

1. Record Nr.	UNINA9910347046503321
Autore	Doychev Todor
Titolo	The dynamics of finite-size settling particles
Pubbl/distr/stampa	KIT Scientific Publishing, 2015
ISBN	1000044723
Descrizione fisica	1 electronic resource (XIX, 238 p. p.)
Collana	Dissertationsreihe am Institut für Hydromechanik, Karlsruher Institut für Technologie / Karlsruher Institut für Technologie (KIT), Institut für Hydromechanik
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Sommario/riassunto	<p>This book contributes to the fundamental understanding of the physical mechanisms that take place in pseudo turbulent particulate flows. In the present work we have considered the sedimentation of large numbers of spherical rigid particles in an initially quiescent flow field. We have performed direct numerical simulations employing an immersed boundary method for the representation of the fluid-solid interface. The results evidence that depending on the particle settling regime (i.e. Galileo number and particle-to-fluid density ratio) the particles may exhibit strong inhomogeneous spatial distribution. It is found that the particles are preferentially located in regions with downward fluid motion. The particles inside clusters experience larger settling velocities than the average. The flow in all flow cases is observed to exhibit characteristic features of pseudo-turbulence. The particle-induced flow field is further found to be highly anisotropic with dominant vertical components. The results indicate that, in the present flow configurations, the collective and mobility effects play significant role for the particle and fluid motion.</p>