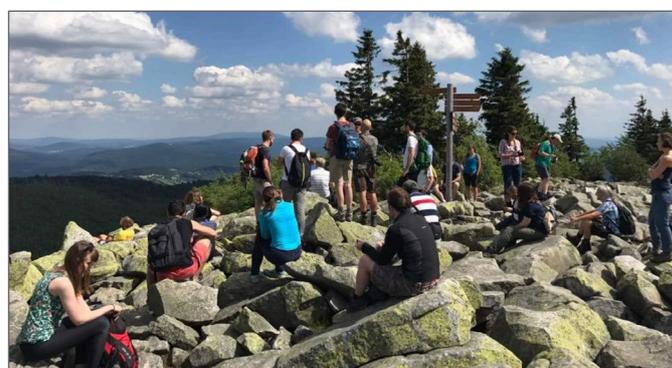
### RS4forestEBV - Airborne remote sensing for monitoring essential biodiversity variables in forest ecosystems

*Bavarian Forest National Park, Germany, 3 - 9 July 2017*  
*DLR, Oberpfaffenhofen, Germany, 10 - 14 July 2017*

Click [here](#) to access all presentations

**University Twente** (Faculty ITC) in cooperation with the funder (EUFAR) coordinated a 2-week (3 - 14 July 2017) summer school which was held in the **Bavarian Forest National Park** and in the **DLR** (Oberpfaffenhofen, Germany).

The summer school offered to 20 PhD students from 15 nationalities and working in 10 EU member states, the technical skills required for understanding and measuring, essential biodiversity variables in forest ecosystem as well as processing with airborne hyperspectral images, thermal images and LiDAR data for the retrieval of essential biodiversity variables (EBV). Field measurements of EBVs were performed in the first week of the summer school at the Bavarian Forest National Park with the aim to train course participants with in situ data EBV collection as well as field spectroscopy, thermal spectrometry and terrestrial LiDAR for remote sensing of EBVs.



EUFAR RS4forestEBV Summer School- Working session at the Bavarian Forest National Park

In parallel with the acquired measurements, an airborne campaign with a **NERC Twin Otter** was organised with the concurrent acquisitions of hyperspectral imaging data in visible, near-infrared, shortwave infrared and thermal-infrared. In the second week of the summer school, participants attended lectures given by experts coming at the **ICARE 2017 conference**. Welcomed by the airborne research and operator community, the students visited the aircraft exhibition show of ICARE 2017.

The organising committee was comprised of Andrew Skidmore and Roshanak Darvishzadeh (ITC, **University Twente**), IIs Reusen (**VITO**), Steffi Holzwarth (**DLR**) and Marco Heurich (**Bavarian Forest National Park**).

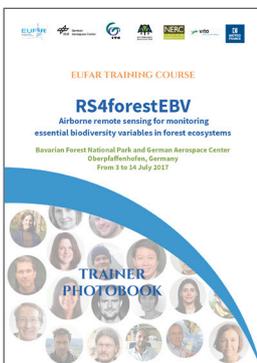
Click [here](#) to access the full gallery.



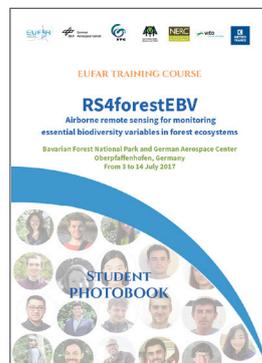
EUFAR RS4forestEBV Summer School students and trainers



EUFAR RS4forestEBV Summer School- Working session



EUFAR RS4forestEBV Summer School photobooks



## THEY ARE TALKING ABOUT THEIR EUFAR TRAINING COURSE EXPERIENCE...

### 6 EASI SUMMER SCHOOL Ana Álvarez Piedehierro, **Universidad de Extremadura, Spain.**

*I recently took part in the EASI training course, organized by CNR-ISAC (Italy) and EUFAR in Shannon, Ireland. 20 trainees, trainers from all around the world and the fantastic SAFIRE crew participated in this 9-day intensive training course: a combination of a summer school with lectures, a field campaign and a computing camp.*

