Actual coordination activities within C-SRNWP

Balázs Szintai

C-SRNWP Manager

… with contributions from many of you

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EWGLAM Meeting
Brussels / online
26 September 2022

Outline

- News from EUMETNET
- Coordination SRNWP
- Obs-SET
- Global Lake Database
- Physiography task
- EMS Annual Meeting

EUMETNET Strategy and next phase

- **Previously existing strategies:**
  - Strategy for EUMETNET 2016 – 2025, adopted in Spring 2017
  - 2021 – 2025 European NMHSs Strategy, adopted in Spring 2021
- **Accepted in May 2022 by EUMETNET Assembly:**
  - 2022 – 2028 EUMETNET Strategic guidelines (4 major goals, 32 strategic objectives)
- **Current EUMETNET phase ends in 2023, next EUMETNET phase will cover 2024-2028**
- **Preparation for the next EUMETNET phase started this summer**
- **C-SRNWP: fast track module → requirements drafted in June 2022, to be accepted by Assembly in autumn 2022 (similar requirements and resources than in current phase)**

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FDCM programme scope

FDCM Programme

Mar 2021		Dec 2021	Jan 2022	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan 2023	Feb	Mar 2023
FDCM start	1. Definition phase	A27	2. Foundation phase				A28	3. Delivery phase [tranche 1]						A29	End point informed by output of Foundation phase.		FDCM end

FEMDI architecture:

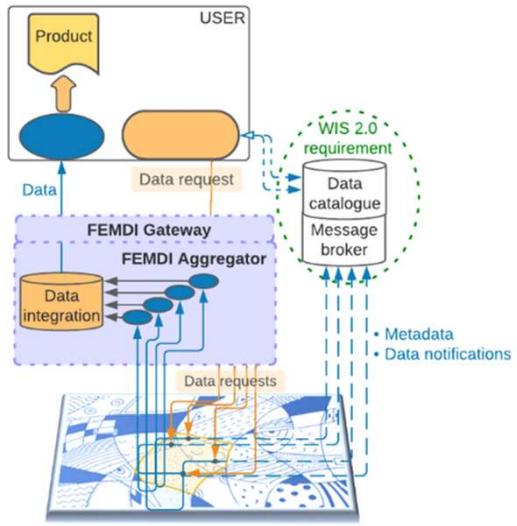
- **Design**
- **Identify and curate**

FEMDI Implementation activity

March 2023: New Programme?

FEMDI
Federated capabilities

- **Community capabilities**
- **Local capabilities**



Agreements, policies and technical standards

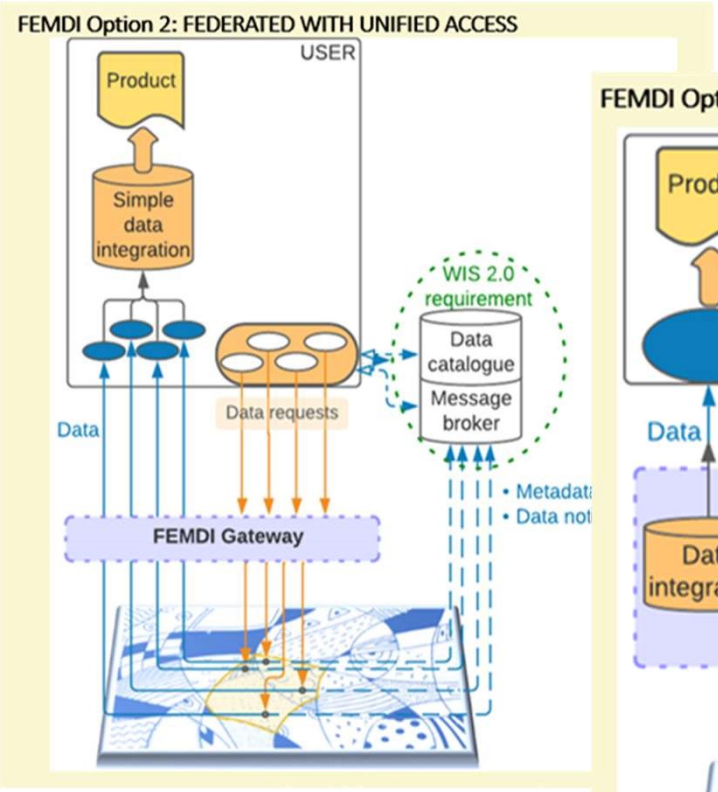
Slide provided by: Jane Wardle

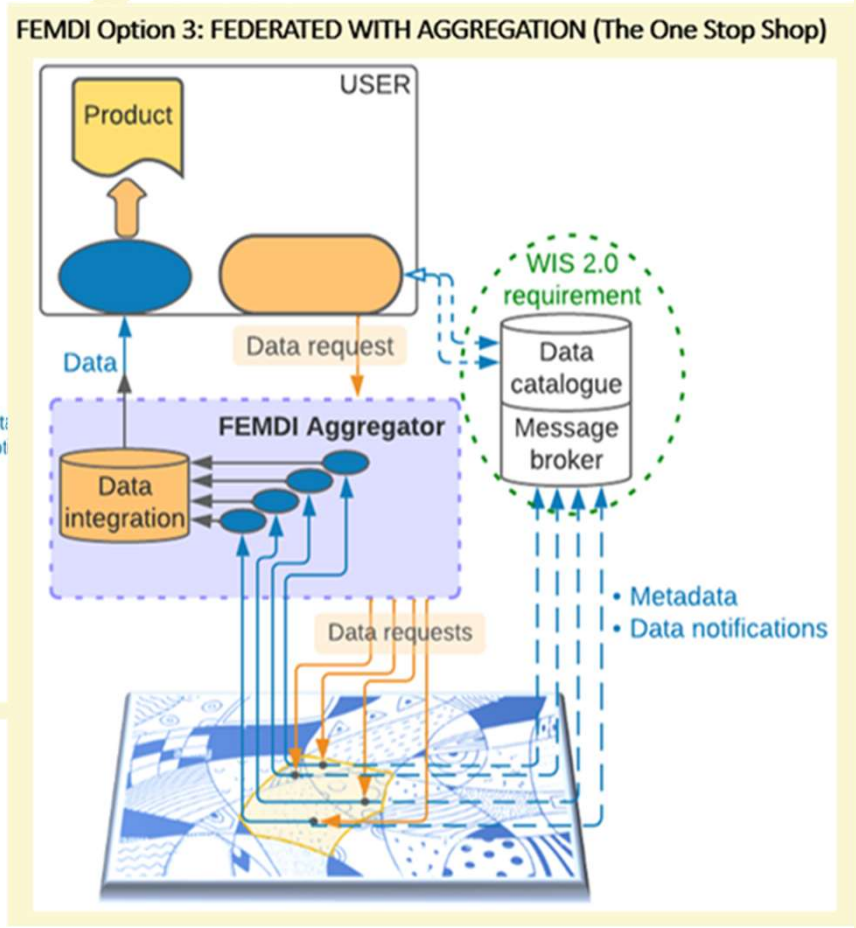
FEMDI: Data access options

Option 3 selected as preferred option at 3rd Directors Workshop

FEMDI

Federated European Meteo-hydrological Data Infrastructure





Data consumer experience

- Send one data request; Receive one response with data from lots of Members.
- Less time and resources needed.

