

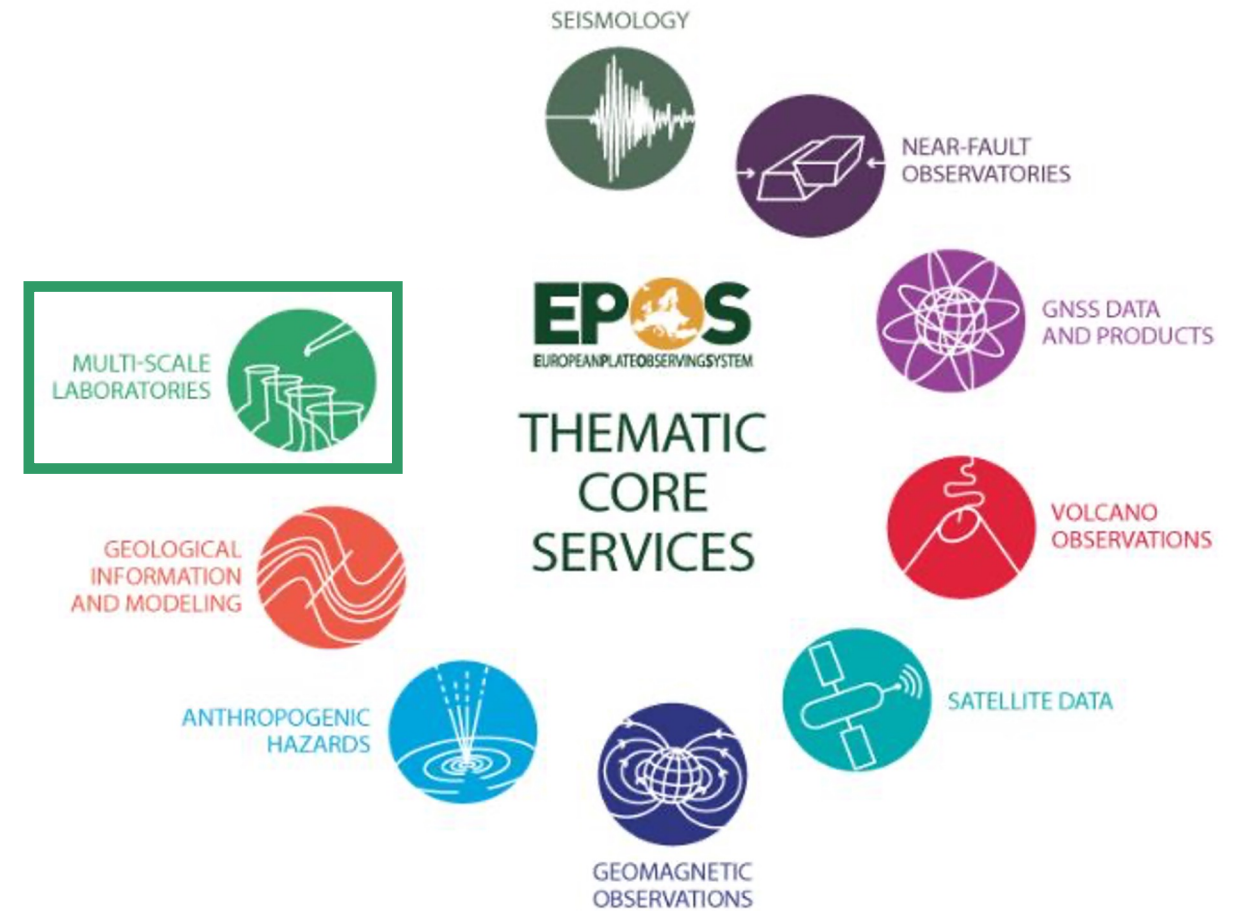


EPOS Multi-scale Laboratories (MSL)

Richard Wessels and the EPOS MSL team

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1 of the 9 EPOS Thematic Core Services (TCS)



*“The temporal and spatial scales of planet Earth’s geological processes are far and wide. The study of the solid Earth requires the use of a **vast range of multi-scale methods and instruments.**”*

