



EnviDat
@SDI-Open 2019

Environmental Data Publication with EnviDat: Open Research Data, Metadata Standards and Open Science

Presenter: Ionuț Iosifescu Enescu
Technical Coordinator EnviDat@WSL

EnviDat Team: Gian-Kasper Plattner, Konrad Steffen, Dominik
Haas-Artho and Lucia Espona Pernas

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EnviDat
@SDI-Open 2019

Open Environmental Research Data

WSL: Research for People and Environment

<https://www.wsl.ch/en.html>



Swiss Federal Institute
for Forest, Snow and
Landscape Research WSL

Forest

Landscape

Biodiversity

Natural hazards

Snow and Ice

Projects

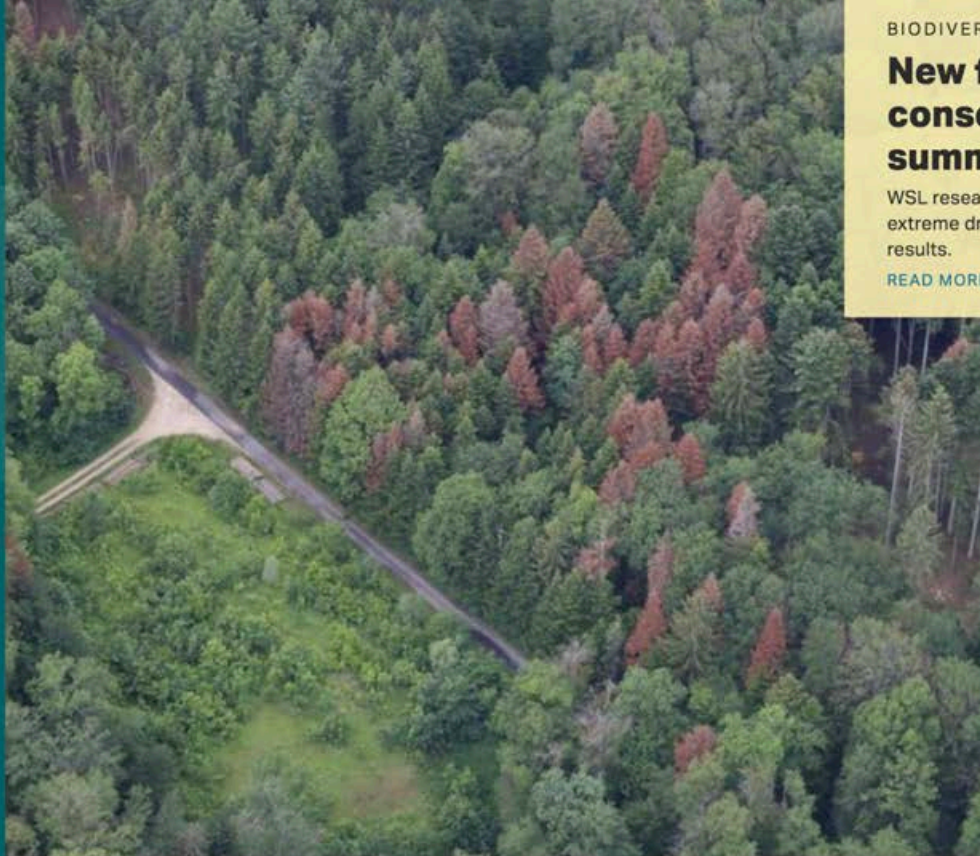
Publications

Services and products

About WSL



Search



BIODIVERSITY, FOREST

10.07.2019

New findings on the consequences of the dry summer of 2018

WSL researchers have investigated the consequences of the extreme drought in 2018 on forests. Now they present the first results.

[READ MORE](#)

