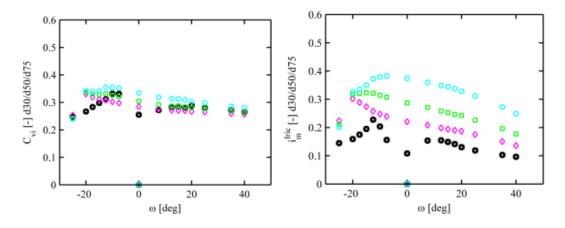
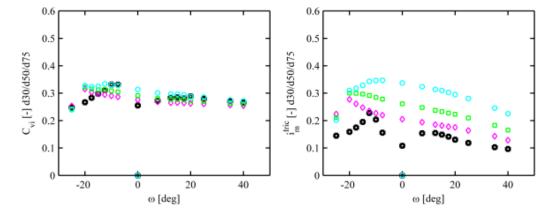
Appendix

Two-layer model results for the broadly graded slurry flow.

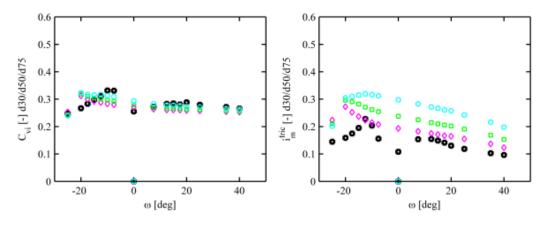
FricEq (2):



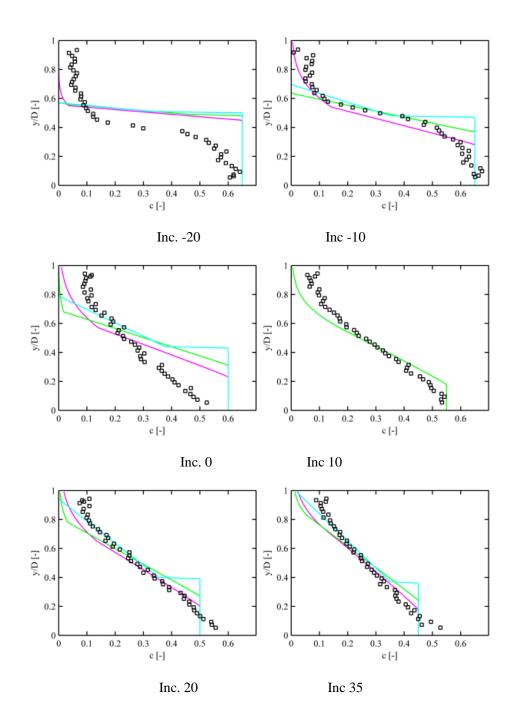
FricEq (6):



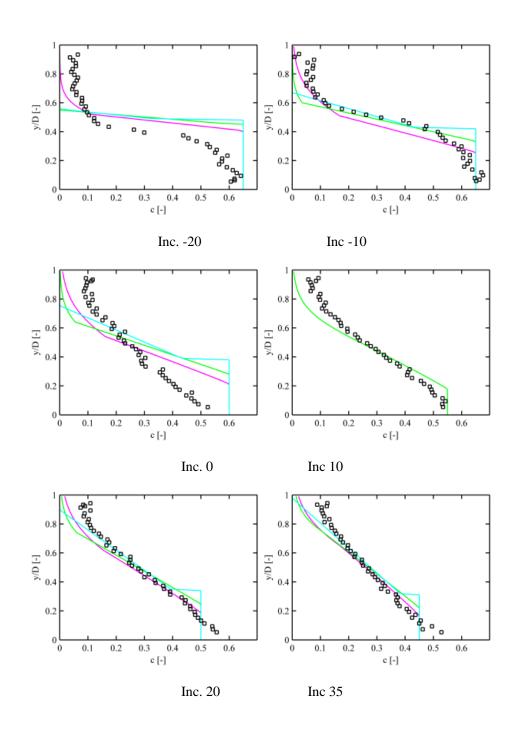
FricEq (9):



