Actual coordination activities within C-SRNWP

Balázs Szintai

C-SRNWP Manager

with contributions from ALADIN, COSMO, HIRLAM, LACE, SEECOP, UKMO

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EWGLAM/SRNWP Meeting

Sofia, Bulgaria

30 September 2019

Outline of the following talks

- Balázs Szintai: actual activities within C-SRNWP
- Steve Stringer: E-ABO in the new programme phase (presented by Balázs Szintai)
- Michal Nestiak: OPERA in the new programme phase
- Bruce Macpherson: NWP requirements on observations

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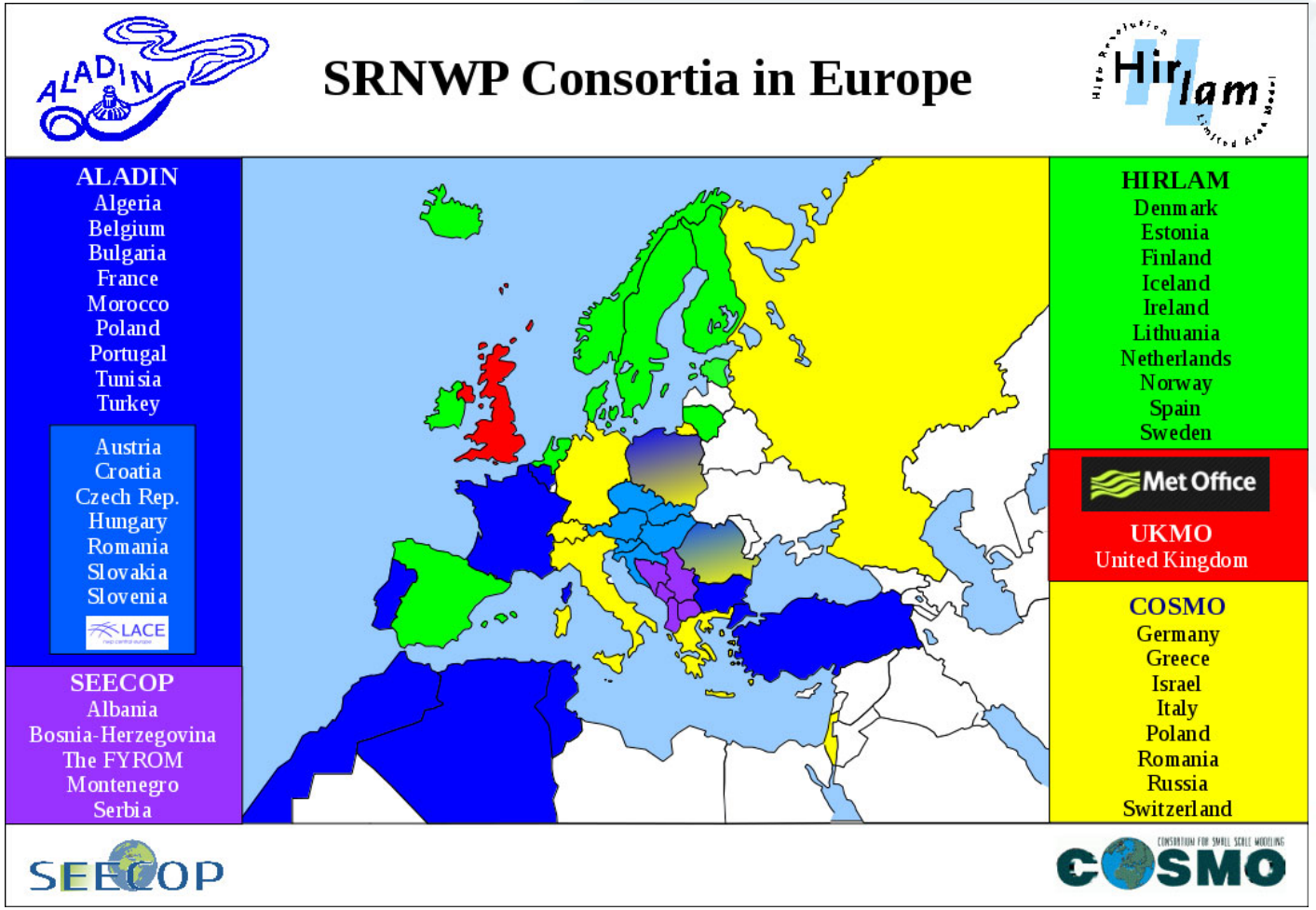
C-SRNWP Module of EUMETNET

- Coordination of Short Range Numerical Weather Prediction in Europe
- 28 Member States, 2 Cooperating States
- New Members: Germany, Ireland
- Module Manager: 0.3 FTE
- Coordinating Member: Hungary, OMSZ



C-SRNWP Expert Teams

To foster communication between Limited Area NWP groups in Europe

8 C-SRNWP Topical Expert Teams (ETs)

- Data Assimilation (chair: Bruce Macpherson)
- Diagnostics and verification (chair: Marion Mittermaier)
- Dynamics and lateral boundary coupling
- Link with applications (chair: Jeanette Onvlee)
- Physical parameterisation (upper air)
- Predictability and EPS (chair: Chiara Marsigli)
- Surface and soil processes (chair: Patrick Samuelsson)
- System aspects

Advisory Expert Team (AET):

- Heads of NWP consortia
- C-SRNWP Topical ET Chairs
- Observers: FCAM, Post-processing MM, SRNWP-EPS MM

Core Members

	ALADIN	COSMO	HIRLAM	MetOffice	RC LACE	SEECOP	ECMWF contact
Data assimilation and use of observations	Claude Fischer	Christoph Schraff	Roger Randriamampianina	**Bruce Macpherson**	Benedikt Strajnar	Bojan Kasic	Lars Isaksen
Diagnostics, validation and verification	Bogdan Bochenek	Flora Gofa	Bent Hansen Sass	**Marion Mittermaier**	Christoph Zingerle	Angel Marcev	Dave Richardson
Dynamics and lateral boundary coupling	Piet Termonia	Michael Baldauf	Sander Tijm	Ben Shipway	Petra Smolikova		Michail Diamantakis
Link with applications	Maria Monteiro	Anastasia Bundel	**Jeanette Onvlee**	Simon Jackson	Benedikt Bica	Bojan Cvetkovic	
Physical parameterisation (upper air)	Yann Seity	Matthias Raschendorfer	Sander Tijm	Mike Bush	Neva Pristov		Irina Sandu
Predictability and EPS	Geert Smet	**Chiara Marsigli**	Inger-Lise Frogner	Aurore Porson	Martin Bellus		Martin Leutbecher
Surface and soil processes (model and data assimilation)	Patrick Le Moigne	Jean-Marie Bettems	**Patrick Samuelsson**	Martin Best	Alena Trojakova		Gianpaolo Balsamo Patricia de Rosnay
System aspects	Ryad El Khatib	Massimo Milelli	Daniel Santos	Richard Gilham	Oldrich Spaniel		Jenny Rourke