1. Community: Creating a coherent and well-organized network of solid Earth Science laboratories

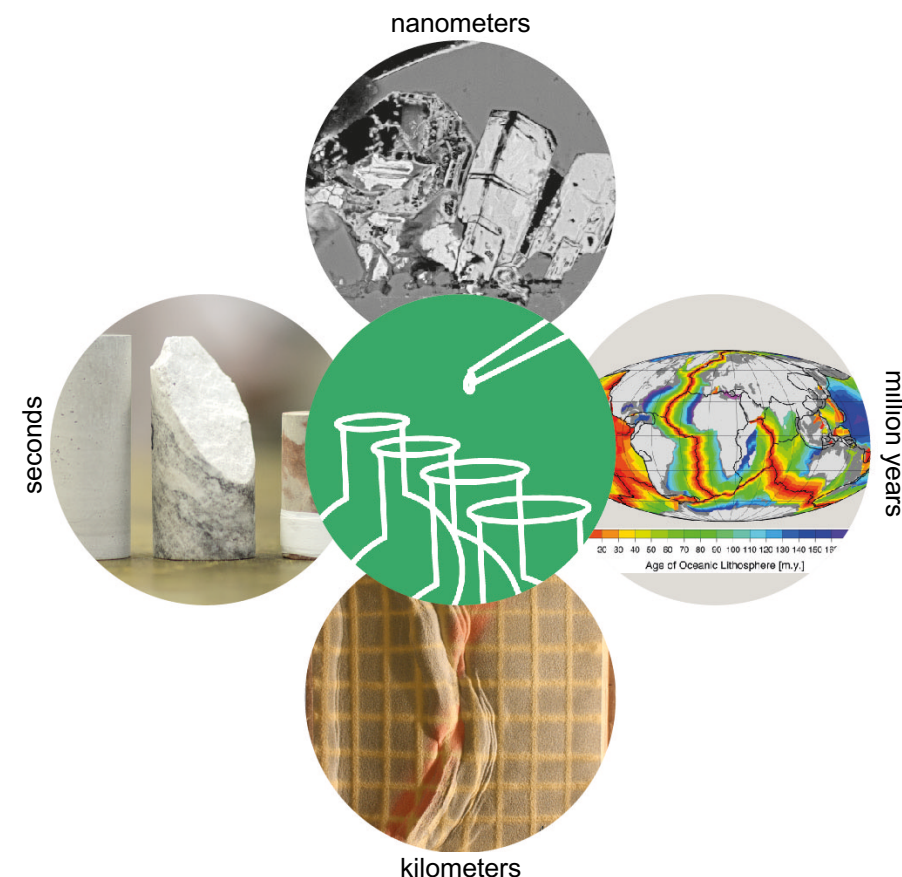
- Consortium of 11 members from 8 countries
- 97 laboratories from 13 countries in MSL community
- 5 subdomains (Analogue Modeling, Paleomagnetism, Rock Physics, Analytical & Microscopy, and Geo-Energy Test Beds*)

2. Data: Implementing dedicated data services

- Establishing data publication chain

3. Facilities: Developing a Facility Access program

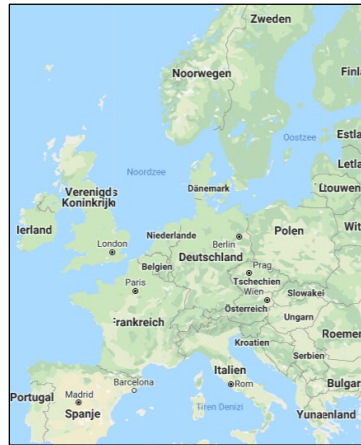
- Providing access to research facilities



