ETH zürich

TreeNet in der Geosciences Roadmap

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Schwerpunkte der Geosciences Roadmap

TreeNet ist im Pillar I integriert

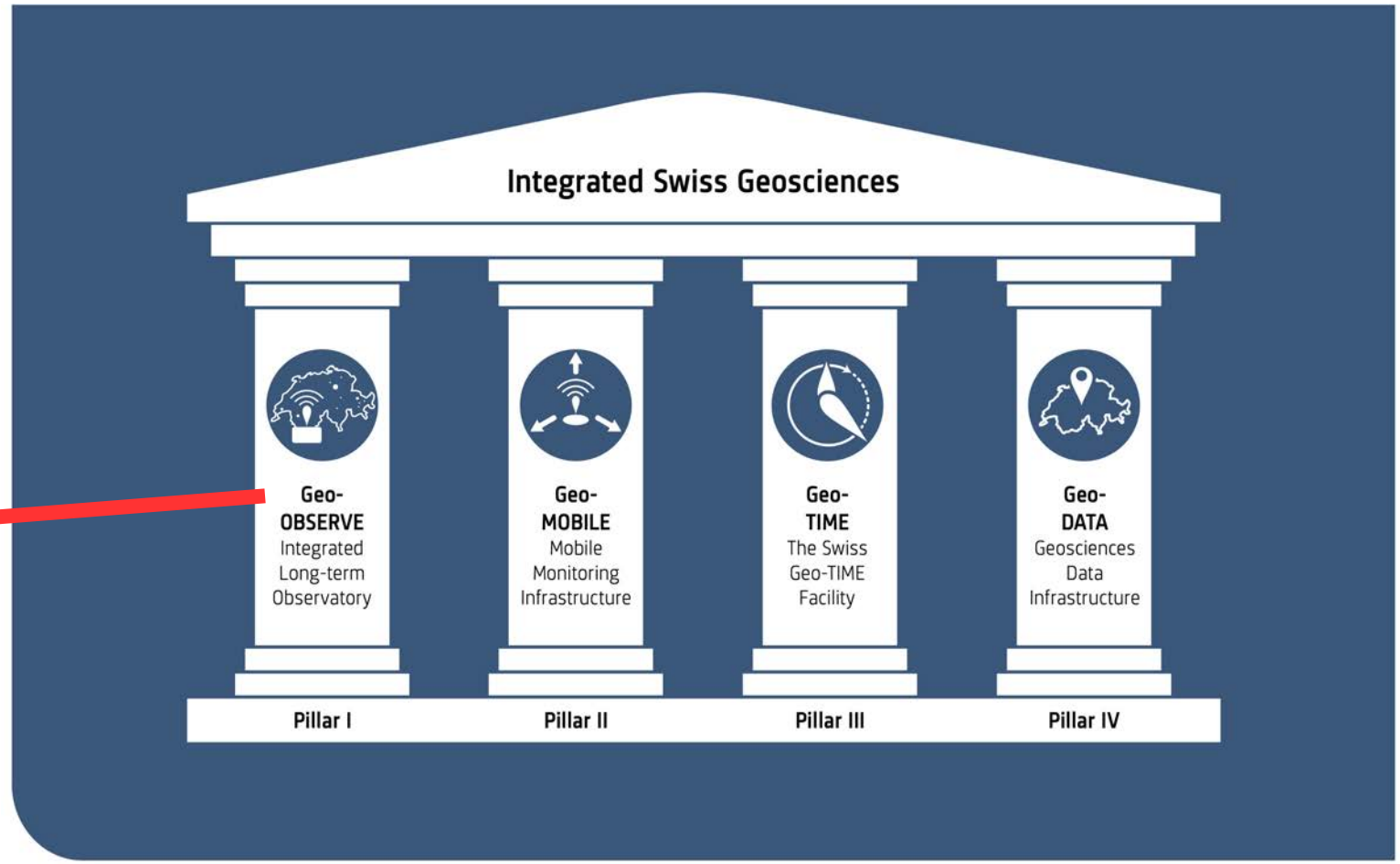


Fig. 1: The 2025–2028 Integrated Swiss Geosciences is built upon 4 thematic pillars that provide the basis for a state-of-the-art multidisciplinary integrated and harmonized geoscientific research environment. Pillar I, Integrated Long-term Observatory (Geo-OBSERVE) integrates the unique longterm observation efforts that make Switzerland one of the most data rich areas on Earth. Pillar II consists of a multi-faceted, Mobile Infrastructure which can be deployed for temporary Monitoring (Geo-MOBILE). Pillar III, Geo-TIME facilities (Geo-TIME) consists of a distributed network of state-of-the-art Swiss facilities to determine timescales and rates of geoscientific events. The final pillar IV, Data Infrastructure for the Geosciences (Geo-DATA) is designed to provide a large-scale open data and analytics facility for linked geodata, as well as storage facility for unique physical samples.

