Volcanic ash hazard assessment In West Java, Indonesia using FALL3D computational model

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Indonesia, a country with many active volcanoes, has experienced a great loss of life . Approximately 100,000 casualties had passed away over the past 200 years due to volcanic eruptions. It is featured by the highest frequency of eruption magnitude of VEI 4 or larger during historical time. One of the eruption material produced during eruption is volcanic ash.

Volcanic ash is the most widespread of all volcanic hazards and has the potential to adversely affect millions of people in the densely populated islands of the Asia Pacific region. Volcanic ash represents a serious hazard to many towns, cities and megacities (population in excess of 10 million) in the vicinity of active volcanoes in developing countries like Indonesia. Undertaking volcanic ash fallout hazard assessments is an important scientific, economic and political exercise and of great importance to public safety, especially for communities on the many densely populated islands of Indonesia.

No detailed information available for this region on the hazard threaten by volcanic ash from volcanoes that have not erupted in recent times in particular. Therefore a clear need exists for computational models capable of accurately predicting volcanic ash dispersal at ground level when coupled with field observations of historical or on-going eruptive activity. The validation of the FALL3D has been nicely done in two volcanoes, Guntur and Tambora volcanoes.

Modelling volcanic ash in four volcanoes in West Java (Gede, Guntur, Galunggung, and Ciremai) using computational model FALL3D (an ADS model) as useful tool for assessing volcanic ash hazard. The parameters employed in this modelling include grain size, density, and sphericity analyses combined with assume eruption column heights (based on historical eruptions) as volcanological inputs along with topographical terrain data using DEM, and meteorological input data.

We present volcanic ash hazard assessments and their impacts using deterministic and probabilistic approach. In addition we model as well, predictive scenarios of ash load on the ground and ash concentration in the atmosphere at some flight levels in the context of aviation safety.

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