



Open Forecast – Final Report on Training, Collaboration, Dissemination and Communication

© The Open Forecast Project
www.open-forecast.eu
@OpenForecastEU



**Co-financed by the Connecting Europe
Facility of the European Union**

Project	Open Forecast
Action number	2017-DE-IA-0170
Report title	Open Forecast Training, Collaboration, Dissemination and Communication
Report number	OF_R8.3_2021
Date of publication	31.05.2021
Revision	Rev_03
Lead Partner	GWDG
Authors	S. Bingert (GWDG), L. Kern (HLRS)
Dissemination level	<CO ¹ >

1

PU = Public

PP = Restricted to other programme participants (including the Commission Services).

RE = Restricted to a group specified by the consortium (including the Commission Services).

CO = Confidential, only for members of the consortium (including the Commission Services)

Executive Summary

This report lists the activities of the action to disseminate the results. Although, somehow limited by the pandemic situation, many different possibilities were used to reach out to interested parties and potential users of the Open Forecast System, the outcome of the action.

1 Table of Contents

Executive Summary.....	2
List of Figures.....	4
2 Introduction.....	5
3 Presentations and Publications.....	5
3.1 Publications.....	5
3.2 Presentations.....	5
3.3 Teaching and Final Theses.....	6
4 Training.....	7
5 Collaboration.....	8
6 Covid-19 pandemic situation.....	8
7 Future Plans.....	9
8 Acknowledgements.....	9
9 References.....	9

List of Figures

Figure 1: Simplified workflow for the AgriCOpen use-case. The preprocessing step is done using Sen2Agri software independently.	7
Figure 2: Workflow for the PMFS use-case.....	8

2 Introduction

The aim of the action is to create a generic system that allows to utilise HPC resources in complex workflows. Those workflows should be capable to include and produce open data.

The results of the action are manifold and are presented at different levels for different communities. First the produced data results are of interest for domain experts from climate research and agriculture, while the development and implementation of Open Forecast System is a topic for computer science.

3 Presentations and Publications

3.1 Publications

- Schwitalla, T., Bauer, H.-S., Warrach-Sagi, K., Bönisch, T., and Wulfmeyer, V.: *Turbulence-permitting air pollution simulation for the Stuttgart metropolitan area*, Atmos. Chem. Phys., 21, 4575–4597, <https://doi.org/10.5194/acp-21-4575-2021>, 2021.
- Christian Bauer, Dominik Schilder, Martin Weis: *Die Augen der Sentinel – Frei verfügbare multispektrale Satellitendatenprodukte für die Präzisionslandwirtschaft*, Mitteilungen des DVW-Landesvereins Baden-Württemberg, Heft 2/2020, 68. Jahrgang, ISSN 0940-2942
- Kern, Leyla S*; Schwitalla, Thomas; Bingert, Sven; Woessner, Uwe; Dembski, Fabian: *Digital Twins for Air Quality Assessment in Urban Regions*, Symposium on Simulation for Architecture and Urban Design (SimAUD), (recorded presentation), available at <https://dl.acm.org/conference/simaud/proceedings>
- Sven Bingert, Christian Köhler, Hendrik Nolte, Alamgir Waqar: *An API to Include HPC Resources in Workflow Systems*, INFOCOMP 2021, The Eleventh International Conference on Advanced Communications and Computation, pages 15-20, May 30, 2021, ISBN: 978-1-61208-865-5

Additionally, final theses related to the Open Forecast action, which are conducted at the University are and will be published with a DOI at the Göttingen Research Online data repository².