Additional Members

	ALADIN	COSMO	HIRLAM	MetOffice	RC LACE	SRNWP-EPS Activity	Post-Processing Activity
Data assimilation and use of observations	Loik Berre, Maria Monteiro	Mihail Tsyrulnikov	Magnus Lindskog	David Simonin Lee Hawkness-Smith	Florian Meier, Michal Nestiak		
Diagnostics, validation and verification	Marek Jerczynski, Alexander Kann	Joanna Linkowska	Xiaohua Yang, Ulf Andrae, Carl Fortelius	Nigel Roberts	Christoph Wittmann		
Dynamics and lateral boundary coupling					Jozef Vivoda		
Link with applications		Flora Gofa	Per Unden	Mike Bush	Martina Tudor		Stéphane Vannitsem
Physical parameterisation (upper air)		Dmitrii Mironov Frederico Grazzini	Bent Hansen Sass		Jan Masek		
Predictability and EPS	Francois Bouttier, Alain Joly	André Walser, Christoph Gebhardt	Jan Barkmeijer	Anne Mccabe	Mihály Szücs	Alfons Callado Pallarés	
Surface and soil processes (model and data assimilation)	Rafiq Hamdi	Jürgen Helmert, Jan-Peter Schulz	Ekaterina Kurzeneva	Breogan Gomez	Jure Cedilnik, Balázs Szintai		
System aspects	Andrey Bogatchev	Uli Schaettler	Ulf Andrae, Xiaohua Yang		Martina Tudor		

EWGLAM/SRNWP Annual Meeting

- **30 September – 3 October 2019, Sofia, Bulgaria**
- **Local host institute: Bulgarian Met Service**
- **EUMETNET support (6000 EUR)**
- **Special topic: crowdsourced observations in NWP**
- **Parallel sessions, side meetings**
    - Use of EUMETNET observations (E-ABO, OPERA) in LAM NWP models
    - External parameters for land surface models

- **Invited experts (4000 EUR/year) → proposed by ETs (in 2019: DA, APP, VERIF ET)**
- **Support for meeting participation (2000 EUR/year) → no applicant this year**

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Short Term Scientific Missions

- New element in the C-SRNWP module
- NWP consortia have the funds to support internal exchange, however, this is usually not applicable for travel outside the consortia
- Yearly 1-2 missions (2000 EUR/year) will be funded to deal with cross-consortia issues (either technical or scientific).
- A typical stay would last 1-2 weeks and participation of young scientist is encouraged.
- Shared funding (EUMETNET/sending-host institute) is very welcome.

- Application form have been prepared and sent to Contact Points and consortia PMs
- Two collection dates per year: 1st March, 1st September
- Decision to be taken by AET
- 2019 autumn: Martin Imrisek (SHMU) work on GNSS STD assimilation (ALADIN-LACE-HIRLAM) at KNMI for four weeks (shared funding with LACE)

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Observation network design (support EUCOS, Obs-SET)

- To communicate the needs of the SRNWP community towards the Observation Programmes of EUMETNET
- New Obs CA Management (UKMO) has conducted a series of information exchange events to shape the five year plan of the Studies Programme
- June 2019: 1 day web-meeting to discuss the needs of SRNWP

Talk of Bruce Macpherson

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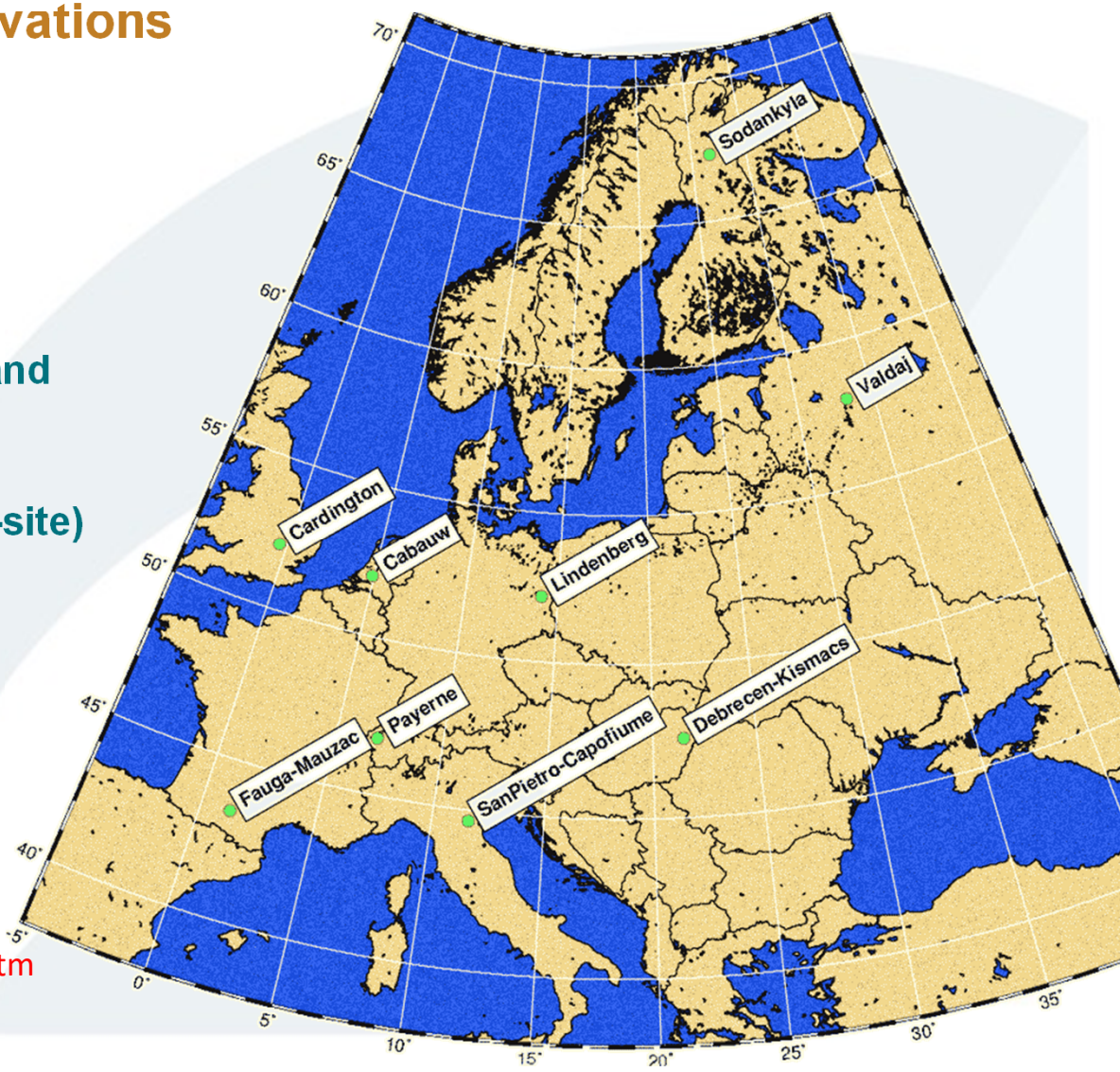
SRNWP Data Pool of surface observations

- Database of surface and boundary layer observations → validation of PBL and land surface models
- Freely available for EUMETNET Members and collaborating universities
- Important in-kind contribution from DWD (collecting the data) and HNMS (web-site)



Statistics for Sept 2018 – Aug 2019:

- 5 new users
- 440 monthly files downloaded

Website: http://srnwp.cosmo-model.org/content/default.htm
Account request: http://srnwp.cosmo-model.org/content/register.htm

Global Lake Database

- Database of lake location and depth
- Important input for NWP models running a lake parameterization
- In the past ~10 years: work financed by different LAM consortia

- Financial support of EUMETNET since 2017: 8500 EUR/year (for maintenance and development) → in the new phase included in the C-SRNWP budget
- Work coordinated by FMI (Ekaterina Kurzeneva), persons involved: Margarita Choulga (ECMWF) and Olga Toptunova to be replaced by Anna Solomatnikova (Main Geophys. Observatory in St. Petersburg)

- Currently ongoing work: adding new lakes with careful quality check (~3000 new lakes)

<u>Future plans:</u>

- Update lake cover based on the GlobCover (or ESA CCI) database
- Increase resolution: 1 km → 300 m
- Produce new version of GLDB

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EUMETNET Portal

- Started in March 2018
- Based on Confluence
- ET mailing lists were moved here (Forum functionality) in spring 2019 → let me know if you experience any difficulties

SRNWP website

- Model table to be updated this October
- Plan for next year: interface to be developed for input of model changes by each Member

EMS Annual Meeting

EMS Annual Meeting – 9-13 September 2019, Copenhagen

- OSA Session: Challenges in High Resolution Short Range NWP at European level including forecaster-developer cooperation
- Conveners: Balazs Szintai, Chiara Marsigli, Emily Gleeson
- Session about EUMETNET, C-SRNWP and related activities
- 8 oral, 5 poster presentations

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Thank you for your attention!

