



Multi-scale **t**ransport and **e**xchange processes in the **a**tmosphere
over **m**ountains – programme and **e**xperiment

Manuela Lehner¹

on behalf of the TEAMx *Coordination and Implementation Group*

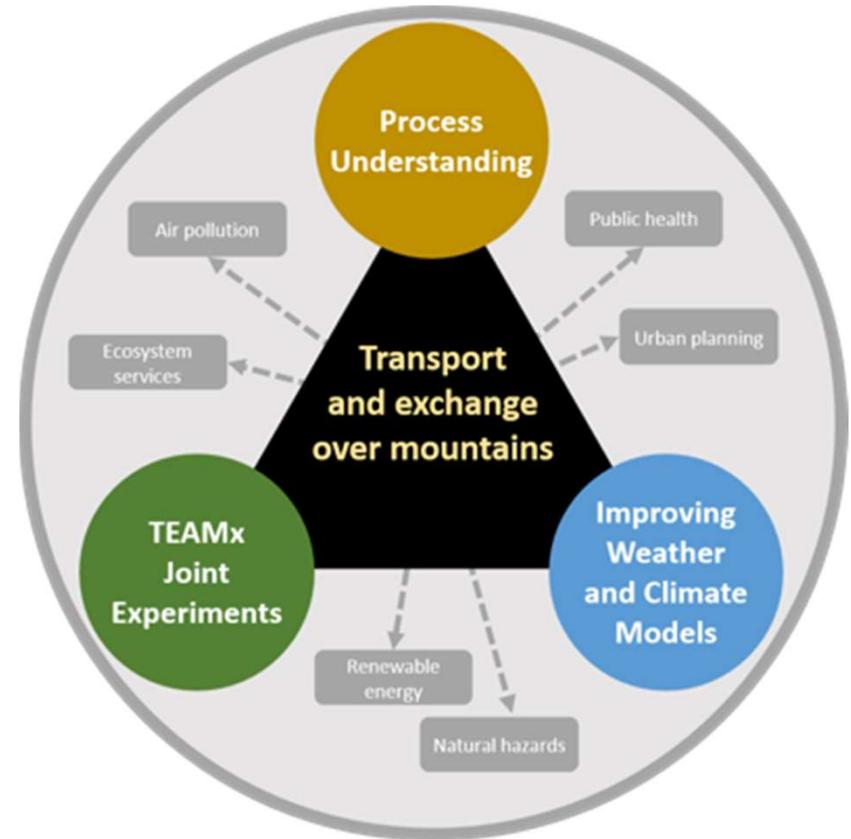
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TEAMx is ...

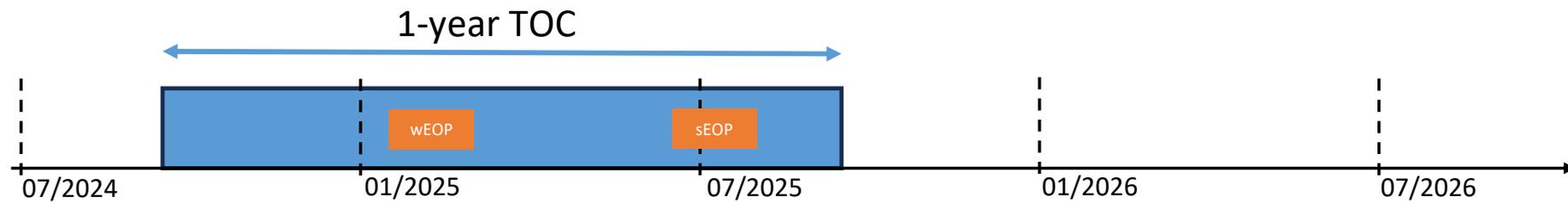
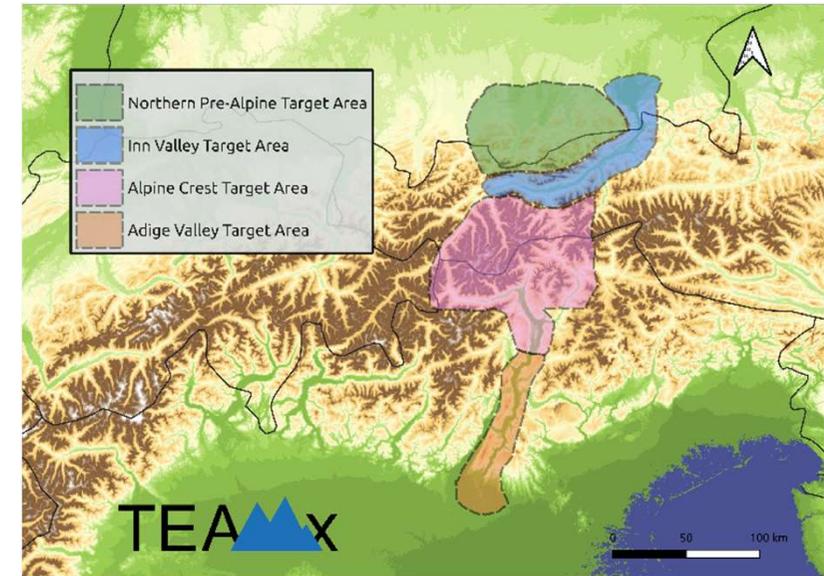
- ▲ ... an international research program focusing on transport and exchange processes over mountains.
- ▲ ... a bottom-up financed research program.
- ▲ ... supported by a Programme Coordination Office at the University of Innsbruck, financed through institutional crowd funding.