FOREST, BIODIVERSITY

20.06.2019

Silver fir genome decoded: A tree for the future

NATURAL HAZARDS

14.06.2019

The world's largest debris-flow force plate is back

NATURAL HAZARDS

28.05.2019

Learning from extreme events

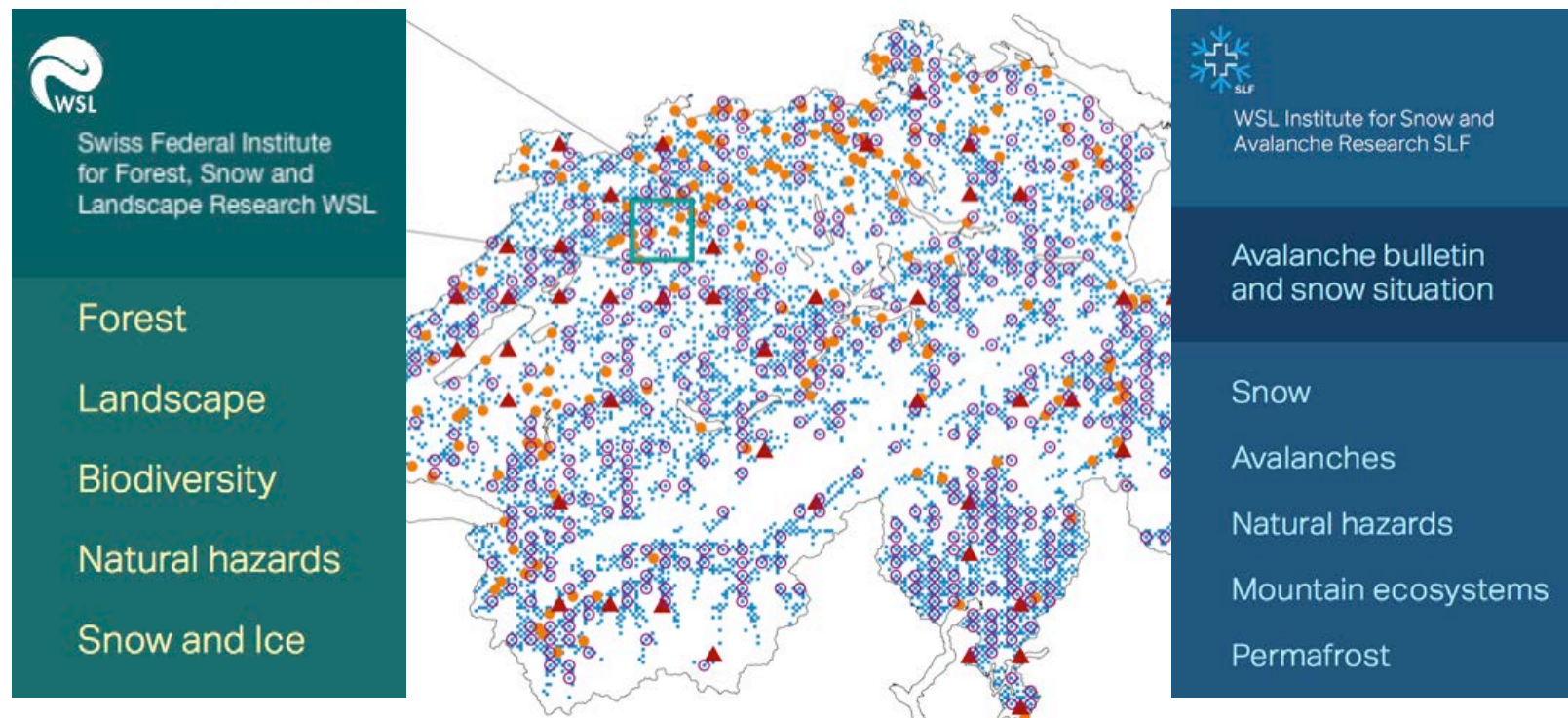
Research for people and environment

Image courtesy of www.wsl.ch



WSL's Environmental Data Treasure

- ❖ **Wide range of research areas:** forests, terrestrial ecosystems, biodiversity, landscapes, natural hazards, snow and ice
- ❖ **From long-term measurements to large-scale monitoring;** some data sets covering over 100 years



(Map source: Rigling & Schaffer 2015: Swiss Forest Report 2015)

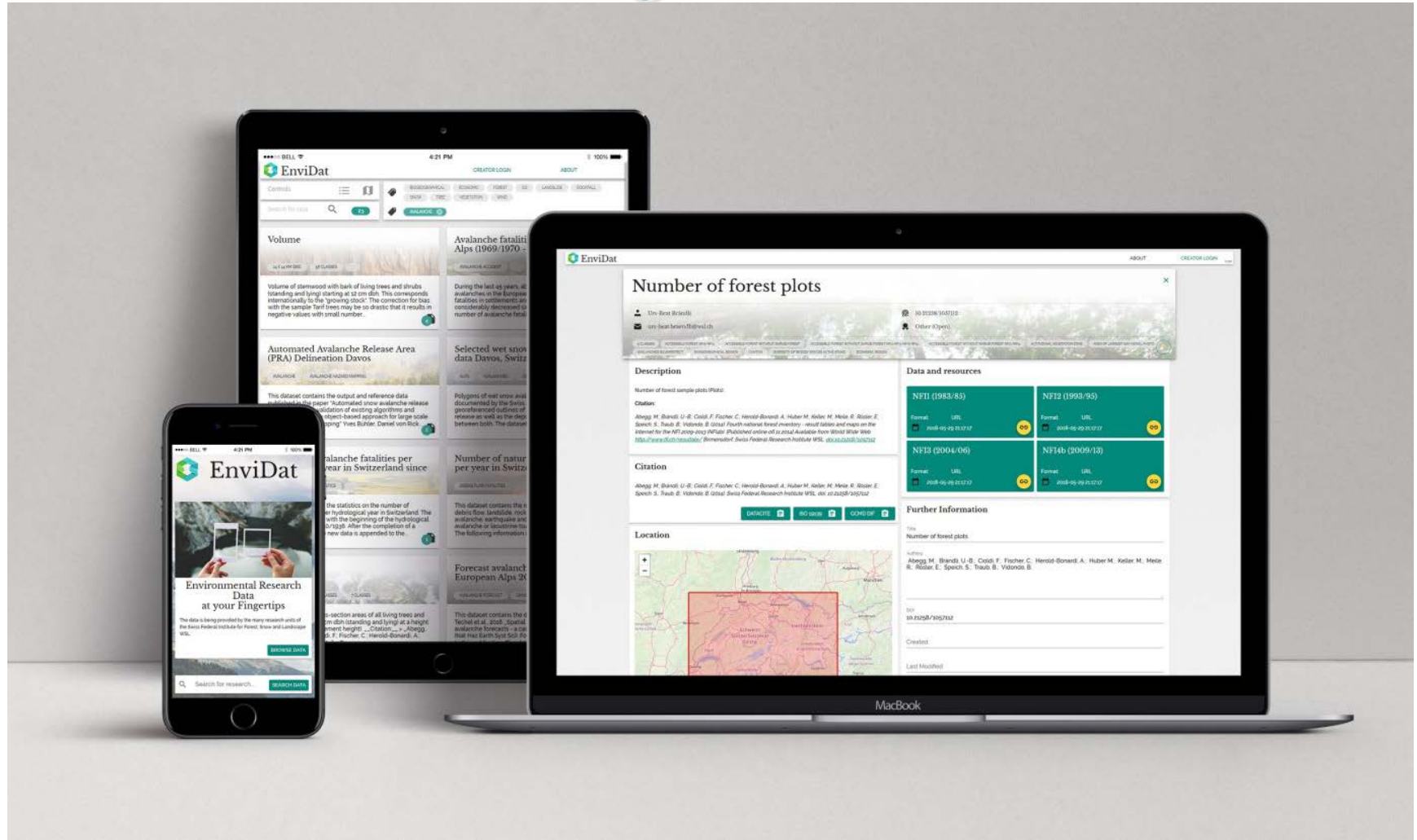
Swiss Federal Institute for Forest, Snow and Landscape Research WSL

Making Research Data Accessible


*WSL acknowledges the **responsibility** to make **research data accessible**. WSL is committed to **ensure long-term availability** of our research data.*

- ❖ **Making data*, methods and code available!** (* with the exception of sensitive data protected by law, e.g. endangered species' locations or National Forest Inventory sample locations)
- ❖ Ongoing cultural evolution in research towards
 - ❖ Openness
 - ❖ Shared data and
 - ❖ Opportunities for distant collaboration
- ❖ Irreproducibility crisis (Baker, 2016; open reuse of this Nature article figures prohibited, please refer to www.nature.com)


EnviDat is a Repository for Environmental Research Data Management and Publication





Research Data Publication with Metadata/DOI


CREATOR LOGIN


G-TREE: Global Treeline Range Expansion Experiment Davos, Switzerland



 Esther R. Frei

 esther.frei@wsl.ch

 10.16904/envidat.42

 Open Data Commons Open Database License (ODbL)

CLIMATE CHANGEFORESTTREELINE






Description

G-TREE is a global research network composed of 40 arctic and alpine researchers from around the world. This summer, our field experiment will be established at numerous sites across Canada, France, Norway, Spain, the United States, and Venezuela. Other sites are being developed in Russia, Scotland, and Sweden.

The Stillberg research area is located in the Eastern Swiss Alps near Davos, Switzerland. The site has been used for several long-term monitoring as well as experimental studies for the last four decades. Our G-TREE experiment consists of a lowest site located in a subalpine Larch-Spruce forest (Larici-Picetum) dominated by *Larix decidua* and *Picea abies* (1930 m a.s.l.), a transition zone site dominated by alpine shrubs (2100 m a.s.l.), and an uppermost site in an alpine meadow with some dwarf shrubs (2390 m a.s.l.).

