

GFZ Potsdam - German Research Centre For Geosciences
Telegrafenberg
14473 Potsdam
Germany

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Subject: permit to fly a drone at Geysir area in research purposes

The Environment Agency of Iceland has received an application from GFZ German Research Centre For Geosciences, dated March 29th 2022, for research permit within Geysir area.

Geysir is protected as natural monument, cf. regulation no. 660/2020. All disturbance of geological monuments is prohibited, incl. any inscriptions and disturbance of the activity and water level of the hot spring area, disturbance of hot springs, hot springs, soils and rocks, without permission. Helicopters and other manned aircraft may not land within the area without the permission of the Environment Agency. Operating an unmanned aircraft/drone within the protected area is subjected to a permit from the Environment Agency of Iceland. Research that involves disturbance to geological formation and animal life is subjected to a permit from the Environment Agency.

Description of the project:

Aim of this research is to study the volcano-tectonic interaction at complex topographic terrain of Iceland. Non-intrusive technologies will be used at Strokkur area for the research to make accurate measurements on the morphology and structural geology. To this aim the plan is to perform a terrestrial laser scanning experiment, utilizing the Leica 6000 TLS instrument from distance, scanning the morphology at 5 million points. Measurement duration is about 2 hours. To transform the local coordinate to global coordinate system (WGS 1984) markers will be placed on the ground and measure their position by GPS and drones carrying optical and infrared cameras. After the measurements, the markers will be taken away again (12 white sheets of 1m² dimension). The drones are small (Phantom 4 from DJI). The drone flights have the aim to acquire photos from above and perform a photo mosaicking thereafter. The drone is lightweight and creates no significant noise, shall fly up to an altitude of maximum 120 m. Because of resolution and performance in the field, the drone will fly 80-100 m above the ground. The drone is steered at a pre-defined path over the target area. Map that shows the flight route was included in the application. The flight takes 90 minutes and will be performed at low sun standing (early in the morning); but as weather conditions change we request flexibility to use the drone during a larger time frame so that we get the chance to catch low wind conditions. The field study is the basis for two student qualification works (Master and Bachelor thesis) as well as one PhD thesis. The

project has 5 employees and will take place from July 10th to July 22nd 2022. No samples will be collected and the group would stay on pedestrian paths where possible.

Impact assessment:

The Environment Agency of Iceland considers the project not likely to have negative effect on the site and nature. Drone flight can affect visitors' experience in the site. Negative impact can be reduced if conditions of the permit are fulfilled.

Conclusions and conditions:

The Environment Agency of Iceland hereby grants German Research Centre for Geosciences permission on its behalf to fly a drone within Geysir area as described above on July 10th to July 22nd 2022 on the following conditions:

- Keep this letter with you on site during the project. The permit conditions should be introduced to the staff of the project before work begins.
- The applicant shall inform rangers in the area about their arrival and departure. This is to be done 24 hours before entering the area and again before leaving it.
- If the project dates or description changes the Environment Agency shall be notified as soon as possible.
- When it is necessary to go off-path, extra care must be taken not to cause damage to terrain, including vegetation, soil and geological formation. All traces of activity must be removed afterwards.
- The crew must follow rules of conduct that apply to the area.
- If it is necessary to go off paths time spent there should be limited as possible and done in collaboration with rangers in the area.
- This permit is only valid for research purposes. It does not include permit to utilize the footage collected and the results of the project for commercial purposes.
- All participants in the project must wear high-visibility clothing during field work, labelled with the identity of the researcher or the research institute.
- All disturbance to animals and wildlife is strictly prohibited.
- Off-road driving in Iceland is strictly prohibited.
- All traces of the work must be removed carefully from the site by the end of the work/project.
- If any complications occur during the project, please contact the ranger or the Environment Agency of Iceland, tel. +354 591 2000.
- The research group should be conscious of other guests on the sites and make sure that the research causes as little disturbance as possible to other visitors. If the material collected is meant for public viewing it must be noted in the video/subtext that permission from the Environment Agency was obtained for the drone flight.
- An unmanned aircraft should never be flown in close proximity to people. Please take precaution not to disturb people's experience, their safety or personal privacy nor the general peace of the protected areas being filmed.
- Flight time should be kept to a minimum and flight should be avoided during the area's busiest times of the day.
- If the use of unmanned aircraft causes disturbance to wildlife in the area, its use should be ceased at once.

- The conductor of the unmanned aircraft is responsible for the aircraft within the protected area. This includes taking responsibility of any possible risk of harm to people, fauna and nature and leaving no permanent marks on the site in question. Should the aircraft crash, all components from it must be collected and removed from the area.
- For safety reasons, the pilot of an unmanned aerial vehicle must wear marked clothing so that the person can be identified.
- **Due to security reasons, it is prohibited to fly drone less than 50m above Strokkur and Geysir.**

If the researcher causes damage to nature, according to art. 87 in the Nature Conservation Act no. 60/2013, the Environment Agency of Iceland can, according to the Nature Conservation Act, f.e. order the licensee to fix damage to nature and vegetation and/or stop the project.

The Environment Agency of Iceland can according to art. 89 in the Nature Conservation Act no. 60/2013 change conditions of the permit, add new conditions or withdraw the permit in order to prevent damage to nature if environmental conditions change.

According to art 89. in the Nature Conservation Act no. 60/2013 the Environment Agency can withdraw the permit if conditions of the permit are not complied to.

Unmanned aircraft should take off and land in a safe distance from other visitors according to regulation 990/2017 on unmanned aircrafts.

The usage of a drone shall be according to regulation no. 990/2017 on the operation of remotely piloted aircraft (<https://www.icetra.is/aviation/drones/>).

Please note that according to the regulation all drones used for commercial flight need to be registered at the Icelandic Transport Authority.

The Environment Agency of Iceland wishes to receive, free of charge, a copy of all reports and scientific articles that result from the research project.

Supervision:

The Environment Agency will supervise the project. The supervisor will be a ranger from the Environment Agency.

Sincerely

Valdimar Kristjánsson
advisor

Þórdís Vilhelmína Bragadóttir
advisor