



**(b)**

### Geomechanical model

Permeability from normal displacement  $\delta$  at each section

$$K_i = \frac{\delta_i^2}{12}$$



### Calculate effective permeability

Serial: 
$$K_a = \frac{n_a}{\sum_i^{n_a} \frac{1}{K_{a,i}}}$$

Parallel:

$$K_{\text{frac}} = \frac{w_a K_a + w_b K_b}{w_a + w_b}$$



### Hydrogeological model

Add fracture permeability ( $K_{\text{frac}}$ ) to matrix ( $K_m$ )

$$K = \frac{\delta_{\text{eff}} K_{\text{frac}} + (dx - \delta_{\text{eff}}) K_m}{dx}$$