Citation


Esther R. Frei; Peter Bebi; Melissa A. Dawes; Christian Rixen (2018). G-TREE: Global Treeline Range Expansion Experiment Davos, Switzerland. WSL Institute for Snow and Avalanche Research SLF. doi: 10.16904/envidat.42.

 DATA CITE ISO 19139 GCMD DIF BIBTEX RIS

Location

Data and resources

climate data G-TREE experiment, Davos, Switzerland

 ZIP
126 Bytes
2016-11-15 17:02:54
2018-07-18 12:00:00

GTREE Website

2016-11-15 17:03:24

Further Information

Title
G-TREE: Global Treeline Range Expansion Experiment Davos, Switzerland

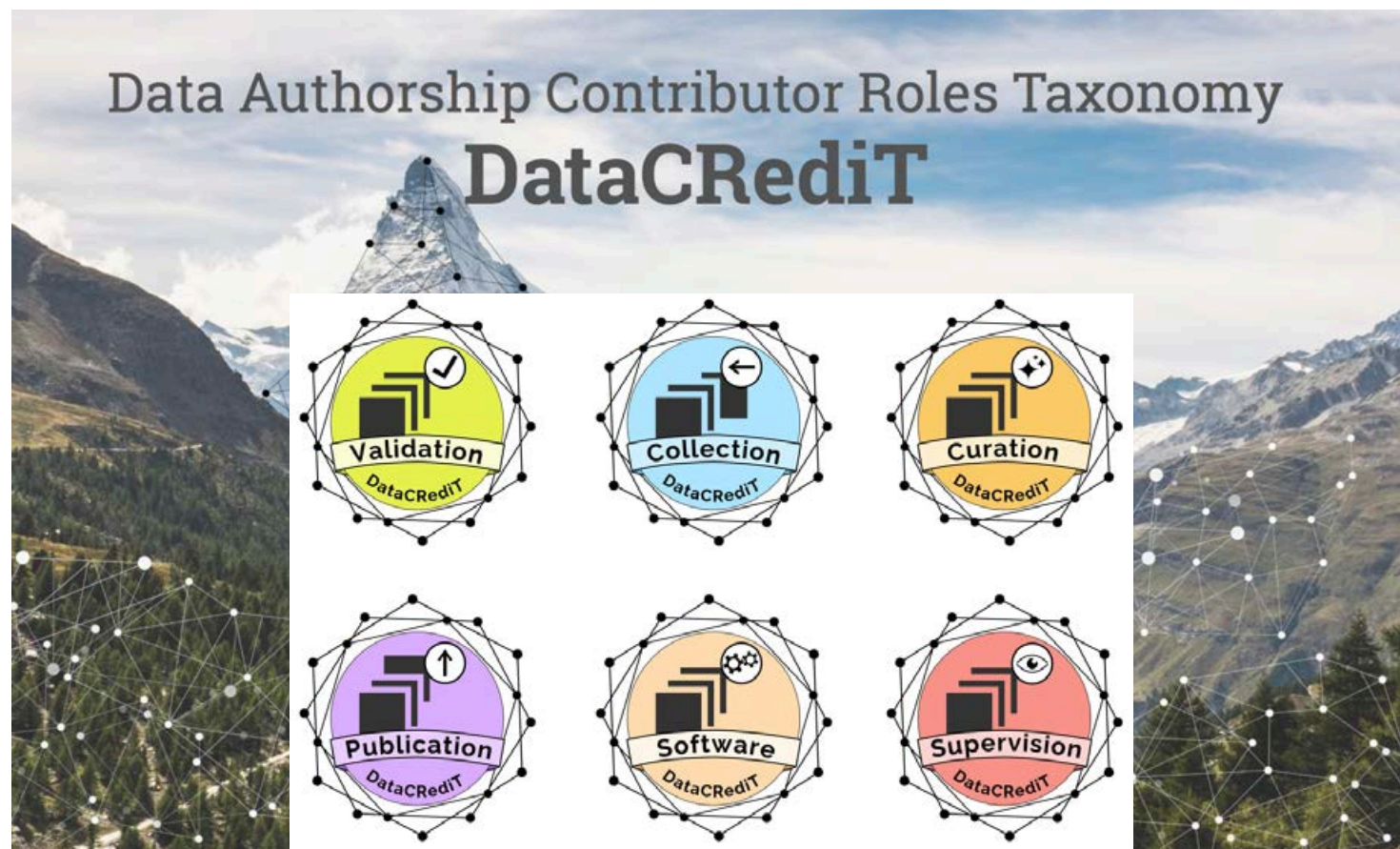
Authors
Esther R. Frei; Peter Bebi; Melissa A. Dawes; Christian Rixen

DOI
10.16904/envidat.42

doi:10.16904/envidat.42

PrefixPostfix

Giving Credit where Credit is Due!





EnviDat
@SDI-Open 2019

Metadata Standards (in Environmental Data Publication)

Research Data Publication with Metadata/DOI

CREATOR LOGIN

G-TREE: Global Treeline Range Expansion Experiment Davos, Switzerland



 Esther R. Frei

 Peter Bebi

 Melissa A. Dawes

 Christian Rixen

 Esther R. Frei

 esther.frei@wsl.ch

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 Open Data Commons Open Database License (ODbL)

CLIMATE CHANGE

FOREST

TREELINE

Description

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climate data G-TREE experiment, Davos, Switzerland

