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Nota di contenuto	Intro -- Acknowledgements -- Collaborators -- Technical Aspects -- Financial Support -- Contents -- 1 Introduction and Motivations -- 1.1 Governing Equations for DNS of Multiphase Flows -- 1.1.1 Mass Conservation -- 1.1.2 Momentum Conservation -- 1.1.3 Fluid Assumptions -- 1.2 Interface and Jump Conditions -- 1.2.1 Surface Tension -- 1.2.2 Viscosity -- 1.3 The Final Model -- 2 DNS of Resolved Scale Interfacial and Free Surface Flows with Fictitious Domains -- 2.1 One-Fluid Model -- 2.2 General Discretization and Solvers -- 2.2.1 Pressure-Velocity Coupling and Solvers -- 2.2.2 Jump Conditions -- 2.2.3 Boundary Conditions -- 2.2.4 Poisson Pressure Solver -- 2.3 Methods for Handling Interfaces -- 2.3.1 Interface Tracking Methods -- 2.3.2 Front-Capturing (Implicit Interface) -- 2.3.3 SPH Methods -- 2.4 Capillary Effects and Jump Conditions at Interface -- 2.4.1 Ghost Fluid -- 2.4.2 Continuum Surface Force -- 2.5 Validations of Interface Tracking and Fictitious Domains -- 2.5.1 Comparison of Interface Tracking Methods -- 2.5.2 Density and Viscosity Averages -- 2.5.3 Capillary Forces -- 3 Interface Tracking -- 3.1 VOF -- 3.1.1 Introduction to VOF Methods -- 3.1.2 Initialization of the Color Function C -- 3.1.3 A Library to Initialize the Volume Fraction Field -- 3.1.4 Algebraic Methods for the Advection of the Color Function -- 3.1.5 Simple Geometric Methods for the Advection of the Color

Function -- 3.1.6 VOF-PLIC Methods: Interface Reconstruction -- 3.1.7 VOF-PLIC Methods: Interface Advection -- 3.2 Level Set -- 3.2.1 Level Set Definition -- 3.2.2 Numerical Method -- 3.2.3 Coupled Level-Set Volume of Fluid -- 3.2.4 Advection of the Level-Set Function and the Volume Fraction -- 3.3 Front Tracking -- 4 Adaptive Mesh Refinement -- 4.1 Introduction -- 4.2 AMR -- 4.3 Poisson Solver -- 4.4 Numerical Results.

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Note generali	Description based upon print version of record.
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Nota di contenuto	Introduction: Many Eyes in the Sky and Compound Eye -- Overview of current and future satellite missions for societal applications -- How is more eyes better than one eye? -- Theme: Water and Disaster Management -- Africa -- Asia -- South America -- Europe -- Issues and the Path Forward -- Theme: Agricultural Management -- Africa -- Asia -- South America -- Europe -- Issues and the Path Forward -- Theme: Energy and Carbon Management -- Africa -- Asia -- South America -- Europe -- Issues and the Path Forward -- Theme: Health and Eco-logical Forecasting -- Africa -- Asia -- South America -- Europe -- Issues and the Path Forward -- CLOSURE Chapter.
Sommario/riassunto	The combined observational power of the multiple earth observing satellites is currently not being harnessed holistically to produce more durable societal benefits. We are not able to take complete advantage of the prolific amount of scientific output and remote sensing data that

are emerging rapidly from satellite missions and convert them quickly into decision-making products for users. The current application framework we have appears to be an analog one lacking the absorption bandwidth required to handle scientific research and the voluminous (petabyte-scale) satellite data. This book will tackle this question: "How do we change this course and take full advantage of satellite observational capability for a more sustainable, happier and safer future in the coming decades?".