Geo-OBSERVE — Integrated Long-Term Observatory

Finding 1: The existing large research infrastructure (RI) in Switzerland can only partially cover the large spectrum of variables required to understand the diversity and the complexity of processes of the Earth system. This requires the fostering of synergies between different disciplines by applying a multidisciplinary holistic approach across a sufficient set of strategically placed monitoring sites combined with innovative monitoring designs and sensor technologies suitable for long-term observations.

Recommendation 1: It is recommended to establish a complementary and innovative new large infrastructure in the form of an Integrated Long-term Observatory (Geo-OBSERVE) with a sufficient set of well-placed monitoring sites, adaptive monitoring designs, and a powerful network of permanent sensor systems. The Alpine region, being highly relevant not only for Switzerland but also for many other mountainous countries, and a testing lab for climate change and air pollution effects, should play a major role in this Geo-OBSERVE, integrating natural hazards and biogeochemical cycles, including hydrological (H_2O), carbon (C), nutrient (N, P), environmental pollutants, and more.

Finding 2: Processes in geosciences often exhibit small but lasting trends overlain by short-term variability. Thus, research infrastructure for long-term observations is key for identifying and quantifying changes. Swiss geosciences have a long tradition of multi-year observations of unprecedented length and quality. Currently, several national research infrastructures (RIs) are operational with close ties between national and international scientific communities within the European arena.

Recommendation 2: Advanced Swiss RIs that are well connected with their respective international (European) RI network (ICOS, ACTRIS, eLTER, SwissOGS, EPOS, ARES) should receive the required funding and coordination to sustainably contribute at the highest quality level and with the best visibility through the Swiss national roadmap.

TreeNet in der Geosciences Roadmap

BOX 13: TreeNet

TreeNet is the biological drought and growth indicator network that collects continuous and high-resolution data on soil water content and stem radius fluctuations measured with point dendrometers on more than 350 trees at 35 forest sites all over Switzerland. These data are the basis for near-real-time information on tree growth and tree water deficit to better understand the soil-plant-atmosphere system. The water related physiological processes are the result of the dynamic imbalance between water loss (transpiration) and water uptake by the roots. The network is supported by WSL, ETH Zurich and IAP and complements the LWF and SwissFluxNet.

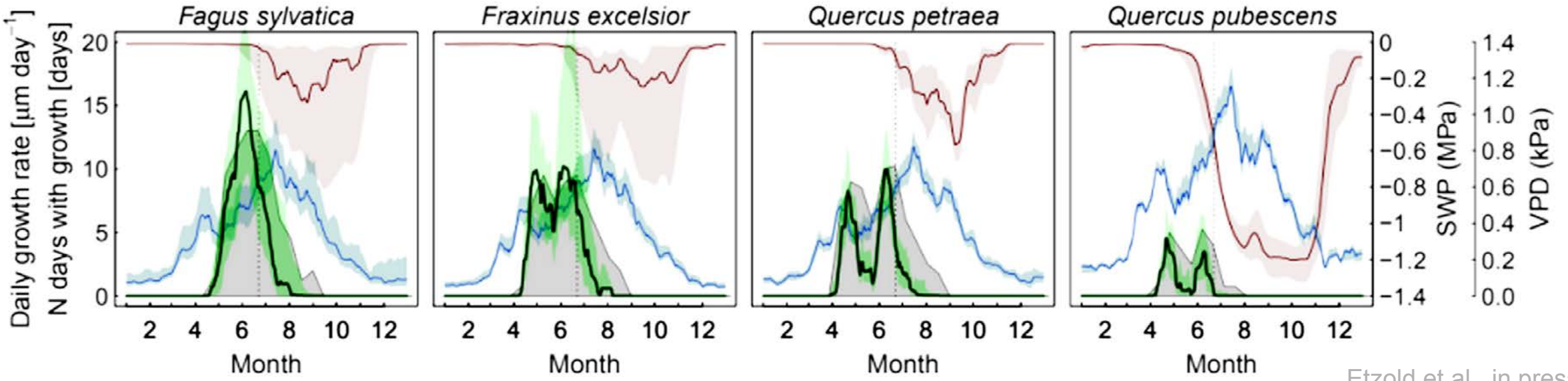
https://treenet.info

TreeNet is an international monitoring and research network in which automated tree stem radius fluctuations measured with point dendrometers (see picture) are analyzed in terms of forest ecosystem responses to climate change. Continuously measured data of microclimate and tree physiology provide real-time information on tree water relations and tree growth. (photo: Roman Zweifel, WSL)

8 The Present Swiss Landscape: Major Successes and International Context

8.2 The Biosphere, the Interface Between Geospheres

In collaboration with eLTER, the Swiss Long-Term Forest Research (LWF; Box 3) plots are included in the ESFRI Roadmap since 2018. The LWF plots complement both the TreeNet (Box 13) and Swiss FluxNet forest sites, including the Davos class 1 ICOS and the Swiss FluxNet Laegeren sites.



Etzold et al., in press

Vielen Dank für Ihre Aufmerksamkeit!

Fragen?