

MONITORING VOLCANOES — A REVIEW

Summary

Minimising risk in volcanic regions involves a number of inter-related studies. First is the collection of historical data on previous eruptions, followed by detailed mapping around the volcano. The resulting volcanic hazard map can be used during volcanic crises to minimise casualties. The range of tools currently deployed on volcanoes includes seismometers, a range of gas monitoring equipment, ground deformation equipment including differential GPS, borehole strainmeters, thermal imaging cameras, micro-gravimeters, magnetometers, laser scanners, radar scanners and magnetotelluric equip-

ment to create subvolcanic images based on electrical conductivity. Satellites are also becoming more important, and new techniques involving solid state sensors may have a significant role to play in the future. Case studies confirm the usefulness of each of these techniques, although even in well-monitored volcanoes some eruptions take place without detectable precursors. To minimise the possibility of unexpected eruptions in the future will involve both increased instrumentation and the application of methodologies such as advanced neural networks and expert solicitation.