

$$\begin{aligned}
 u_{s,i} &= u_e \left(\frac{\theta}{\theta_{sat}} \right)^b \\
 &= \text{MPa} \left(\frac{\cancel{\text{m}^3} \cancel{\text{m}^3}}{\cancel{\text{m}^3} \cancel{\text{m}^3}} \right) \\
 &= \text{MPa}
 \end{aligned}$$

$$\begin{aligned}
 R_{s,i} &= \frac{\ln \left(\frac{r_s}{r_r} \right)}{2\pi b D k_{soil}} \\
 &= \frac{\cancel{\frac{\text{m}}{\text{m}}}}{\frac{\frac{\text{m}}{\text{m}^3} \times \text{m} \times \frac{\text{m}^2}{\text{s MPa}}} \\
 &= \frac{1}{\text{m}^4}
 \end{aligned}$$

$$\text{m}^3 \text{ s MPa}$$

$$= \frac{\text{M}^{\cancel{3}^2} \text{ s MPa}}{\text{m}^{\cancel{4}^3}}$$

$$= \frac{\text{m}^2 \text{ s MPa}}{\text{m}^3}$$

$$a_1 = \frac{-k_{x1}}{C_1}$$

$$= \frac{\text{mmol}}{\text{m}^2 \text{ MPa s}}$$

$$\frac{\text{mmol}}{\text{m}^2 \text{ MPa s}}$$

$$= \frac{\cancel{\text{mmol}}}{\cancel{\text{m}^2 \text{ MPa s}}} \times \frac{\cancel{\text{m}^2 \text{ MPa s}}}{\cancel{\text{mmol}}}$$

= Unitless

$$b) = \varphi_{x, k-1} k_{x1} - (L A | E)$$

C1

$$= \cancel{\text{MPa}} \times \frac{\text{mmol}}{\text{m}^2 \text{ s MPa}} - \frac{\text{mmol}}{\text{m}^2 \text{ s}} \times \frac{\cancel{\text{m}^2}}{\cancel{\text{MPa}}}$$

$$\frac{\text{mmol}}{\text{m}^2 \text{ MPa s}}$$

$$= \cancel{\text{mmol}} - \cancel{\text{mmol}}$$

$$\begin{aligned}
 & \frac{\frac{\text{mmol}}{\text{m}^2 \text{ s}}}{\frac{\text{mmol}}{\text{m}^2 \text{ MPa s}}} \\
 &= \frac{\text{MPa} \cancel{\text{m}^2} \cancel{\text{s}}}{\frac{1}{\cancel{\text{m}^2} \cancel{\text{s}}} - \frac{1}{\cancel{\text{m}^2} \cancel{\text{s}}}} \\
 &= \text{MPa}
 \end{aligned}$$

$$a_{\text{K}} = \frac{k_{\text{sx}}}{C_{\text{S}}}$$

$$\begin{aligned}
 &= \frac{\text{mmol}}{\cancel{\text{m}^2 \text{ s}} \text{ MPa}} \\
 &= \frac{\text{mmol}}{\text{MPa}}
 \end{aligned}$$

$$\frac{\text{mmol}}{\text{m}^2 \text{ MPa s}}$$

= unitless

$$b_x = \frac{k_{gx} Q_{\text{soil}} - J_{\text{sl}}}{C_s}$$

$$\frac{\text{mmol}}{\text{m}^2 \text{ s MPa}} \times \text{MPa} - \frac{\text{mmol}}{\text{m}^2 \text{ s}}$$

$$\frac{\text{mmol}}{\text{m}^2 \text{ MPa s}}$$

$$\frac{\cancel{\text{MPa}} \text{ mmol}}{\text{m}^2 \text{ s } \cancel{\text{MPa}}} - \frac{\text{mmol}}{\text{m}^2 \text{ s}}$$

$$\text{mmol}$$

$$\frac{\text{mmol}}{\text{m}^2 \text{ MPa s}}$$

$$\frac{\cancel{\text{mmol}}}{\text{m}^2 \text{ s}} - \frac{\cancel{\text{mmol}}}{\text{m}^2 \text{ s}}$$

$$\frac{\cancel{\text{mmol}}}{\text{m}^2 \text{ MPa s}}$$

$$= \frac{\cancel{\text{m}^2 \text{ MPa s}}}{\text{m}^2 \text{ s} - \text{m}^2 \text{ s}}$$

$$\frac{1}{\cancel{\text{m}^2 \text{ s}}} - \frac{1}{\cancel{\text{m}^2 \text{ s}}}$$

$$= \text{MPa}$$