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 2016-11-15 17:03:24



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 DATA CITE

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 GCMD DIF

 BIBTEX

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Further Information

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Authors

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DOI

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doi:10.16904/envidat.42

Prefix

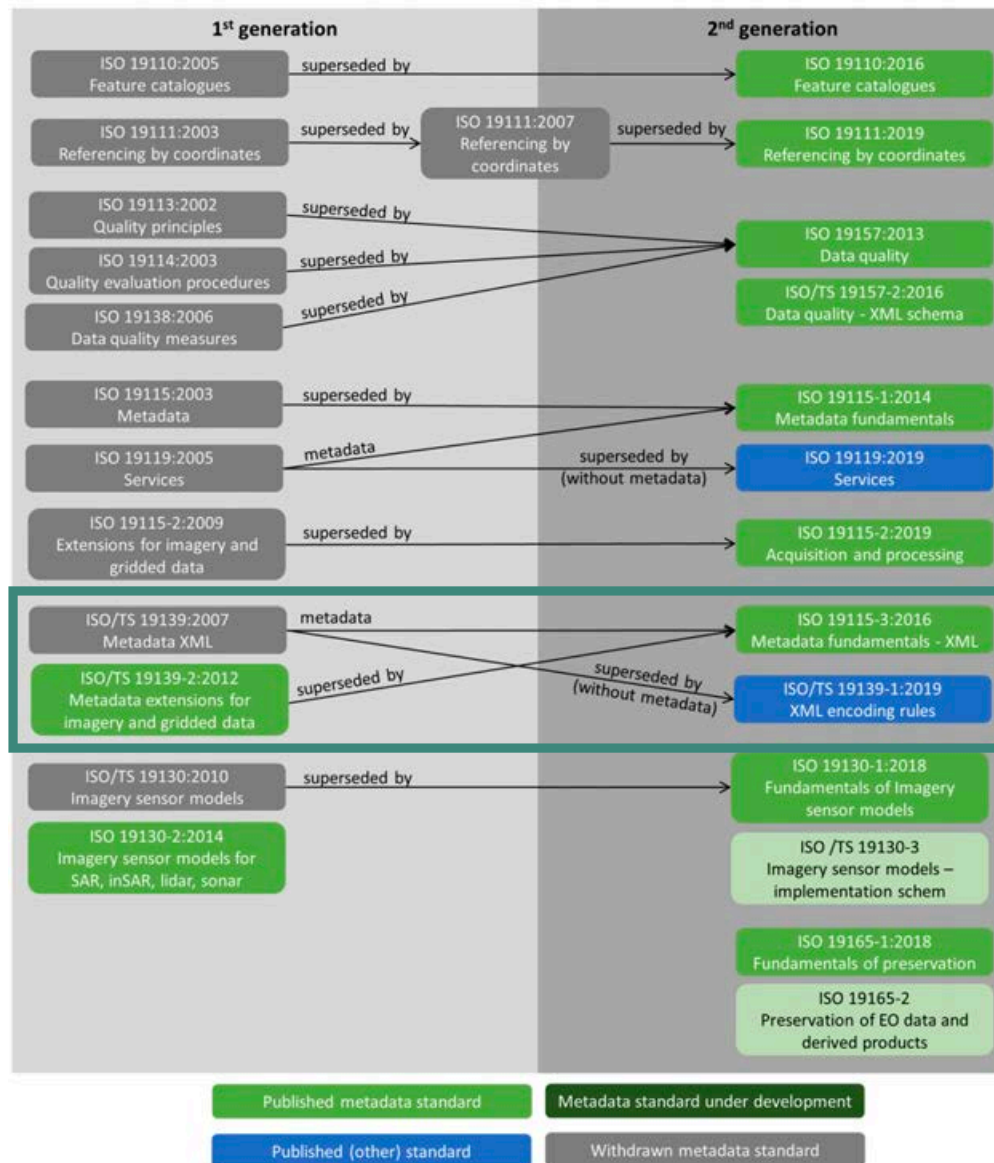
Postfix

DataCite Standard

Mandatory	Recommended	Optional
Identifier	Subject	Language
Creator	Contributor	Alternate ID
Title	Date	Size
Publisher	Resource Type	Format
Publication year	Related identifier	Version
	Description	Rights
	GeoLocation	

Image courtesy of <https://project-thor.readme.io/>

Vs. ISO/TC 211 Metadata Standards



Source: Brodeur J., Coetzee S., Danko D., Garcia S., Hjeltnager J. (2019). **Geographic Information Metadata—An Outlook from the International Standardization Perspective**

ISPRS Int. J. Geo-Inf. 2019, 8(6), 280;
<https://doi.org/10.3390/ijgi8060280>

+ Antagonistic Data Providers' Requirements

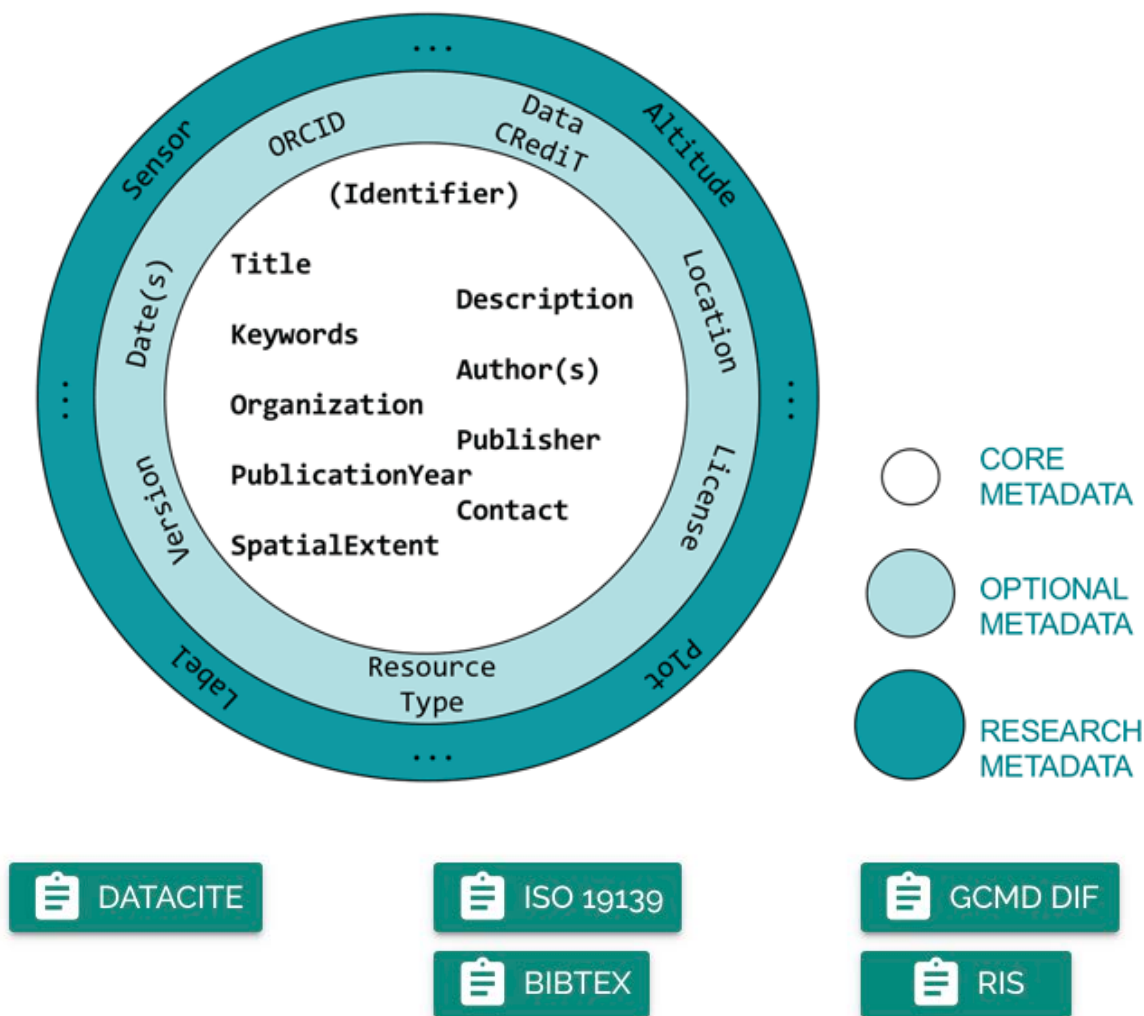
I want to write as little metadata as possible!