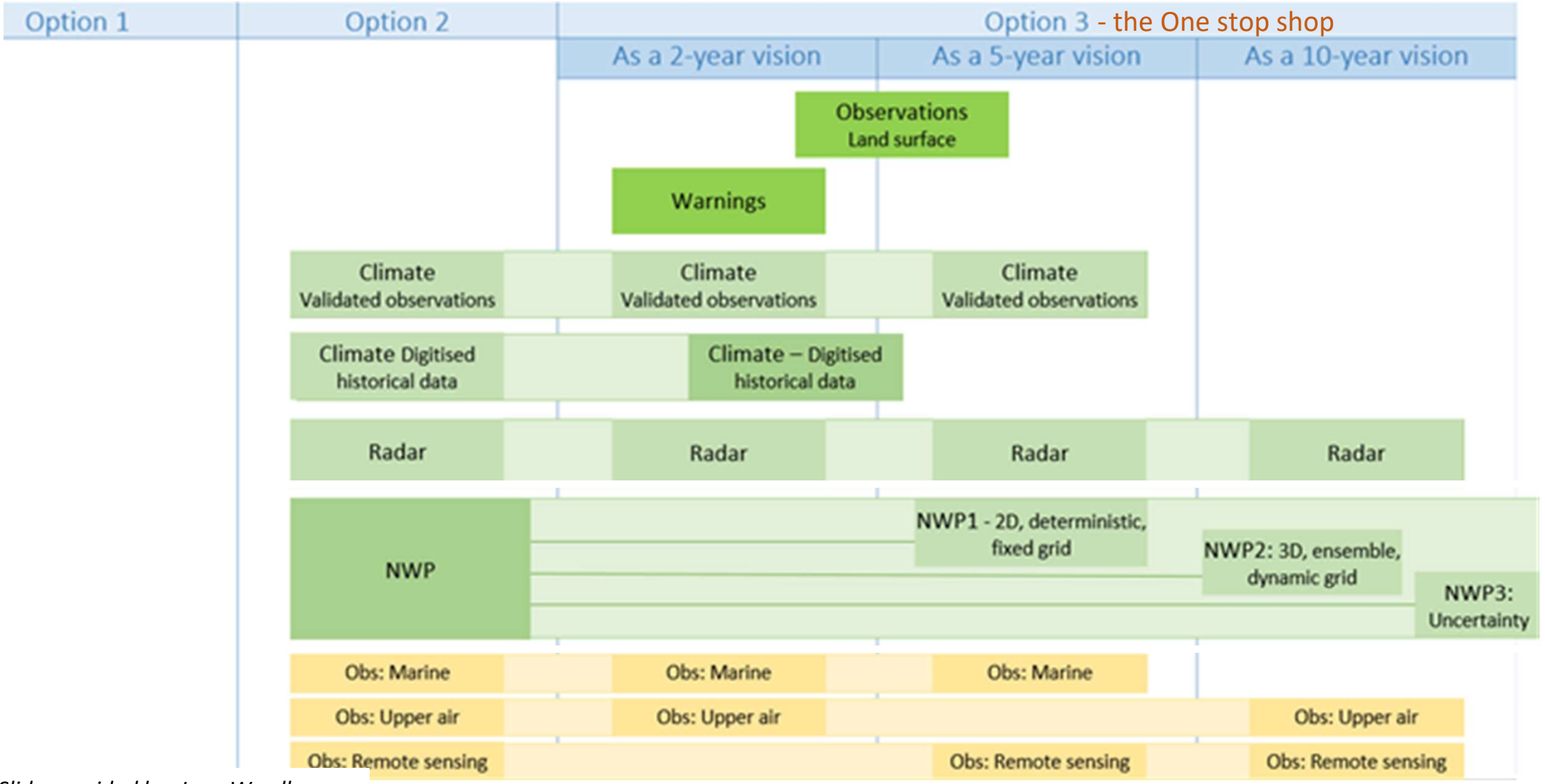
Data provider experience

- Ability for others, including AI, to request and use our data is as easy as possible, increasing reach and reputation
- Lower costs through pooling resources, sharing development, and cheaper build cost due to use of widely supported standards

BUT: This is a complex solution, which will require significant resources and take many years to deliver.

Slide provided by: Jane Wardle

FEMDI prioritised scope (data)



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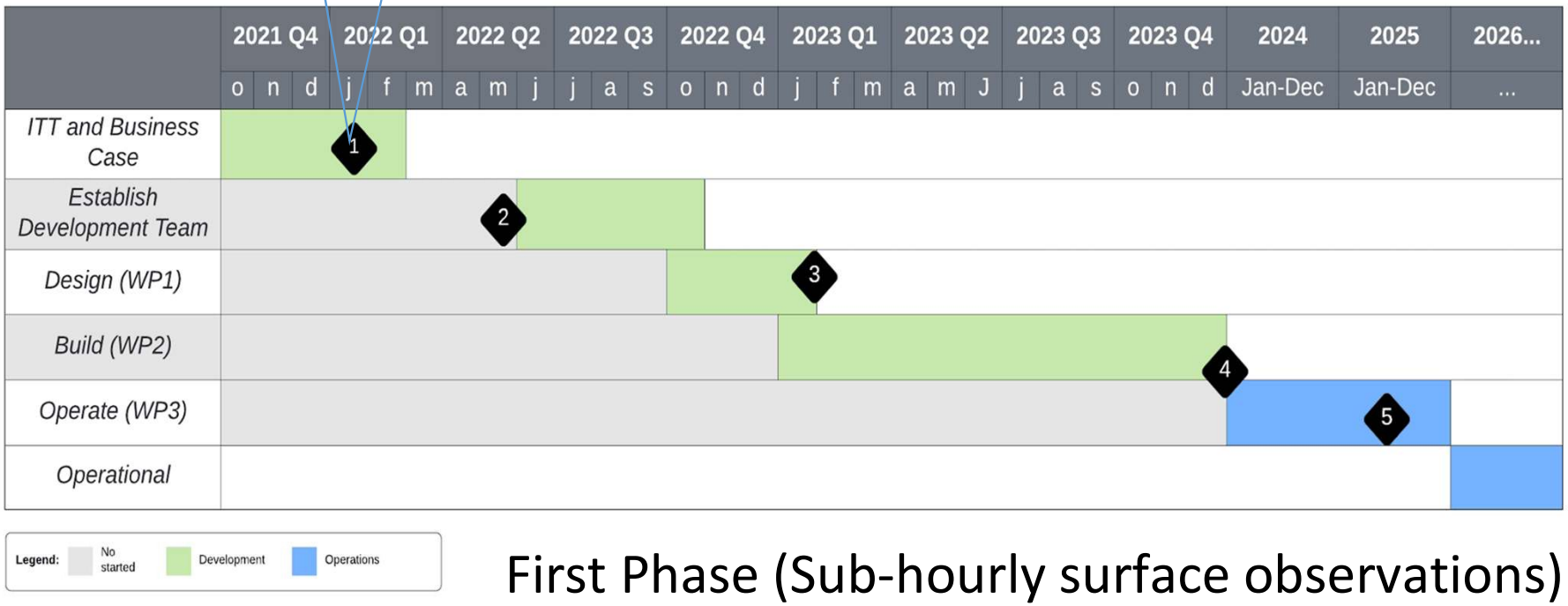
EUMETNET Supplementary Observations dataHub

Assessment period underway now

Bid Team

Met Norway, FMI, KNMI, DWD



First Phase (Sub-hourly surface observations)