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CONTACT DETAILS

Balázs Szintai

C-SRNWP Manager

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Eumetnet – Aircraft Based Observations (E-ABO) Programme

EWGLAM/SRNWP Meeting 2019

Steve Stringer,
E-ABO Programme Manager
steve.stringer@metoffice.gov.uk

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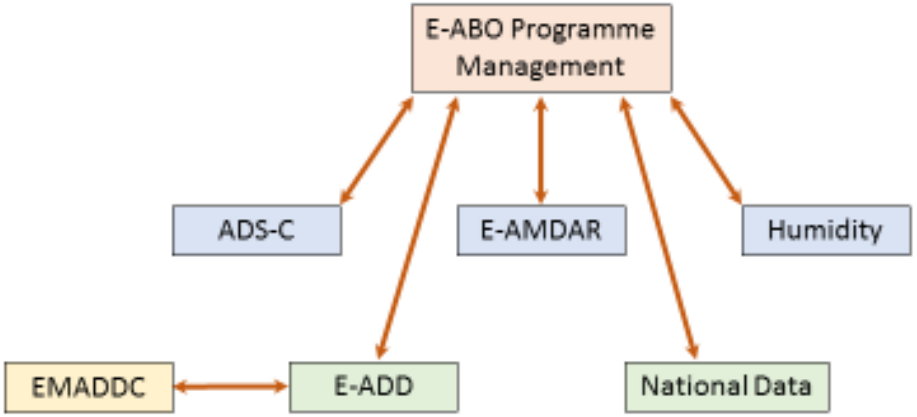
EUMETNET- Aircraft Based Observations (E-ABO) Programme

The E-ABO Programme is now a number of separated but interdependent activity areas, i.e Modules, with an overarching Programme management activity.



Module 0 : E-ABO Programme Management (Mandatory)
Module 1 : E-AMDAR (Mandatory)
Module 2 : National Additional data (Optional)
Module 3 : E-ADD (Optional)
Module 4 : ADS-C (Mandatory)
Module 5 : Humidity (Mandatory)

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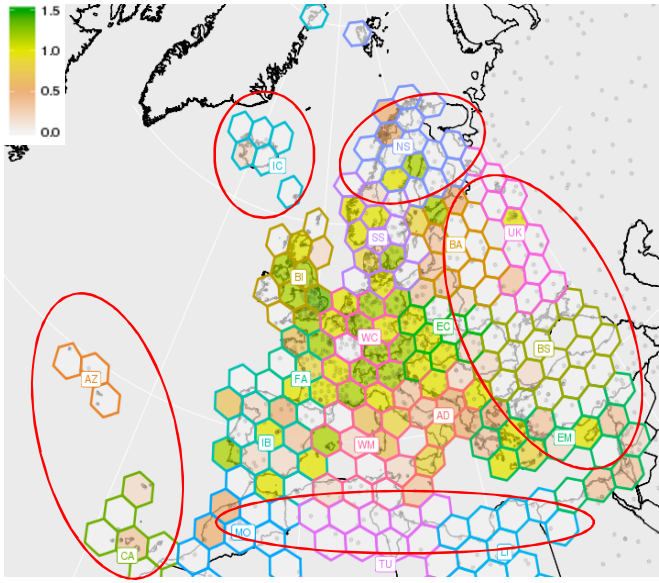
E-ABO Programme (2019-2023)



E-ABO Programme started 1st Jan 2019.

Priorities:

- Continue to improve horizontal coverage in data sparse areas: Azores, Canaries, Iceland, Baltic, Eastern Europe regions & N.Africa
- for which we need to engage new AMDAR Airlines – Azores Airlines (SATA), Turkish Airlines, LOT & Royal Air Maroc in discussion. Wizz Air are still priorities for AMDAR. RAM & El Al added
- Acquire & QC ADS-C MET data direct from Data Service providers (DSPs) to reduce need for some en-route AMDAR data
- Continue to independently encourage airlines to report EDR turbulence – with IATA initiative.
- Develop E-ADD (Mode-S) as EUMETNET programme – Business case March 2020
- Develop WMO-IATA Collaborative AMDAR Programme (WICAP) – Operational in 2020?

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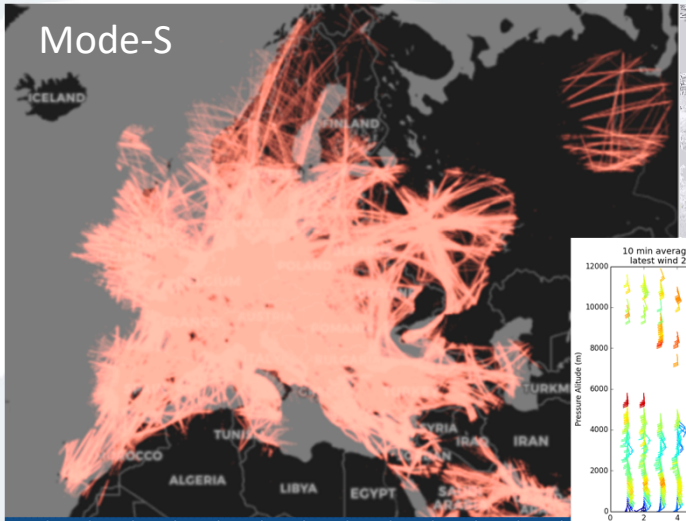
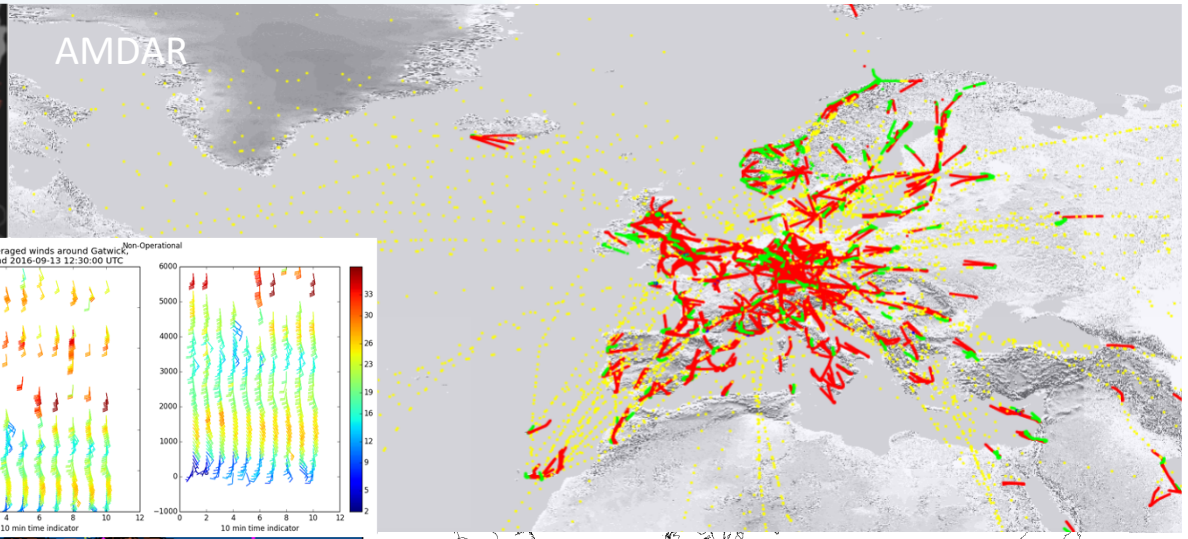
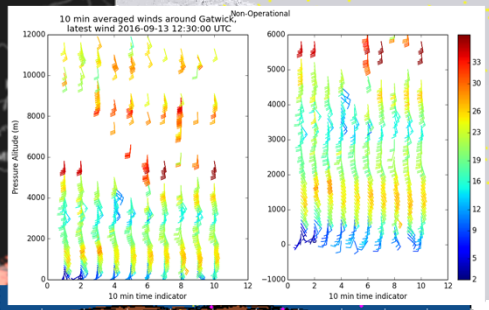
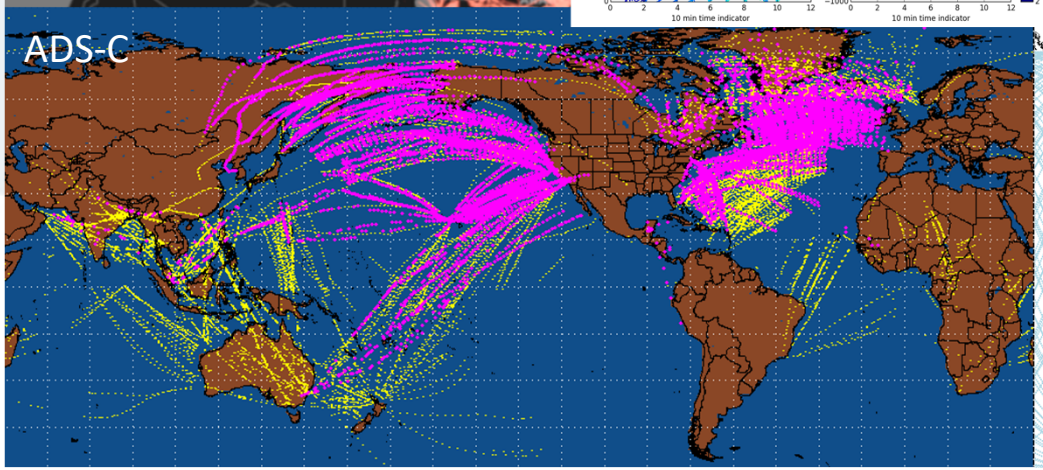
E-ABO: Programme Plans (2019-2023)