TEAMx numbers and highlights

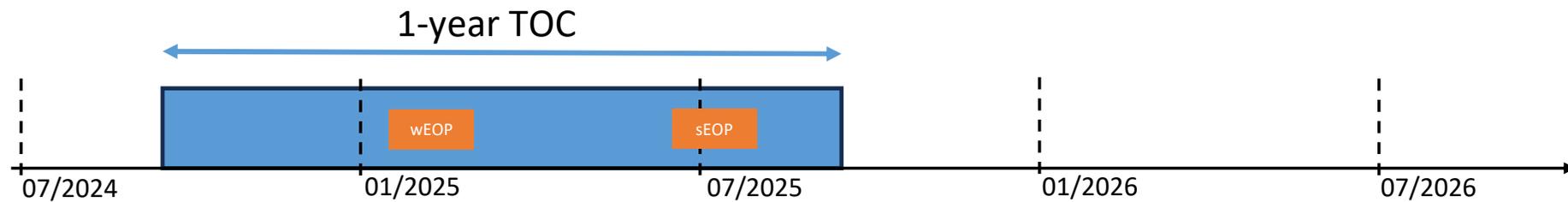
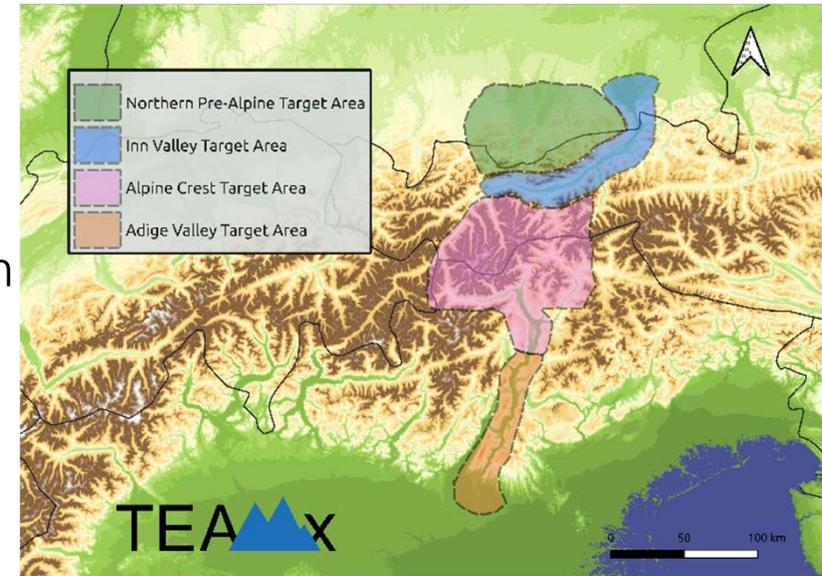
- ▲ > 40 partner institutions signed the Memorandum of Understanding.
- ▲ 6 new TEAMx projects have started since the beginning of 2024.
- ▲ At least 7 currently submitted TEAMx proposals are awaiting funding decisions, including several international collaborative proposals.
- ▲ TEAMx-UK has received funding (> £3 mio) to
 - ▲ participate in the field campaign.
 - ▲ support 4 UK research projects.
- ▲ New members of the Coordination and Implementation Group
 - ▲ Nikolina Ban and Sven Kotlarski representing the mountain climate community
 - ▲ Günther Zängl strengthening the involvement of national weather services

