The question to consider is : Are crystal sinking and bubble rising important processes during cooling and crystallization of lavas (considering the physical properties of magmas and their components)?

For this problem we can consider first that we analyzing a basaltic lava flow that is 40 ft (12.192 m) thick. We first assume the lava temperatures is ~ 1200˚C. Then we consider the properties of lava that can affect its cooling: viscosity, density, and thermal conductivity. Basaltic lava has low viscosity and therefore flows faster. The viscosity can range from 10 to 100 Pa·s and density can range from 2650 - 2800 kg/m^3. We also consider fouriers law for heat conduction.

$$q = -k\frac{dT}{dx}$$, where k is thermal conductivity, q is heat flux, and dT/dx is the thermal gradient.

We can assume that the heat flux is constant and use a temperature gradient, $q = -k\Delta T$

So we assume a thermal conductivity of ~ 0.6 W/ (m k). We also know that the lava will fully solidify at 800 C. We also consider newtons las of cooling

$$\frac{dT}{dt} = -h\left(T - T_\infty\right) \quad , \qquad h = \frac{q}{\Delta T}$$

So then,

$$\int dT = \int -h\left(T - T_\infty\right)dt$$

$$T\left(t\right) = T_\infty + \left(T(0) - T_\infty\right)e^{-ht}$$

Considering this equation and the values above we can see that the cooling of magma is related to the thermal conductivity and is on the order of mins-days(for basaltic lava flows). We see that there will be fast cooling.

Now we consider stokes law, and excess gravitational force due to weight and buoyancy of a particle in the melt we have,

$$F_d = 6\pi\mu Rv \qquad F_g = \rho_p - \rho_f + g\frac{4}{3}\pi R^3$$

For lava flow not on a steep flow we can assume a speed of 0.27m/s.

So a particle settling equation can be derived from F_d = F_g,

$$v = \frac{2}{9}\frac{p_p - p_f}{\mu} g R^2$$

$$V = \frac{2}{9}\left(\frac{3500\frac{kg}{m^3} - 2600\frac{kg}{m^3}}{100kg\frac{m}{s^2}\cdot\frac{1}{m^2}}\right)\left(9.81\frac{m}{s^2}\right)(\cdot 002m)$$

$$\approx 5 \times 10^{-6}\frac{m}{s}$$

$5 \times 10^{-6} \frac{m}{s} \times t = 10m$

$= 2 \times 10^{6}$ seconds

From the settling equation we can infer that the crystals will take about a month to settle in about 10m thick melt, the sinking velocity is proportional to the density contrast between the solid and the liquid (so denser minerals sink faster than less dense ones), the sinking velocity is inversely proportional to the viscosity(so a crystal would sink faster in basaltic magma than it would in more viscous granitic magma), and the sinking velocity is proportional to the square of the diameter of the grain. From this we can also say that if the crytals have time to sink then cooling was slow and the crystals will be larger, therefore the rock formed will be coarser grained.

Then if we see more crystals(and bubbles) in the melt it is because the melt had high viscosity. So for flows with lower viscosity we will also we will see less crystal growth(and we know a basaltic lava flow has low viscosity).
Bubbles in magma will increase viscosity and therefore facilitate crystallization.