The flash floods of April 2020 in Uvira (DR Congo): story of an event with extreme impacts

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Uvira is a rapidly growing city of about 600,000 inhabitants in DR Congo. Squeezed between the shore of Lake Tanganyika and steep mountains hillslopes, and under the influence of a tropical climate, the city is familiar with flash floods. Nevertheless, the impacts of the flash flood event of April 2020 have been unprecedented in the last decades. Debris-rich flash floods led to at least 43 deaths, nearly 200 injuries, more than 5,500 houses destroyed and at least 70,000 people made homeless. Dozens of socio-economic infrastructures were damaged and nearly 280,000 people were left without hydroelectric power as a result of damage to water and electricity distribution networks in the city. In this work we explore the natural and anthropogenic causes of the exceptional impacts of these flash floods. To do so, we use satellite images, historical aerial photographs, social media reports, field observations, and details provided by local stakeholders and citizen observers. We show that a high-magnitude rainfall event, that occurred at the end of a wetter-than-usual rainy season, triggered, over an exceptionally large area for the region, hundreds of landslides in the upper parts of the watersheds. These landslides transported extra material to the flooded rivers, increasing their sediment content and lateral mobility. We also show that the landscapes of the watersheds where this compound event occurred remained rural in the last six decades and were not impacted by significant forest cover changes and road construction, hence eluding the role of key potential human activities on the magnitude of the flash floods. However, downstream, the city expanded with little consideration of the geomorphological context of the environment where the alluvial fans and flood plains of the rivers have been significantly urbanized in the last decades, often in an informal manner. The impacts of the April 2020 flash flood event are still present almost after two years and are anticipated to remain at least a few more years; most remarkably, the disturbance of the river dynamics and the severe bank erosion caused by the large supply of sediment. Furthermore, often-uncontrolled sediment mining, seen here by the local people as an opportunity, exacerbates the unpredictable dynamics of the system. In the meantime, flooded areas where houses were destroyed are being
resettled. Although authorities and inhabitants are aware of the danger, they face limited means to improve the management and planning of the city.