Operational from January 2024

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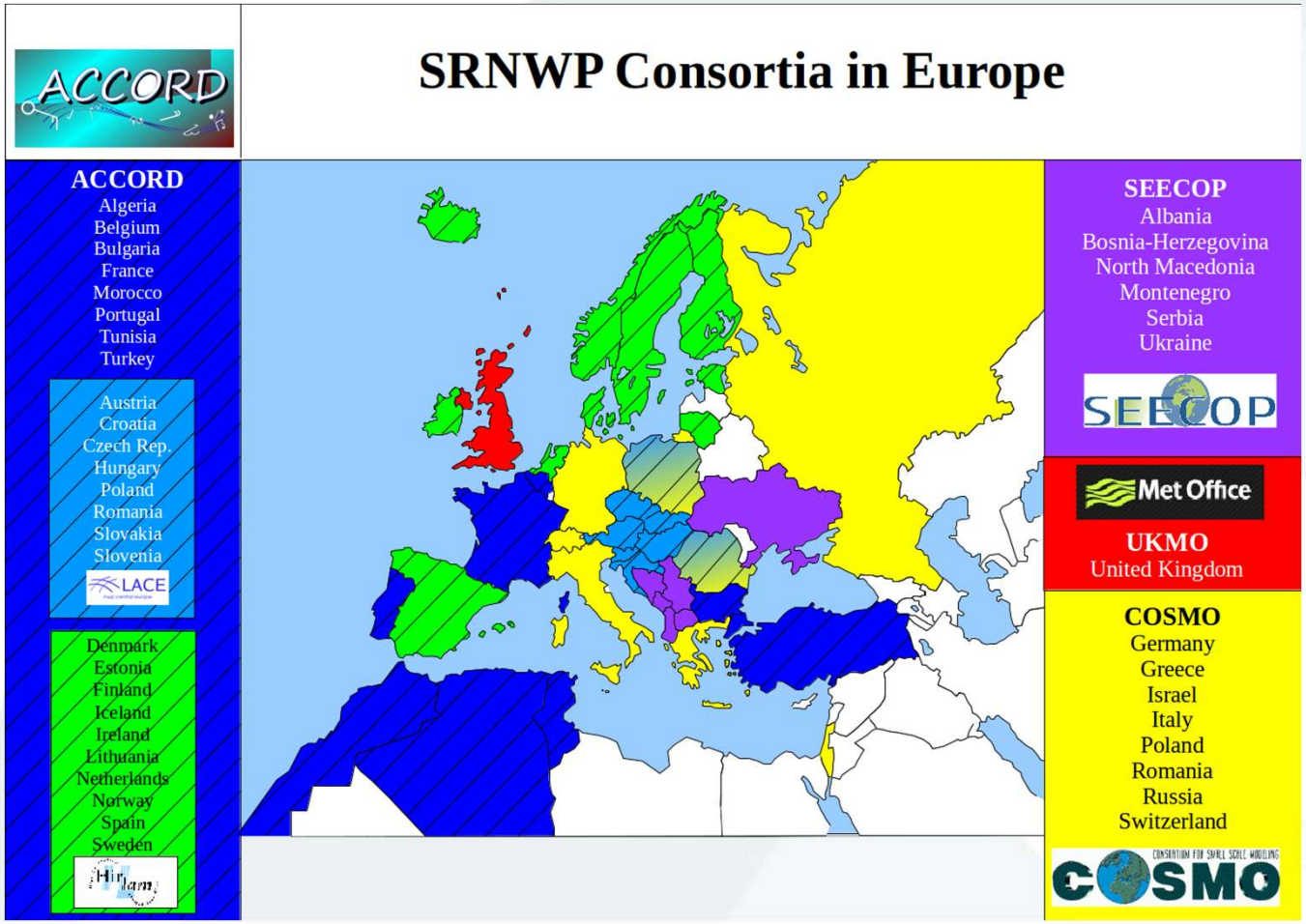
Slide provided by: Jacqueline Sugier

C-SRNWP Module of EUMETNET

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



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) (chair: Mike Bush)
- 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

	ACCORD	COSMO	HIRLAM	MetOffice	RC LACE	SEECOP	ECMWF contact
Data assimilation and use of observations	**Roger Randriamampianina**	Christoph Schraff	Magnus Lindskog	Marco Milan	Benedikt Strajnar	Bojan Kasic	
Diagnostics, validation and verification	Carl Fortelius	Flora Gofa	Bent Hansen Sass	**Marion Mittermaier**	Simona Tascu	Angel Marcev	Dave Richardson
Dynamics and lateral boundary coupling	Ludovic Auger	Michael Baldauf	Sander Tijm	Ben Shipway	Petra Smolikova		Michail Diamantakis
Link with applications	Eric Bazile	Anastasia Bundel	**Jeanette Onvlee**	Simon Jackson	Simona Tascu	Bojan Cvetkovic	
Physical parameterisation (upper air)	Yann Seity	Matthias Raschendorfer	Emily Gleeson	**Mike Bush**	Bogdan Bochenek		Irina Sandu
Predictability and EPS	Henrik Feddersen	**Chiara Marsigli**	Inger-Lise Frogner	Aurore Porson	Clemens Wastl		Martin Leutbecher
Surface and soil processes (model and data assimilation)	**Patrick Samuelsson**	Jean-Marie Bettems	Ekaterina Kurzeneva	Martin Best	Stefan Schneider		Gianpaolo Balsamo Patricia de Rosnay
System aspects	Daan Degrauwe	Massimo Milelli	Daniel Santos	Richard Gilham	Oldrich Spaniel		Jenny Rourke

Additional Members

	ACCORD	COSMO	HIRLAM	MetOffice	RC LACE	SRNWP-EPS Activity	Post-Processing Activity
Data assimilation and use of observations	Loik Berre, Maria Monteiro	Mihail Tsyrulnikov	Jelena Bojarova, Kasper Hintz	David Simonin Lee Hawkness-Smith	Florian Meier, Michal Nestiak		
Diagnostics, validation and verification	Boryana Tsenova, Fabien Stoop	Joanna Linkowska	Xiaohua Yang, Ulf Andrae, Carl Fortelius	Nigel Roberts	Christoph Wittmann, Christoph Zingerle		
Dynamics and lateral boundary coupling	Piet Termonia				Jozef Vivoda		
Link with applications		Flora Gofa	Per Unden	Mike Bush	Martina Tudor, Benedikt Bica		Stéphane Vannitsem
Physical parameterisation (upper air)	Eric Bazile, Neva Pristov	Dmitrii Mironov Frederico Grazzini	Bent Hansen Sass	Anke Finnenkoetter	Jan Masek, Neva Pristov		
Predictability and EPS	François Bouttier, Geert Smet	André Walser, Christoph Gebhardt	Jan Barkmeijer	Anne Mccabe	Mihály Szücs, Martin Bellus	Alfons Callado Pallarés	
Surface and soil processes (model and data assimilation)	Patrick Le Moigne, Rafiq Hamdi	Jürgen Helmert, Jan-Peter Schulz		Breogan Gomez Cristina Charlton-Perez	Jure Cedilnik, Balázs Szintai, Alena Trojáková		
System aspects	Alexandre Mary	Uli Schaettler	Ulf Andrae, Xiaohua Yang		Martina Tudor		

Optimizing investment in E-ABO - MODE-S versus AMDAR

Opportunity:
MODE-S is a relatively new(ish) way of getting access to observations from aircraft. It provides an opportunistic access to huge volume of data (free of charge, unlike AMDAR).

Questions:
Can we replace AMDAR data with MODE-S data?
What is the optimum balance of investment for Aircraft-based observations?

How:
Running data denial experiments of limited area models (e.g. UKV).
Three NWP centre are involved running the same scenarios but on completely differently designed and operated models, to provide more robust results and inform decisions.