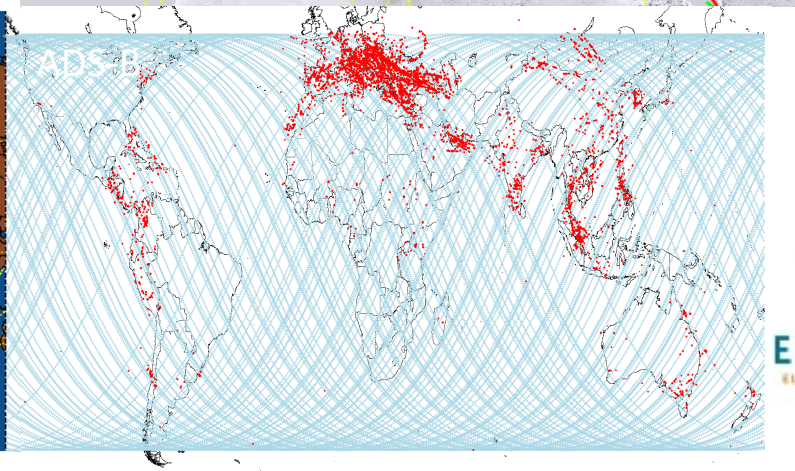
Challenge to combine AMDAR, ADS-C, Mode-S EHS & others into one network!











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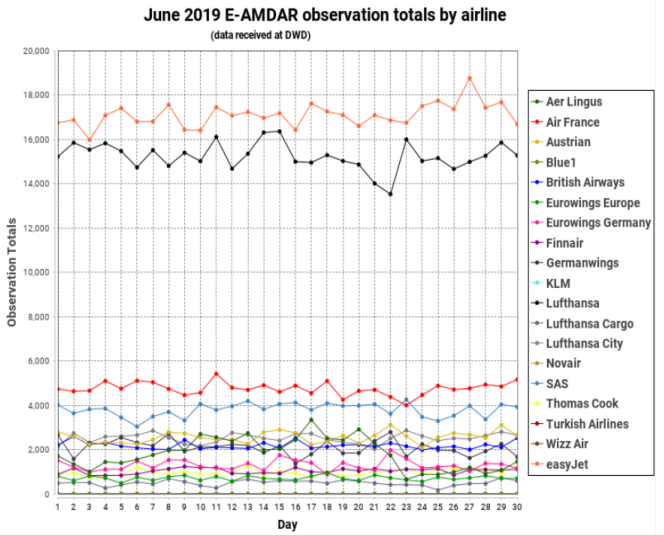
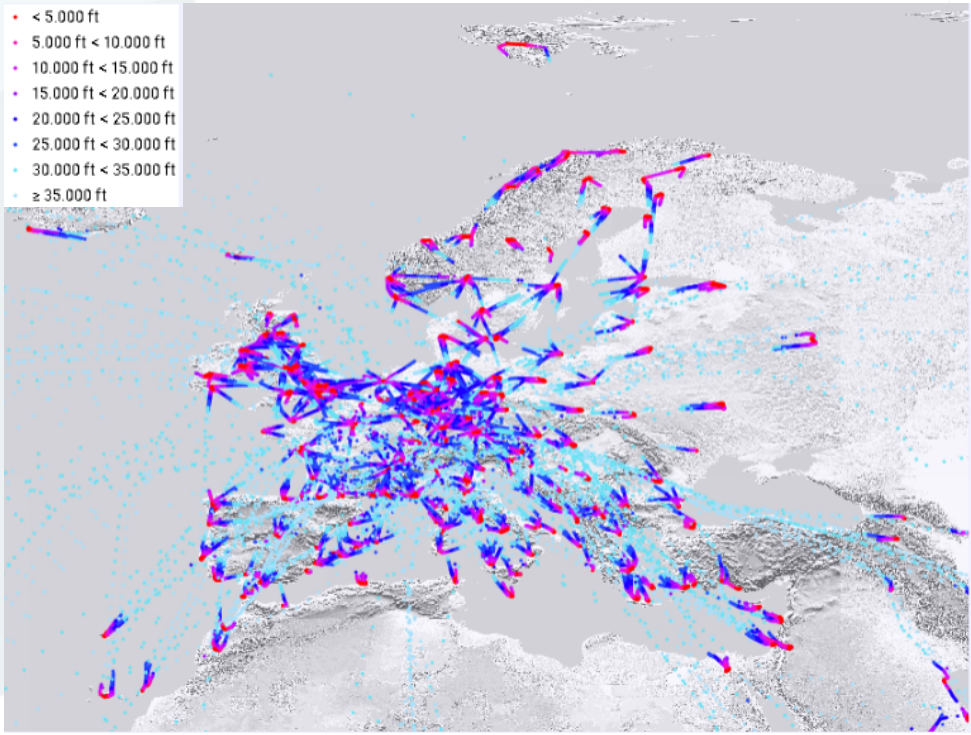
AMDAR

Requirement: Temperature & Winds (& water vapour) every 3-hours on 250km resolution.