TEAMx Observational Campaign



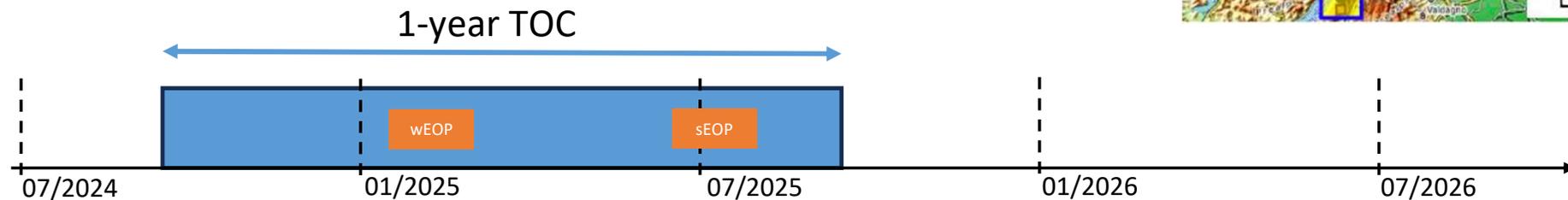
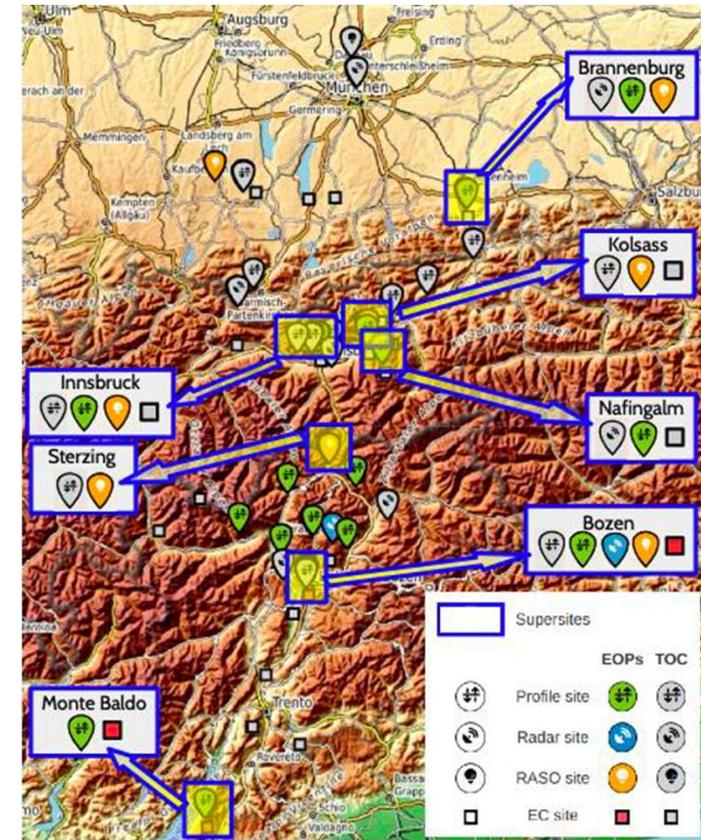
TEAMx Observational Campaign

▲ Ongoing deployment and testing of instrumentation



TEAMx Observational Campaign

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TEAMx Observational Campaign

- ▲ A 1st version of the **Implementation Plan** will be discussed at the 4th TEAMx Workshop.
- ▲ Distribution of available resources to best meet the TEAMx research goals
- ▲ Phenomena of interest and IOP types
- ▲ Decision process for the planning of IOPs
- ▲ Daily weather forecasts during the TOC

TEAMx Observational Campaign

TEAMx Observational Campaign TOC
Implementation Plan (TOC IP)

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 - ▲ Distribution of available resources to best meet the TEAMx research goals
 - ▲ Phenomena of interest and IOP types
 - ▲ Decision process for the planning of IOPs
 - ▲ Daily weather forecasts during the TOC
- ▲ The **Data Management Plan** has been finalized and shared with the TEAMx community.
 - ▲ Near real-time data exchange during the TOC
 - ▲ Long-term storage and access of TEAMx data

