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PRESS RELEASE

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University of
Zurich ^{UZH}



Four scientific institutions will monitor Switzerland from space

UNEP/GRID-Geneva, the universities of Geneva and Zurich and the Swiss Federal Institute for Forest, Snow and Landscape Research join forces for the continuous monitoring of Switzerland from space using the Swiss Data Cube.

The Swiss Data Cube (SDC) is an innovative technology that gathers all available satellite images from the American Landsat program and the European Sentinel 1 and 2. UNEP/GRID-Geneva, the University of Geneva (UNIGE), the University of Zurich (UZH) and the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) have entered a new cooperation agreement to foster the use of Earth Observation data for environmental monitoring at national scale.

The increasing population, urbanization and development of infrastructure in Switzerland generate pressure on natural resources and biodiversity. This pressure will be intensified by the impact of climate change. Given its small and densely populated territory, Switzerland needs to achieve the best possible land management which requires continuous monitoring to assess priorities, compliance to policies and progress. “The SDC will deliver a unique and near real-time capability to track various environmental changes: climate, vegetation, water quality, urbanization, cropland, natural habitats. It will enable more effective responses to problems of national significance,” says Gregory Giuliani, Head of Digital Earth Unit and Swiss Data Cube project leader at GRID-Geneva, UNIGE Institute of Environmental Science (ISE). It will provide ready-for-use information as evidence for developing policy advices, land planning and environmental assessments.

Ready for use by non-experts

Since the launch of the first Landsat satellite in 1972, Earth Observation satellites demonstrate their impressive power for monitoring environmental change through space and time. Previously, the access to this information was restricted by the cost of data, computational power, storage, expenses and the complexity of data processing. Nowadays, data from numerous satellites are freely accessible while computational power and storage allows processing big data. “The Swiss Data Cube technology is abolishing the last barrier, i.e. the data processing complexity. It does this by automatizing the image processing of large amount of satellite imagery and brings this data at a level where it is ready for analysis even by non-experts”, explains Michael E. Schaepman, Professor at the UZH Department of Geography.

Switzerland is one of the very few countries in the world to have a national-scale satellite data cube. “The SDC was initially developed by UNEP/GRID-Geneva for the Swiss Federal Office for the Environment (FOEN) and supported by the cloud computer infrastructure from the University of Geneva” recalls Pascal Peduzzi, Director of the UNEP/GRID-Geneva, United Nations Environment Programme and Professor



Cloud-free mosaic of Switzerland in 2018 seen by the Sentinel-2 satellite.

High resolution pictures

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at the Dep. F.A. Forel for environmental and aquatic sciences, UNIGE Faculty of Science. Now the SDC can rely on two additional partners: the University of Zurich (UZH) through its Remote Sensing Laboratories and the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL). Each partner is bringing its own scientific knowledge and staff. Working together, these four institutions will pull from their mutual expertise on Earth Observation to bring the Swiss Data Cube to an operational level.

10'000 images and a daily update

This data cube is highly enhancing the way users can interact with this data. All the complexity of the calibration and corrections is automatically computerized, thus minimizing the time and scientific knowledge required for dealing with satellite imagery. Based on an analytical cloud-computing platform, the SDC is an innovating technology allowing users the access and visualization as well as the possibility to analyze satellite images from Landsat, Sentinel 1 and Sentinel 2 data from 1984 to now. Images from satellite sensors covers all Switzerland at 10 to 30 meters spatial resolution and twice per week. "The SDC currently includes more than 10'000 images and is updated daily. I expect that it might help the Swiss Confederation, cantons and municipalities to practice environmental monitoring and standalone reporting" says Charlotte Steinmeier from the Swiss Federal Research Institute WSL. It will also allow scientific institutions to fully benefit from Earth Observation data for research and innovation.

A cooperation with immediate results

This new agreement, reinforce Switzerland's position as one of the leading countries on this Data cube technology. It is expected to foster collaborations, incubate new ideas and projects, innovate and promote this expertise at national and international levels. This cooperation is already bringing immediate results. For example, UZH provides the entire Sentinel-1 radar data for Switzerland, adding more than 4 years of radar data into the SDC, making it one of the few Earth Observation Data Cube in the world to include Landsat, Sentinel 1 and Sentinel 2 data. It also brings new algorithms developed by WSL, for instance on drought monitoring.

The SDC is contributing to the national "Digital Switzerland" strategy by supporting innovation; monitoring the progresses made following government's decisions; improving management of natural resources; stimulating research; supporting the decision processes and improving data access and use to generate new products and services.

About the University of Geneva

The University of Geneva (UNIGE) enjoys worldwide recognition and ranks amongst the top 100 best universities in the world. Founded in 1559 by Jean Calvin and Theodore de Beze, it welcomes more than 17 000 students in its nine faculties and fourteen interdisciplinary centres and constantly strengthens its links with the International and Non-Governmental Organisations based in Geneva, one of the world's capitals for multilateralism. A member of the League of European Research-intensive Universities, the UNIGE fulfills three missions: education, research and knowledge-sharing. www.unige.ch

About UN Environment/GRID-Geneva

UNEP/GRID-Geneva is a partnership between the United Nations Environment Programme (UNEP), the University of Geneva (UNIGE) and the Swiss Federal Office for the Environment (FOEN). Created in 1985 by UNEP, GRID-Geneva is the older GRID centre. With a team of 20 environmental data scientists, GRID-Geneva manages and analyses data to generate information and knowledge in support of environmental decision making processes. GRID-Geneva is a member of the One Global Partnership of environmental information centres <https://unepgrid.ch/>

About the University of Zurich

The University of Zurich (UZH) is a member of the League of European Research Universities and numbers among Europe's most prestigious research institutions. UZH's international standing is reflected in the many renowned academic distinctions conferred upon its members, including twelve Nobel Prizes. As Switzerland's largest university, UZH has a current enrollment of over 25,000 students and offers the most comprehensive academic program in the country. Nearly 5,000 excellent members of staff teach and perform research at one of the University's 130 departments, including 675 professors. UZH also looks back on a rich history, having been founded in 1833 as Europe's first university to be established by a democratic political system. www.uzh.ch

About WSL

The Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) scrutinizes the use, development and protection of natural and urban spaces and focuses on solving problems linked with the responsible use of landscapes and forests and a prudent approach to natural hazards. An international leader in these areas, WSL also provide groundwork for sustainable environmental policies in Switzerland. It maintains over 6000 experimental and research plots, including large experimental stations for studying rock fall or debris flow, study areas for monitoring the effects of climate change on forests and sites damaged by storms or fires. A research institute of the Swiss Confederation it is part of the ETH Domain and employs approximately 500 people <https://www.wsl.ch/en.html>

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