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## **UAV- and SfM-related techniques applied to volcano-tectonics for virtual outcrops construction and geoscience communication. Examples from the North Volcanic Zone, Iceland**

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### **UAV- and SfM-related techniques applied to volcano-tectonics for virtual outcrops construction and geoscience communication. Examples from the North Volcanic Zone, Iceland**

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Iceland offers an unparalleled chance to observe the most powerful natural phenomena related to the combination of tectonic and magmatic forces, such as active rifting, volcanic eruptions, sub-volcanic intrusions. We have focused on a number of geosites which are found in the Northern Volcanic Zone (NVZ) of Iceland; here, the following volcano-tectonic features can be observed: i) the Theystareykir Fissure Swarm (ThFS), an active rift system with a central volcano, several major faults and numerous eruptive fissures; ii) the Krafla Fissure Swarm (KFS), another major rift system marked by the presence of monogenetic cones, dip-slip faults, eruptive fissures, extension fractures and the active Krafla volcano.

In order to showcase a few, outstanding examples of the above, we have made use of UAVs integrated by the Structure-from-Motion (SfM) Photogrammetry. As is well known, the combination of UAV-digital image collection and SfM techniques has been increasingly applied to geological and environmental research. We have applied this approach to the collection of high-definition images and with the purpose of constructing 3-D models, which may be considered “Virtual Outcrops (VO)”.

We highlight that such 3-D models can be navigated in immersive Virtual Reality mode, and hence can be a key tool not only for research purposes: in fact, this is a novel, cutting-edge approach which is suitable for improving geosite popularization and geoscience communication, allowing for

the engagement of a wider audience, including potential end-users from the younger generation.