国際共同研究 中間報告（ 課題番号： 29W-02 ）

課題名： Do earthquake fissures predispose slopes to landslides and subsequent sediment movement?
研究代表者：Professor Roy C. Sidle
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所内担当者名：釜井俊孝
研究期間：平成 29 年 6 月 1 日 ～ 平成 31 年 3 月 31 日
研究場所：斜面災害研究センター，熊本県南阿蘇村
共同研究参加者数： 12 名 (所外 5 名，所内 7 名)
・大学院生の参加状況： 6 名（修士 4 名，博士 2 名）(内数)
・大学院生の参加形態 [現地調査の補助，議論，計測データの解析の補助]

平成 29 年度 実施状況

Prior to the May 2017 trip to Japan, collaborators at Kyoto University DPRI and Tokyo University of Agriculture and Technology (TUAT), worked with Prof. Sidle (University of the Sunshine Coast, USC) to determine the field monitoring needed to measure soil moisture changes affected by earthquake fissures. Potential study sites were selected in the area northwest of the Aso Volcano. Arrangements were made to purchase and secure additional tensiometers and TDR equipment. During the field trip, tensiometers and TDR's were installed in several earthquake fissures along ridgelines in the affected region.

Later in 2017, in consultation with all team members, TUAT (Prof. Gomi) installed additional tensiometers and TDRs in fissures at a nearby grassland site that was heavily impacted during the 2016 earthquake. In early January 2018, Prof. Sidle visited this new site with TUAT members and collected soil samples for hydrological analysis as well as conducted a preliminary survey of fissures in the area. This research was followed up by several site visits by both the DPRI (Assoc. Prof. Wang) and TUAT teams to service and collect data from tensiometers ad TDRs and conduct detailed mapping of the fissure networks.

More recent research has examined the preliminary field results related to soil moisture changes during storms. Findings indicate that fissures enhance the soil moisture directly under the fissure compared to areas with no fissures; however, more work needs to be conducted on how this subsurface water is propagated downslope and whether multiple fissures (as shown in Figure 1) affect the subsurface hydrology within the longitudinal slope profile. To this end, we are currently conducting hydrological modeling of simple fissure-affected hillslope profiles with Associate Professor Saito at TUAT and a graduate student. This modeling effort is using HYDRUS 2-D to simulate saturated-unsaturated flow and water content in soils with and without fissures for design storms.

平成 30 年度 実施計画:

The following research activities are planned for FY2018:

- Install new tensiometers and TDRs in fissures on sloping areas to ascertain effects of lateral subsurface water movement in hillslopes due to fissures.
- Continue the shallow soil water modelling work using different scenarios of fissure arrangements on hillslopes and ridgelines.
- Continue monitoring of soil moisture content and potential in our study site, including within fissures and in adjacent areas without fissures. Test model results with monitored field data.
- Conduct electrical resistivity tests in the field to determine deep profiles of soil water.
- Prepare several papers for publication in refereed journals.

Field visits to the Kumamoto site are planned for September 2018 and March 2019 as part of this joint research.