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WP18
Access to the *Volcano Dynamics Computational Centre* at INGV Pisa

VIRTUAL ACCESS

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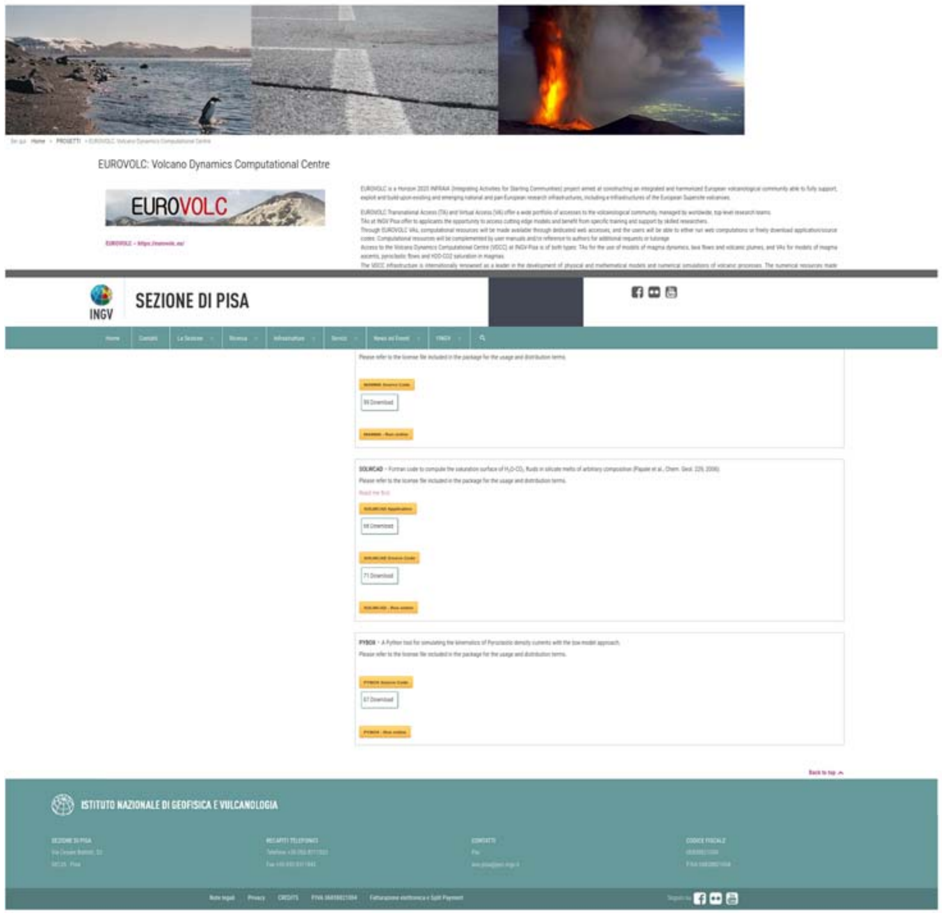
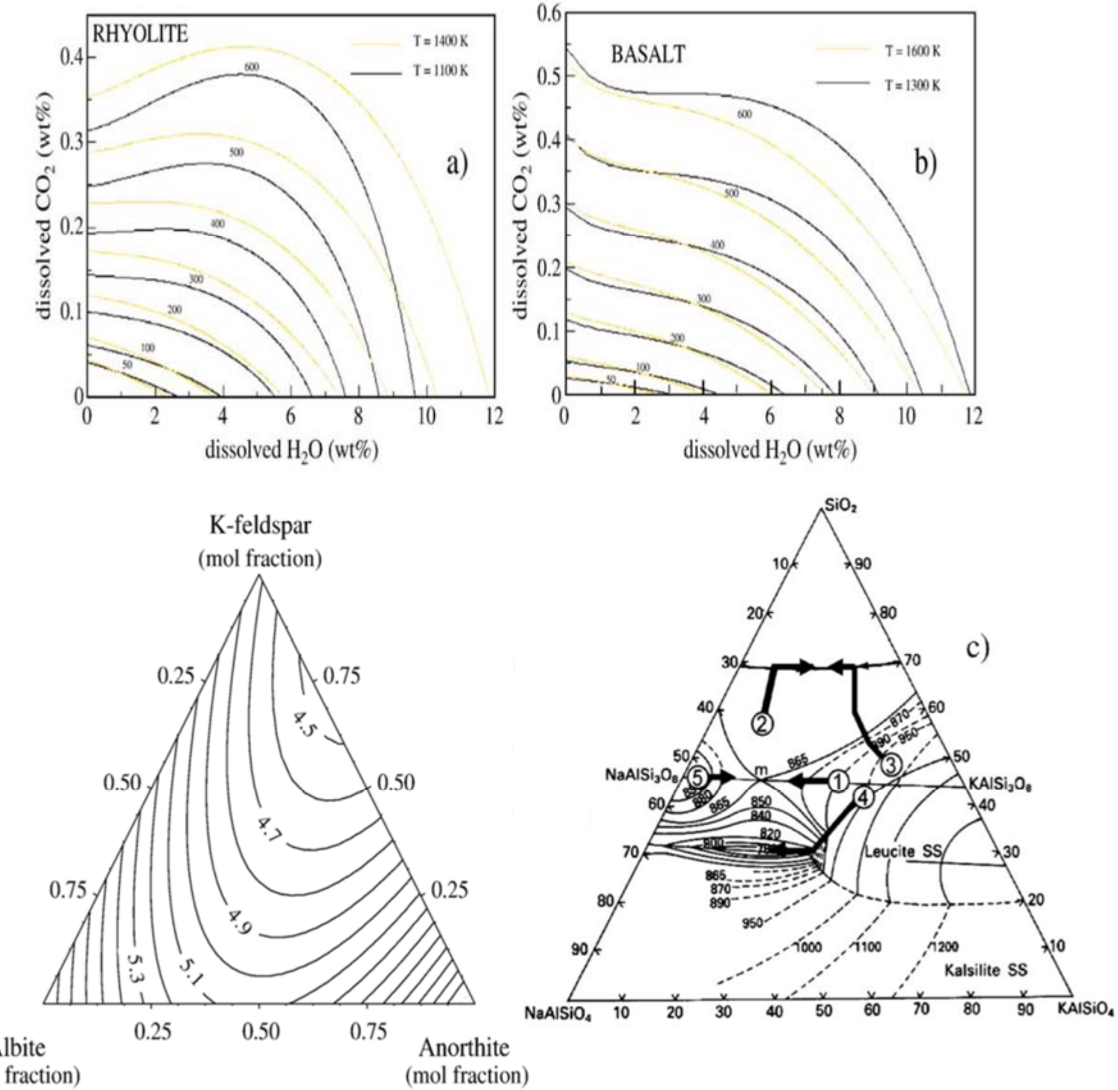
Virtual Access active since March 2019



