

Appendix I

Comparison of experimental conditions in relevant studies

| | Particle diameters (mm) | Volumne (mm cubed) | Mass (kg) | ψ_{CRf} | Δ | System-to-grain size ratio [□] | N^{Sa} |
|------------------------------|---|--|--------------|--------------|-----------|--|---|
| Goujon et al. (2007) | 0.132, 0.225, 0.275, 0.325 | * | 0.176 | variable | 2.5 | ** | *** |
| Moro et al. (2010) | 0.15, 0.20, 1.00 | * | 10 | 0.25 | 6.7 | ** | *** |
| Yang et al. (2015) | 0.1-0.3, 0.42-2.00, 4.75-9.503 | 1.15×10^6 | 3 | variable | 35.6 | 3.3×10^4 | *** |
| Bartali et al. (2020) | 3.0, 1.5, 0.375 | * | 4 | <0.07 | 4.0-21.3 | ** | *** |
| Hu et al. (2020) | 1.0-4.0, 4.0-8.0, 8.0-12.0, 12.0-16.0 | * | 10 | 0.3 | 5.6 | ** | *** |
| Li et al. (2021) | 0.175, 1.5 | 2.00×10^7 - 8.00×10^7 | * | * | 8.6 | 4.8×10^7 - 1.9×10^8 | 1.0×10^{-3} - 1.0×10^{-1} |
| Duan (2022) | <0.075, 0.075-0.5 | 1.80×10^6 | * | 0.05 | 7.7 | 4.4×10^8 - 3.0×10^9 | *** |
| This study | 0.355-0.500, 0.5-1.0, 9.5-16.0, 16.0-22.4 | 1.33×10^7 - 20.00×10^7 | 20-30 | 0.05-0.15 | 17.0-44.9 | 5.0×10^4 - 6.9×10^4 | 1.5×10^{-2} - 1.7×10^{-1} |

* not reported

** could not be calculated because the volume is not reported

*** not calculated because required data was not available

□ at $\psi=0.5$

° for experimental series A