

Study on sediment management in an active volcanic area

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The slopes of Indonesia's 130 active volcanoes have been densely populated for thousand of years. Millions of Indonesians were affected by volcanic eruptions directly or indirectly. Mt. Merapi shown in the Figure 1 is one of the most dangerous volcanoes in Indonesia, located at dense population between Central Java and Yogyakarta Special Province, Indonesia. The produced sediment in each eruption of Mt. Merapi varies widely from less than 1 million m³ to more than 20 million m³. At least 1.1 million inhabitants live on its slopes and 440,000 people live in areas with high risk prone to pyroclastic flows, pyroclastic surges and debris flows. From this point of view, it is extremely significant to manage and countermeasure the sediment related hazard in Mt. Merapi area. On the other hand, the deposited sediment has been used as sediment resources by local people. From the sediment resources management view, people tend to take the sediment as much as possible for supporting regional development. Consequently, it causes the negative impact for ecological and decreases in disaster prevention safety. Thus far, both a sediment disaster management and a sediment resources management must be considered in the sediment management applied in Mt. Merapi.

In this study, we attempt to propose a sediment management considering both sediment disaster management and sediment resources management. The proposed sediment management is expected effective, sustainable and feasible with considering natural condition, socio-economic and technical aspect. The balanced condition related the disaster mitigation, sediment utilization and environment conservation will be discussed. In addition, the impact of varied sediment production of Mt. Merapi on Progo

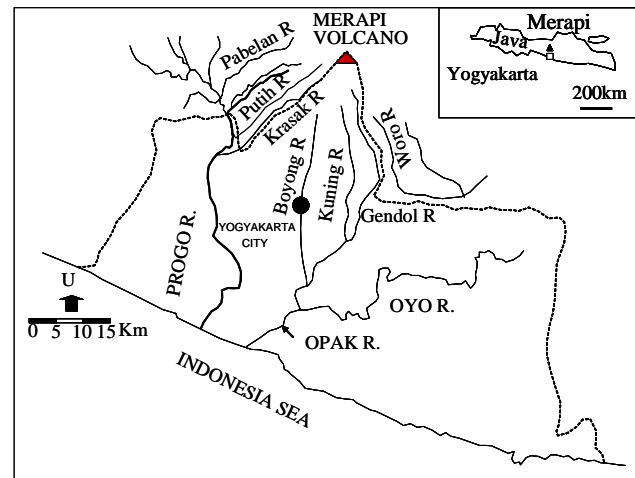


Fig. 1 Location of Mt. Merapi and its surrounding area

River is also discussed. One dimensional bed variation model will be used as a tool to manage the sediment in the area. The simulation will be conducted from tributary to the lower Progo with considering the impacts of sabo works, channel works and controlled sand mining.

Based on the results of simulation, if the sand mining is not controlled, the serious bed degradation occurred. Degradation still takes place in Progo River if sand mining is not controlled, even though the channel works have been installed. Combination between sediment resources management by controlled sand mining combined with channel works, the river bed could be kept while the sediment could be used as resources. However, under big eruption when huge amount of sediment is produced, the severe aggradation occurred in downstream area. It indicates that the sabo works are needed to control the sediment discharge flowing to downstream area. Hence, the combination between sabo works, channel works and controlled sand mining is needed to manage the sediments in Mt. Merapi area.