

$$\frac{w_{i,k+\frac{1}{2}}^n}{\theta_w \Delta t} - \frac{\overline{\phi_{i+\frac{1}{2},k+\frac{1}{2}}^n}^z \overrightarrow{y_{1;i+\frac{1}{2}}} \left(\hat{w}_{i+\frac{1}{2},k+\frac{1}{2}}^n - w_{i,k+\frac{1}{2}}^n \right) - \overline{\phi_{i-\frac{1}{2},k+\frac{1}{2}}^n}^z \overrightarrow{y_{1;i-\frac{1}{2}}} \left(\hat{w}_{i-\frac{1}{2},k+\frac{1}{2}}^n - w_{i,k+\frac{1}{2}}^n \right)}{\overline{h_{i,k+\frac{1}{2}}^n}^z y_{1;i} \Delta r_i} + \boxed{\frac{\alpha}{y_{1;i}} \frac{\overline{\phi_{i,k+\frac{1}{2}}^n}^{rz}}{\overline{h_{i,k+\frac{1}{2}}^n}^z} w_{i,k+\frac{1}{2}}^n}$$