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Investigations of Dynamic Behaviors of Lock-exchange Turbidity  
Currents down a Slope Based on Direct Numerical Simulation

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**Highlights**

- Direct numerical simulations are conducted to investigate dynamics of lock-exchange turbidity currents down slopes in terms of the front velocity, energy budget, and water entrainment ratio.
- The evolution process of a turbidity current can be divided into a first acceleration stage, a second stage during which its behavior is determined by the slope angle, and a third deceleration stage.
- A dynamic reference plane defined at the lowest point of the turbidity current is proposed to analyze the energy budget.
- Both bed slope and sediment settling do not show an appreciable effect on the water entrainment ratios.

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