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A conductive thermal model of the Campi Flegrei magmatic system.

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A 2-dimensional conductive model has been computed to simulate the thermal evolution of the Campi Flegrei magmatic system. A 2D finite difference scheme is proposed to solve the problem of the heat transfer inside and around a magma body. Moreover, the displacement of the boundary separating the melt and the solid magma, in the reservoir and the conduit, due to magma crystallization, is computed with an ad hoc fixed grid scheme. It is also considered the thermal problem of the emptying of a large magma chamber.

The numerical code here presented has been used considering as initial and boundary conditions a general crustal structure determined by geology and geophysics and the major magmatic events, the 39 ka Campanian Ignimbrite and the 15 ka Neapolitan Yellow Tuff, that casused two large collapses of the Campi Flegrei caldera. The magma chamber parameters used in modelling, as depths, volumes and dimensions, are deduced by the melt inclusion, geochemical and volcanological data, such as erupted volumes, caldera collapses and diameters.