令和3年度　環境科学院　修士論文内容の要旨

Changes in morphological characteristics of drainage basins following coseismic landslides by the 2018 Hokkaido Eastern Iburi Earthquake
（2018 年北海道胆振東部地震による斜面崩壊にともなう流域地形特徴の変化）

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A strong earthquake (Magnitude 6.7) happened in the Iburi sub-prefecture of Southern Hokkaido on 6th September 2018, whose epicenter with focus depth of 37 km was located at 42.690°N and 142.007°E within the Ishikari Teichi Touen Fault Zone. Numerous coseismic landslides (n = 7837) covered over 700 km^2. Tarumae-d tephra layer with fine-grained texture and high water infiltration capacity was considered as the inherent factor of the coseismic landslides. Gradual post-earthquake morphological changes in the watersheds, including fluvial channels and drainage patterns, are expected. This study aimed to identify the drainage basin geomorphological changes following the 2018 Hokkaido Eastern Iburi Earthquake with particular interests in fluvial characteristics and causal factors. The study sites are 2 catchments along the Atsuma River with less artificial modifications after the earthquake. Digital Elevation Models (DEMs) by Airborne Laser Scanning (ALS) of October 2012 and September 2018, as well as those by Unmanned Aerial Vehicle (UAV)-based Structure-from-Motion Multi-View Stereo (SfM-MVS) photogrammetry taken by 4 field surveys in April to October 2020 were used. Orthorectified aerial images (orthophotos) by the UAV-SfM were also utilized. In the multi-temporal DEMs and orthophotos, morphological changes such as slid slopes, gullies, stream-bed deposition and stream network development were observed. Visual inspections and GIS analysis were performed for analyzing drainage basin morphology, channel network extraction, stream profile analysis, and morphological change detection between multiple DEMs. Patterns of changes in drainage basin characteristics, including watershed geometry, drainage network, drainage texture, and relief characteristics were found. The pattern changes in characteristics of the study sites showed that channel developments on slid slope surfaces increased progressively with the increase in stream length and bifurcation ratio. Moreover, potentially higher surface runoff, gully development on the slid surfaces, and further slope deformations may be expected based on the obvious increase in drainage intensity. Furthermore, increase of stream length ratio and mean gradient indicated the active increase of potential soil erosion either by fluvial or freeze-thaw action with the interactions between slope and fluvial processes. Further assessments of factors on the morphological changes and long term fluvial landscape evolution will be necessary.