



National Research Data Infrastructure Consortium Earth Systems Sciences

<https://nfdi4earth.de>

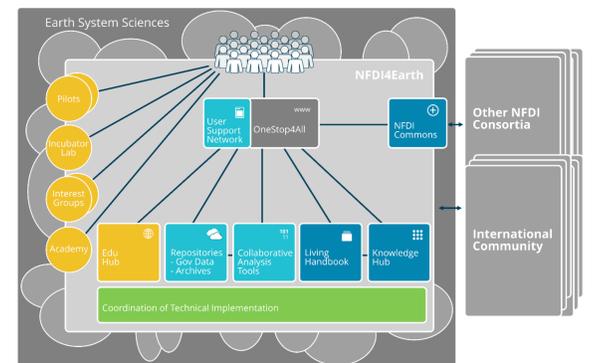
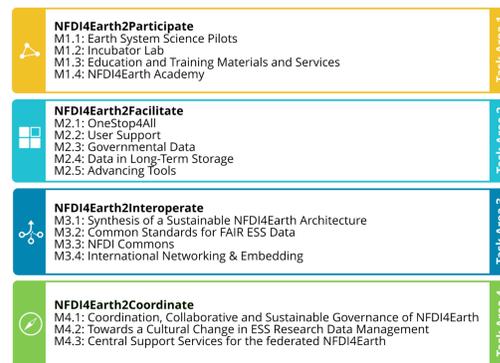
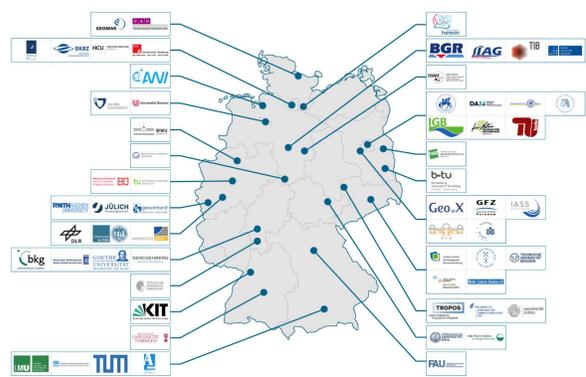


NFDI4Earth addresses digital needs of Earth System Sciences. Earth System scientists cooperate in international and interdisciplinary networks with the overarching aim to understand the functioning and interactions within the Earth system and address the multiple challenges of global change. NFDI4Earth is a community-driven process providing researchers with FAIR, coherent, and open access to all relevant Earth System data, to innovative research data management and data science methods.

NFDI4Earth will provide in five years' time an environment for simple, efficient, and – whenever possible – open access to ES data, RDM support, data integration and data analysis services guided by FAIR principles, hereby supporting the entire research data life cycle. It will thus enable cutting-edge research in ESS and beyond.

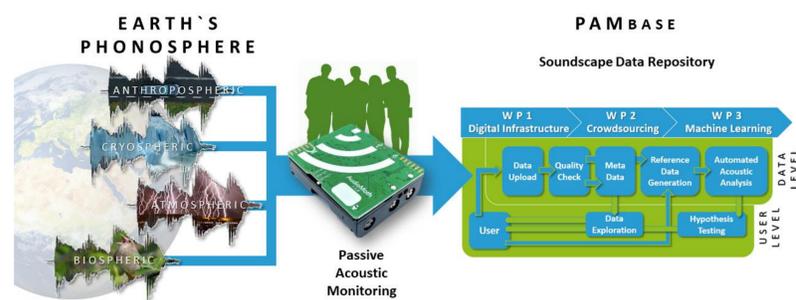
The development of the NFDI4Earth is driven by the researchers' needs and requirements for research data management according to the FAIR principles. NFDI4Earth uses Earth System Science pilots to engage the community. These pilots stem from different domains of the ESS community, manifest the researchers' needs and are the community's contribution to an agile development of the NFDI4Earth.

The Faculty of Environmental Sciences is involved in several task areas: The Chair of Geoinformatics coordinate the project, in particular the software developments (TA4); the Chair of Computational Landscape Ecology and the Junior Professorship in Environmental Remote Sensing provide pilots on developing a soundscape data repository and on prototyping a seamless model data integration (TA1).



PAMbase: A Soundscape Repository to Study Earth's Phonosphere

The increasing availability of data characterizing acoustic environments (so-called soundscapes) enables the study of a still underexplored information layer in Earth System Sciences, the phonosphere. The phonosphere comprises all the acoustic information emitted on Earth's surface emerging from biological, hydrological, glacial, atmospheric or anthropogenic sources and thus highlights the close interactions among the Earth's spheres.



Since interest in passive acoustic recording across different domains in Earth System Sciences has increased, large amounts of data are being collected.

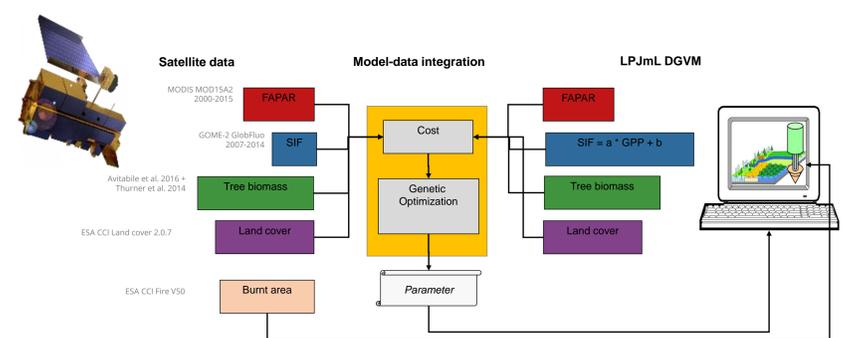
Therefore, we aim at creating a centralized data hub for soundscapes: PAMbase will be the first repository for multi-purpose soundscape recordings, providing the opportunity to work on larger scale research questions that go beyond the capacities of individual projects and research areas. We envision PAMbase to be user-friendly and explorative to the public. It will also allow methodological and technological developments related to:

1. Data labelling for automated audio analysis model development
2. Development of models through the increased availability of labelled data
3. Improving algorithms' accuracy and efficiency over shared benchmark datasets.

PAMbase will specifically pair and advance innovative tools with a high degree of interoperability among disciplines and stakeholders to help researchers explore and study Earth's phonosphere.

NFDI for seamless Earth system model-data integration

Global Earth observation data is invaluable to evaluate, parametrize and further develop Earth system models and its land components, dynamic global vegetation models. However, such an integration of Earth observation data with Earth system models requires the expertise of multiple institutions, and in practical terms often involves converting file formats, copying large datasets between institutions and related computing systems, and manual and time-consuming application of multiple scripts and program code. The objective of the pilot is to identify requirements and to define a generic framework for a seamless integration of Earth observation data with Earth system models.



Specifically, we will outline and develop a prototype for a seamless workflow to apply satellite observations for benchmarking and parametrization of the LPJmL (Lund-Potsdam-Jena managed Land) dynamic global vegetation model as part of the Potsdam Earth Model (POEM). The expected results will enable a comprehensive and continuous use of satellite observations for the development of LPJmL and POEM. Moreover, the developed framework and prototype will guide the development of seamless infrastructures to integrate Earth observations and models in the global biogeochemical, hydrological, ecological, and climate science communities and hence in NFDI4Earth as a whole.