I want you to support additional metadata fields!



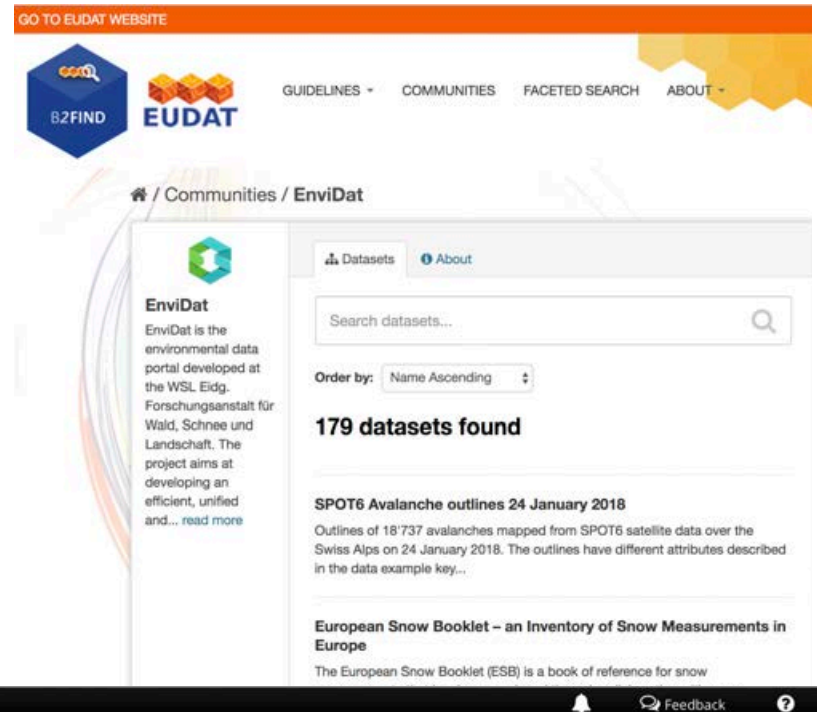
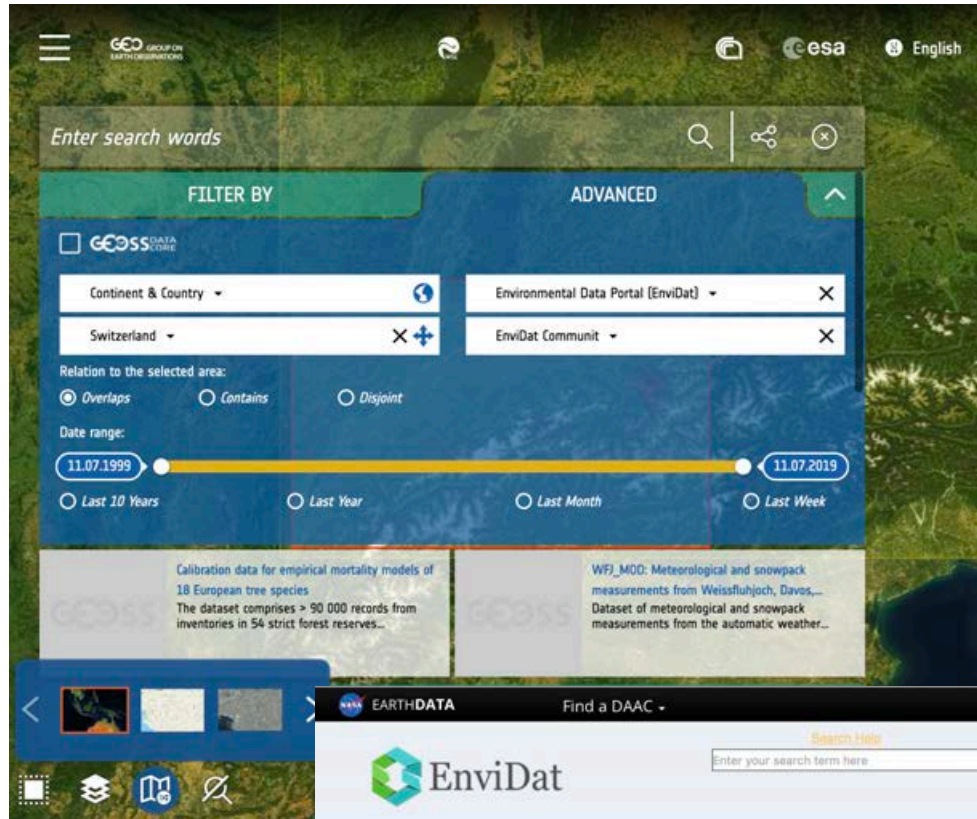
Image courtesy of:
<https://www.pexels.com/@co-sch-48159>

Solution: Flexible Metadata Schema Model

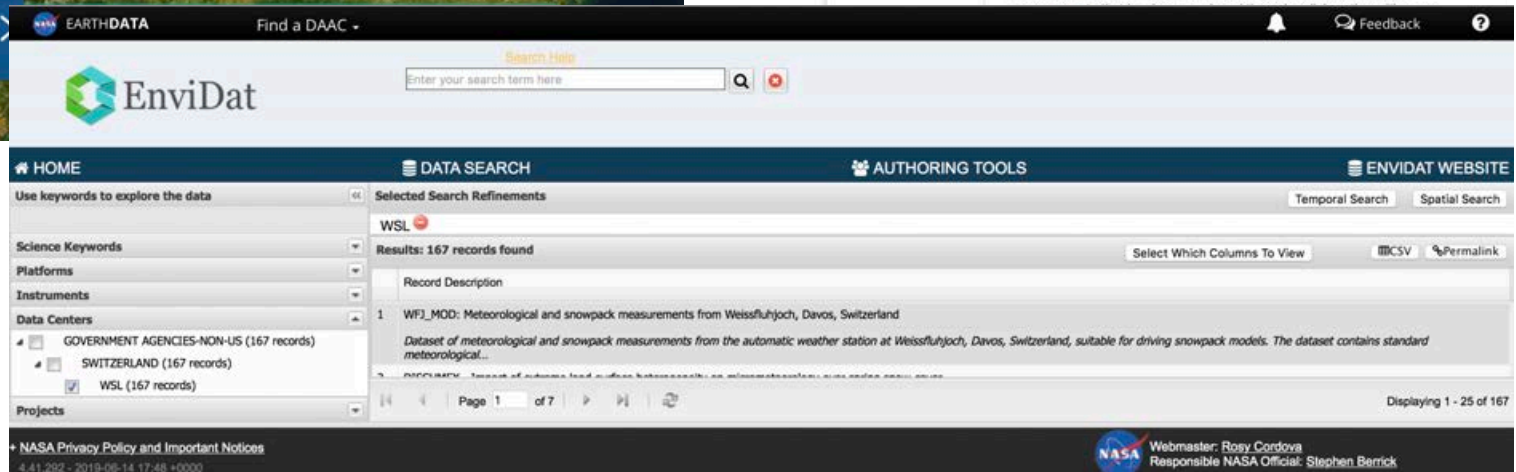


Source: Iosifescu Enescu, I., Plattner, G. K., Pernas, L. E., Haas-Artho, D., Bischof, S., Lehning, M., & Steffen, K. (2018). The EnviDat concept for an institutional environmental data portal. *Data Science Journal*, 17, 28 (17 pp.). <https://doi.org/10.5334/dsj-2018-028>

