Table S1. Summary of notations. An estimate is given for parameters used in the analytical model (Text S2).

$\vec{v}$	Velocity of the hydrothermal fluid (m/s)
k	Permeability of the hydrothermal layer (m^2)
ρ	Density of the hydrothermal fluid (kg/m^3)
c_P	Heat capacity of the hydrothermal fluid (J/kg/K)
U	Internal energy of the hydrothermal fluid (J/kg)
μ	Kinematic viscosity of the hydrothermal fluid (5.1×10^{-5} Pa.s)
T	Temperature of the hydrothermal fluid and surrounding rock (K)
$\overline{c}_P$	Equivalent heat capacity of the rock-melt-fluid system (J/kg/K)
$\overline{\rho}$	Equivalent density of the rock-melt-fluid system (kg/m^3)
$\overline{U}$	Equivalent internal energy of the rock-melt-fluid system (J/kg)
λ	Thermal conductivity (2 W/m/K)
κ	Thermal diffusivity (10^{-6} m^2/s)
$\vec{q}$	Conductive heat flux (W/m^2)
ρ_m	Density of the melt (2700 kg/m^3)
c_{Pm}	Heat capacity of the melt (1400 J/kg/K)
γ	Thermodynamic parameter = $\rho c_P / \overline{\rho c}_P$
x_L	Melt fraction
x_C	Crystal fraction ($x_C + x_L = 1$)
L	Latent heat of crystallization (4.2×10^5 J/kg)
T_0	Seafloor temperature (0°C)
T_{cut}	Maximum temperature of percolation for the hydrothermal fluid (700°C)
T_S	Solidus temperature (1000°C)
T_L	Liquidus temperature (1200°C)
h_{AMC}	Initial AMC thickness (60 – 900 m)
z_{AMC}	Initial AMC depth (1500 m)
g	Acceleration of gravity ($9.8\ m/s^2$)
δ	Thickness of the thermal boundary layer between isotherms T_{cut} and T_S
Ra_C	Critical Rayleigh number ($4\pi^2$)
$V^{1000°C}$	Downward migration rate of the 1000°C isotherm (m/s)
$\Delta\rho$	Density variation of the hydrothermal fluid between T_{cut} and T_0 ($950\ kg/m^3$)
F^d	Heat flow below the discharge zone (W/m^2)
F^r	Heat flow below the recharge zone (W/m^2)
dx_L/dt_{MAX}	Maximum rate of crystallization (%melt/yr)