



# Turbulent Multiphase Flows with Heat and Mass Transfer (Fluid Mechanics)

*Roland Borghi, Fabien Anselmet*

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Numerous industrial systems or natural environments involve multiphase flows with heat and mass transfer. The authors of this book present the physical modeling of these flows, in a unified way, which can include various physical aspects and several levels of complexity.

Thermal engineering and nuclear reactors; the extraction and transport of petroleum products; diesel and rocket engines; chemical engineering reactors and fluidized beds; smoke or aerosol dispersion; landslides and avalanches – the modeling of multiphase flows with heat and mass transfer for all these situations can be developed following a common methodology. This book is devoted to the description of the mathematical bases of how to incorporate adequate physical ingredients in agreement with known experimental facts and how to make the model evolve according to the required complexity.

## Contents

### Part 1. Approach and General Equations

1. Towards a Unified Description of Multiphase Flows.
2. Instant Equations for a Piecewise Continuous Medium.
3. Description of a “Mean Multiphase Medium”.
4. Equations for the Mean Continuous Medium.

### Part 2. Modeling: A Single Approach Adaptable to Multiple Applications

5. The Modeling of Interphase Exchanges.
6. Modeling Turbulent Dispersion Fluxes.
7. Modeling the Mean Gas–Liquid Interface Area per Unit Volume.
8. “Large Eddy Simulation” Style Models.
9. Contribution of Thermodynamics of Irreversible Processes.
10. Experimental Methods.
11. Some Experimental Results Pertaining to Multiphase Flow Properties that Are Still Little Understood.

### Part 3. From Fluidized Beds to Granular Media

12. Fluidized Beds.
13. Generalizations for Granular Media.
14. Modeling of Cauchy Tensor of Sliding Contacts.
15. Modeling the Kinetic Cauchy Stress Tensor.

### Part 4. Studying Fluctuations and Probability Densities

16. Fluctuations of the Gas Phase in Reactive Two-Phase Media.
17. Temperature Fluctuations in Condensed Phases.
18. Study of the PDF for Velocity Fluctuations and Sizes of Parcels.

## About the Authors

Roland Borghi is Professor Emeritus at Ecole Centrale Marseille in France and works as a consultant in the space, petrol and automobile sectors. His research activities cover fluid mechanics, combustion and flames, and multi-phase and granular flows. He was a member of the CNRS scientific committee and a laureate of the French Academy of Science.

Fabien Anselmet is Professor at Ecole Centrale Marseille in France. His research activities focus on the turbulence of fluids and its varied applications in industry and in fields linked to the environment.

With a unified, didactic style, this text presents tangible models of multiphase flows with heat and mass transfer with attention to various levels of complexities. It addresses thermal engineering and nuclear reactors, extraction and transport of petroleum products, diesel engines and rocket engines, chemical engineering reactors and fluidized beds, smoke or aerosol dispersion, and landslides and avalanches. Engineers, researchers, and scientists will appreciate the discussions of modeling principles, flows and granular media, and fluctuations around averages.

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