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## **Agent-Based Simulation of Vulcano Evacuation under Different Eruption Scenarios**

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Emergency evacuation of people in areas prone to volcanic hazards is a challenging process. Evacuation planning plays a crucial role in successful implementation of emergency evacuation before and during volcanic eruptions. Agent-Based Simulation is a new trend in evacuation modelling in which key players in the evacuation processes are considered as agents with their own dynamic behavior. Agent-based simulation has been recently used in mass evacuation modelling of tsunamis, wildfire, and volcano. This paper describes the theoretical framework, major components and detailed outcomes of a GIS based agent-based evacuation simulation (using AnyLogic multi modelling platform) developed for Vulcano Island in Italy. While small in size, Vulcano has a very dynamic condition in terms of the number of people in the island in different seasons. Vulcano evacuation simulation tool enables emergency planners to develop different evacuation scenarios based on the timing, number of people in the island, and type of eruptions and their associated secondary hazards. This tool simulates the evacuation process from the pre-alarm phase till the end of evacuation. In particular volcano emergency evacuation simulation tool calculates the evacuation time from when people receive the evacuation notification till they leave the island. It also assesses the logistic resources required to evacuate the people from the island under various weather conditions that impact the evacuation process. Moreover, by changing simulation parameters, users can assess the impacts of different emergency measures on the evacuation process. This simulation tool can be easily adapted to other cities or communities that are subject to volcanic hazards, particularly island environments.