MSc Thesis: Geomorphic Responses to the Wild Fires in Bohemian-Saxonian sandstone ecosystems

Long-lasting high temperatures and minimal precipitation are currently leading to falling river levels and forest fires. One of the most affected areas is the German-Czech border area in the picturesque Bohemian-Saxonian Switzerland (Figure 1). There massive forest fires are (still) raging and are far from being completely extinguished. As of today, > 8 km^2 of forest is lost. Such massive landscape disturbances come along with a long list of ecological impacts and (cascading) geomorphic hazards. One of the well-known effects is enhanced, post-fire geomorphic activity, with landsliding as a prime process agent. Post-fire landsliding is arguably caused/ triggered mostly by changed infiltration dynamics and hydro-logical conditions in general during subsequent rainfall events. The aim of this thesis, however, is to bring life into play. This thesis circles around the question: How root strength decay and subsequent regrowth affect slope processes in the aftermath of forest fires in the 'rubbly sandstone ecosystems' of the Saxonian- Bohemian Switzerland for (1) given fire intensities, and (2) forest structure, i.e. tree species composition and density.

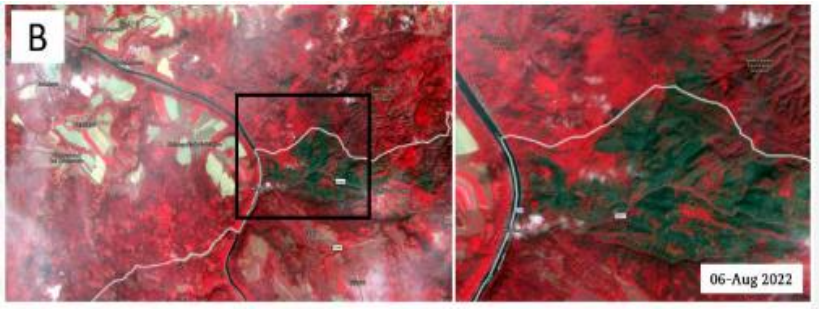

Figure 1. False color representation shows burned areas (green-black) in parts of Saxon-Bohemian Sandstone area, intact vegetation is shown in red colors. Source: ESA Sentinel-2, DaVis / BBK.

Within a newly formed rapid response initiative involving scientists at GFZ Potsdam, University of Göttingen and TU Dresden, this MSc-project tests landslide susceptibility by biotic controls along gradients of (1) fire intensity, and (2) forest structure. Here, exposure models come in handy as they provide promising tools to assess the long-term impact along gradients.

This proposed MSc-project consists of: (1) field work to estimate root biomass that will be compared to (2) remote sensing data and/or forest stand inventory data, and (3) Landlab-assisted landslide exposure modeling.

Beside interest in ecogeomorphic work, skills in programming in R, the willingness to learn Landlab and particularly Python is required. Interested? Start can be immediately. The possibility of a joint supervision by Dr. Michael Dietze, University of Göttingen, may be discussed.

Contact Christian Mohr (cmohr@uni-potsdam.de)

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