

Evolution processes of hydrothermal fluids from a crystallizing magma chamber

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Evolution processes of hydrothermal fluids from a crystallizing magma chamber were modeled based on a very simple model of magma chamber cooling and crystallization. The fluid evolution pattern largely depends on the existence of magma convection or differentiation during cooling. When a magma chamber crystallize without any magma convection, it solidified from outer rim to inner core without any changes in fluid composition. In contrast, when magma chamber crystallize homogeneously by convection, the evolved fluid composition can change with time. As fluid exsolution occurs where melt crystallizes, therefore fluids distribute along every grain boundary as the initial condition, and the fluids likely flow through the sub-solidus magma as permeable flow.