Currently 14 airlines participating in Europe generating:

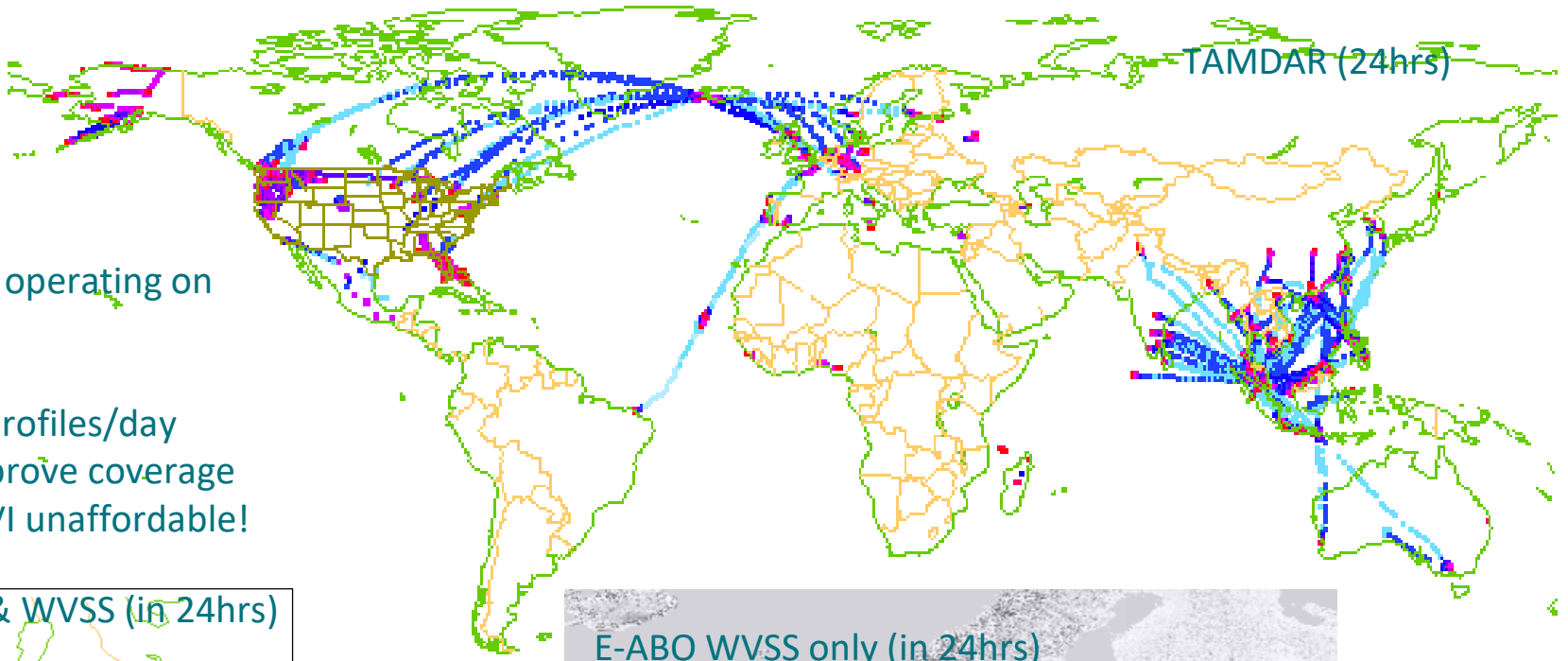
- Approx. 60,000 obs per day
- at 120-140 airports per day
- & 1200-1300 profiles per day

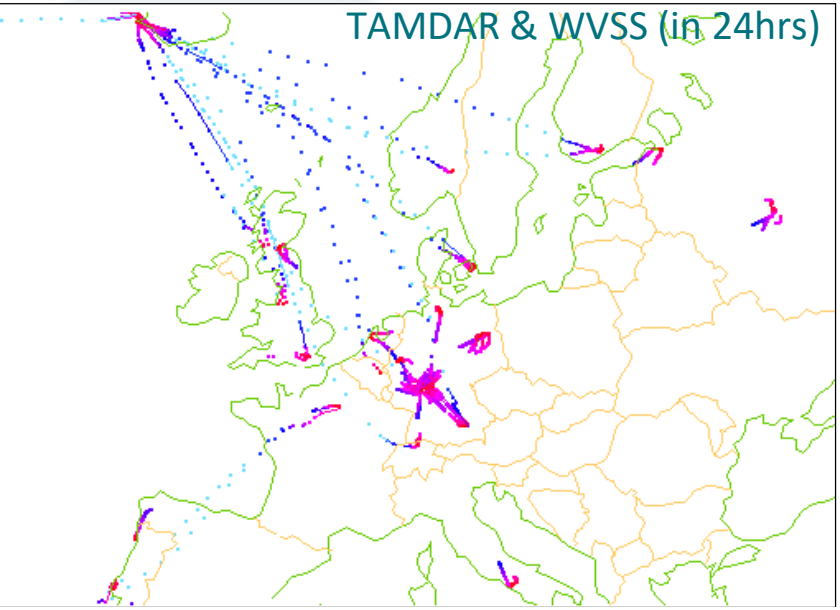


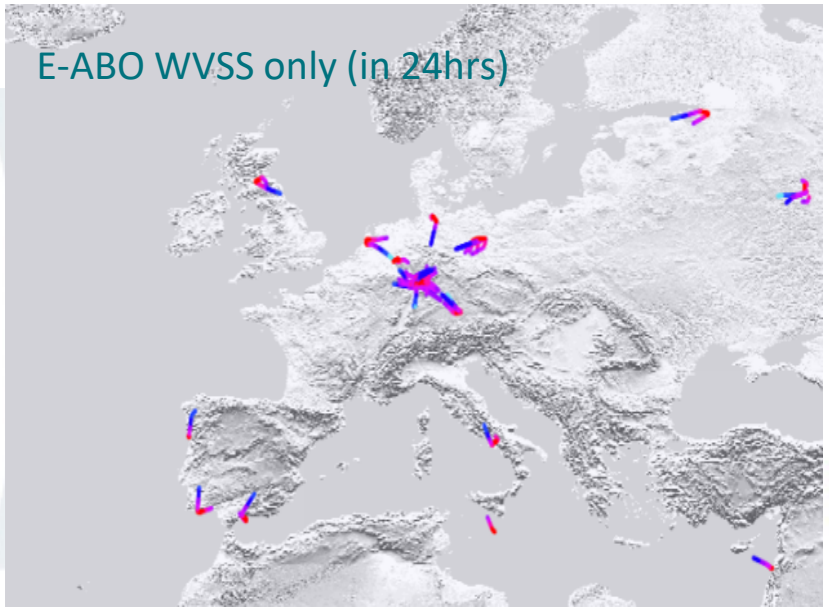


Water Vapour

- E-ABO has 9 WVSS operating on Lufthansa aircraft
- 130+ WVSS in USA
- TAMDAR: ~3,500 profiles/day
  …which would improve coverage
  …but price for RAVI unaffordable!







