

Documentation of natural processes in the Gesäuse National Park

**Tobias Köstl, Vanessa Berger, Hanns Kirchmeir,
Corinna Hecke, Michael Jungmeier**

Abstract

From a scientific point of view, wilderness can be described as the sum of unaffected natural processes. Natural processes are therefore subsystems of wilderness. Like species, habitats and ecosystems, natural processes are distributed differently, have specific characteristics, and are endangered by different human interventions. An inventory and a well-founded knowledge basis of the characteristic natural processes of an area are therefore essential cornerstones of wilderness protection. Ecosystem and natural process research are designated as research priorities and as central components of the science accompanying the national park (Maringer & Kreiner 2012). The present series of projects presents a basic survey based on vegetation studies and a nature conservation concept for the documentation of natural processes and is also intended to serve as a template for further inventorying of natural processes in protected areas.

In a pilot study in 2014, a methodology for recording and documenting natural processes was developed using the system factor "avalanche". The pilot study was also published in the reports of the Natural Science Association for Styria (Jungmeier et al., 2016). As a result, the system factor "water" and its influence on the surrounding vegetation were examined (area of interest: Johnsbach, Enns and debris flow Kühgraben) in 2015 and 2016. Using standardized vegetation maps along transects, which are intended to cover a cross-section of the disturbance-affected habitats, an attempt was made to map the intensity and frequency of the disturbance events and the progressing succession in response. The vegetation studies were carried out based on high-resolution aerial photos that were created using UAS (UAS, i.e., Unmanned Aircraft System, commonly "drone"). With the help of high-resolution aerial photographs, vegetation patterns could be delineated in particularly detail and further processed in a GIS.

The documentation of spatial-temporal patterns and the connection between biodiversity and process dynamics was chosen as the methodological approach. The methodological approach focused on the analysis and characterization of habitats based on ecological indicator value analyses. The data was then processed and visualized graphically as dynamograms and structural diagrams of the processes. The UAS recordings helped to depict the process dynamics on a larger scale and still in detail. Additionally, TLS (Terrestrial Laser Scanning) and ALS (Airborne Laser Scanning) technologies were used to create a digital twin for the documentation of these processes.

Keywords

biodiversity, natural processes, process dynamics, vegetation monitoring, remote sensing

References

Maringer, A., & Kreiner, D. 2012: Forschungskonzept 2013 - 2023 im Nationalpark Gesäuse. Nationalpark Gesäuse GesmbH

Jungmeier, M., Kirchmeir, H., Hecke, C., Kreiner, D. 2016: Naturprozesse in einem Lawinarsystem – das Beispiel Kalktal im Nationalpark Gesäuse (Ennstaler Alpen, Tamischbachturm) – Mitteilungen des Naturwissenschaftlichen Vereins für Steiermark. Bd. 145.15-29

Contact:

koestl@e-c-o.at