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TEAMx Data Management Plan

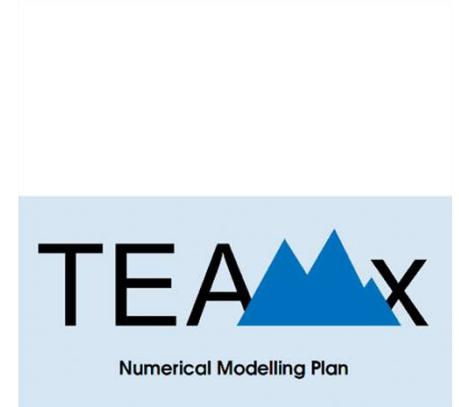
Authors

Manuela Lehner, Helen Ward, Stefano Serafin, Marco Arpagaus, Lorenzo Giovannini, Martin Juckes, Peter Knippertz, Martin Kohler, Katharina Loeve, Stephen Mobbs, Corinna Rebmann, Greg Strossmeister, Stephanie Westerbuik

TEAMx (Multi-scale transport and exchange processes in the atmosphere over mountains - Programme and experiment) is an international research programme focused on improving our understanding of transport and exchange processes in the atmosphere over mountains. The goals of TEAMx are summarized in a *Memorandum of Understanding*, while the scientific objectives are described in the *TEAMx White Paper* and an *Experimental Plan*, consisting of a *Field Observations Plan* and a *Numerical Modeling Plan*. The practical implementation of the *TEAMx Observational Campaign (TOC)* is described in the *TEAMx Implementation Plan*. This *Data Management Plan* summarizes all

Numerical modeling

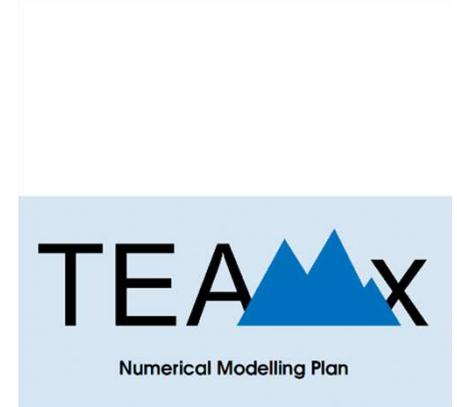
- ▲ The final version of the [Numerical Modeling Plan](#) has been published.
 - ▲ Literature review of known challenges over complex terrain
 - ▲ Summary of model intercomparison studies
 - ▲ Summary of planned NWP support for TOC
 - ▲ Guidelines and best practices



https://www.teamx-programme.org/files/TEAMx_NumericalModellingPlan_final_22may2024.pdf

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 - ▲ Literature review of known challenges over complex terrain
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- ▲ Ongoing [model intercomparison studies](#) focusing on thermally driven flows, cold-air pools, and orographic convection.