1. Community growth

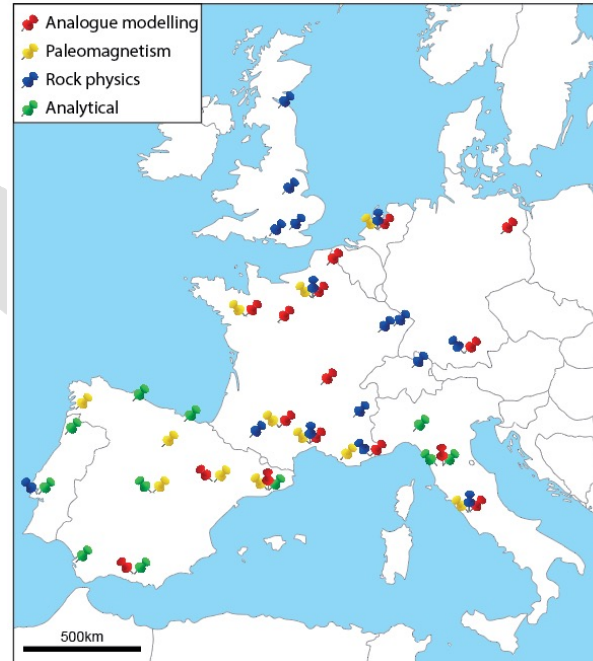
Growth of a multi-disciplinary, heterogeneous, multi-scale experimental community

<2016



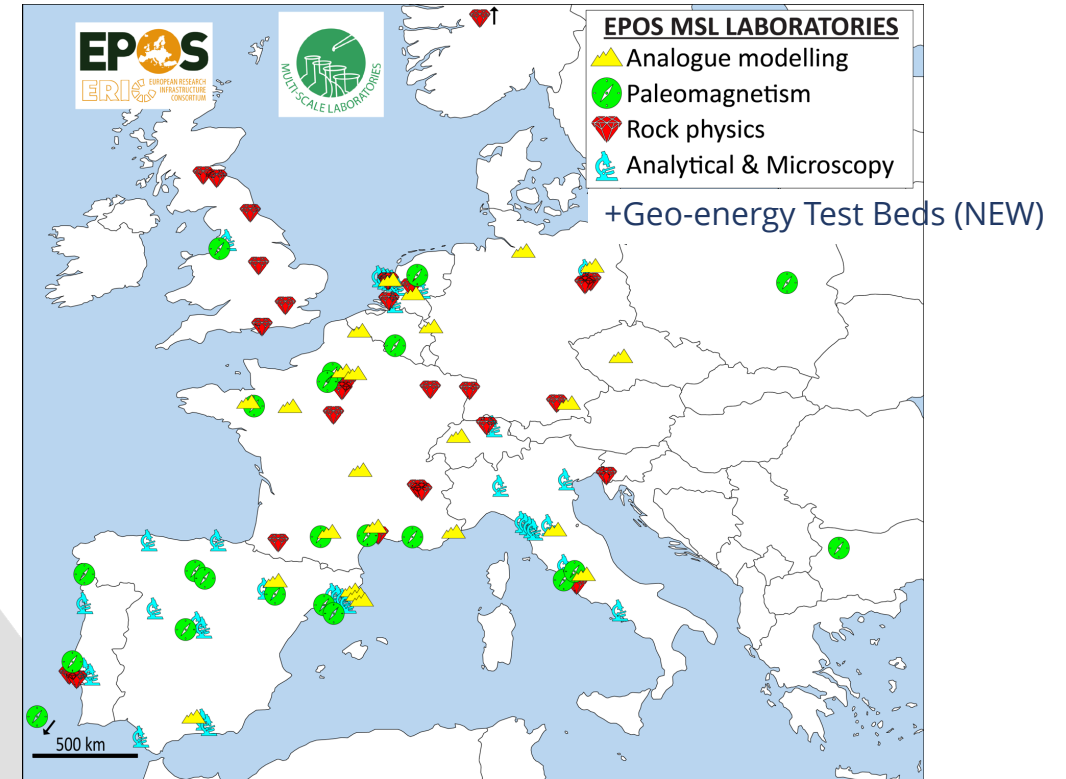
Green field

2018



72 laboratories

2022



Scientific domain	# laboratories
Analytical & Microscopy	30
Analogue Modelling	25
Paleomagnetism	20
Rock & Melt physics	22