SOLWCAD

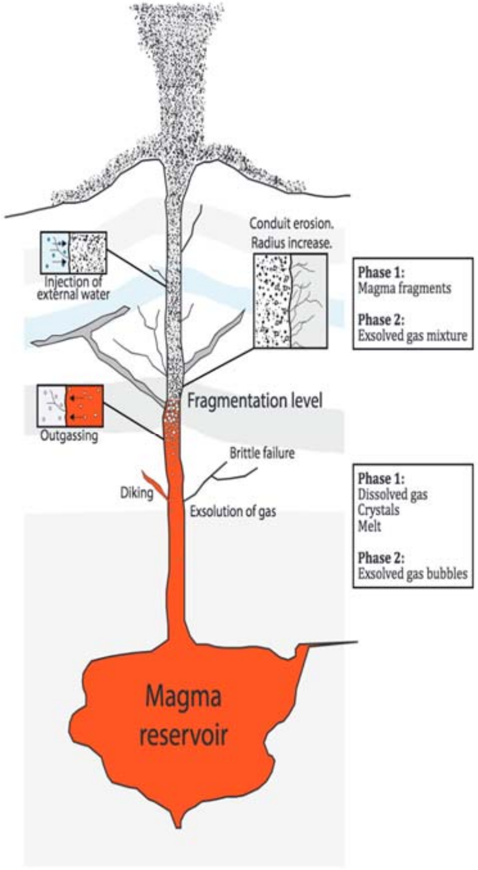
SOLWCAD is a Fortran code that computes the **fully non-ideal**, multi-component, compositional-dependent saturation surface of H_2O+CO_2 in silicate melts over P-T-composition conditions relevant to magmatism and volcanism. Calculations allow to either **1)** determine the partition of H_2O and CO_2 between the melt and gas phase, or **2)** determine the entrapment pressure and corresponding gas phase composition from dissolved amounts.



