



Grid Oriented Implementation of the Tephra Model

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TEPHRA is a two dimensional advection-diffusion model implemented by Bonadonna et al. [2005] that describes the sedimentation process of particles from volcanic plumes. The model is used by INGV - Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Catania, to forecast tephra dispersion during Etna volcanic events. Every day weather forecast provided by the Italian Air Force Meteorological Office in Rome and by the hydrometeorological service of ARPA in Emilia Romagna are processed by TEPHRA model with other volcanological parameters to simulate two different eruptive scenarios of Mt. Etna (corresponding to 1998 and 2002-03 Etna eruptions). The model outputs are plotted on maps and transferred to Civil Protection which takes the trouble to give public warnings and plan mitigation measures.

The TEPHRA model is implemented in ANSI-C code using MPI commands to maximize parallel computation. Actually the model runs on an INGV Beowulf cluster. In order to provide better performances we worked on porting it to PI2S2 sicilian grid infrastructure inside the "PI2S2 Project" (2006-2008). We configured the application to run on grid, using Glite middleware, analyzed the obtained performances and comparing them with ones obtained on the local cluster.

As TEPHRA needs to be run in a short time in order to transfer fastly the dispersion maps to Civil Protection, we also worked to minimize and stabilize grid job-scheduling time by using customized high-priority queues called Emergency Queue.