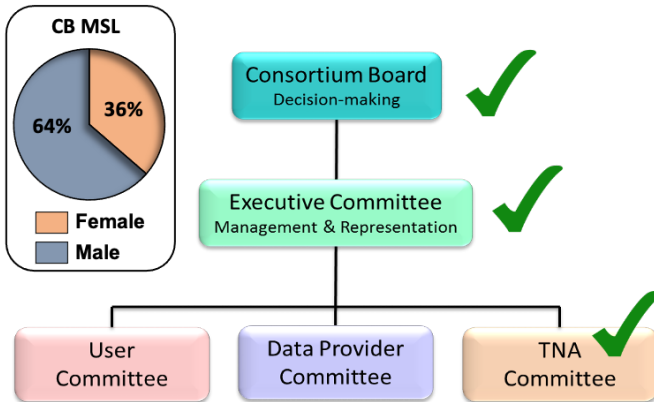
97 laboratories & growing!

1. Governing the community

MSL Legal & Governance structure

TCS MSL Governance Structure

- Consortium Board: UU, GFZ, ROMA3, INGV, CNRS, ETHZ, CSIC, UBI, NERC, CNR, LMU
- Executive committee: UU, INGV, ROMA3



TCS MSL Legal Framework

Consortium Agreement:

- 11 partners, 8 countries

Framework:

- EPOS Data Policy
- TNA General Principles

Service Provision:

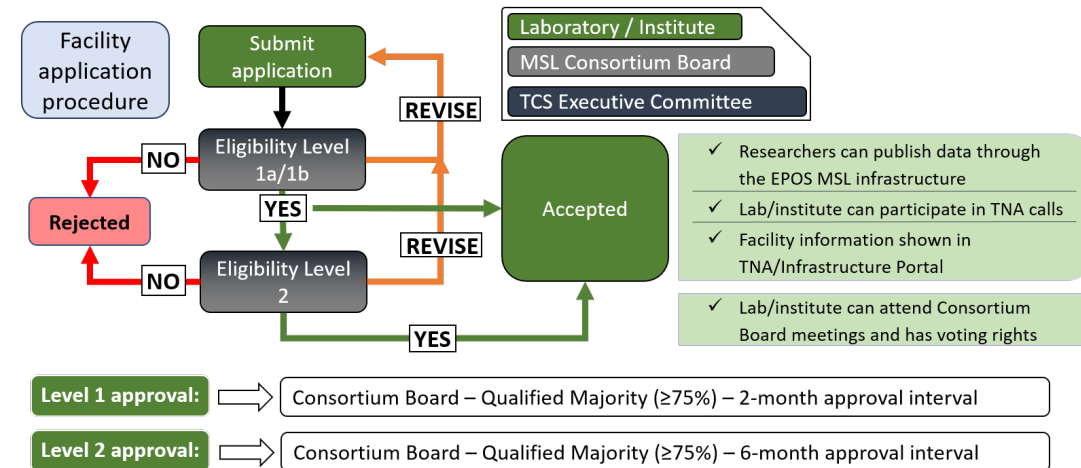
- UU: TCS Governance, catalog, repository
- GFZ: GFZ Data Services
- Roma3: TNA Coordination
- INGV: TNA Coordination

Data Provision:

- Data Provider Letter; to be replaced by Online Agreement Form

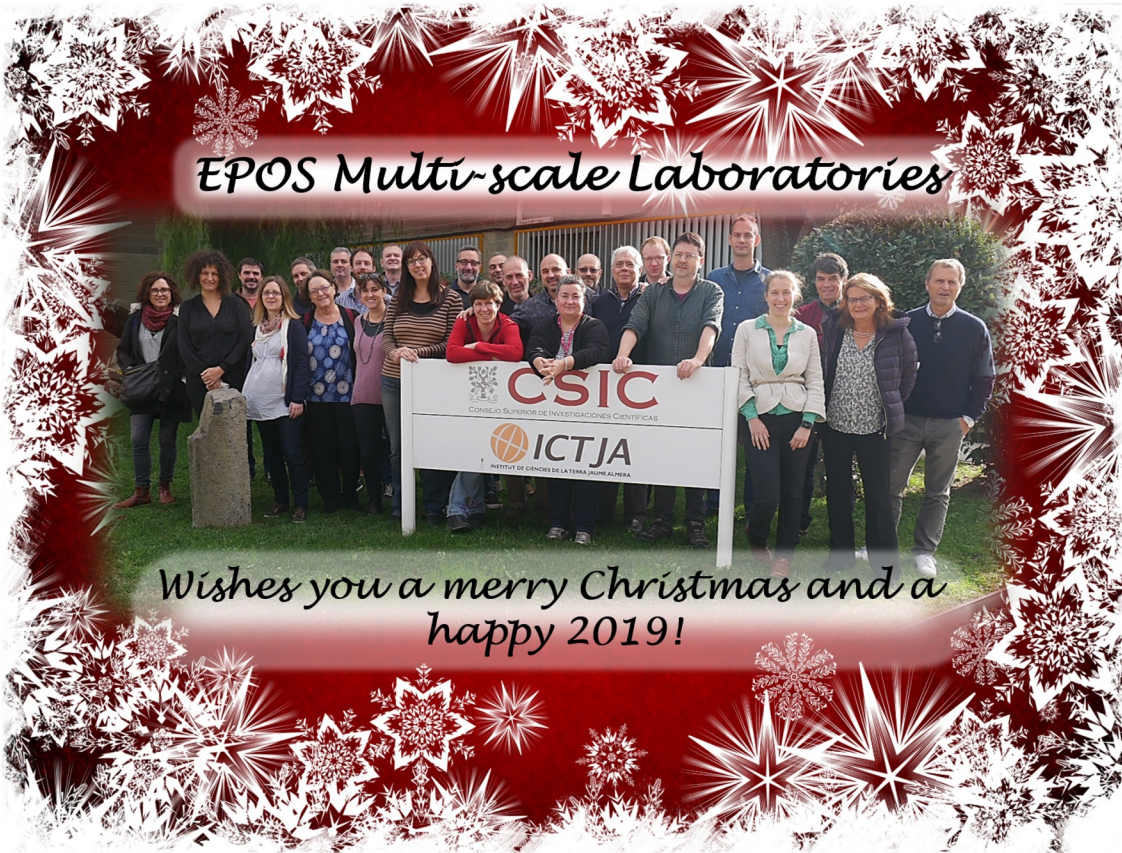
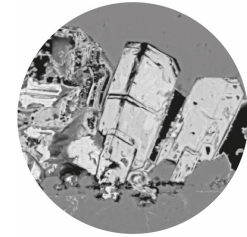
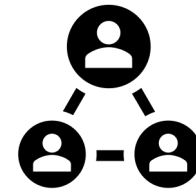
Procedures (e.g. application by new laboratory)

Level of involvement of new laboratory/institute within EPOS TCS MSL	
1a: Data Provider	<ul style="list-style-type: none"> ➤ Lab/institute can join MSL activities and share its data via TCS compliant repositories linked to the TCS catalog ➤ Requirements: Motivation Letter + Facility Information + Signed Data Provider Letter*¹
1b: TNA Provider	<ul style="list-style-type: none"> ➤ Lab/institute can join MSL activities sharing its facilities through Trans-National Access (TNA) ➤ Requirements: Motivation Letter + Facility Information + Signed Data Provider Letter*¹
2: Member	<ul style="list-style-type: none"> ➤ Lab/institute can join MSL Consortium Board meetings and has voting rights ➤ Requirements: Joined MSL at level 1a/1b + Signed Accession form + Support Letter from national EPOS contact
*1: Data Provider Letter is not required if the laboratory is a legal partner of an RI that is already a Member of EPOS TCS MSL	



1. Building the community

"It takes a community to make a community"