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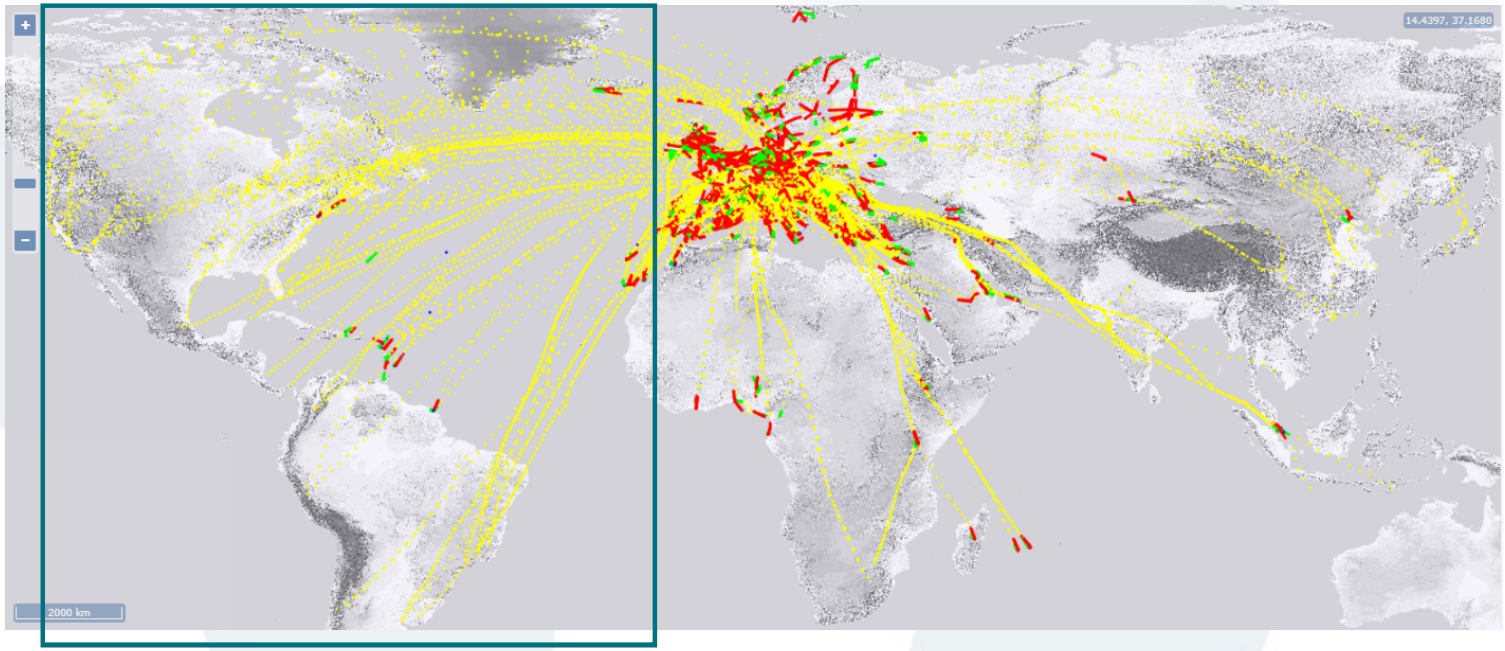
Automatic Dependent Surveillance-Contract (ADS-C) Data

ADS-C messages are primarily for safe air navigation (position, altitude, speed, heading, etc) but many reports contain Met info – Temps & Winds

- Aim: to replace some AMDAR en-route data with ADS-C Met reports, with intention of saving up to ~100k€ per annum on data costs for E-ABO.



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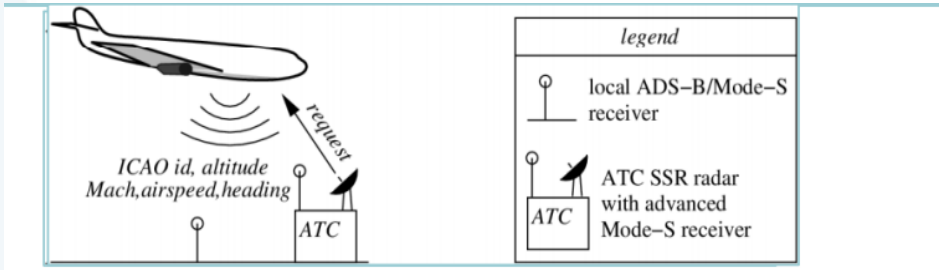
Aircraft Derived Data (ADD)

Wind & Temperature data derived from Automated Dependent Surveillance – Broadcast (ADS-B) messages triggered by surveillance radars.

- Considering both Mode-S EHS/MRAR.
- European Meteorological ADD Centre (EMADDC) – set up by KNMI to operationally gather & process Mode-S data - either direct from Air Traffic Controllers or from local receivers across Europe.
- EMADDC operational from earlier this year, includes data from MUAC plus others, but not UK Met Office yet.
- Potential for huge increase in high resolution, high quality aircraft data across Europe

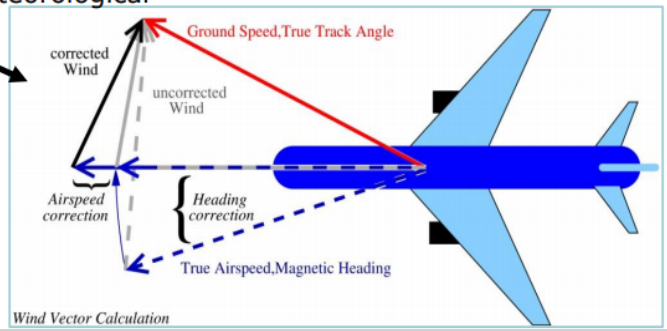


Active interrogation by ATC

Aircraft data that are broadcasted

BDS Register	Basic DAP Set (if track Angle Rate is available)	Alternative DAP Set (if Track Angle Rate is not available)
BDS 4,0	Selected Altitude	Selected Altitude
BDS 5,0	Roll Angle	Roll Angle
	Track Angle Rate	
	True Track Angle	True Track Angle
	Ground Speed	Ground Speed
		True Airspeed (provided if Track Angle Rate is not available)
BDS 6,0	Magnetic Heading	Magnetic Heading
	Indicated Airspeed (IAS) / Mach no. (Note: IAS and Mach no. are considered as 1 DAP (even if technically they are 2 separate ARINC labels). If the aircraft can provide both, it must do so).	Indicated Airspeed (IAS) / Mach no. (Note: IAS and Mach no. are considered as 1 DAP (even if technically they are 2 separate ARINC labels). If the aircraft can provide both, it must do so).
	Vertical Rate (Barometric rate of climb/descend or baro inertial)	Vertical Rate (Barometric rate of climb/descend or baro inertial)

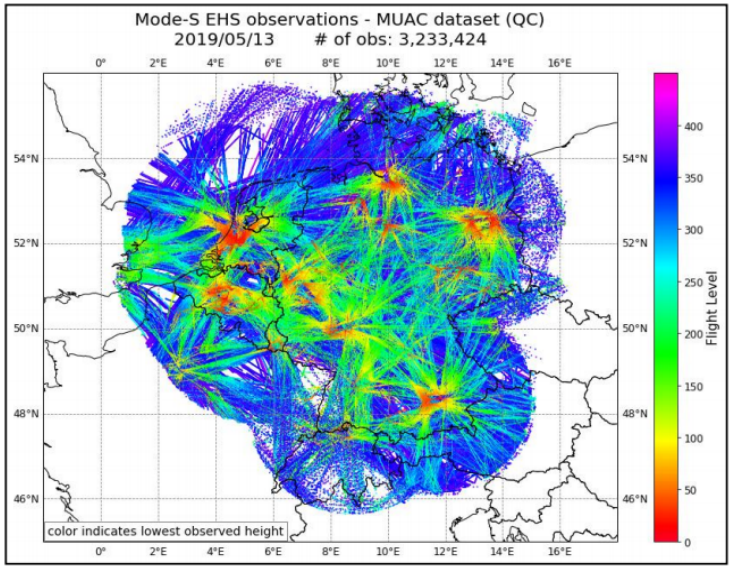
Quality control process to improve the quality of derived meteorological observations