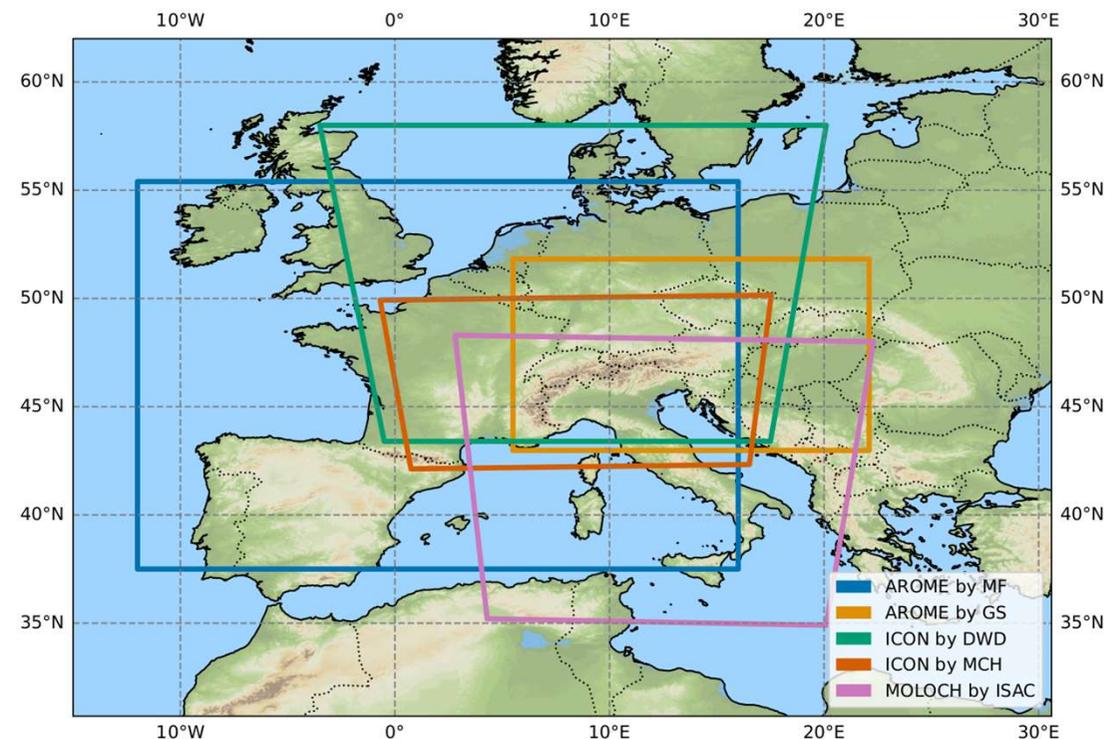


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NWP support for the TOC

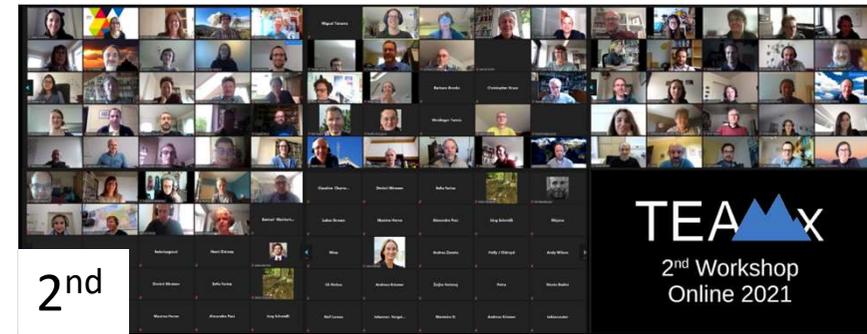
High-resolution (0.5 – 2.5 km) **NWP forecast runs** will be provided during the TOC to guide IOP planning.

- ▲ CNR ISAC (MOLOCH)
- ▲ DWD (ICON)
- ▲ GeoSphere Austria (AROME)
- ▲ Météo-France (AROME)
- ▲ MeteoSwiss (ICON)
- ▲ UK Met Office (UM)



4th TEAMx Workshop

- ▲ Hybrid Workshop held in Innsbruck
- ▲ 19 – 20 November
- ▲ About 70 in-person and 55 online participants registered
- ▲ Information about TOC activities and data management
- ▲ Presentations of research projects
- ▲ Operations Center test run



Links to goals of WWRP projects

SAGE – InPRHA - Urban prediction

- ▲ Working groups on orographic convection, mountain climate, surface-atmosphere exchange, and air chemistry
 - ▲ Transport and exchange over mountainous terrain
- ▲ Local impact for tourism, agriculture, and transportation
- ▲ Unique dataset for model validation and development and for data assimilation
 - ▲ Assimilating data from remote-sensing instrumentation
 - ▲ Improved model parameterizations (e.g., turbulence and land-atmosphere exchange)
- ▲ High-resolution modeling (sub-kilometre scale)

Links to the WWRP Implementation Plan (2024-2027)

Goals G1 – G3

- ▲ Processes and observations covering multiple scales (turbulence to seasonal)
- ▲ Addressing local mountain weather phenomena that affect local communities (e.g., foehn, orographic convection)
- ▲ Strong involvement of national and regional weather services
- ▲ Main goals include improving NWP models and reducing errors in impact models
- ▲ Exploring the use of new observational tools and the assimilation of these data

WWRP mission

- ▲ International group of scientists from different fields
- ▲ Involvement of early- to mid-career scientists (from students to project PIs)



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Thank you!

