**Overview**: This machine learning (ML)-enabled sediment settling calculator provides a tool for resources managers to quickly estimate how far sediment can be transported downstream under predefined hydraulic conditions. The model assumes sediment density of 2650 kg/m3.

Two ML models (Kolmogorov-Arnold Networks (KAN) and Randon Forest (RF)) were trained based on 41,600 process-based simulations. The trained models can provide fast prediction on probability density function of sediment settling distance. Detailed data and analyses supporting the hydraulic calculations can be found in Sun et al. (2024) and Xu et al. (2025).

**Instruction**: This calculator can be used for two scenarios:

Scenario #1: settling of single particle

Users input particle diameter and two key hydraulic parameters: (1) mean flow velocity (must be within 0.1–1 m/s) and (2) water depth (must be within 0.5–10 m). These parameter ranges are derived from data collected across 49 reaches within 21 streams and rivers in Missouri, United States.

Model output:

1. A plot for the best log-normal probability density function (PDF) of sediment settling distance predicted by two ML models
2. The model computed and for the log-normal distribution. Median settling distance and variance are also given.

Scenario #2: settling of multiple particles

Users only need to input the hydraulic parameters: (1) mean flow velocity (must be within 0.1–1 m/s) and (2) water depth (must be within 0.5–10 m). The particle diameters are a fixed size range (0.01-20 mm with median diameter of mm, log-normal distribution). Similar to Scenario #1, the model will output the PDF and the predicted distribution parameter and , as well as median and variance of sediment settling distance.

**Reference**:

Sun et al. (2024). xxx

Xu et al. (2025). xxx