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Hydro-Meteorological Hazards Assessment Based Upon Climate Change Considerations in Isfara Basin

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Central Asia is highly exposed and vulnerable to hydro-meteorological hazards and presents a constant threat to the population, in particular with flood and mudflow as frequent events in this region. Annual floods and mudflows cause enormous economic and social affects e.g. damages on houses and infrastructure in the floodplains, agricultural production particularly for water control (channels, bridges, etc.). An important challenge for the assessment of hydro-meteorological hazards is climate change, which is altering exposure.
In the framework of the Trans-boundary Water Management in Central Asia/WMBOCA project, supported by TWM-CA and CAWa projects of German Research Centre for Geosciences (GFZ) and German Aerospace Center (DLR), we developed an approach how to address flood and mudflow using the official sources have been performed for selected areas in Central Asia based upon climate change considerations. This research has been carried out for the Isfara River basin which is located in northern Tajikistan and south-western Kyrgyzstan. The Isfara River basin belongs to Sugdh Oblast in Tajikistan and to Batken Oblast in Kyrgyzstan.
The study begins with a description of the employed sources and methodology. The ensuing section offers analysis of exposure to hydro-meteorological hazards. Then, the study covers an overview of work related to the analysis of changes in mudflow and flood hazards in the past 20 years. Additionally, exposure to hydro-meteorological hazards in the case study has been assessed against a backdrop of rising climate change and variability for year 2050.
This study presents initial findings from these analyses which are including (a) mapping of previous floods and mudflows in the basin, using conventional and traditional sources, supported remote sensing tools, (b) forecast of floods and mudflows in the basin, based upon climate change scenarios, and finally (c) supporting the local authorities and administrations in consideration of consequences for protection measures against floods and mudflows and contribution to basin planning. The resulted observations will help to identify current gaps and future needs in flood and mudflow hazard assessment in terms of mitigation and/or protection measures in selected case study in Central Asia.

Keywords: Hydro-meteorological hazards, Central Asia, Mudflow, Climate Change