Total cost - 200.4 k€

Table 3: Overview of Study A3.02 R&D proposals

	RMIB	DWD	Met Office
Model	ALARO or AROME.	ICON-D2, LEKF, 40 members.	UKV, 4d-Var, hourly cycling.
Domain	Belgium AROME.	Germany and surrounding areas.	UK, Ireland and large parts of France, Germany, Northern Italy.
Datasets for the OSE	2 separate 30-day periods – summer and winter.	2 separate 30-day periods – summer and winter.	2 separate 30-day periods – summer and winter.
Evaluation	Forecast T+36 every 12 hr.	Forecast T+36 every 6 hr.	Forecast T+30 every 6 hr.
Case studies	Analysis of a number of fog and high-impact weather events.	Not specified	Analysis of a small number of high-impact weather events. Forecasts to T+8 hourly.
Monitoring	OmA, OmB, observation error	OmA, OmB.	OmA, OmB, profiles of bias and stdev, distribution maps
Verification	Radiosonde & SYNOPS.	Classical score (radiosonde, ABO), categorical score with respect to SYNOPS, Fractional skills score.	Classical score (radiosonde, ABO), categorical score (SYNOPS), Fractional skills score.
Resources	RMIB	Post Doc	Met Office
Timeline	52 weeks	26 weeks	28 weeks
Cost	€ 60,165	€ 55,000	€ 85,250.52

Slide provided by: Jacqueline Sugier

Automatic quality control for data from personal weather stations (PWS)

Opportunity:
Huge volume of observations are generated in real-time from PWS owned by members of the public. These data have demonstrated values for nowcasting and post-processing applications, and possibly many more. However, robust automatic quality controls (auto-QC) are essential.

Questions:
What are the strength and weakness of auto-QC for PWS data (for specific variable and application area)?
What are the minimum requirements in terms of metadata?

How:
Run parallel trials on 5 auto-QC using common datasets from Netatmo and WOW.
Four NMHS are involved in this study.
Algorithms developed/tested will be made available to the whole EUMETNET community.

Total cost – 141.5 k€

Table 4: Overview of Study A1.05 R&D proposals

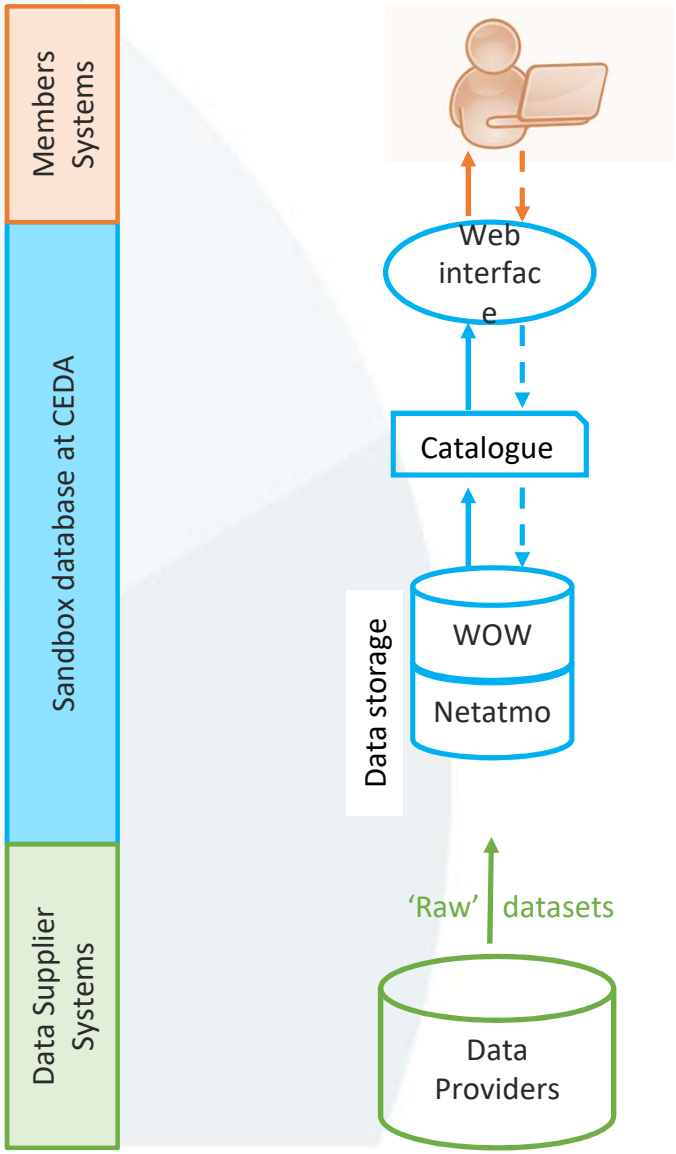
	Met Office	MET Norway, KNMI, SMHI
QC Tools	Met Office QC (semi-operational code, currently only available at the Met Office)	Titan (operational code, open source with LGPL license), NetatmoQC (inc. ML, Open source with MIT license), and KNMI QC (Research code, currently only available internally at KNMI)
User Application	Nowcasting	Nowcasting, Post-processing
Datasets	Netatmo & WOW	Netatmo & WOW
Period	2020	2020 (NetatmoQC & KNMI QC) Jan-Aug 2020 (Titan), then Sep-Dec 2020
Domain	UK initially, then Europe	Europe
Variables	All variables	All variables (NetatmoQC) Precipitation, Temperature and wind (KNMI QC), Precipitation (Titan)
Resources	Met Office	Met Norway, KNMI, and SMHI
Duration	24 weeks	26 weeks
Cost	€ 73,591.32	€ 68,266

Slide provided by: Jacqueline Sugier

Sandbox Database

Support R&D studies, not an operational service, providing easy access to new or additional datasets that are not currently routinely shared.

- Procured of Personal Weather Station (PWS) datasets from WOW and Netatmo.
- Uploaded the datasets on CEDA, along with the necessary catalogue entries and data policy agreements.
- **Sandbox went live on 19 October 2021**.



Centre for Environmental Data Analysis
SCIENCE AND TECHNOLOGY FACILITIES COUNCIL
NATURAL ENVIRONMENT RESEARCH COUNCIL