3.2 Presentations

- 1) Martin Weis (OK Lab Karlsruhe); *Open Data from Space*; “Seasons of Media Arts” 2019 ZKM Karlsruhe; 31. August 2019, Karlsruhe, Germany:
<https://zkm.de/en/exhibition/2019/08/seasons-of-media-arts> &
<https://zkm.de/de/veranstaltung/2019/08/offene-daten-aus-dem-all-0>

² <https://data.goettingen-research-online.de/dataverse/gwdg-final-theses>

- 2) Sven Bingert, Martin Weis, Christian Bauer; *Offene Smart Farming Produkte aus offenen Satellitendaten*; FOSGISS Konferenz 2020, 11.-14. March 2020, Freiburg, Germany. Presentation: <https://pad.gwdg.de/p/SktHxU6NI#/> , Video: <https://media.ccc.de/v/fossgis2020-3136-offene-smart-farming-produkte-aus-offenen-satellitendaten>
- 3) Martin Weis (OK Lab Karlsruhe); *Guided Tour through Critical Zones: Open Data*; “Critical Zones” 2020 ZKM Karlsruhe; 24. October 2020; Karlsruhe, Germany; <https://zkm.de/en/exhibition/2020/05/critical-zones> & <https://zkm.de/en/guidedtours-workshop/2020/10/guided-tour-through-critical-zones-open-data>
- 4) Kern, Leyla S*; Schwitalla, Thomas; Bingert, Sven; Woessner, Uwe; Dembski, Fabian; *Digital Twins for Air Quality Assessment in Urban Regions*, Symposium on Simulation for Architecture and Urban Design³, April 16th 2021
- 5) RDA VP16: Bingert, S. “Adoption of the PID-INST schema to the sensor.community network” <https://www.rd-alliance.org/plenaries/rda-16th-plenary-meeting-costa-rica-virtual/pidinst-deliverables-and-wg’s-call-adoptions>, August 3rd 2020
- 6) RDA VP17: Bingert, S. “Update on implementation of the PID-INST schema to the sensors of the sensor.community network” <https://www.rd-alliance.org/plenaries/rda-17th-plenary-meeting-edinburgh-virtual/pidinst-adoption>, January 25th 202
- 7) Kern, Leyla; Dembski, Fabian; Wössner, Uwe “Virtual Twins, Smart Cities and Smart Citizen”, Supercomputing Conference 2020, Atlanta, Georgia, USA (Online), November 16th 2020
- 8) Wössner, Uwe; Dembski, Fabian; Kern, Leyla; “Digital Urban Twins”, ISC High Performance 2021, (Online), June 30th 2021

3.3 Teaching and Final Theses

In the course of the Open Forecast action several master and bachelor topics were provided for the computer science students of University of Göttingen and for the students of the "Internet Technologies and Information Systems" program⁴, offered by the four universities Braunschweig, Clausthal, Göttingen and Hannover, located in northern Germany. Professor Ramin Yahyapour, Managing Director of the GWDG, as well as Dr. Sven Bingert, Deputy Head of the eScience group at GWDG, do have the examination authorization for these students.

The theses finalized at the end of the action are:

- Alamgir Waqar “*Design and implementation of an API to ease the use of HPC systems*“, <https://doi.org/10.25625/S3GI5N>

³ <https://www.youtube.com/embed/slXjIQKGK3k> (last visited: 31.05.2021)

⁴ <http://www.itis-graduateschool.de> (last visited: 31.05.2021)

- Jakob Leonard Hördt “*Extending and continuously deploying projects regarding the sensor.community citizen science project*”, <https://doi.org/10.25625/RLET5C>

Still ongoing theses which will be finalized after the end of the action are:

- Iman Al-Obaidi “*Sensor Data Analysis*”
- Ding-Ze Hu “*In-memory data base for high performance visualization of the sensor.community time-series data*”

Additionally, the results of the action were used in lectures of the courses “502663 *Application areas of data science*” and “502662 *Introduction to Python for data scientists*” at Georg-August University of Göttingen.

4 Training

The successful implementation of the Open Forecast System allows for future use. Currently the system is continuously creating new data using the workflow derived for the AgriCOpen use-case (c.f. [1]). The two workflows derived for the use cases are depicted in Figure 1 and Figure 2. Those workflows can be constructed by domain experts in cooperation with the maintainer of the Open Forecast System. A dedicated training is not required, but requirements for the workflow has to be derived and implemented in the workflow. On the other hand, the execution of the workflow can be done by everyone and no domain knowledge is required. The Open Forecast System provides a graphical user interface, e.g., a web form, that allows to collect user specific input to be used in the workflow. In Figure 1, this is shown with the workflow item “Input Job Token”, where the user is asked to provide an authorization token for the usage of the HPC resources. Details are described in OPEN FORECAST System Architecture [2] .