*Lectures had both a theoretical and a practical approach to "Exploring Air-Sea Interaction via Airborne Measurements". We started with the basics of turbulence, structure of the marine and coastal boundary layer, flux estimations, study of aerosol and clouds, but we were also introduced to airborne environmental measures and how to maximize the possibilities that our flights on board the SAFIRE-ATR42 would bring us. In order to achieve that, we were provided with tools for data analysis and visualization and we were walked through the processing of core parameters of the SAFIRE-ATR42 and many other measurements. The trainers made a great effort to preprocess data from our flights very quickly so we would be able to work on our data as soon as possible to show preliminary results of our research to the rest of the group.*

*The practical work was organized into teams each with assigned objectives and a predesigned flight plan. Every team consisted of five trainees each with different expertise and backgrounds, making the team as well-balanced as possible. We also had a trainer supervising each team, helping on planning the flight experiments. The SAFIRE staff was always helpful, trying very hard to meet our flight plans. Working so close with the crew (pilots and scientific staff) was very inspiring.*

*I was impressed with the high scientific level reached during the training course. The meteo briefings we had during our flight days were detailed and the discussions very enriching. During these meetings we decided together which flight plan would best meet the existing weather conditions and which team should go next.*

*For a first-timer in airborne research, the most interesting part was performing the research flight itself. Every member of my team had a key role during the flight, being responsible for one of the working stations controlling certain instrumentation. Working with my team was easy and fun, we all tried to contribute with something and learn from the others. The SAFIRE-ATR42 aircraft was fully equipped with atmospheric research instrumentation and we had the chance of using a recently installed LIDAR, which turned out to be very useful for our boundary layer studies. The aircraft also had HT, gas, wind, radiation, particle, droplet sensors... everything we needed for carrying out our projects.*

*The coding language of the training course was Python, and*

even though almost all the participants were new to this, we successfully learned the basics. We did this by helping each other and therefore could use the analysis scripts provided by the trainers.

Despite the difficulty of planning a training course like this one, EASI went smoothly. The organizers and trainers did a splendid job making the EASI training course possible for us. We brought home a lot of knowledge, new skills and many contacts to stay in touch with and to help keep working on airborne research and many other projects to come. ,



Ana Álvarez Piedehierro (on the left)  
© Ana Álvarez Piedehierro

## STANCO SUMMER SCHOOL Peter Gallimore, University of Cambridge, UK

The STANCO training course brought together a diverse range of participants from across Europe with an interest in airborne observations of the atmosphere. My own background is in laboratory measurements of atmospheric chemistry and I found the course an invaluable means to gain scientific flight experience.

The course's strength was its combination of background theory and hands-on experience. Lectures in Cambridge were delivered by experts with experience in airborne observations and covered atmospheric composition, aircraft instrumentation, case studies of previous campaigns and an introduction to the practicalities of airborne research.

Participants gained unique "live" experience by flying on the UK's BAe 146 research aircraft based at the Facility for Airborne Atmospheric Measurements, Cranfield. We were encouraged to play an active part in planning the itinerary for these flights, although some of our more outlandish suggestions were brought back to Earth by the course organisers and pilots! Each participant was seated with an experienced scientist during their flight which provided a great opportunity for informal questions in the turbulent boundary layer, or 50ft above the ocean.

Following the airborne experience, workshops on methods and software for analysing flight data were given and we divided into teams to digest the aircraft observations. I found it particularly interesting to work alongside other participants with complementary strengths in meteorology and climate science. Since the formal course we have continued to work together at a distance to put what we learned during the course into

practice. I would like to thank the many experts who made this course a valuable experience and particularly the programme organisers Piero, Jim and Radek. ,



Peter Gallimore in front of the FAAM Aircraft

## RS4FORESTEBV SUMMER SCHOOL Katarzyna Zielewska-Büttner, Forest Research Institute Baden-Württemberg, Germany

I found the RS4forestEBV summer school very comprehensive, valuable and thoroughly prepared for young scientists in the field of biodiversity and remote sensing.

The RS4forestEBV organized by ITC - Faculty of Geo-Informatics Science and Earth Observation took place at two locations in Bavarian in Germany (Bavarian Forest National Park and German Aerospace Centre, Oberpfaffenhofen).