For Flexible Metadata Standard Support



Images courtesy of the corresponding portals and organizations



More Information



Iosifescu Enescu, I. et al. 2018. The EnviDat Concept for an Institutional Environmental Data Portal. *Data Science Journal*, 17: 28, pp. 1–17. DOI: <https://doi.org/10.5334/dsj-2018-028>

RESEARCH PAPER

The EnviDat Concept for an Institutional Environmental Data Portal

Ionuț Iosifescu Enescu¹, Gian-Kasper Plattner¹, Lucia Espona Pernas¹, Dominik Haas-Artho¹, Sandro Bischof¹, Michael Lehning^{2,3} and Konrad Steffen^{1,3,4}

¹ Swiss Federal Institute for Forest, Snow and Landscape WSL, CH

² WSL Institute for Snow and Avalanche Research SLF, CH

³ School of Architecture, Civil and Environmental Engineering, EPFL, CH

⁴ ETH Zurich, CH

Corresponding author: Ionuț Iosifescu Enescu (ionut.iosifescu@wsl.ch)

EnviDat is the environmental data portal developed by the Swiss Federal Institute for Forest, Snow and Landscape Research WSL. The strategic initiative EnviDat highlights the importance WSL lays on Research Data Management (RDM) at the institutional level and demonstrates the commitment to accessible research data in order to advance environmental science.

EnviDat focuses on registering and publishing environmental data sets and provides unified and efficient access to the WSL's comprehensive reservoir of environmental monitoring and research data. Research data management is organized in a decentralized manner where the responsibility to curate research data remains with the experts and the original data providers.

EnviDat supports data producers and data users in registration, documentation, storage, publication, search and retrieval of a wide range of heterogeneous data sets from the environmental domain. Innovative features include (i) a flexible, three-layer metadata schema, (ii) an additive data discovery model that considers spatial data and (iii) a DataCRediT mechanism designed for specifying data authorship. In addition, the overall user-friendly appearance in EnviDat provides an important opportunity for showcasing WSL research activities and results. The EnviDat portal builds on a conceptual system consisting of a core system, a set of guiding principles and a number of key services. Its development closely follows the conceptual framework, being guided by principles towards the ultimate goal of providing useful services for researchers.

Keywords: EnviDat; Data Portal; Metadata; Environmental Data; Data Sharing; Research Data Management; Environmental Science

Iosifescu Enescu, I. et al. 2018. The EnviDat Concept for an Institutional Environmental Data Portal. *Data Science Journal*, 17: 28, pp. 1–17. DOI: <https://doi.org/10.5334/dsj-2018-028>

www.envidat.ch



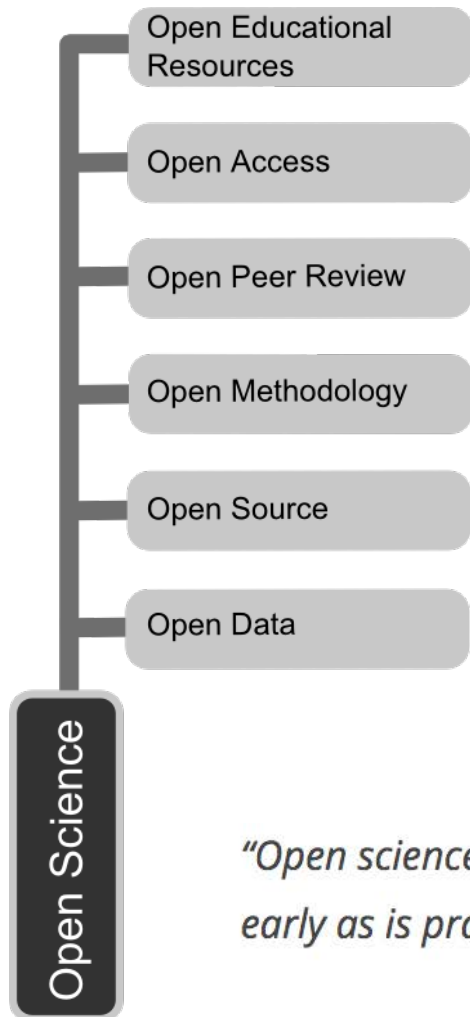
envidat@wsl.ch



EnviDat
@SDI-Open 2019

Open Science (an EnviDat Point of View)

Open Science @ WSL



➤ Universities, Massive Online Open Courses

➤ Open Access Journals, Lib4RI / DORA

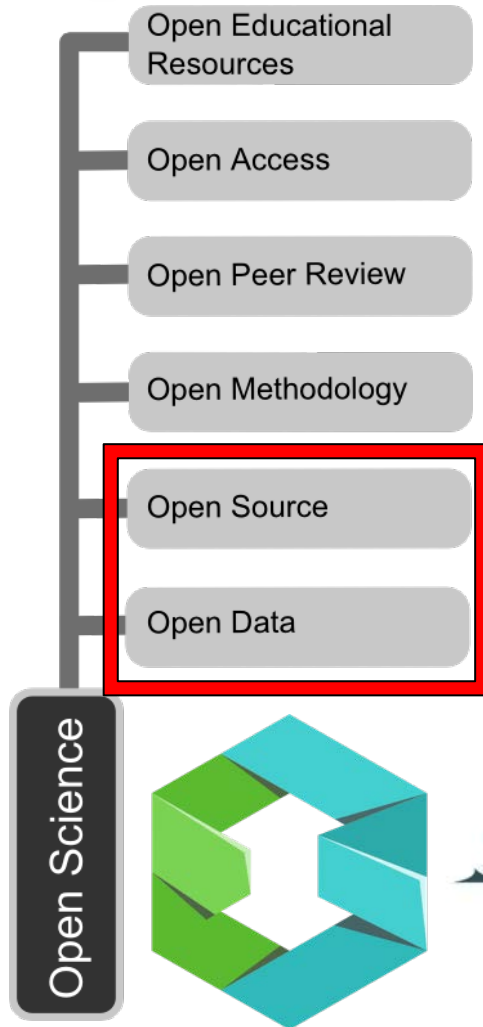
➤ EnviDat & WSL IT



"Open science is the idea that scientific knowledge of all kinds should be openly shared as early as is practical in the discovery process." [Michael Nielsen](#)


