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Geertje ter Maat¹, **Richard Wessels**¹, and the the EPOS TCS Multi-scale Laboratories Team*

¹Utrecht University, Earth Science, Netherlands (geertjetermaat@gmail.com)

*A full list of authors appears at the end of the abstract

The Multi-scale Laboratories (MSL) are a network of European laboratories bringing together the scientific fields of analogue modeling, paleomagnetism, rock and melt physics, geochemistry and microscopy. MSL is one of nine Thematic Core Services (TCS) of the European Plate Observing System (EPOS) (<https://www.epos-eu.org/>). The overarching goal of EPOS is to establish a comprehensive multidisciplinary research platform for the Earth sciences in Europe. It aims at facilitating the integrated use of data, models, and facilities, from both existing and new distributed pan-European Research Infrastructures, allowing open access and transparent (re-)use of data.

Laboratory facilities are an integral part of Earth science research. The diversity of methods employed in such infrastructures reflects the multi-scale nature of the Earth system and is essential for understanding its evolution, assessing geo-hazards, and sustainably exploiting geo-resources.

Experimental data from these laboratories provide the backbone for many scientific publications, but are often available only on request from the author, as supplementary information to research articles or in a non-digital form (printed tables, figures), limiting data re-use, re-interpretation and availability. Moreover, the raw data remains often unpublished, inaccessible, and unpreserved for the long term.

The TCS MSL is committed to making Earth science laboratory data Findable, Accessible, Interoperable, and Reusable (FAIR). For this purpose, the TCS MSL encourages the community to share their data via DOI-referenced, citable data publications. To facilitate this and ensure the provision of rich metadata, we offer user-friendly tools, plus the necessary data management expertise, to support all aspects of data publishing for the benefit of individual lab researchers via partner repositories. Data published via TCS MSL are described with the use of sustainable metadata standards enriched with controlled vocabularies used in geosciences. The resulting data publications are also exposed through a designated TCS MSL online portal that brings together DOI-referenced data publications from partner research data repositories (<https://epos-msl.uu.nl/>). As such, successful efforts have already been made to interconnect new data (metadata exchange) with existing databases such as MagIC (paleomagnetic data in Earthref.org) and, in the future, we expect to broaden and improve this practice with other repositories.

the EPOS TCS Multi-scale Laboratories Team: Antonio M. Álvarez-Valero, Universidad de Salamanca, ORCID:0000-0001-9707-0168; Elisabet Beamud, CCiTUB- Geo3BCN CSIC, ORCID: 0000-0003-3158-2966; Philip Benson, University of Portsmouth, ORCID: 0000-0003-2120-3280; Susanne Buijer, RWTH Aachen University, ORCID: 0000-0002-2493-2377; Andrea Caburlotto, OGS, Trieste, ORCID: 0000-0001-7259-6884; Rita Caldeira, LNEG, Portugal, ORCID: 0000-0002-4379-1311; Lluís Casas, Universitat Autònoma de Barcelona, ORCID 0000-0003-0948-8658; Francesca Cifelli, Università Roma Tre, ORCID 0000-0002-6337-8786; Fabio Corbi, IGAG - CNR, ORCID:0000-0003-2662-3065; Elisabetta Del Bello, Istituto Nazionale di Geofisica e Vulcanologia, ORCID:0000-0001-8043-7410; Mark J. Dekkers, Utrecht University, ORCID: 0000-0002-4156-3841; Elena Druguet, Universitat Autònoma de Barcelona, ORCID: 0000-0001-5907-7721; Martyn Drury, Utrecht University, ORCID: 0000-0002-2246-2009; Kirsten Elger, GFZ German Research Centre for Geosciences, Potsdam, Germany, ORCID 0000-0001-5140-8602; Jan Oliver Eisermann, Universität Hamburg, ORCID: 0000-0002-3350-0445; Ismael Himar Falcon-Suarez, National Oceanography Centre, ORCID: 0000-0001-8576-5165; Jose-Luis Fernandez-Turiel, CSIC, GEO3BCN, Barcelona, ORCID: 0000-0002-4383-799X; Oriol Ferrer, Geomodels Research Institute, Facultat de Ciències de la Terra, Universitat de Barcelona, ORCID: 0000-0001-5545-9992; Francesca Funicello, Uni. Roma TRE, ORCID: 0000-0001-7900-8272; Carlos J. Garrido, CSIC, IACT, Granada, ORCID: 0000-0003-4357-3637; Alexandra Guedes, FCUP, ORCID: 0000-0001-6397-3713; Benjamin Guillaume, Université de Rennes 1, ORCID: 0000-0002-4260-3155; Catherine Kissel, LSCE (CEA, CNRS, UVSQ), ORCID: 0000-0002-2572-2742; France Lagroix, Université de Paris, IPGP, CNRS, 0000-0003-2873-2767; Otto Lange, Utrecht University, ORCID: 0000-0003-3560-988X; Giacomo Mastella, Uni. Roma TRE, ORCID: 0000-0002-9052-4873 Nicolás Molnar, RWTH Aachen University, ORCID: 0000-0003-2065-7184; Lucia Pappalardo, INGV-NA, ORCID: 0000-0002-9187-252X; Ronald Pijenburg, Utrecht University, ORCID: 0000-0003-0653-7565; Marta Rejas, CSIC, GEO3BCN, Barcelona, ORCID: 0000-0003-2356-0927; Ulrich Riller, Universität Hamburg, ORCID: 000-0002-3803-6792; Teresa Román Berdiel, Universidad de Zaragoza, ORCID: 0000-0002-9743-8695; Matthias Rosenau, GFZ Potsdam, Germany, ORCID: 0000-0003-1134-5381; Piergiorgio Scarlato, Istituto Nazionale di Geofisica e Vulcanologia, ORCID: 0000-0003-1933-0192; Guido Schreurs, University of Bern, ORCID: 0000-0002-4544-7514; Albert Soler i Gil, Facultat de Ciències de la Terra, Universitat de Barcelona (UB), Spain, ORCID: 0000-0003-3140-182X; Pauline Souloumiac, CY Cergy Paris Université, ORCID: 0000-0002-5370-0954; Juan José Villalain, Universidad de Burgos, ORCID: 0000-0001-9948-0953; Richard Wessels, Utrecht University, ORCID: 0000-0003-0714-8705; Ernst Willingshofer, Utrecht University, ORCID: 0000-0002-9119-5557; Aldo Winkler, INGV, Rome, ORCID: 0000-0002-0653-0059; Alberto Zanetti, IGG-CNR, ORCID: 0000-0001-9026-1519; Alba Zappone, Department of Earth Sciences, ETH Zurich, ORCID: 0000-0003-0965-7271; Frank Zwaan, University of Bern, ORCID: 0000-0001-8226-2132