Depending on future usage scenarios of the Open Forecast System, training for users for new workflows might be necessary.



Figure 1: Simplified workflow for the AgriCOpen use-case. The preprocessing step is done using Sen2Agri software independently.

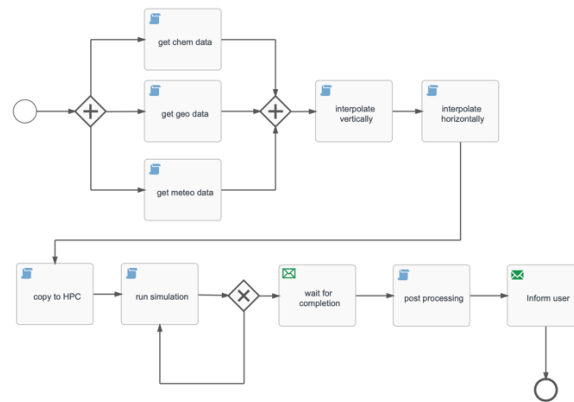


Figure 2: Workflow for the PMFS use-case.

The visualization of the PMFS use case was implemented in Vistle and COVISE. Regular courses in visualization using these softwares are offered at HLRS⁵. Moreover, training material for visualisation with Vistle was created within this project in the form of a tutorial [3].

5 Collaboration

In the course of the action several meetings with the Cross-Forest action⁶ took place. The meetings were focused on the knowledge exchange by presenting the use-case and the approaches to integrate HPC resources in the implementation of the actions.

Another important aspect is the communication and the interaction with the community of Sen2Agri⁷ users. Sen2Agri was chosen by the action to be an integral part of the Open Forecast System. Therefore, already early in the project members of the action took part in the respective forums⁸ and shared knowledge achieved during the action. Dedicated code developed by the action was published on GitHub which led to even communication. Even at the time of writing the proposal members of the action were contacted via social media platforms such as Xing or Linked-In.

6 Covid-19 pandemic situation

The pandemic situation in the world which started early 2020 forced the action to adapted the plans for the dissemination and training. In the first period of the pandemic many conferences were cancelled, either a virtual meeting was not considered or technical possible. In the course of the pandemic the organisers of meetings and conferences shifted to virtual meetings, which

⁵ HLRS course catalogue <https://www.hlrs.de/training/> (last visited 31.5.2021)

⁶ Cross-Forest is co-financed by the European Union's Innovation and Networks Executive Agency (INEA), through the Connecting Europe Facility (CEF) 2014-2020 (Action 2017-EU-IA-0140) <https://crossforest.eu> (last visited: 31.05.2021)

⁷ <http://www.esa-sen2agri.org>; Software for downloading and preprocessing satellite data (last visited: 31.5.2021)

⁸ E.g. <https://forum.esa-sen2agri.org> (last visited: 31.5.2021)

then allowed the action to present the results. The impact of those meetings is of course different as the usual coffee break chat is missing.

7 Future Plans

The Open Forecast team decided to organise a final meeting in September 2021 with the focus on stakeholders for continuation of the Open Forecast Service. The event will be a combination of the presentation of the results of the action and a possible business model, as well as training event for interested users.

8 Acknowledgements

The work carried out by the Open Forecast project is co-financed by the Connecting Europe Facility of the European Union under action number 2017-DE-IA-0170.

9 References

- [1] Project Report “Open Forecast Use Cases”, http://open-forecast.eu/wp-content/uploads/2019/07/Open_Forecast_Use_Cases_M02_published.pdf (last visited 31.05.2021)
- [2] Project Report “Open Forecast System Architecture” https://open-forecast.eu/wp-content/uploads/2021/07/Open_Forecast_Architecture_Design-R5.1.pdf (last visited 31.05.2021)
- [3] Open Forecast visualization training material “Vistle - Tutorial”, <https://open-forecast.eu/2020/10/07/an-interactive-model-for-the-analysis-of-air-quality-simulations/> (last visited 31.05.2021)