



# Total-load Transport Equation

- $k$  : Grain class
- $h$  : Water depth
- $C_{tk}$  : Total-load concentration
- $\beta_{tk}$  : Total-load correction factor
- $U$  : Current velocity
- $\epsilon_{tk}$  : Total-load diffusion coefficient
- $E_{tk}$  : Total-load erosion rate
- $D_{tk}$  : Total-load deposition rate

2D Computational Options

Transport

Advection Scheme: Exponential

Sediment Matrix Solver: PARDISO

Implicit Sediment Weighting Factor: 1.

2D Methods:

AD Parameters | **Erosion Parameters**

Adaptation Coefficient

Total Load: Total Length  
Total Length: 200. ft

Suspended Adaptation Coefficient: Constant Coefficient  
Constant Coefficient:

Bed Load Adaptation Length: Constant Length  
Length:  ft

$$\frac{\partial}{\partial t} \left( \frac{hC_{tk}}{\beta_{tk}} \right) + \nabla \cdot (h\mathbf{U}C_{tk}) = \nabla \cdot (\epsilon_{tk} h \nabla C_{tk}) + E_{tk} - D_{tk}$$

Temporal/Storage
Advection
Diffusion
Erosion
Deposition

2D Methods:

AD Parameters | Erosion Parameters

Load Correction Factor

Total-load Correction Factor (Relative Particle Vel)

Bed-Load Correction Factor: Van Rijn-Wu

Suspended-Load Correction: Exponential Conc Profile

Diffusion Coefficient

Total-Load Diffusion Method: Weighted Suspended and Bedloac


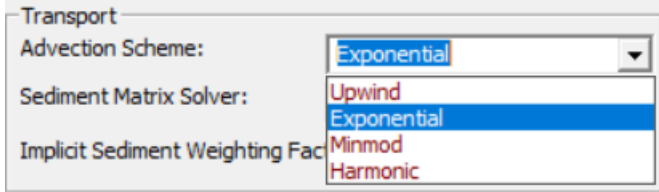

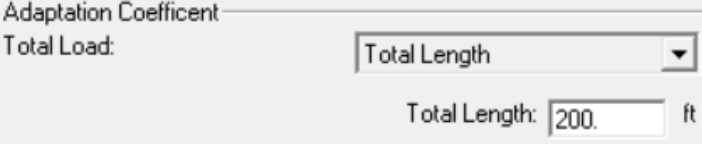
Susp Diffusion Method: Dynamic  
C

Bed Load Diffusion Method: Dynamic  
C



# User Defined Terms in the Transport Equation



Variable	Term	Interface	Notes and Recommendations
$\beta_{tk}$ Load Correction Factor (Relative Particle Velocity)	$\frac{\partial}{\partial t} \left( \frac{hC_{tk}}{\beta_{tk}} \right)$		Will be sensitive for rapid rates of change and insensitive for slow rates of change.
$\nabla \cdot (h\mathbf{U}C_{tk})$ Advection Scheme	$\nabla \cdot (h\mathbf{U}C_{tk})$		Use the default advection scheme: <b>Exponential</b>
$\epsilon_{tk}$ Dispersion Coefficient	$\nabla \cdot (\epsilon_{tk} h \nabla C_{tk})$		More important for suspended load than bedload.
$L_a$ Adaptation Length	$E_{tk}$		Scales to the cell size (or up to 50% larger)

$$\frac{\partial}{\partial t} \left( \frac{hC_{tk}}{\beta_{tk}} \right) + \nabla \cdot (h\mathbf{U}C_{tk}) = \nabla \cdot (\epsilon_{tk} h \nabla C_{tk}) + E_{tk} - D_{tk}$$