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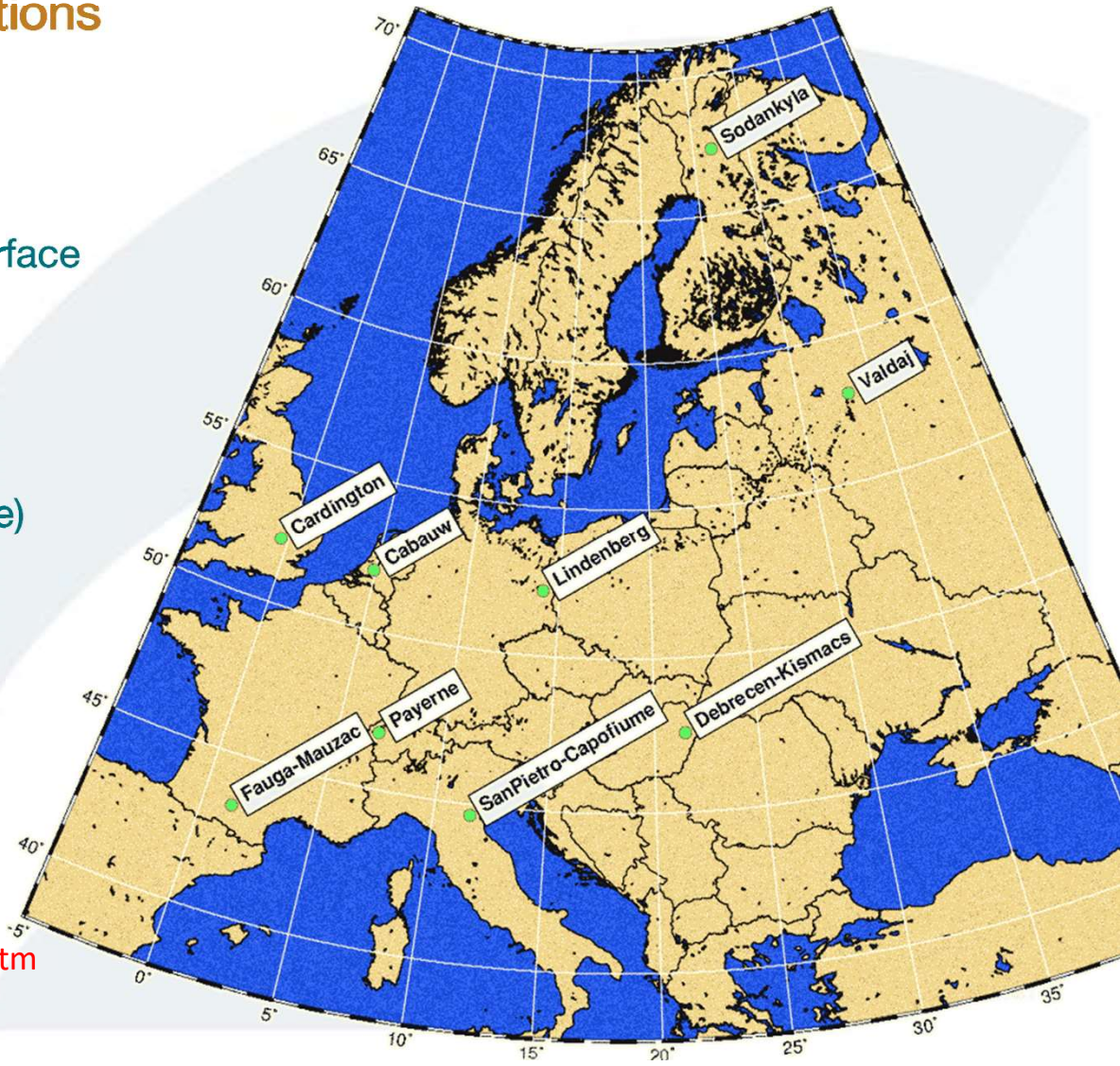
SRNWP Data Pool of surface observations

- 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)

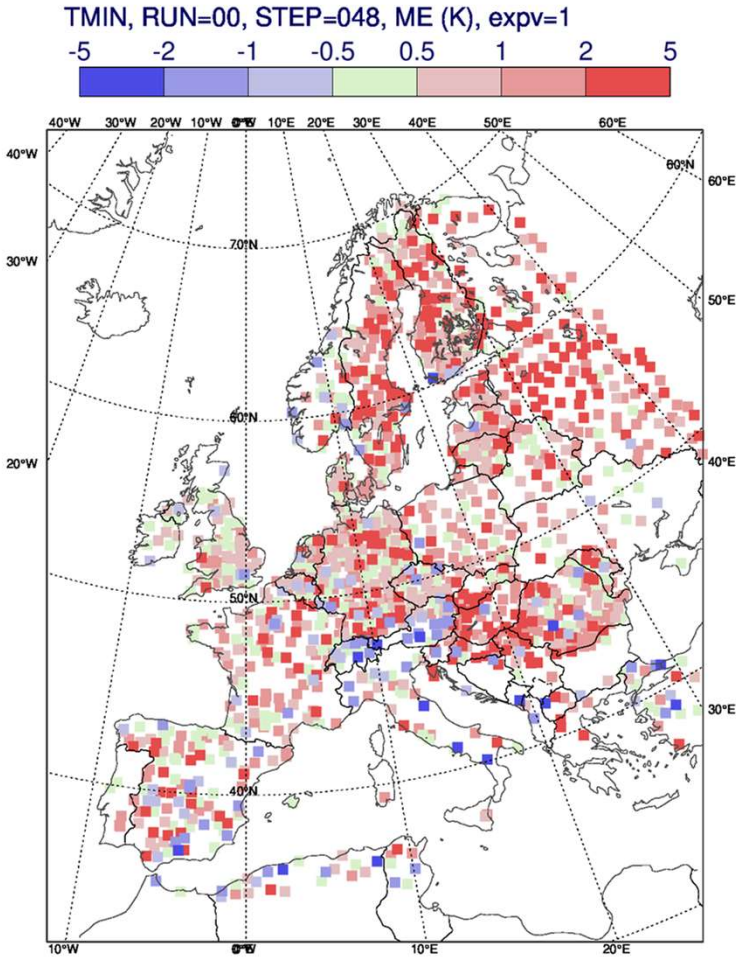
<u>Statistics for Sept 2020 – Aug 2022:</u>

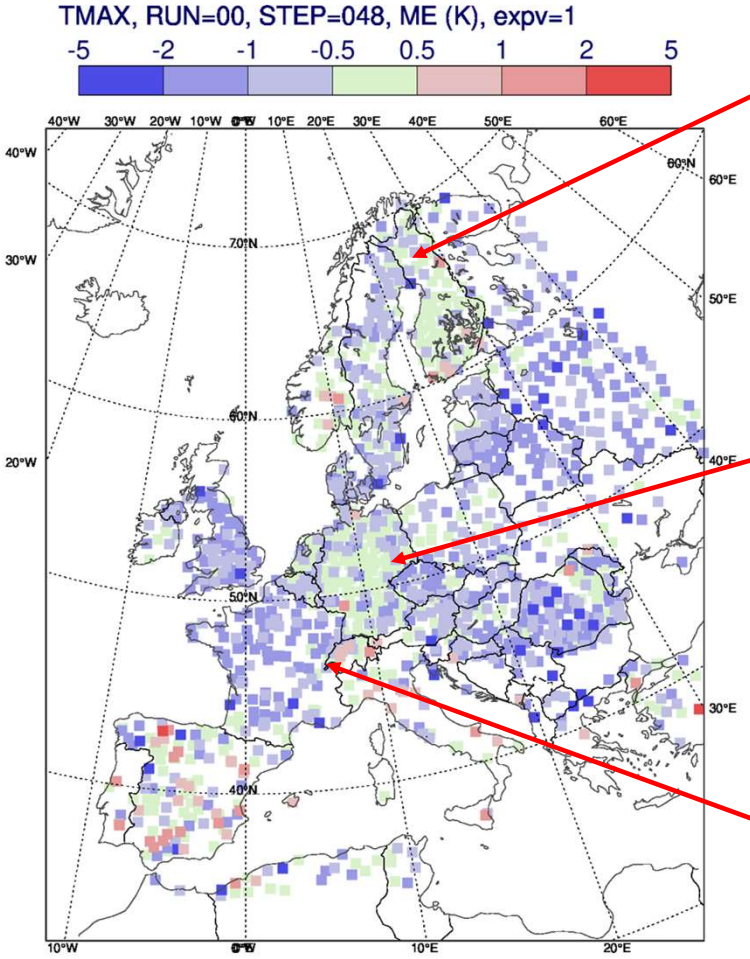
- 4 new users
- 730 monthly files downloaded

