MAIN DIFFERENCES BETWEEN TEPHRA AND TEPHRA2

TEPHRA is and advection-diffusion model described in *Bonadonna et al.* [2005] and developed as a collaboration between the University of South Florida and the University of Hawaii. It allows for grainsize-dependent diffusion and particle density, a stratified atmosphere, particle diffusion time within the rising plume and settling velocities that include Reynold's Number variations along the particle fall.

TEPHRA consists of three main parts: (i) a physical model that describes diffusion, transport and sedimentation of volcanic particles [*Armienti et al.*, 1988; *Bonadonna et al.*, 1998; *Bonadonna et al.*, 2002; *Bursik et al.*, 1992; *Connor et al.*, 2001; *Suzuki*, 1983]; (ii) a probabilistic approach used to identify a range of input parameters for the physical model (i.e. column height; eruption duration; grainsize parameters; wind profile) and to forecast a range of possible outcomes (i.e. hazard curves and probability maps); (iii) a computational approach that uses parallel processing methods to speed up calculation and make fully probabilistic approaches practical.

TEPHRA2 was developed at the University of South Florida between 2005 and 2006 as an implementation of the physical model of **TEPHRA**. As a result, **TEPHRA2** also accounts for topography and wind interpolation between atmospheric levels. In addition, **TEPHRA2** was optimized to improve the computing speed and was also modified to run on a single processor.

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