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In the continental crust, silicate rich melts with their range of composition are one of the prime sources of ore on Earth. Understanding how such fluids propagate and interact with the lithosphere is therefore of prime interest to study (i) the long-term lithospheric dynamics with emphasis on its deformation and the weakening effects related the weakening properties of fluids or (ii) to predict how ore concentration can form, in relation with the deformation and/or the chemical evolution of the melts and simply (iii) how pegmatite are emplaced. Generally speaking,pegmatites are igneous rocks, most of the time with a granitic composition and are characterised by a crystal growth dominated texture (with graphitic intergrowth). They are often enriched in rare elements such as Li, Cs, Be, Ta, (amongst others) offering valuable ore deposit of economical interest and they produce amongst the purest minerals used in the ceramic industry (e.g. quartz, feldspar, mica…). Recent experimental constraints show that pegmatitic melt must have crystalized ca. 130°C below their solidus (∼630°C at 2 kbar), and thus be emplaced extremely fast. In nature we observe pegmatite as fields at different crustal levels (lower to mid, mid and upper levels). Statistical approaches show that the organisation of a pegmatite field is directly related to the host rock: clustering along brittle fault in the upper levels, scattering in the mid to lower crustal levels. Here, we use the finite difference approach to solve for this two-phase flow problem. The formulation couples a Stokes solver to predict the deformation of the porous matrix to a non-linear Darcy flow representing the pore fluid. The code run on GPU(s) (Graphic Process Unit) allowing fast and high-resolution calculation in order to bypass problems related to the dependence on the grid resolution. Here, we show that we reproduce the first order geometry of a pegmatite fields using a numerical modelling approach. We discuss our results and discuss the effects heterogeneities in the host porous media.