



Hydro-meteorological risk reduction through land restoration in Rangárvellir, Iceland – an overview of the HydroResilience project

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Ecosystems that are in equilibrium provide vital resources to local inhabitants, including protection from naturally occurring disasters. Natural vegetation cover has been optimized over many years to retain a maximum of rainfall runoff by increasing the field capacity (FC) of the soil cover, securing water availability during droughts and reducing the flood risk during heavy precipitation events. In this presentation we will present the HydroResilience project, which will assess the effects of ecosystem restoration on the runoff dynamics of rainfall water in Rangárvellir, a restoration area in southern Iceland. The Rangárvellir area presents ideal conditions for such investigations. Dramatic deforestation during the last millennium and year round livestock grazing along with devastating ash depositions during volcanic eruptions and a harsh sub-polar oceanic climate have led to severe degradation in Rangárvellir. Since the beginning of the 20th century diverse restoration measures have been implemented making Rangárvellir an ideal case study to investigate the effects of restoration on hydro-meteorological risk reduction. In this project we will assess and quantify the evolution of water resources in Rangárvellir by assessing the runoff dynamics in the main rivers of Rangárvellir under four main scenarios: i) present conditions, ii) degraded conditions as was the case 100 years ago, iii) under hypothetical fully restored ecosystems and, finally, iv) under conditions of a scenario developed in collaboration with local stakeholder groups to optimize socio-ecological benefits. For this purpose the dynamics of the relevant hydrological processes in the area (incl. river runoff, ground water table, snow cover duration, and soil moisture dynamics) will be reconstructed using hydrological models to run the above mentioned scenarios. The scientific findings and conclusion of this project will generate valuable insights on the effects of land restoration on hydro-meteorological risk reduction. The presentations will outline the main methods used during the project and conclude by providing an outlook on the expected results.