Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06707, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06707
EGU General Assembly 2008

APOLLO: An automatic procedure to forecast transport and deposition of tephra

A. Folch (1), A. Costa (1) and G. Macedonio (1)
(1) Osservatorio Vesuviano, OV-INGV, Napoli, Italy.

Volcanic ash fallout represents a serious threat to communities around active volcanoes. Reliable short term predictions constitute a valuable support for to mitigate the effects of tephra fallout on the surrounding area during an episode of crisis. We present a platform-independent automatic procedure aimed to periodic (daily) forecast volcanic ash dispersal. The procedure builds on a series of programs and interfaces that allow an automatic data/results flow. Firstly the procedure downloads mesoscale meteorological forecasts for the region and period of interest, filters and converts data from its native format (typically GRIB format files), and sets up the CALMET diagnostic meteorological model to obtain hourly wind field and micro-meteorological variables on a local finer mesh. Secondly a 1-D version of the buoyant plume equations assesses the distribution of mass along the eruptive column depending on the obtained wind field and on the conditions at the vent (granulometry, mass flow rate, etc.). All these data are used as input for the ash dispersion model(s). Any model able to face physical complexity and coupling processes with adequate solving times can be plugged into the system by means of an interface. Currently, the procedure contains two the semi-analytical models HAZMAP and TEPHRA able to simulate tephra deposits, and the 3-D model FALL3D, in both serial and parallel versions, able to simulate both tephra deposits and airborne ash concentration. The last step is to post-processes the model(s) outcomes to end up with homogeneous maps written on portable format files. Maps plot relevant quantities such as predicted ground loads, expected deposit thicknesses or visual and flight safety concentration thresholds. Several examples of an application to recent volcanic eruptions such as Etna 2001, Vesuvius 1944 and Mt Spurr 1992 are presented.