Papale, P., Moretti, R., Barbato, D., The compositional dependence of the saturation surface of H_2O + CO_2 fluids in silicate melts. Chem. Geol. 229, 78-95 (2006).

MAMMA (Magma Ascent Mathematical Modeling and Analysis)

MAMMA is a FORTRAN90 code designed to solve a conservative model for magma ascent in a volcanic conduit, described as a compressible multicomponent two-phase flow. The system of conservation equations considers the effects of the main processes that magmas experience during ascent, such as crystallization, rheological changes, fragmentation, physical interaction with conduit walls, outgassing and degassing. The model is capable of describing conduits with elliptical cross sections and depth-dependent dimensions.



Aravena, A, M. de' Michieli Vitturi, R. Cioni, and A. Neri. "Physical constraints for effective magma-water interaction along volcanic conduits during silicic explosive eruptions." *Geology* 46, no. 10 (2018): 867-870.

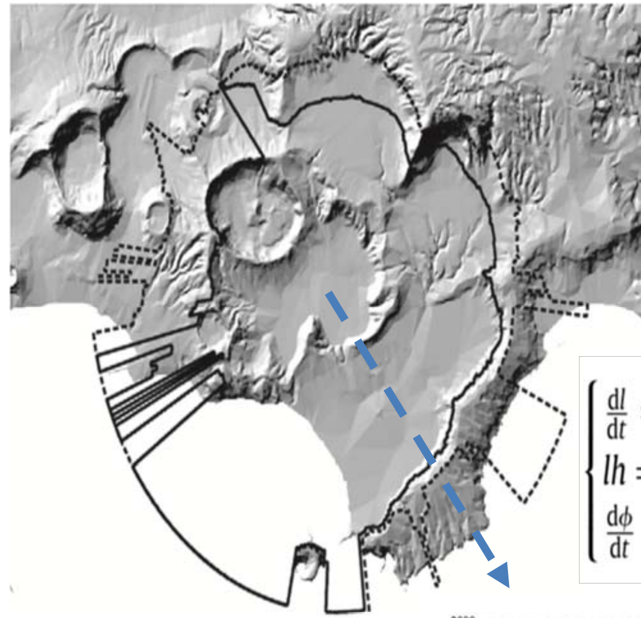
La Spina, G, M. Burton, M. de'Michieli Vitturi, and F. Arzilli. "Role of syn-eruptive plagioclase disequilibrium crystallization in basaltic magma ascent dynamics." *Nature communications* 7 (2016): 13402.

PyBOX

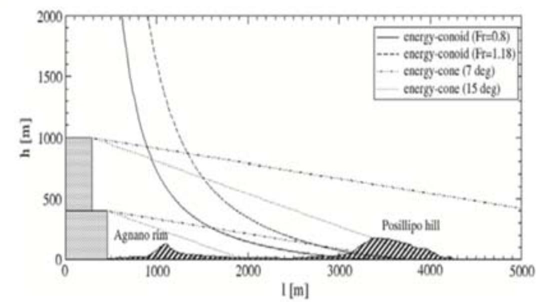
PyBOX is a Python/Fortran90 code that solves the so-called «box model» equations describing the kinematics of a pyroclastic density current over a flat surface and in a steady atmosphere.

The model integrates a procedure to account for blockage of PDCs by a rugged topography imported as a ASCII file, by adopting the so-called «energy-conoid» approach.