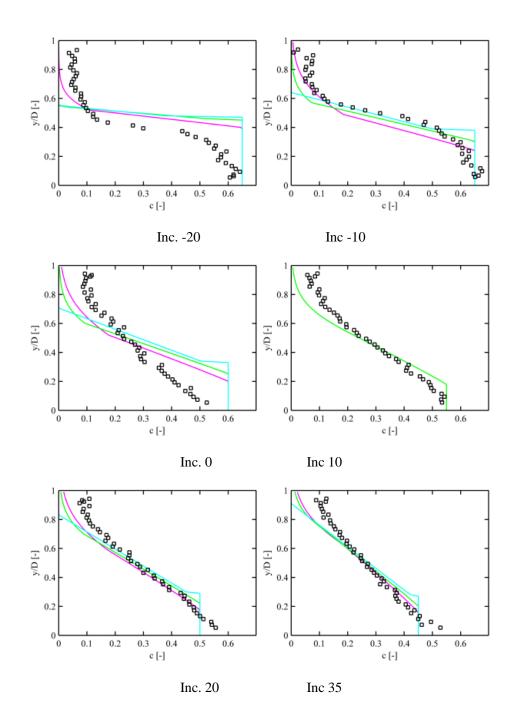
Results for different friction gradients and spatial volumetric concentrations, of sand-water flow, at $V_m \approx 2.5$ m/s and $C_{vd} \approx 0.24$, at different inclination angles, with transpEq = 1, Cmode = 1, fricEq = 2-6-9; Legend: black-square Measured frictional hydraulic gradient/ C_{vi} ; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24$ at different inclination angles, with transpEq = 1, Cmode = 1, fricEq 2; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24$ at different inclination angles, with transpEq = 1, Cmode = 1, fricEq 6; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24$ at different inclination angles, with transpEq = 1, Cmode = 1, fricEq 9; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.

FricEq (2): 0.6 0.5 0.5 C_{vd} [-] d30/d50/d75 i^{fric} [-] d30/d50/d75 0.4 0.4 0.3 0.3 0.2 0.1 0.1 40 -20 -20 20 20 40 ω [deg] ω [deg] FricEq (6): 0.6 0.6 0.5 0.5 C_{vd} [-] d30/d50/d75 i^{fric} [-] d30/d50/d75 0.4 0.4 0.3 0.3 0.2 0.2 0.1 0.1 0 -20 20 40 -20 20 40 ω [deg] ω [deg] FricEq (9): 0.6 0.6 0.5 0.5 C_{vd} [-] d30/d50/d75 i^{fric} [-] d30/d50/d75 0.4 0.4 0.3 0.3 0.2 0.2 0.1 0.1

Results for different friction gradients and spatial volumetric concentrations, of sand-water flow, at $V_m \approx 2.5$ m/s and $C_{vd} \approx 0.24$, at different inclination angles, with transpEq = 1, Cmode = 2, fricEq = 2-6-9; Legend: black-square Measured frictional hydraulic gradient/ C_{vi} ; green-square: d50; magenta-diamond: d30; cyan-circle: d75.

0

-20

0

ω [deg]