The course combined theoretical lectures on forest biodiversity, biodiversity monitoring systems and applicable remote sensing techniques with practical exercises on study design, use of special equipment and data collection in the field. Tutorials and hands on training in data modelling and evaluation rounded the curriculum of the course

All needed advanced equipment was available for trainees to be used for field measurements giving an opportunity to perform a lot of measurements (e.g. terrestrial LiDAR, LAI, spectral and thermal leaf measurements etc.) that are useful for collection of reference terrestrial data.

Both locations, Bavarian Forest for the first week and field work, and the DLR Earth Observation Centre were an excellent choice. Exploring the area and scientific experiments of the National Park where remote sensing is widely used for biodiversity studies delivered a lot of motivation, impulses and scientific ideas for further research work of many of us. Visiting the DLR we had an opportunity to learn more about the technical aspects of airborne research and development. A special point of the summer school was a visit to the EUFAR aircraft show and social dinner organized for the ICARE International Conference taking place in Oberpfaffenhofen at that time, giving a chance for interaction with the participants of the conference.

During entire two weeks excellent international trainers shared openly their expertise and knowledge and presented interesting case studies on data processing, data fusion, modelling and analysis. Also all the trainees contributed in a very important way with their different profiles to the course making shar-

ing of experiences and ideas and having always a good mood a very important aspect of the course.

Having a background in traditional photogrammetry, aerial imagery and LiDAR, it was a great opportunity for me to learn about the thermal and hyperspectral remote sensing measurements and their practicalities and to master my knowledge on LiDAR. I found the combination of theoretical and practical elements of the summer school very important. I definitely benefited a lot from the course and I will use the knowledge gained in my doctoral thesis and in my daily work on detection of forest structure parameters from remote sensing data in the thematic field of forest nature conservation.

Thank you very much for the excellent organization! ;



Katarzyna Zielewska-Büttner

## EXPERT WORKSHOPS

### EUFAR/IAMAS/IUGG/ICCP Workshop on Processing of Cloud Particle Measurements

DLR, Oberpfaffenhofen, Germany, 7 - 9 July 2017

The analysis of recent airborne campaigns showed differences in cloud products (e.g., size distributions, bulk cloud properties) resulting from different data analysis methods of imaging cloud probes. Hence experts and students from 26 institutions participated in the EUFAR/IAMAS/IUGG/ICCP Workshop on Processing of Cloud Particle Measurements at German Aerospace Center (DLR) Oberpfaffenhofen to discuss, optimize and harmonize cloud data analysis in order to augment data quality of current optical array probes employed on aircraft. 39 participants from 12 nations met from 7 to 9 July 2017 at the Institute for Physics of the Atmosphere to receive training on cloud probe software and to transfer knowledge on cloud probe data evaluation within the international cloud community. The workshop was planned in connection with EUFAR's 2<sup>nd</sup> International Conference on Airborne Research for the Environment (ICARE 2017) held at DLR in Oberpfaffenhofen, from 10 to 13 July 2017.

The workshop was planned as a follow-up to the 2014 Cloud Probe Intercomparison Workshop prior to the AMS cloud conference in Boston and the 2016 Cloud Probe Software Work-

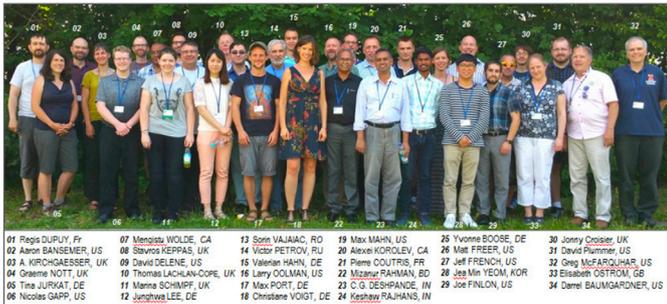
shop prior to the International Conference on Clouds and Precipitation (ICCP) in Manchester. These two workshops set the stage for the 2017 workshop that focused on data analysis of optical array cloud probes and hands-on training with the most commonly used software packages by students and early career scientists who will be working with cloud measurements in the future. By the close of the workshop, participants were proficient in manipulating, analyzing and graphing cloud data.

