

LANDSLIDE SUSCEPTIBILITY AND RISK ASSESSMENT AT SETE CIDADES VOLCANO (S. MIGUEL ISLAND, AZORES)

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Sete Cidades is an active central volcano with a summit caldera located in the westernmost part of S. Miguel Island (Azores). Its eruptive history was marked by two distinct periods: the first one was dominated by the extrusion of lava flows forming the basal part of the volcanic edifice; the second, starting 36,000 years ago, was characterized by the emplacement of major pyroclastic flows and tephra fall deposits. Since the settlement of the Island, in the 15th century, many landslides occurred at Sete Cidades Volcano, causing extensive damages in buildings and infrastructures. The study of historical records and the observation of new occurrences showed that landslides in the region have been triggered by heavy rainfall periods, earthquakes and volcanic eruptions. In order to assess the landslide susceptibility at Sete Cidades Volcano, landslides scars and associated deposits were mapped through aerial photographs and field surveys. The obtained data were inserted in a GIS to produce a landslide distribution map and a landslide density map. It was concluded that the high density landslide areas are related with (1) major scarp faults and other important tectonic structures, (2) the margin of fluvial channels, (3) the sea cliffs and (4) volcanic landforms, namely the caldera wall. About 73% of the mapped landslides took place in areas where pyroclastic deposits are the dominant lithology and more than 77% occurred where slopes are equal or higher than 20°. These two parameters were integrated and used to generate a susceptibility map. The incorporation of vulnerability data into the GIS allowed concluding that 37% of dwellings and most of the roads on Sete Cidades Volcano are located in areas where the landslide susceptibility is high to very high. Moreover, it was verified that 25% of the land reserved to the development of future urban areas is also located in high risk zones. Such conclusions should be taken into account for

emergency and land use planning.