20

40

0

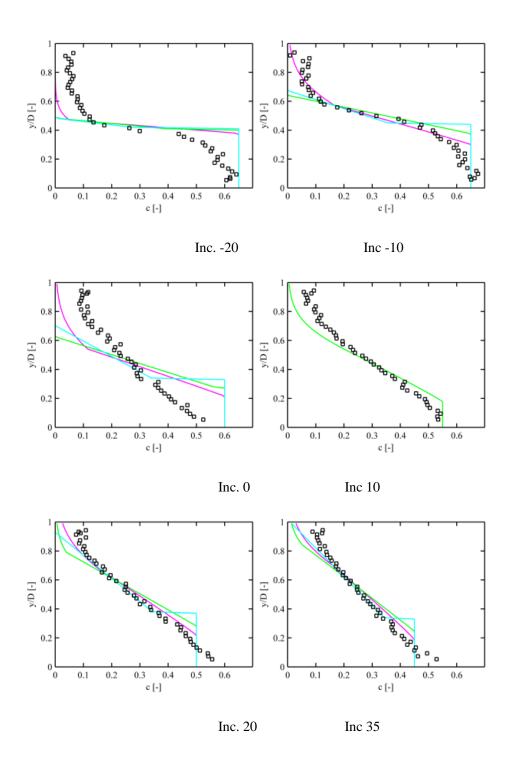
-20

0

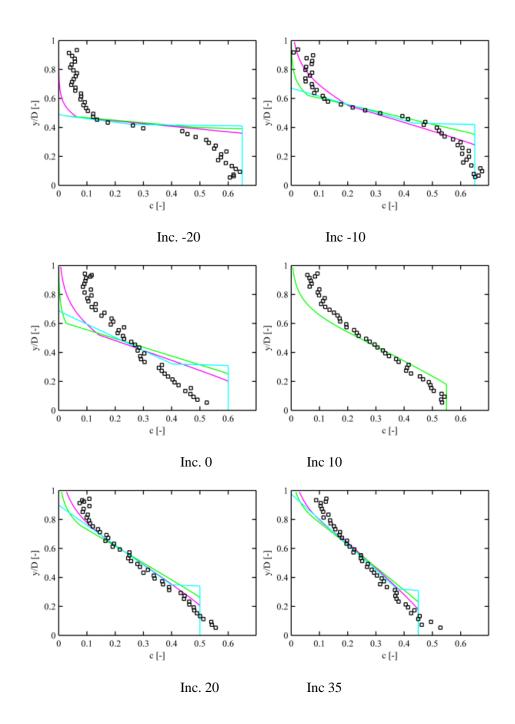
ω [deg]

20

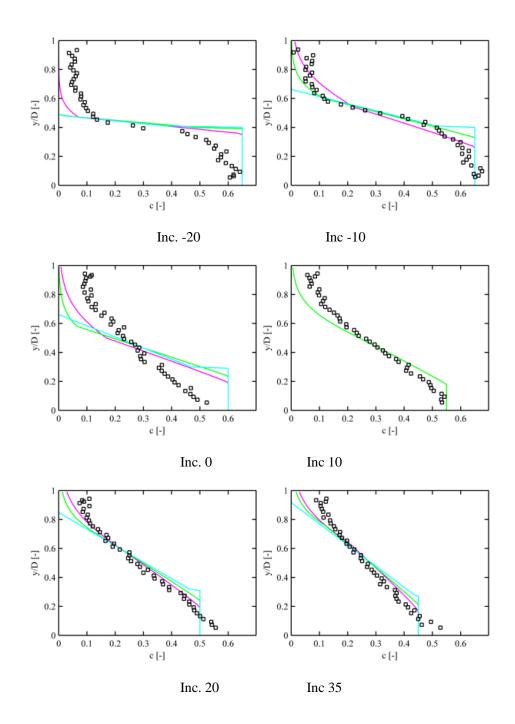
40



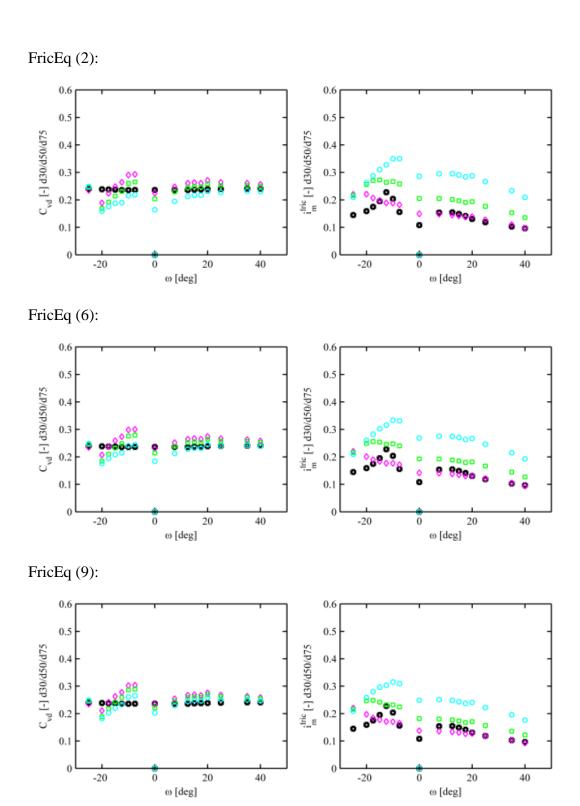
Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24$ at different inclination angles, with transpEq = 1, Cmode = 2, fricEq 2; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