The workshop opened on 7 July 2017 with introductions by Hans Volkert (DLR) for IAMAS/IUGG, Christiane Voigt (DLR) representing EUFAR and Darrel Baumgardner (DMT) for ICCP. Then Darrel Baumgardner presented an overview of sensors, their operating principles and limitations of single particle light scattering spectrometers. Thereafter, an overview of single particle imaging spectrometers and algorithms to process optical array probe data by Greg McFarquhar (University of Illinois) showed methods for depth of field determination, out of focus particle corrections, particle reconstructions and shattering corrections. After lunch, basic data analysis methods and typical errors were presented by Darrel Baumgardner. These introductory talks set the stage for the scope of the workshop to provide overviews and hands-on training on the individual cloud probe software packages currently in use within the cloud community. The training on software packages started with an introduction to the SPEC processing software by Colin Gurganus (SPEC) and the Canadian D2G processing software by Alexei Korolev (ECCC).

The workshop continued on next day with hands-on training in two parallel sessions. The software developers Aaron Bansemer (NCAR, SODA) and Jonny Croisier (University of Manchester, OASIS) trained on the SODA and OASIS packages in session I, while Joe Finlon (University of Illinois) and Adam Majewski (University of Wyoming) presented the University of Illinois and University of Wyoming software programs in session II. After lunch participants switched sessions to allow each to get an introduction to all four software packages. After a productive day, the participants were able to operate two to four of the different programs on their laptops limiting the need for further assistance. The day closed with an overview of the features of the EUFAR EGADS software and data depository by Matt Freer (DMT), which is planned as a future data base for cloud probe processing algorithms. In the evening, the participants visited Munich and enjoyed a social dinner at the famous Hofbräuhaus.

David Delene (University of North Dakota) opened session III on Sunday with an introduction to the University of North Dakota processing package, ADPAA, and a description of the software depository created for airborne cloud instrumentation. Then the status of the AMS monograph on Ice Formation and Evolution in Clouds and Precipitation: Measurement and Modeling Challenges was presented by Darrel Baumgardner and an update on the EUFAR Handbook on Airborne Measurements for Environmental Research (Edt. Brenguier and Wendisch) was given by Christiane Voigt.

The final discussion and outlook was guided by Greg McFarquhar with the objectives to create a Steering Committee to oversee software evaluation and standardization, to enhance software availability and to encourage and facilitate software documentation. As an outcome of the workshop, there are plans to submit a joint research proposal to EUFAR/EU/NSF. This might include the formation of an international cooperation for cloud probe data analysis with a step by step instruction on cloud data analysis for two selected data sets of cloud measurements, as well as a simulated test data set. Results will be presented in a workshop preceding the AMS cloud conference in Vancouver, Canada in 2018. The encouraging workshop ended with a trip to the monastery Andechs.



Workshop group photo

Contact: Christiane Voigt - DLR - [christiane.voigt@dlr.de](mailto:christiane.voigt@dlr.de)

## AIRBORNE RESEARCH CAMPAIGNS

### PRE-TECT: studying desert dust aerosols with airborne and ground-based measurements

*Finkolia, Crete, 01 - 30 April 2017*

PRE-TECT is an atmospheric experiment organized by the National Observatory of Athens (NOA). The experiment took place from 1<sup>st</sup> to 30<sup>th</sup> of April 2017 at the Greek atmospheric observatory of Finokalia in Crete, aiming to advance desert dust microphysical characterization from advanced ground-based remote sensing, employing sophisticated inversion techniques capable of retrieving the aerosol absorption. This is the main objective of the ACTRIS JRA1 activity "Improving the accuracy of aerosol light absorption determinations". In order to validate the ground-based remote sensing retrievals, airborne in-situ measurements are of paramount importance. EUFAR has awarded two Transnational Access projects (DoGMA, CIIMA) that helped fulfilling the ACTRIS scientific objectives. This was a great example of collaboration between the two Research Infrastructures, aiming to advance our knowledge on aerosol microphysics and their impact on radiation and cloud formation. The flights were performed by the research aircraft FA20 of the German Aerospace Center (DLR), in synergy with the A-LIFE ERC project (University of Vienna). The FA20 performed 8 EUFAR flights which were coordinated with the ground-based measurements in Finokalia. The research aircraft was equipped with an extended in-situ aerosol payload, a wind

lidar and meteorological sensors.