Open Science image courtesy of [Andreas E. Neuhold](#)

Specific to Academic Research Publication: Open Science Easier with FOSS4G









Logos courtesy of the corresponding softwares and organizations

Software Publication with Metadata/DOI

 CREATOR LOGIN

Seilaplan

 Leo Gallus Bont  Patricia Edith Moll

 Leo Gallus Bont  leo.bont@wsl.ch  10.16904/envidat.software.1  Other (






CABLE PLANNING CABLE YARDING CATENARY LOAD PATH PYTHON QGIS SOFTWARE STEEP TERRAIN HARVESTING

Description

Cable-based technologies have been a backbone for harvesting on steep slopes. The layout of a single cable road is challenging because one must identify intermediate support locations and heights that guarantee structural safety and operational efficiency while minimizing set-up and dismantling costs. Seilaplan optimizes the layout of a cable road by Seilaplan stands for Cable Road Layout Planner. Seilaplan is able to calculate the optimal rope line layout (position and height of the supports) between defined start and end coordinates on the basis of a digital elevation model (DEM). The program is designed for Central European conditions and is designed on the basis of a fixed suspension rope anchored at both ends. For the calculation of the properties of the load path curve an iterative method is used, which was described by Zweifel (1960) and was developed especially for standing skylines. When testing the feasibility of the cable line, care is taken that 1) the maximum permissible...

Citation





Leo Gallus Bont; Patricia Edith Moll (2018). Seilaplan. EnviDat. doi: 10.16904/envidat.software.1

 DATACITE  ISO 19139  GCMD DIF  BIBTEX  RIS

Location

Data and resources

Seilaplan QGIS Plugin v2.0

Format: .zip
 9.71 MB
 2018-11-22 12:18:30
 2018-11-22 12:18:30 

Further Information

Title
Seilaplan

Authors
Leo Gallus Bont; Patricia Edith Moll

DOI
10.16904/envidat.software.1

Data + Code + Documentation (Together)

The screenshot shows the EnviDat project page. The title is "Sample Geodata and Software for Demonstrating Geospatial Preprocessing for Forest Accessibility and Wood Harvesting at FOSS4G2019". The creators are Leo Gallus Bont, Marielle Fraefel, and Ionut Iosifescu Enescu. The project is licensed under the Open Data Commons Open Database License (ODbL). The page is divided into several sections: Description, Citation, Location, and Data and resources. The Description section provides a detailed overview of the dataset, which includes open vector data for railways, forests, and power lines, as well as an open digital elevation model (DEM) for a small area around a sample forest range in Europe (Germany, Upper Bavaria, Kochel Forest Range, some 70 km south of München, at the edge of Bavarian Alps). The Citation section provides the citation information: Leo Gallus Bont, Marielle Fraefel, Ionut Iosifescu Enescu (2019). EnviDat. doi: 10.5120/evnvidat.75. The Location section shows a map of the sample forest range. The Data and resources section lists the following data and resources: Forest vector data (for sample forest range), Railways vector data (close to the sample forest range), DEM (for the area of the sample forest range), Power lines vector data (close to the area of the sample forest range), Digitised sample perimeter, Jupyter Notebook for Data Preparation, and Jupyter Notebook for Data Preparation (online). Each resource is listed with its format, size, and download link.

Description

This dataset contains open vector data for railways, forests and power lines, as well as an open digital elevation model (DEM) for a small area around a sample forest range in Europe (Germany, Upper Bavaria, Kochel Forest Range, some 70 km south of München, at the edge of Bavarian Alps). The purpose of this dataset is to provide a documented sample dataset in order to demonstrate geospatial preprocessing at FOSS4G2019 based on open data and software. This sample has been produced based on several existing open data sources (detailed below), therefore documenting the sources for obtaining some data needed for computations related to forest accessibility and wood harvesting. For example, they can be used with the open methodology and QGIS plugin [Scalable](#) for optimising the geometric layout cable roads or with additional open software for computing the forest accessibility for wood harvesting. The vector data (railways, forests and power lines).

Citation

Leo Gallus Bont, Marielle Fraefel, Ionut Iosifescu Enescu (2019). EnviDat. doi: 10.5120/evnvidat.75.

Location

Data and resources

Resource	Format	Size	Download Link
Forest vector data (for sample forest range)	SHP	281.55 KB	Download
Railways vector data (close to the sample forest range)	SHP	49.89 KB	Download
DEM (for the area of the sample forest range)	geotiff	1.62 MB	Download
Power lines vector data (close to the area of the sample forest range)	SHP	65.34 KB	Download
Digitised sample perimeter	SHP	2.03 KB	Download
Jupyter Notebook for Data Preparation	ipynb	28.03 KB	Download
Jupyter Notebook for Data Preparation (online)	ipynb	28.03 KB	Download



More Details at FOSS4G 2019



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EnviDat
@SDI-Open 2019

Outlook and Conclusions

Following European Open Science Cloud through EOSC-Hub



Image courtesy of EOSC-hub



The two-fold benefit of collaborating with EOSC-hub: the EnviDat story

Ionut Iosifescu Enescu explains why and how EnviDat is collaborating with EOSC-hub and the results achieved so far

How would you describe EnviDat to someone who is not very familiar with it?

EnviDat (envidat.ch) is the environmental data portal of the Swiss Federal Institute for Forest, Snow and Landscape Research WSL (wsl.ch). EnviDat provides a range of services in the area of research data management with particular focus on (1) data publication with provision of metadata and Document Object Identifiers (DOIs), (2) maintenance of an efficient data repository for validated, quality-controlled and properly documented, thus reusable data sets and (3) supporting and providing options to researchers for sharing the curated data sets. As a repository, EnviDat actively implements the FAIR (Findability, Accessibility, Interoperability and Reusability) principles by ensuring that the published research outputs have licenses that are as open as possible, and as protected as necessary.

Why EnviDat approached EOSC-hub?

EnviDat aims to disseminate its data sets as broadly as possible in order to foster international research cooperation in the field of environmental science and contribute to the ongoing cultural evolution in research towards openness, shared data and opportunities for collaboration. Becoming an EOSC-hub integrated thematic service provider means leveraging on an important platform for making our datasets discoverable.

How is EOSC-hub supporting EnviDat?

The collaboration with EOSC-hub is two-fold:

- Using EOSC-hub services to make the EnviDat records visible for EOSC/EOSC-hub users, thus enabling an easier discovery of valuable environmental data sets that are owned by WSL. Currently 163 EnviDat datasets are already discoverable via B2FIND (bit.ly/2EPjOAU).
- Promoting the EnviDat portal in the EOSC-hub Marketplace and the EOSC Portal to increase our visibility as a portal. Furthermore, we hope that



this step would increase our recognition as a professional institutional repository and portal at Swiss and European levels.