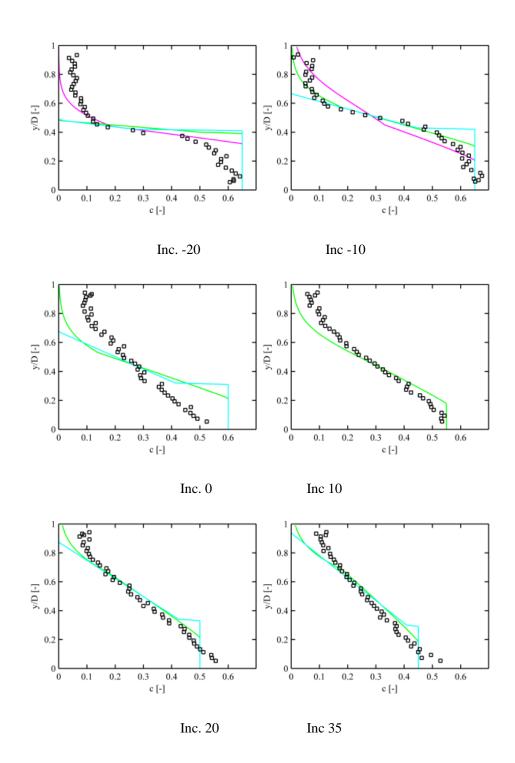
Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24$ at different inclination angles, with transpEq = 1, Cmode = 2, fricEq 6; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



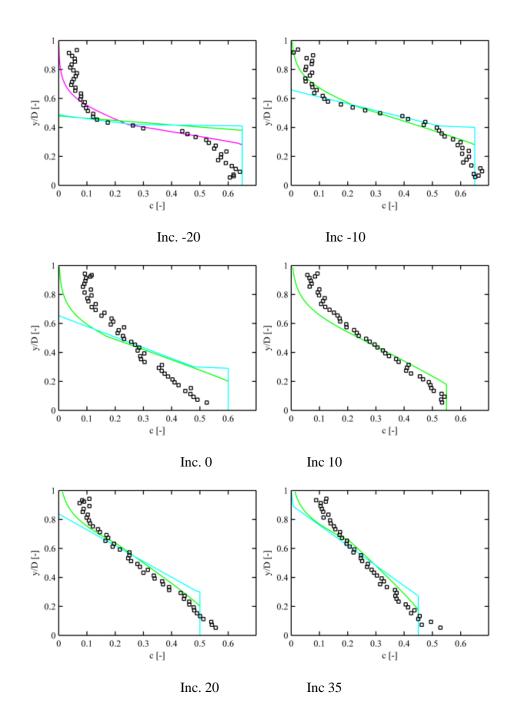
Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24 \text{ at different}$ inclination angles, with transpEq = 1, Cmode = 2, fricEq 9; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



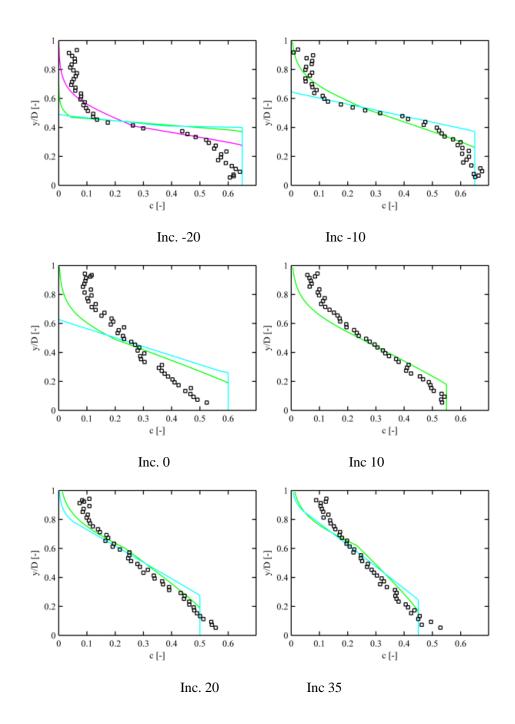
Results for different friction gradients and spatial volumetric concentrations, of sand-water flow, at $V_m \approx 2.5$ m/s and $C_{vd} \approx 0.24$, at different inclination angles, with transpEq = 2, Cmode = 2, fricEq = 2-6-9; Legend: black-square Measured frictional hydraulic gradient/ C_{vi} ; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24$ at different inclination angles, with transpEq = 2, Cmode = 2, fricEq 2; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24$ at different inclination angles, with transpEq = 2, Cmode = 2, fricEq 6; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.



Solids concentration profile of sand-water flow at $V_m \approx 2.5 \text{ m/s}$ and $C_{vd} \approx 0.24$ at different inclination angles, with transpEq = 2, Cmode = 2, fricEq 9; Legend: black-square: measured concentration profile; green-square: d50; magenta-diamond: d30; cyan-circle: d75.