PRE-TECT has been framed by a number of synergistic atmospheric experiments that were implemented during the same period in Eastern Mediterranean. Specifically, the following projects and initiatives contributed in PRE-TECT:

- 1- The **D-TECT** ERC project, aiming to assess the impact of particle electrification on desert dust dynamics and long-range transport. During PRE-TECT, new sensors for atmospheric electricity have been tested in order to combine these measurements with the advanced ACTRIS aerosol products.
- 2- The **ECARS TWINNING** EU project, aiming to boost **INOE**'s research capacity in the domain of atmospheric remote sensing and create a pole of excellence in East Europe. The scientists of PRE-TECT organized a summer school for ECARS, aiming to introduce young researchers in a large-scale atmospheric calibration exercise, focusing on the evaluation of aerosol and cloud satellite products employing ground-based and airborne sensors. During the summer school, the students were exposed on dedicated **hands-on training activities**.
- 3- The **A-LIFE** ERC project, aiming to provide fundamental new understanding on the properties of absorbing aerosols and its impact on dynamics (in particular mineral dust – black carbon mixtures).
- 4- The **CyCARE** campaign, a common initiative between the Cyprus University of Technology, Limassol and TROPOS, aiming to fill the gap in the global understanding of aerosol-cloud interactions. These investigations will help answering the question how rain patterns will develop in future and what the effect of climate change on arid regions might be.
- 5- The **GEO-CRADLE** project, aiming to coordinate and integrate state-of-the-art Earth Observation Activities in the regions of North Africa, Middle East, and Balkans in order to develop links with GEO related initiatives towards GEOSS. Two thematic pilots of GEO-CRADLE and their services have been evaluated using the PRE-TECT dataset, the dust forecast service of the ACC pilot (Adaptation to Climate Change) and the SENSE energy system for the determination of solar energy field in the Eastern Mediterranean.



The PRE-TECT team

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## AIRBORNE RESEARCH CAMPAIGNS

### EUFAR transnational access flight campaign - MASOMED

Camarena, Madrid, Spain, 03-19 May 2017

MASOMED field and airborne campaign (Camarena, Madrid, Spain, 03-19 May 2017), funded by [EUFAR Transnational Access](#) and jointly organized by the [GFZ](#) in Germany, [CIEMAT](#) and [INTA](#) in Spain, aimed at mapping soil variability and quality related to crop stress and land management within rainfed crops based on hyperspectral imagery from the VIS-NIR to TIR (0.4-12  $\mu\text{m}$ ).

Indeed, inadequate management due to cultivation and land use practice within Mediterranean regions is endangering soil quality and productivity, whereas soils are an essential factor contributing to agricultural production in cereal crops, olive groves and vineyards. The MASOMED data will be used to map soil variability during the growing season and associated vegetation stress indicators using the full potential of visible, near infrared, and thermal infrared hyperspectral CASI 1500i and AHS data within a rainfed Mediterranean agroecosystem (Camarena test site, Madrid, Spain). Further, the following issues will be pursued:

- > Assessing the spatial distribution of the different rainfed agroecosystems according to abiotic and biotic properties
- > Relating vegetation stress to soil degradation processes and conditions
- > Detecting changes related to soil erosion by comparing current conditions with those identified in Schmid et al., 2016
- > Testing the transferability of the methods used to future hyperspectral space-borne sensors such as EnMAP, HISUI, PRISMA, SHALOM.

Finally with a good weather and fully motivated team, successful flight acquisitions took place on Sunday, 7 May 2017, with the [CASA 212-200 from INTA](#), Madrid, during the day with the highest sun angle with the CASI-1500i and AHS sensors, and on the following night on 8 May 2017 at the coolest time (3am) for a night acquisition with the thermal AHS sensor. Simultaneously, a large field team was gathered composed of participants from GFZ, CIEMAT, [University of Almeria](#), [Denmark Technical University](#), in collaboration with participants from [Tel-Aviv University](#) and the [Technical University of Berlin](#), to acquire calibration/validation surface data around the airborne acquisition date. Additionally, a 2-man field INTA team accompanied the field MASOMED team for calibration/validation measurements during the flight campaign both for the day and night acquisition.

