

EGU22-3860

<https://doi.org/10.5194/egusphere-egu22-3860>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Unmanned Aerial Vehicles for permafrost monitoring in high alpine regions within the new EU framework

Inga Beck¹, Robert Delleske², **Riccardo Scandroglio**³, Till Rehm¹, Markus Keuschnig², and Michael Krautblatter³

¹Environmental Research Station Schneefernerhaus, Germany (i.beck@schneefernerhaus.de)

²Georesearch Forschungsgesellschaft mbH

³Chair of Landslide Research, Technical University Munich

The deployment of Unmanned Aerial Vehicles (UAV) for scientific purposes gained a lot of importance during the last years. The new EU regulations for the use of civil drones, in effect since January 2021, set out a new framework for their safe operation in the European skies. With a risk-based approach the purpose of the drone (leisure or civil) is no longer relevant, but only its weight, specifications and operations is considered. Also for scientific use these new rules mean a more elaborate project preparation and require the compilation of a so-called Specific Operational Risk Assessment (SORA) for each individual case.

Here we report on a three years project, in which drones will be flown at altitudes around and above 3000m asl from the Environmental Research Station Schneefernerhaus (UFS), located on the Zugspitze (Northern Limestone Alps, Germany). It is a collaborative initiative of the UFS as lead and coordinator, the TUM Chair of Landslide Research as scientific partner as well as the Georesearch mbH as technical partner. The project is financed by the Bavarian State Ministry of the Environment and Consumer Protection and started in June 2021. It stands out as an innovative pilot project, pursuing two different goals:

- Expertise should be collected in writing a SORA for the use of drones in high alpine areas, crossing national borders (D/A) and operating beyond the visible line of site. Thereby a broad know-how will be gained that will facilitate future scientific drone missions with the Schneefernerhaus as starting point.
- Scientific data will be collected by means of an IR camera and will record the temperature of the ground, delivering information about the current status of the permafrost-affected steep rockwalls. This will extend the present permafrost monitoring conducted on the Zugspitze (Scandroglio et al., 2021) to wider and unexplored areas. Furthermore the influence of infrastructures and their influence on the bedrock thermal behavior will be identified and monitored.
- An inventory of potential rockfall areas will be recorded by means of optical sensors.

In fall 2021 areas of interest, flight routes and starting positions have been defined. After the

installation of targets and rock surface temperature loggers, the first flight has been conducted with a drone of the open category, allowing the collection of the first thermal and RGB datasets. Currently a user-defined UAS gets manufactured and the SORA process – supervised by bavAIRia e. V. – is in process. The next steps will be the use of the new drone at least twice this year (2022) in order to collect more data.