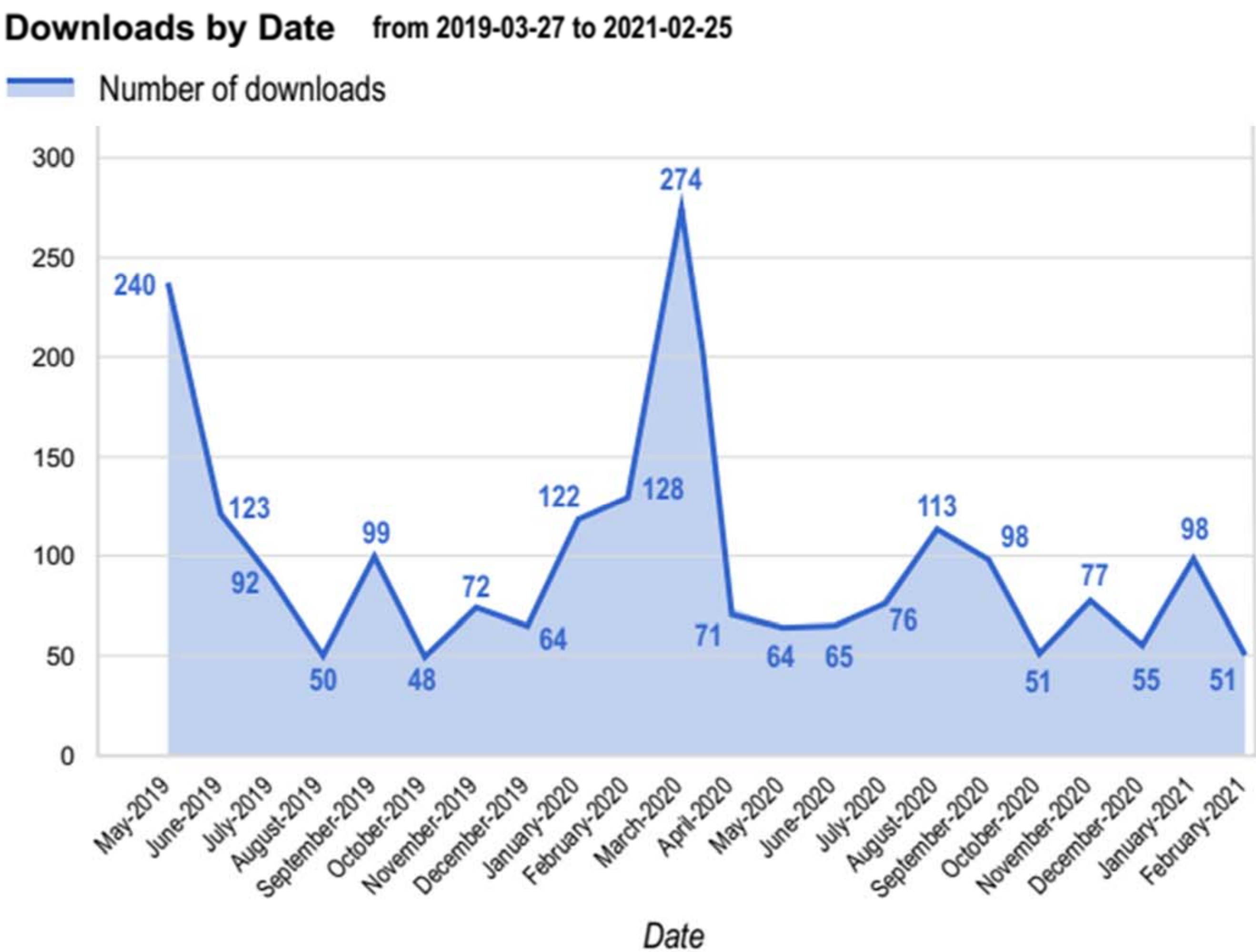
Virtual Access will include an interface to import the DEM file and input parameters and to visualize georeferenced maps of invasion and plots of decaying dynamic pressure.



$$\begin{cases} \frac{dl}{dt} = \mathrm{Fr}(g'h)^{1/2} = \mathrm{Fr}(g'_p \phi h)^{1/2} \\ lh = l_0 h_0 = A \\ \frac{d\phi}{dt} = -\frac{w_s \phi}{h}. \end{cases}$$



Esposti Ongaro, T. , Orsucci, S., & Cornolti, F. (2016). A fast, calibrated model for pyroclastic density currents kinematics and hazard. Journal of Volcanology and Geothermal Research, 327, 257-272.



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The future

- Add entries to EUROVOLC wiki
- Add another package to calculate synthetic geophysical signals

- After EUROVOLC the infrastructure will most probably be mantained within EPOS ERIC