All airborne and field data acquired during the campaign are currently under processing by INTA and the different teams in the project. The data include 8 AHS and CASI-1500i flight lines taken during the day and 2 AHS flight lines taken during the night. Field data include 8 test sites with a total of 27 measurement plots within different crops with the following data: surface reflectance in the VNIR-SWIR, surface-leaving radiance in the TIR, temperature, LAI, fAPAR, chlorophyll, vegetation and

soil samples, and field observations.



MASOMED field team by the dark calibration target, for the day overflight passes

Contact: Sabine Chabrilat - [sabine.chabrilat@gfz-potsdam.de](mailto:sabine.chabrilat@gfz-potsdam.de)

## MANAGEMENT

### Submission of the first periodic report to the EC

The 31<sup>st</sup> of January 2017 marked the end of the second EU-FAR2 reporting period (18 months). The EUFAR Office together with activity leaders and project partners finalised the RP2 technical and financial reports, last 17 July 2017. The delay after the contractual requirement of 60 days is due to technical issues related to the amendment approval and work overload during the last months.

Validation and payment should occur within 90 days from the submission date. Should any clarification or modification be requested by the EC, this counter will stop until the request is addressed. The reimbursement of expenses incurred during RP2 will be distributed to the beneficiaries upon reception of the overall requested amount by the Project Coordinator (Météo-France) - cut to 85% of the €6M total budget according to the RP1+RP2 cumulated interim payment threshold, presumably in late autumn.

### 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) related 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 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 atmospheric processes and remote-sensing of land or water surfaces.

We envisage that Eols 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 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.

Eols 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](#).

### EUFAR to become an AISBL !

After a lengthy period of negotiation, 8 European institutions representing 6 different countries involved in airborne environmental research have signed the necessary Statutes to constitute EUFAR as an AISBL – an international non-profit association under Belgian law. These documents will now be deposited with the Belgian courts so that EUFAR AISBL will be formally constituted early in 2018.

Achievement of this status has been a key goal of the present EUFAR consortium since 2014. The founding members of the new organisation recognize the continuing benefit of working together on matters of common interest using their own resources. The objectives of the AISBL will include:

> promoting efficiency in the operation of airborne research infrastructures through the exploitation of common instruments, data processing software formats and archiving

> development and promotion of schemes to broaden access to European airborne research facilities for all European scientists

> fostering coordination between European research funding agencies, the development of joint priorities for airborne science and the harmonised development of future airborne observing systems, including Unmanned Aerial Systems

> promoting training opportunities in airborne measurements and their application to researchers across Europe

> providing a focus for collaboration between the airborne research communities in Europe and elsewhere

Whilst the negotiation process has been lengthy, it has resulted in an organisation which will be open to further growth, welcoming a broad range of institutions working in environmental research which will be able to participate as members or partners. The founding members of the AISBL are, in alphabetical order of their home country: **VITO**, **CzechGlobe**, **CNRS**, **Météo-France**, **ONERA**, **DLR**, **University of Warsaw** and **Met Office**.

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## PUBLICATIONS

Click [here](#) to access the full online articles on the EUFAR website

### Research articles related to Transnational Access projects

> In the frame of the **EUFAR AIMWETLAB TA project** (Aerial imaging of the wetlands of Lake Balaton and the Kis-Balaton) held in 2010, the following article was published.



Zlinszky, A., Boergens, E., Glira, P. and Pfeifer, N.: Airborne Laser Scanning for calibration and validation of inshore satellite altimetry: A proof of concept, Remote Sensing of Environment, 197, 35-42, <https://doi.org/10.1016/j.rse.2017.04.027>, 2017

> In the frame of the **EUFAR ACEMED TA project** (Evaluation of CALIPSO's aerosol classification scheme over Eastern Mediterranean) held in 2011, the following article was published.



Tsekeri, A., Amiridis, V., Marenco, F., Nenes, A., Marinou, E., Solomos, S., Rosenberg, P., Trembath, J., Nott, G. J., Allan, J., Le Breton, M., Bacak, A., Coe, H., Percival, C., and Mihailopoulos, N.: Profiling aerosol optical, microphysical and hygroscopic properties in ambient conditions by combining in situ and remote sensing, Atmospheric Measurement Techniques, 10, 83-107, <https://doi.org/10.5194/amt-10-83-2017>, 2017

## Articles on EUFAR in Adjacent Open Access Journal and Ebook

Philip Brown (Met Office, UK), the EUFAR scientific coordinator, published a 2-page article and 8-page ebook on EUFAR and its support to the airborne research community in the Adjacent Open Access journal, August 2017 edition.