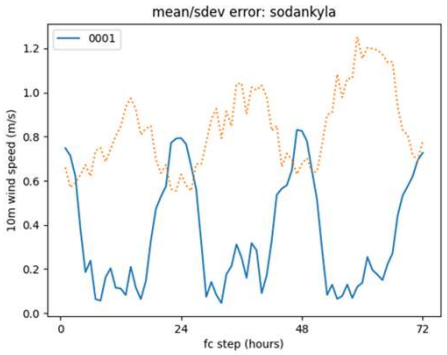


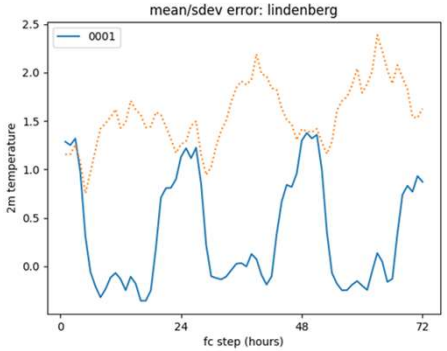
Website: http://srnwp.cosmo-model.org/content/default.htm
Account request: http://srnwp.cosmo-model.org/content/register.htm

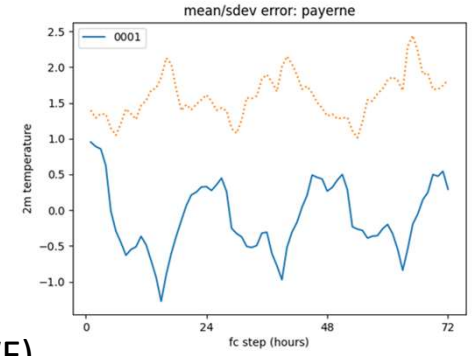
ECMWF HRES temperature errors: JJA202?







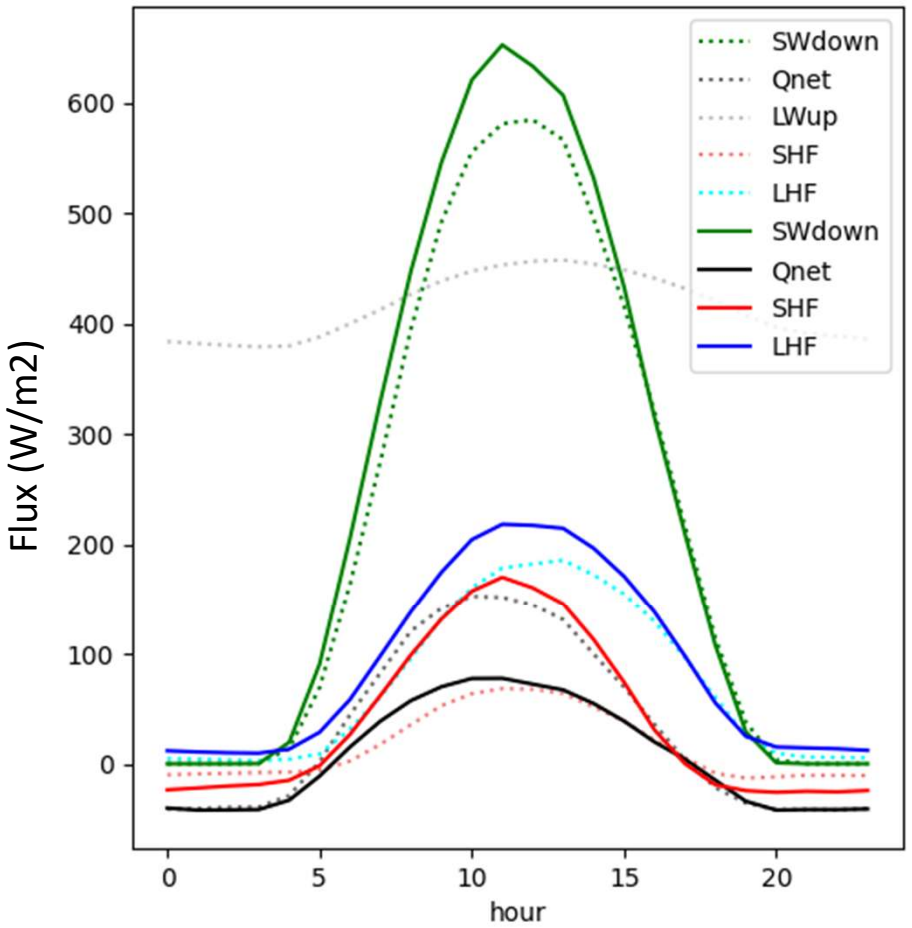


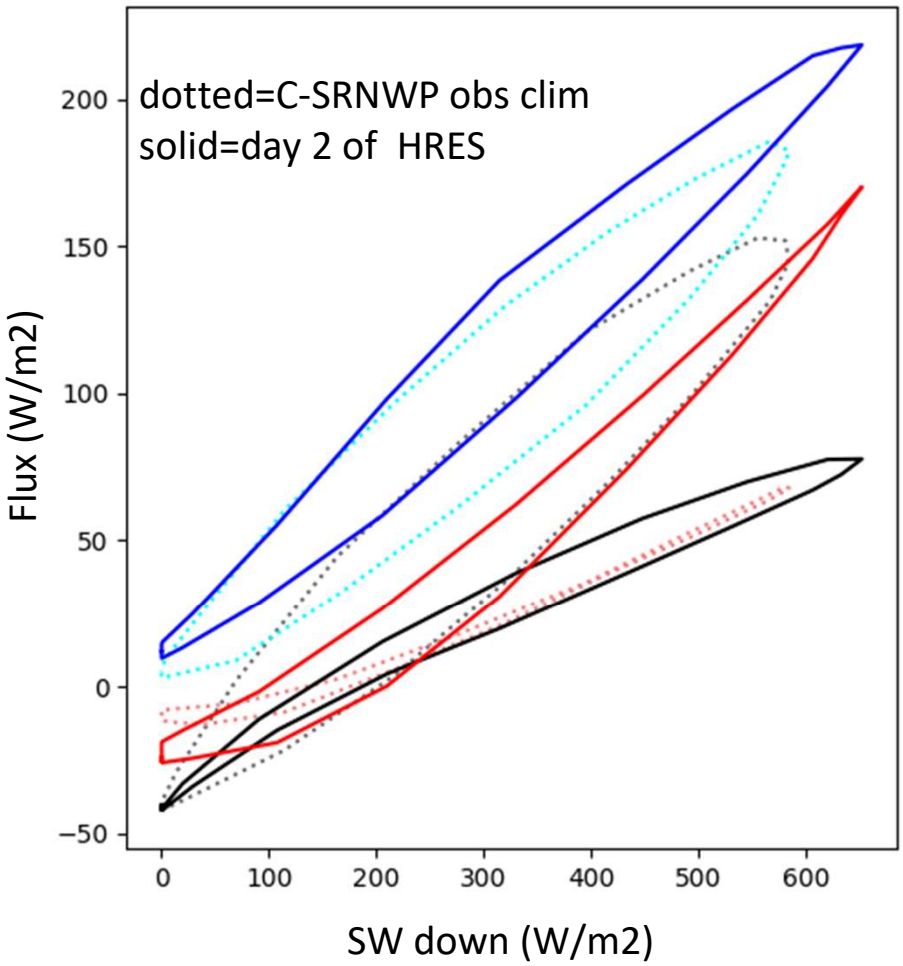


Jonny Day (ECMWF)

Surface energy budget at Lindenberg

Jonny Day (ECMWF)





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) → since 2019 included in the C-SRNWP budget
- Work coordinated by FMI (Ekaterina Kurzeneva), person involved: Georgy Kurzenev
- Currently ongoing work:
    - Two land-water datasets are currently under processing for the new fine resolution version of GLDB: (i) ECOCLIMAP SG as a preliminary map and (ii) the new map based on Joint Research Centre (JRC) Global Surface Water (GSW) dataset as a final map.
    - Both ECOCLIMAP SG and JRC GSW - based dataset contain errors of mis-classification between inland water and sea water (river estuaries, coastal lagoons, etc.). The algorithm to treat these errors exists (see e.g. C. Fortelius et al., 2020, p. 47), but it should be adapted for the specific task, for a specific map resolution and applied globally. Georgy Kurzenev is currently working on that, using ECOCLIMAP SG as a prototype.
    - Finally, after correcting all mis-classification errors, the lake depth will be mapped on the JRC GSW

