1. Divergent evolutionary pathways of Induced subduction initiation

From our numerical model, different plastic parameters and plate age lead to different structural models of subduction initiation.

\[ \tau_f = \mu_0 f + C, \]
\[ \mu = \mu_0 \left( 1 - \min\left( \frac{\rho_f}{\rho_0}, 1 \right) \right), \]
\[ C = C_0 + \left( C_0 - C_f \right) \left( 1 - \min\left( \frac{\rho_f}{\rho_0}, 1 \right) \right). \]

Fig. 3. (right) (a) model setup. (b) initial temperature. (c) initial viscosity. (d) mode 1: continuous with backarc spreading. (e) mode 2: segmented. (f) mode 3: continuous without backarc spreading.

2. A preliminary melting model for studying magma records during subduction initiation

The samples recovered from deep sea drilling program at the forearc region can be used to infer the melting process associated with the subduction initiation (e.g. Fig. 6). We develop a combined parameterization melting model (Fig. 7).

Fig. 6 (above) Inferred cross section from petrological and geochemical analysis of samples recovered from recent deep sea dives in the Mariana forearc near Guam.

Fig. 7 (above) The flow chart of the combined melting model.

- Type 1 (SiO₂ > 51%, MgO < 10%)
- Type 2 (SiO₂ < 51%, 10% < MgO < 13%)
- Type 3 (SiO₂ < 51%, MgO > 13%)
- Type 4 (SiO₂ > 51%, MgO > 15%)

Fig. 8 (above) Melting results from the combined melting model for subduction initiation.