

Preface

The chapters contained in this volume correspond to the lectures given during the course “Particles in wall-bounded turbulent flows: deposition, resuspension and agglomeration” that was held at the CISM, Udine (Italy), 14–18 September 2015.

The subject of particle dynamics in turbulent flows is a rich and diverse one, especially in the case of turbulent boundary layers. As indicated by the subtitle of the course, this issue was addressed with a view towards the theme of particle deposition. This general terminology includes a complex array of phenomena such as deposition of particles on walls but also resuspension and agglomeration. This is an intricate field involving an interplay between particle transport by turbulent flows, adhesion forces as well as material properties. This is also an interdisciplinary subject where numerical investigations complete experimental studies and help to develop models at various levels of description.

This volume starts with a general introduction to particle deposition by Jean-Pierre Minier. It is followed by a presentation of the experimental techniques needed to analyse the physics involved by René van Hout. The modelling aspects of turbulent flows and particle dynamics are discussed by Jacek Pozorski. The chapter written by Cristian Marchioli details the physical picture of particle transport in near-wall boundary layers revealed in recent years by direct numerical simulations. The complementary aspect of adhesion forces between particles and surfaces that is important in particle deposition is covered in the last chapter by Christophe Henry.

It is therefore believed that the present volume offers an up-to-date and comprehensive overview of the various phenomena playing a role in particle dynamics in wall-bounded flows and particle deposition.

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Re-Suspension and Agglomeration

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