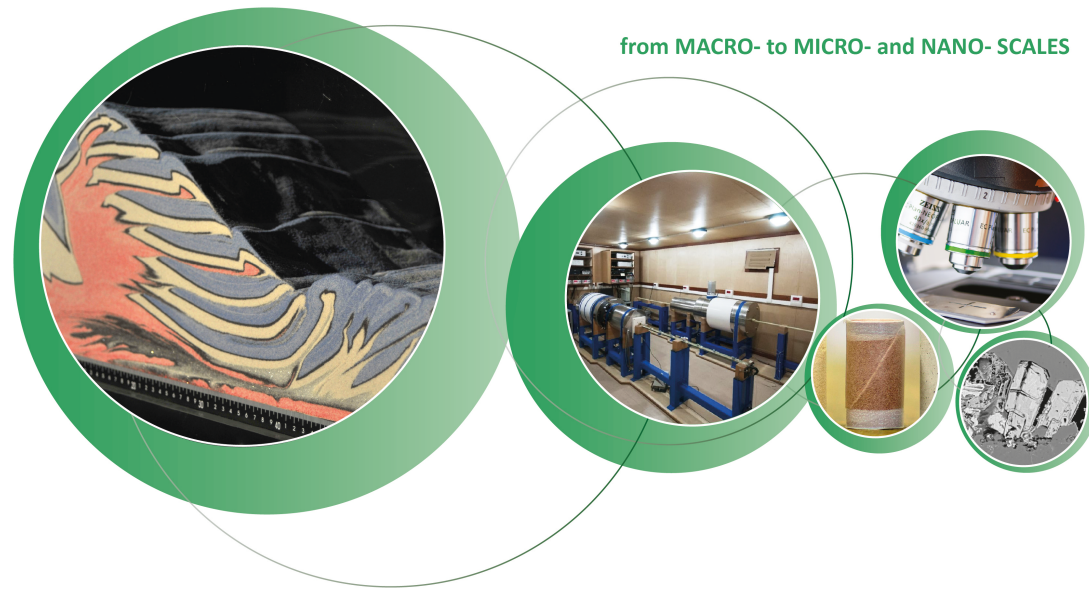
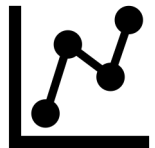
2. Data publication chain

Aim:

Dissemination of **scientific results from experimental research** in the form of datasets, uniquely identifiable through publication **with a DOI**: citable, trackable, persistent and with metadata and data description for re-use and discovery.



Findable
Accessible
Interoperable
Reusable



Why publish your research data?

- ✓ Make your research data **Findable**, **Accessible**, **Interoperable**, **Reusable (FAIR)** and citable for other scientist!
- ✓ Increases the **impact** and **transparency** of research.
 - ✓ Significantly improves data availability, findability, visibility
 - ✓ Citation advantage – both for journal publications and datasets
- ✓ Improves **reproducibility** of research.
- ✓ **Compliance**: increasingly required by funders, publishers and universities.

2. Data publication chain

STEP 1
Data are produced in the labs and organised in datasets

Wide variety of data types and sizes!

Name	File Name
550-fast	550-fast
550-slow	550-fast
NS-fast_A	550-fast_raw
NS-fast_B	550-fast_s
NS-fast_C	550-fastl
VS-fast	
VS-slow	

Datasets are described with the EPOS Multi-scale laboratories metadata model, using the GFZ Metadata editor.

STEP 2
Dataset description with MSL metadata model

Findable Accessible Interoperable Reusable

<https://www.ics-c.epos-eu.org/>

STEP 4
Datasets and metadata are harvested in the MSL catalogue and EPOS ICS-C

<https://epos-msl.uu.nl>

GFZ Data Services

Found 67 datasets. (2 global datasets)

Fluid-Induced Fault Slip Experiments in the Laboratory on Critically Stressed Saw-Cut Sandstone Samples with High Permeability

Authors: Wang, Lei; Kwieciek, Grzegorz; Rybacki, Erik et al.

Abstract: To understand the physical mechanisms governing fluid-induced seismicity at field-scale fluid injection projects, we conducted fluid-induced fault slip experiments in the laboratory on critically stressed saw-cut sandstone samples with high permeability using different fluid pressurization rates. more

STEP 3
Datasets are published with a DOI in a MSL/Institutional repository

3. Facility access - rationale

Rationale: optimize the use of instrumentation and expertise

Past situation:

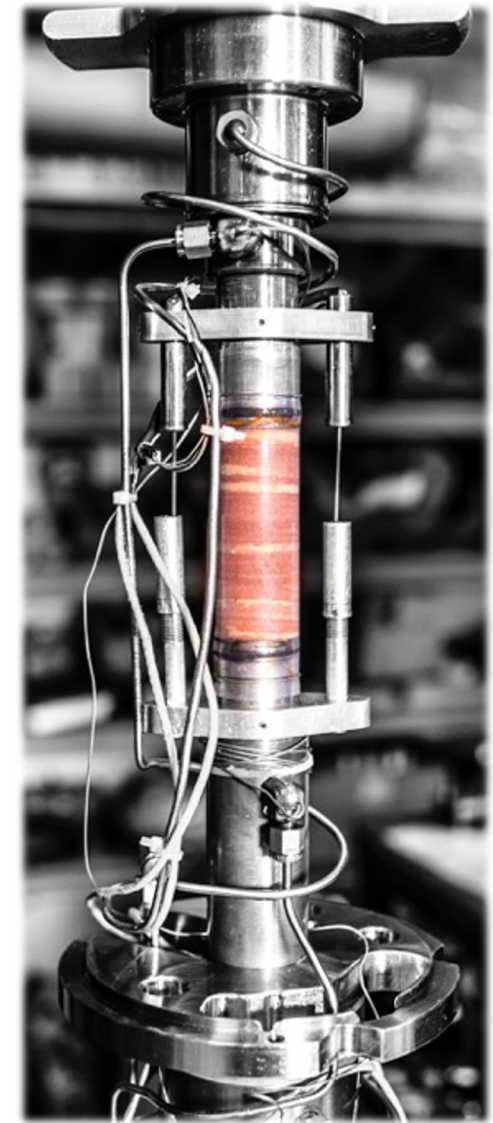
- Instruments heterogeneously located within countries / continents
- Full capacity of instruments often not used

Envisioned situation:

- Move researchers and samples to facilities with surplus capacity
- Added benefit >> sharing knowledge and kick-starting collaborations

Mechanism: Transnational access (TNA) // Facility access (FA)

Requires external funding, often in the form of competitive grants (e.g. Horizon Europe // national // institutional funds)

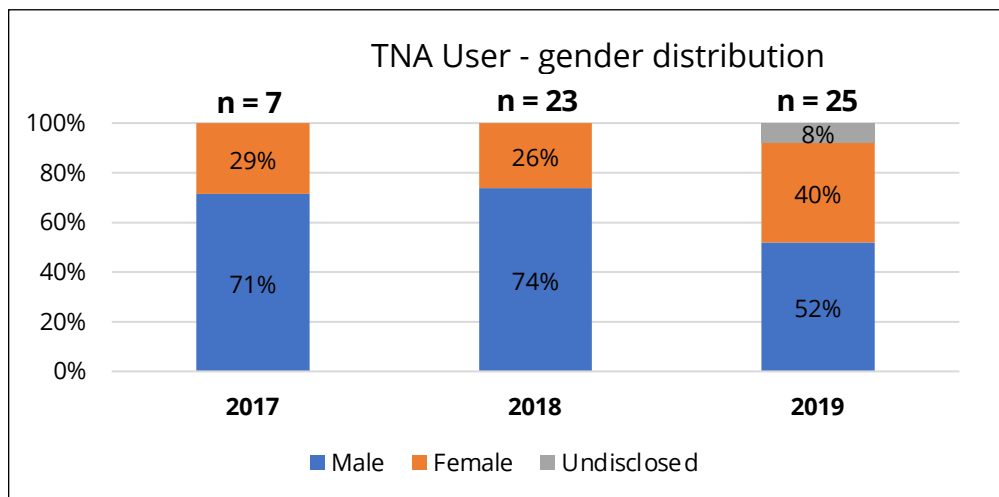


3. Facility access – the MSL experience

✓ Transnational Access (TNA) Program:

1. Three TNA pilot calls (2017, 2018, 2019)
2. 65 labs participated – 55 TNA users
3. TNA-derived data gets published through the MSL Data Publication Chain

EPOS TNA STATISTICS											
Group	Year	Offered Facilities/ Instruments	No. of applications		Applicant's institute		Granted access type		Granted access days		
			Submitted	Granted	EU	non-EU	Physical	Remote	Min	Avg	Max
MSL	2017	5/15	7	6	50%	50%	66%	33%	5	16	35
MSL	2018	22/72	30	23	65%	35%	86%	14%	3	15	45
MSL	2019	38/211	33	28	52%	48%	82%	18%	2	11	30