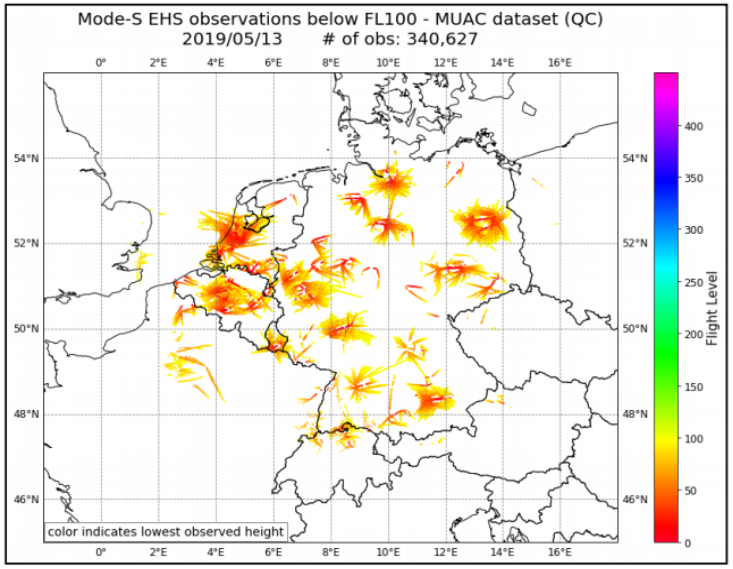
E-ADD

Currently preparing a Business Case for inclusion of EMADDC into E-ABO.
Presentation to EUMETNET expected Spring 2020.

Expected benefits of many more quality observations at a fraction of AMDAR costs



The distribution of one day of input quality controlled derived observations (wind speed, wind direction, temperature) per altitude for the EUROCONTROL MUAC area.



The distribution of input quality controlled observations below FL 100, correlating with aircraft departing and landing at aerodromes.

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E-ABO
Questions?
steve.stringer@metoffice.gov.uk

Thank you for your attention!

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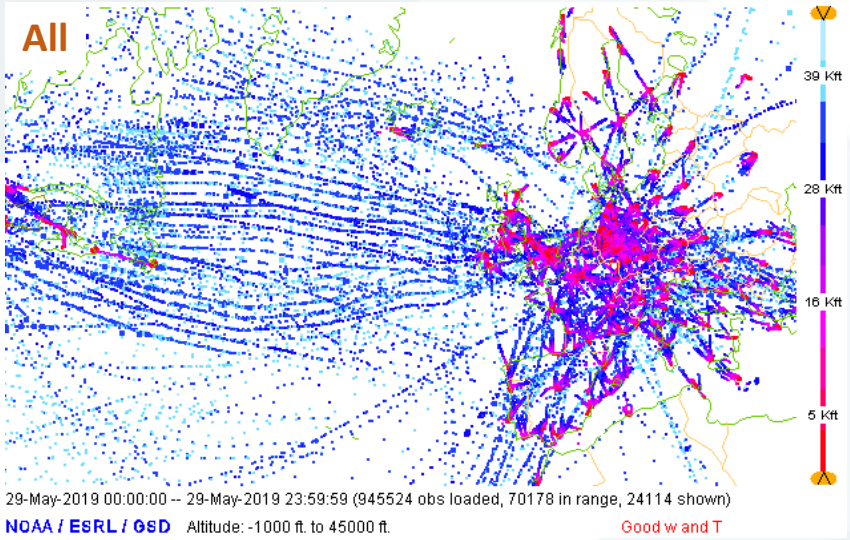
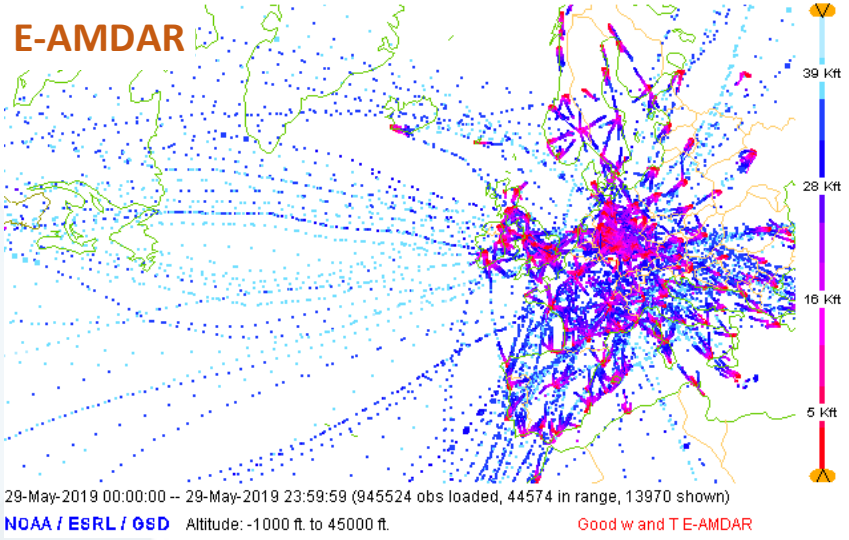
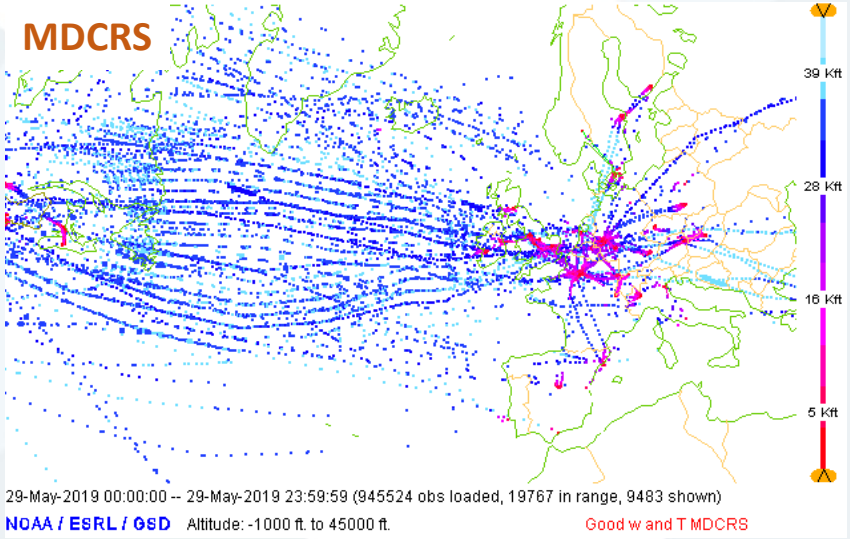
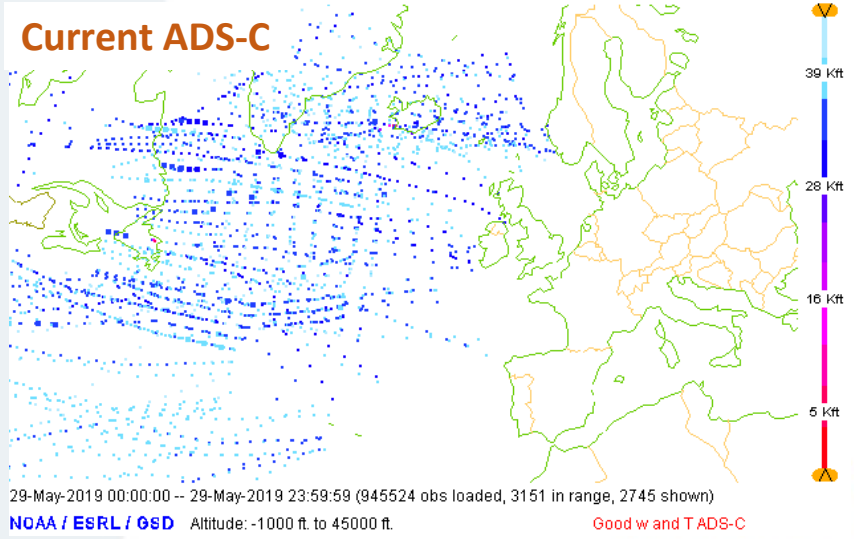
Spare slides – E-ABO