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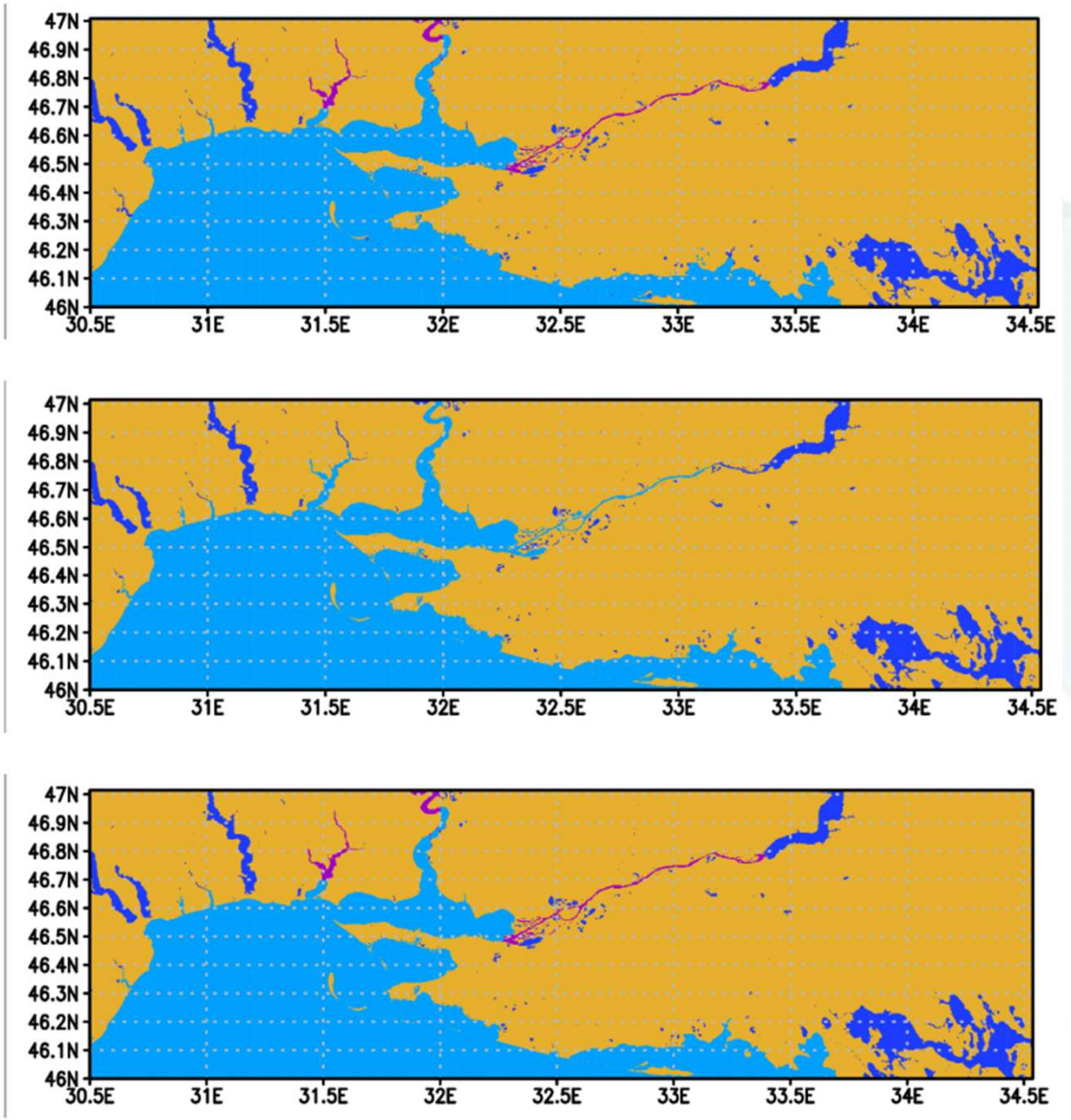
Global Lake Database

Example of processing the land-water map for the Northern coast of Black Sea.

Upper:ECOCLIMAP SG without corrected errors
Middle: ECOCLIMAP SG with corrected distinguishing between the ocean and inland water
Lower: distinguishing between the ocean and inland water with applying river information from ECOCLIMAP SG where possible.

Dark yellow – land, light blue – sea, blue – lake or reservoir, magenta – river.



Slide provided by: Ekaterina Kurzeneva

Physiography work

- Goal: checking and correction of ESA-CCI land cover map for NWP purposes
- Budget: 27.000 EUR for three years: 2021-2023 (money not spent in other C-SRNWP tasks)

- Supervisory team defined on 24 February 2021:
  - C-SRNWP Surface ET Chair: Patrick Samuelsson (SMHI)
  - NWP expert: Ekaterina Kurzeneva (FMI)
  - GIS expert: Bolli Pálmason (IMO)

- Successful application: Sandro Oswald (ZAMG) on 24 March 2021

- Questionnaire to collect user needs (autumn 2021) → fine tune the goals of the work

- First version of corrected dataset ready in August 2022 → will be distributed via C-SRNWP Surface ET