3. Facility access – publication

Wessels et al., 2022, *Annals of Geophysics*, 65, 2

ANNALS OF GEOPHYSICS, 65, 2, DM214, doi:10.4401/ag-8768
OPEN ACCESS

Transnational Access to Research Facilities: an EPOS service to promote multi-domain Solid Earth Sciences in Europe

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⁽⁷⁾ Utrecht University, University Library, Heidelberglaan 3, 3584 CS, Utrecht, The Netherlands

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Abstract

Transnational access (TNA) allows cross-border, short-term and frequently free-of-charge access to world-class research facilities, to foster collaborations and exchanges of experience. Specifically, TNA aims to encourage open science and innovation and to increase the efficient and effective use of scientific infrastructure. Within EPOS, the European Plate Observing System, the Volcano Observatories and Multi-scale Laboratories communities have offered TNA to their high-quality research facilities through national and European funding. This experience has allowed the definition, design, and testing of procedures and activities needed to provide transnational access in the EPOS context.

In this paper, the EPOS community describes the main objectives for the provision of transnational access in the EPOS framework, based on previous experiences. It includes practical procedures for managing transnational access from a legal, governance, and financial perspective, and proposes logistical and technical solutions to effectively execute transnational access activities. In addition, it provides an outlook on the inclusion of new thematic communities within the TNA framework, and addresses the challenges of providing market-driven access to industry.

Keywords: EPOS; Transnational access; TNA; Solid Earth Sciences; Physical and remote access

EPOS Transnational Access

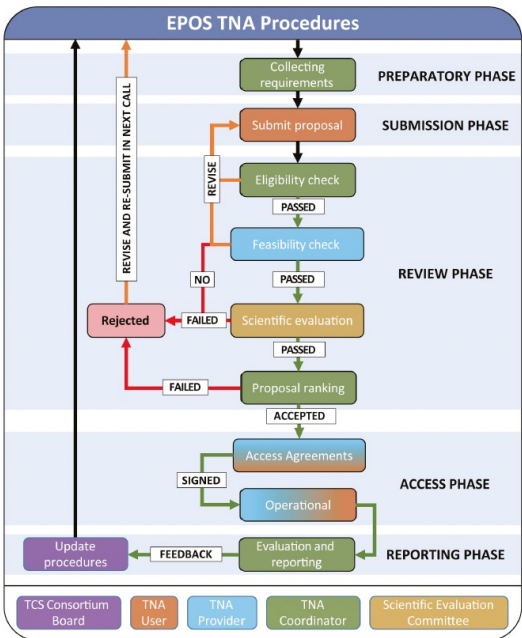


Figure 6. Access procedures for EPOS TNA.

The EPOS TNA procedures are organized in a workflow that consists of at least: a) preparatory phase, b) proposal submission phase, c) review phase, d) access phase, and e) reporting phase. This workflow is described in detail below and shown in Figure 6.

During the call preparation phase, the TNA coordinator collects requirements from the TNA providers regarding the mode(s) of access, units of access, and available facilities for the specific call period. TNA legal documents are also drafted in this period. The collected information is published through the TNA brokering system and available on the dedicated call website.

In the proposal submission phase, users create a scientific proposal that is submitted through an online application. Interaction with the requested facility is advised at this time to discuss the technical and logistical feasibility of the project.

During the evaluation phase, submitted proposals are first subjected to a check that verifies the eligibility of a user and their application, based on admissibility, legal, and ethical criteria. The TNA coordinator is responsible for this check, but the verification may take place through self-assessment by the applicants acknowledging the criteria to which their application must adhere. Subsequently, the feasibility of the proposal is checked based on lo-

doi:10.4401/ag-8768

1. Heterogeneity of our TCS

- Scales, cultures, expectations, needs
- How to target prospective partners (and how to keep them involved)

2. Collaborations

- How to get (and keep) them going
- How to make an impact

3. Sustainable funding

- Continuous vs ad-hoc (competitive) funding
- Opportunities and spin-offs

Thank you!

