

COMPUTATIONAL TECTONICS

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From tectonics to geodynamics

$$\rho \frac{D\mathbf{v}}{Dt} = -\nabla p + \mu \nabla^2 \mathbf{v} + \rho \mathbf{g}$$

$$\dot{\gamma}_x = \frac{1}{2} \cdot \left(\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x} \right)$$

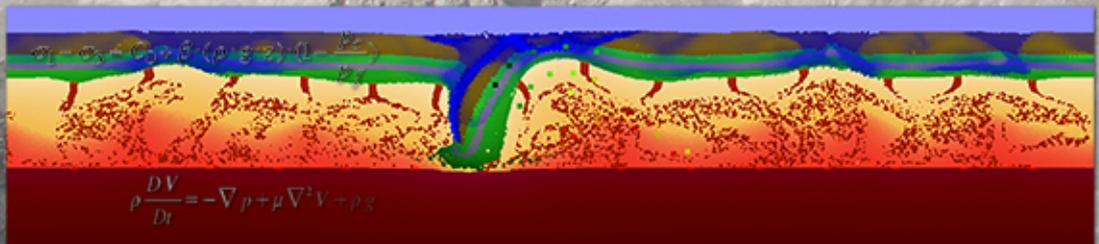
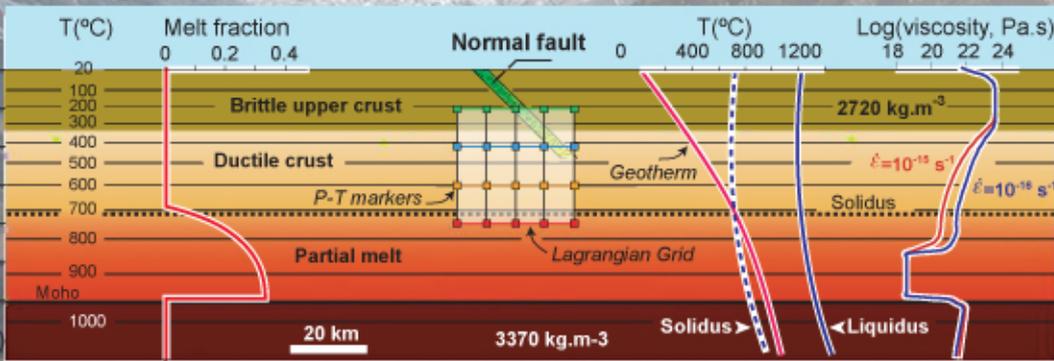
$$\dot{\gamma}_y = \frac{1}{2} \cdot \left(\frac{\partial v}{\partial z} + \frac{\partial w}{\partial y} \right)$$

$$\dot{\gamma}_z = \frac{1}{2} \cdot \left(\frac{\partial w}{\partial x} + \frac{\partial u}{\partial z} \right)$$

Recent advances in numerical methods, numerical codes and high-performance computers provide geoscientists with the ability to model crustal-scale to plate-scale to mantle-scale processes.

Computational Tectonics is a 3-day course dedicated to honours students and postgraduate geoscientists keen to develop a practical expertise in computational tectonics using Underworld.

Time = t_0



$$0 = -\frac{\partial p_x}{\partial x} + \mu \left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} \right) + \rho g_x$$

$$0 = -\frac{\partial p_y}{\partial y} + \mu \left(\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} + \frac{\partial^2 v}{\partial z^2} \right) + \rho g_y$$

$$0 = -\frac{\partial p_z}{\partial z} + \mu \left(\frac{\partial^2 w}{\partial x^2} + \frac{\partial^2 w}{\partial y^2} + \frac{\partial^2 w}{\partial z^2} \right) + \rho g_z$$

$$Ra_{\text{eff}} = \frac{\rho_0 \cdot g \cdot \alpha \cdot z_m^3 \cdot (Q_m \cdot z_m + H \cdot z_m^2)}{\eta \cdot K}$$