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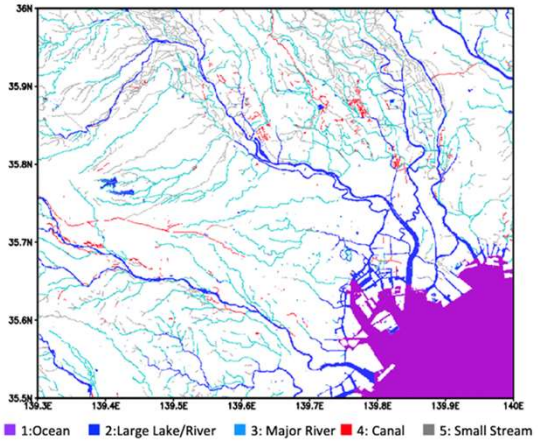
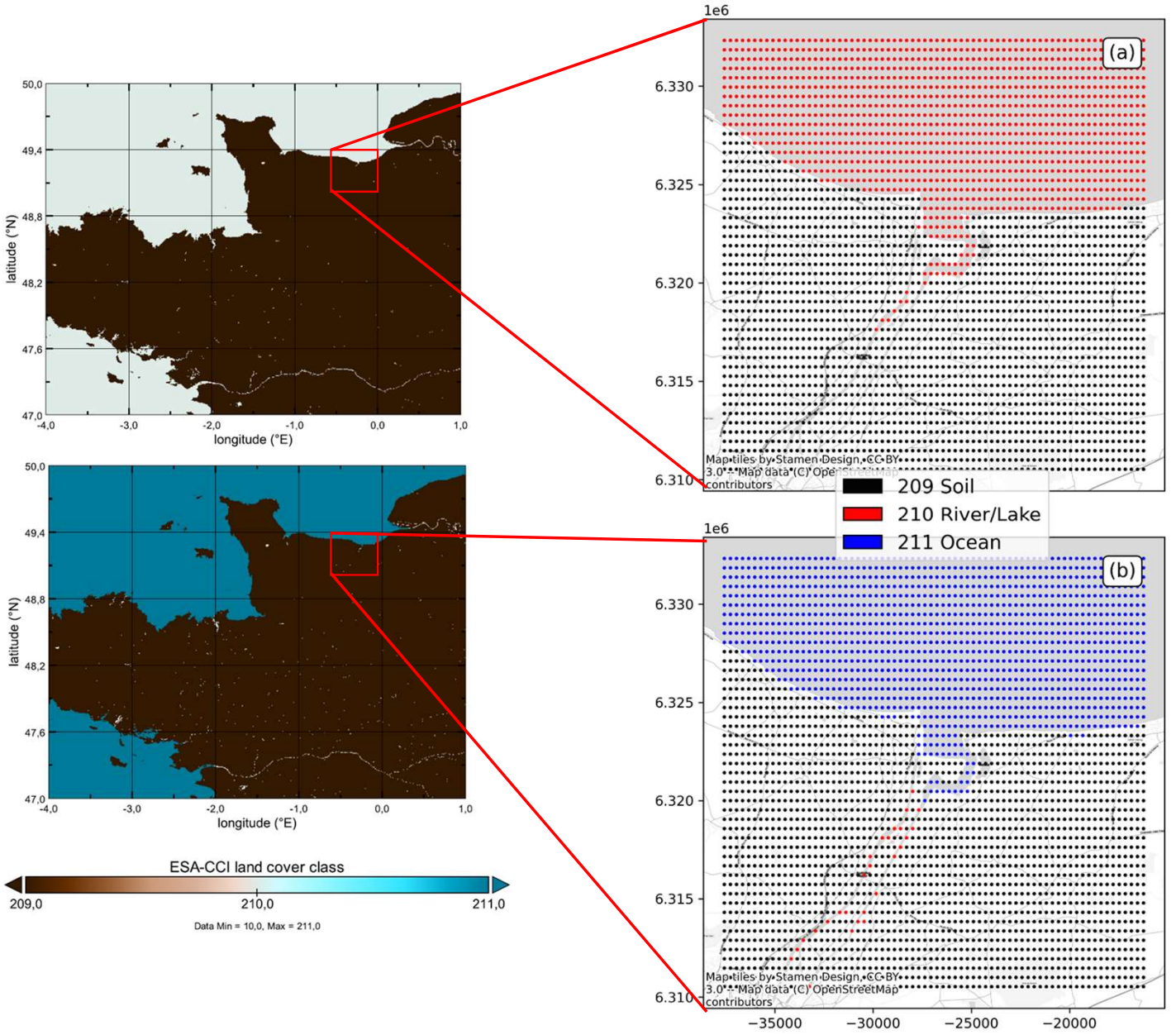
Physiography work

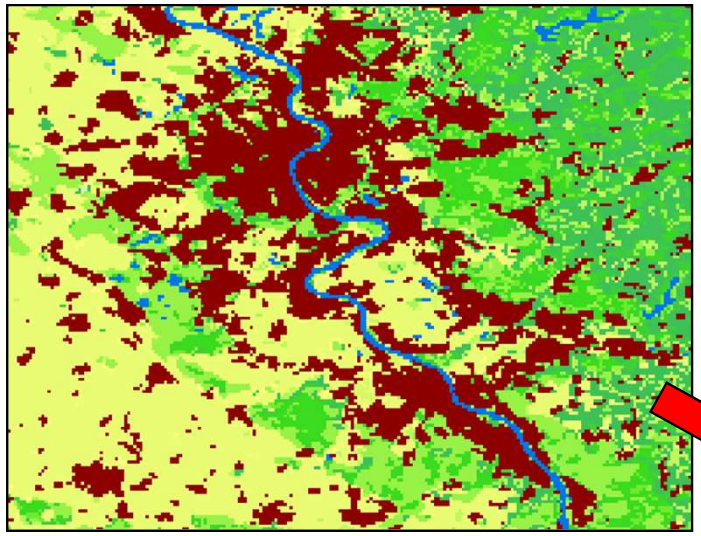


Use the **Open Street Map** and **GlobalLand30** to correct the land-water mask and to distinguish between fresh and salt water

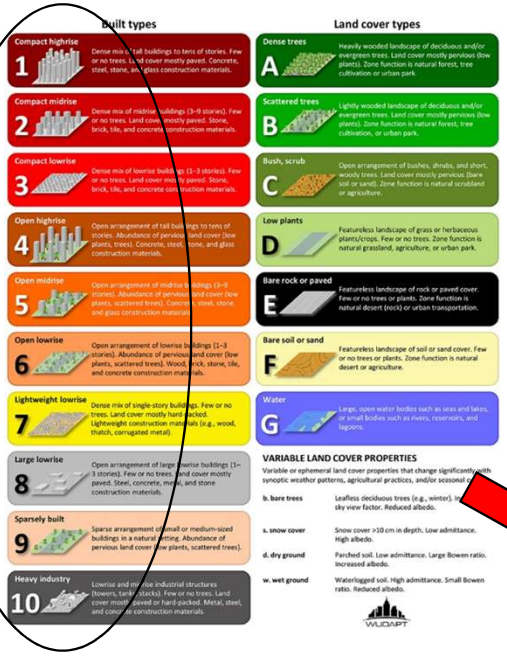
Slide provided by: Sandro Oswald



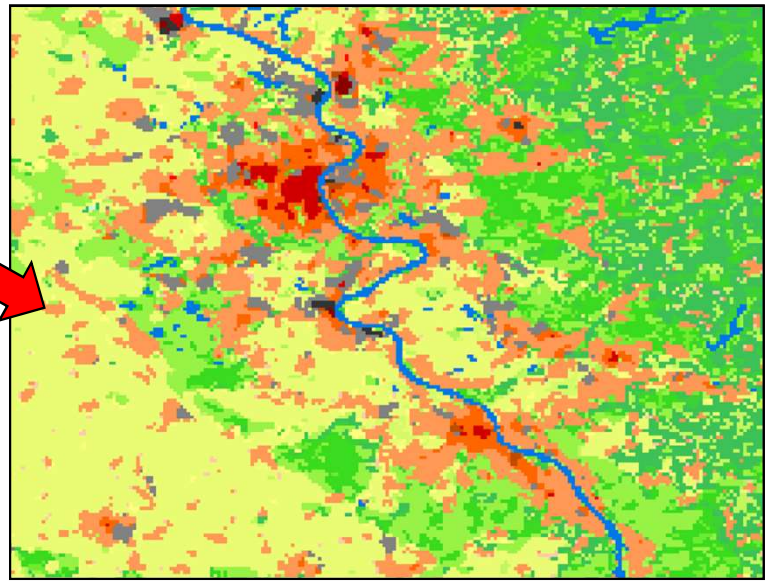
Physiography work



Example for Cologne, Germany



Use the **Local Climate Zones (LCZ)** to correct the urban class →
10 classes instead of 1



Slide provided by: Sandro Oswald

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
- 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)
- 2020-2021: no travels due to COVID, funds carried forward to 2022
- 2022: two weeks travel by Ivan Bastak Duran (University Frankfurt) to CHMI to work on ICON and ALARO turbulence schemes

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EMS Annual Meeting 2022

- 4-9 September 2022, Bonn, Germany (hybrid event)

- OSA1.5 Session: Challenges in Weather and Climate Modelling: from model development via verification to operational perspectives
- Conveners: Estíbaliz Gascón, Daniel Reinert, Balázs Szintai
- Co-conveners: Chiara Marsigli, Manfred Dorninger
- Sub-session about EUMETNET, C-SRNWP and related activities

- 28 abstracts received, 5 associated with EUMETNET/C-SRNWP activities

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Thank you for your attention!

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CONTACT DETAILS

Balázs Szintai

C-SRNWP Manager

EIG EUMETNET
European Meteorological Services' Network
www.eumetnet.eu

Phone: +36 1 346 4705

Email: szintai.b@met.hu