### PROFILE

#### EUFAR – Coordinating airborne environmental sciences

Instrumented aircraft are an important scientific tool, allowing researchers to support a range of applications in environmental sciences, says EUFAR

EUFAR is currently supported by the 7th Framework Programme (FP7) of the European Commission. It combines 24 European institutions and organisations involved in airborne research, operating 18 instrumented aircraft and 16 remoting instruments, providing a broad measurement capability.

There is a long history of airborne observational research contributing to the scientific understanding of Earth system processes. These developments have proceeded in parallel with major developments in the capabilities to observe these processes on a global scale from space and to model them in operational Numerical Weather Prediction (NWP), Climate and Earth-System Models. The fields of science that are impacted by an airborne research observing capability are very broad and span the atmosphere, ocean, land surface and biological systems. Maximising access to a broad range of airborne observing facilities is critically important to our future ability to study processes in the environment and to develop and use the models that, for example, to guide policy mitigation strategies in a changing climate.

EUFAR aims to:

- develop international access to national facilities;
- improve the quality of the services provided by aircraft and instrument operators by strengthening expertise through knowledge exchange;
- develop and maintain a central database of airborne data and the standards by this database to be interoperable with other environmental science and earth observation datasets;
- support joint instrumental research activities centred on the development of improved data processing and calibration techniques;
- promote the use of research aircraft and instruments by providing education and training courses in airborne research topics;
- support innovation in airborne research, working with industry to transform airborne research instruments, methodologies and software into new products and services.

**EU Networking activities**

EUFAR supports a number of networking activities that help to improve the efficiency and spreading best practice in airborne research observations.

Education and training are designed to attract and train both early stage researchers and university lecturers in airborne atmospheric research. Lecturers and remote sensing of the

### PROFILE

#### The future of EUFAR

EUFAR is looking to establish itself as an AGSL (International non-profit association) such as associations supported by members' cash and in-kind contributions will ensure that key EUFAR activities can continue beyond its present funding by the European Commission. These activities will include the maintenance of its website and broadening access both to the aircraft observations and to data obtained from flight campaigns. EUFAR is also currently seeking European members, where the combined measurements yield more detailed information on the nature of the lower canopy. EUFAR tools, including ion gauges and user manuals can be downloaded from the EUFAR website.

Significant progress has been made by a group of members to form such an association. Agreements will enable as wide a range of organisations as possible to participate in its work as members or partners, hence broadening its impact in countries not presently operating their own research aircraft. The AGSL will be formally established at the start of 2018.

TCCG is working to develop robust calibration systems for gas phase chemical measurements made on board research aircraft.

These contribute substantially to the development of numerical models used for both air quality forecasting and longer-term climate studies, providing information on the vertical distribution of species that are difficult to obtain by other means. They are also an important source of field and regional validation for satellite observations that are used for global scale measurements. Studies of these gas emissions and oxidation other involve one or more aircraft together with fixed, ground-based measuring means. Working with the AGOS and ACTE communities to develop the best calibration techniques, TCCG seeks to reduce measurement uncertainties and so enable them to be used to provide more detailed analyses of the processes involved in the

Open Access Government, August 2017 Issue (14/08/2017), pp 282-283

## FOCUS ON EUFAR AIRCRAFT FLEET



THE POLAR5, A TURBO PROPELLER AIRCRAFT, OPERATED BY ALFRED WEGENER INSTITUTE (AWI), AVAILABLE FOR TRANSNATIONAL ACCESS UNDER THE EUFAR TA FRAMEWORK

**Transport News**

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14/08/17

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### European Facility for Airborne Research

**EUFAR**  
European Facility for Airborne Research

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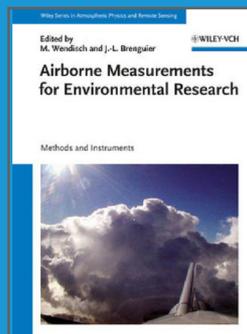
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**EUFAR Handbook**

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.

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