What are your first impressions?

EnviDat is delighted with the professionalism of the EOSC-hub team and the fruitful integration process, especially regarding the technical interoperability. Furthermore, the feedback related to the integration in EOSC Portal, motivated us to start the process for further professionalizing the EnviDat portal on several fronts.

What are the plans for the near future?

We welcome the exchange of know-how and best practices with any members of EOSC-hub community that are interested in our initiative. We are looking at the future developments of EOSC to see how EnviDat can better align to it.

Ionut Iosifescu Enescu is Technical Coordinator of EnviDat at the Swiss Federal Research Institute WSL.
envidat@wsl.ch



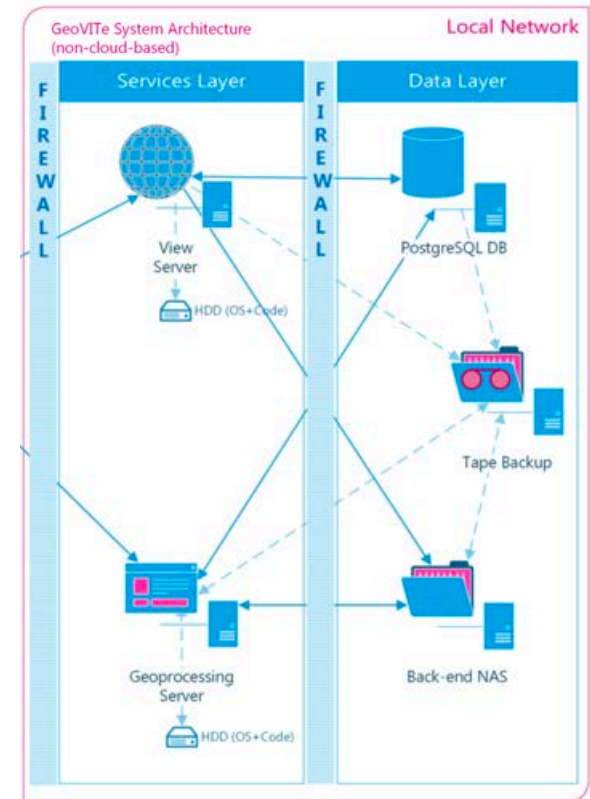
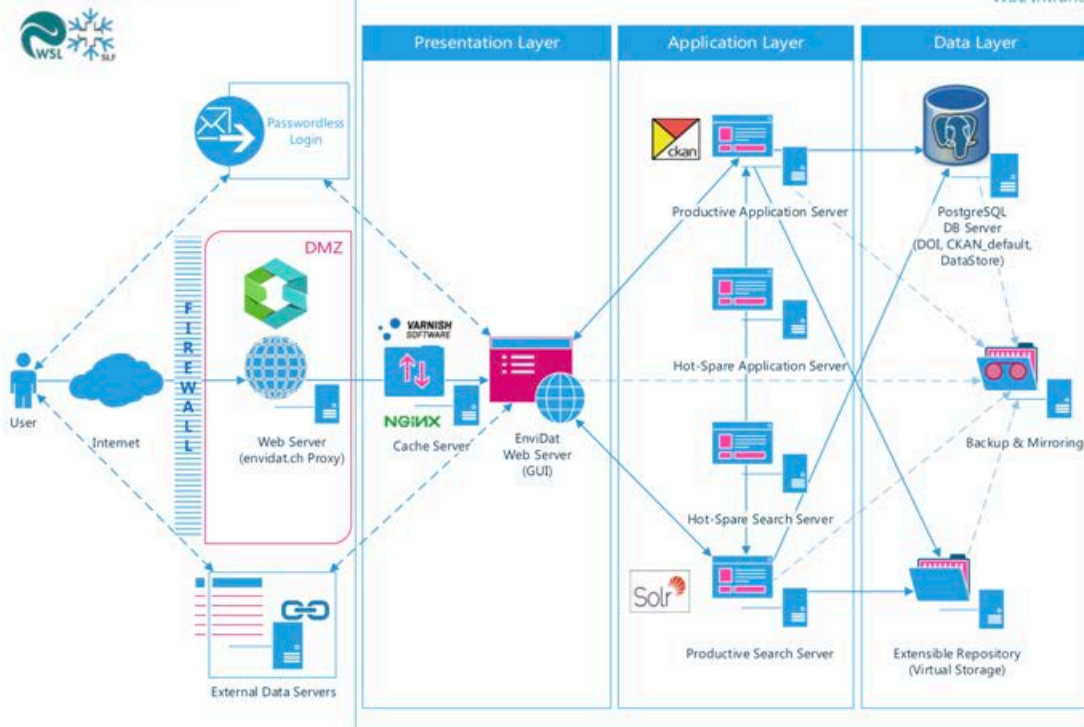
EOSC-hub Magazine Issue 3 // Page 8

Future: Data Repository and SDI Convergence (e.g. EnviDat + the Geoportal of ETH Zurich)

The image displays two web interfaces side-by-side. On the left is the EnviDat portal, featuring a search bar, a category filter (Avalanche, Humidity, Rockfall, etc.), and a list of datasets including 'Rockfall gallery testing Parde 2016', 'Data Broedlin CNP', and 'Precipitation Scaling Data Set'. On the right is the GeoVite portal, showing a map of Zurich (ZH) with various layers and datasets. The 'SELECT DATASETS' section lists 'City of Zurich OGD', 'Historical Maps (experimental)', and 'Siegfried Maps (Vectorized Buildings)'. The 'ACTIVE LAYERS' section shows 'Fountains', 'Indoor Swimming Pools', 'Nursery Schools', 'Roads', 'Railway', 'Siegfried Maps (Vectorized ...)', and 'Statistical Zones'. The map interface includes a search bar, a zoom control, and a 'Pinned' list at the bottom.

Enhancing EnviDat with basic SDI Architecture

EnviDat System Architecture



Sources:

Iosifescu Enescu, I., Plattner, G. K., Pernas, L. E., Haas-Artho, D., Bischof, S., Lehning, M., & Steffen, K. (2018). **The EnviDat concept for an institutional environmental data portal.** *Data Science Journal*, 17, 28 (17 pp.).
<https://doi.org/10.5334/dsj-2018-028>

Iosifescu Enescu, I., Matthys, C., Gkonos, C., Iosifescu-Enescu, C.M., Hurni, L. (2017). **Cloud-Based Architectures for Auto-Scalable Web Geoportals towards the Cloudification of the GeoVITe Swiss Academic Geoportal.** *ISPRS Int. J. Geo-Inf.* 6(7), 192.
<https://doi.org/10.3390/ijgi6070192>

Questions are Welcome!