ABO Coverage

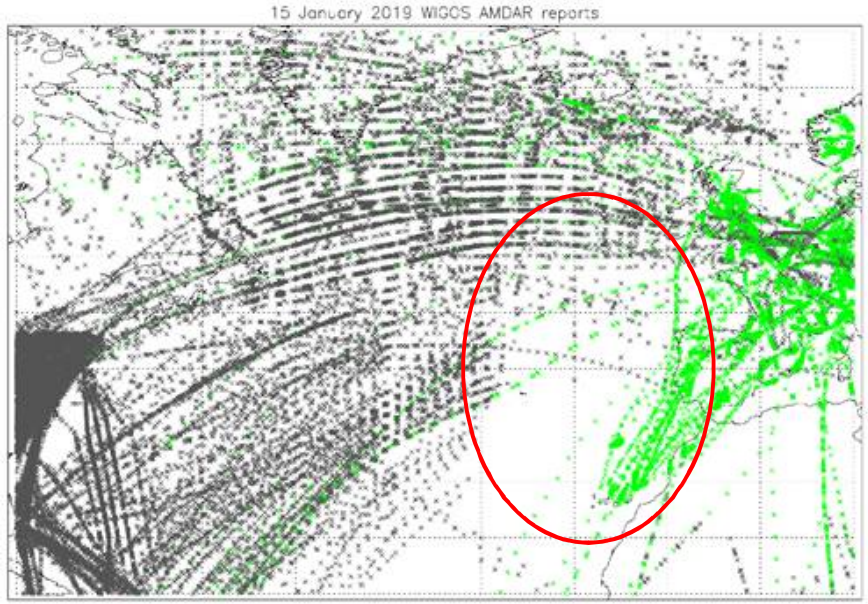






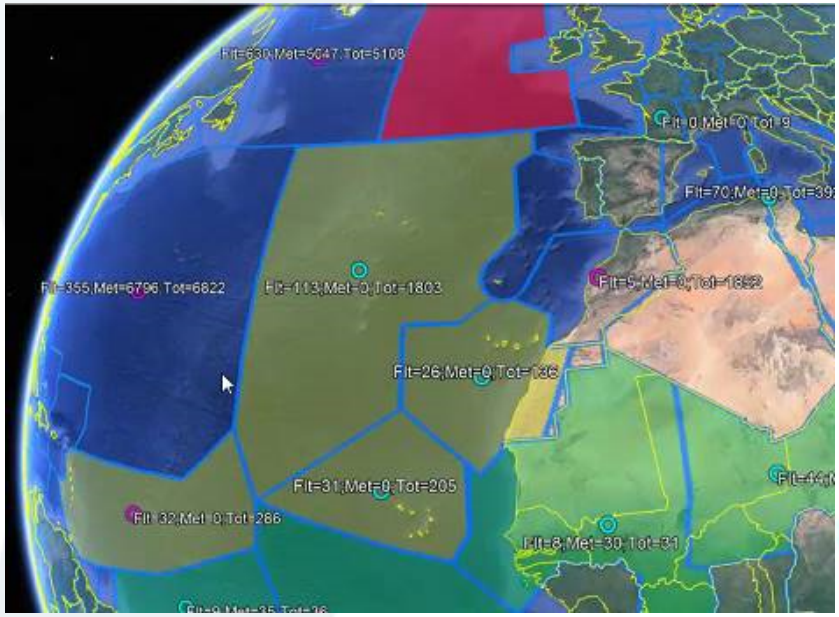


ADS-C Met reports



- Working with MetDB/MetSwitch teams to correct issue - More data soon!
- Santa Maria do not request Met reports – In contact with Nav Portugal to see what can be done.
- ARINC paper on global ADS-C being drafted.

- Missing data!
- Aligns with Shanwick & Santa Maria FIRs
- UK NATS sending all data to Met Office on AFTN but not all getting through – old format/software!
- Some may arrive at ECMWF via NavCanada – needs checking



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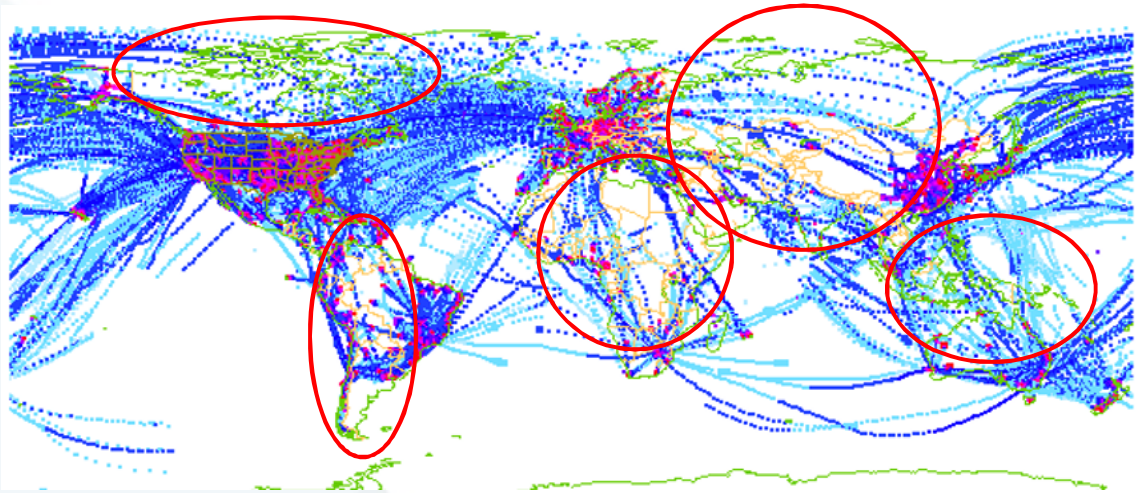
WMO-IATA Collaborative AMDAR Programme (WICAP)

WMO & IATA recognize there are large areas of the globe that are not adequately covered by ABO:



- Together they plan to promote, encourage and facilitate AMDAR Programme expansion over currently **data-sparse areas**
  - by making it simpler for airlines to participate
  - and reducing the costs of data.
- At the same time WICAP will enhance the Programme through wider implementation of **turbulence and water vapor;**
- Using E-ABO as an example, WICAP is to be run through regional programmes.
- In WMO RA VI this means non-EUMETNET NMHSs will be encouraged to cooperate with E-ABO in setting up AMDAR with airlines in Russia/Eastern Europe.

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E-ABO Development Plans 2019/20

- Profile Product – Distribute new BUFR product to NMHSs (similar to BUFR msg for radiosondes, i.e profile is contained in the one message)
- THY AMDAR data operational - initially a few aircraft un-optimised (2019) then full optimisation in 2020.
- SATA & LOT – Assist with internal business case, supported by IPMA & IMGW
- Develop RAM – Some legal issues resolved- begin technical talks
- WizzAir – Airline contacts need to be re-established
- Shanwick FIR ADS-C data to be QC'd
- Nav.Portugal discussions re ADS-C Met reports from Santa Maria FIR
- 1st draft BC for E-ADD Nov'19 – submit to STAC/PFAC Spring 2020
- WICAP – Coordination for WICAP-RA VI
  - Business case for EUMETNET to participate in WICAP (Spring 2020?)
- Support WMO IPET-ABO (Autumn 2019?)

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