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	Titolo	Compatible Finite Element Methods for Geophysical Flows : Automation and Implementation Using Firedrake / / by Thomas H. Gibson, Andrew T.T. McRae, Colin J. Cotter, Lawrence Mitchell, David A. Ham
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	Soggetti	Mathematics
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	Sommario/riassunto	This book introduces recently developed mixed finite element methods for large-scale geophysical flows that preserve essential numerical properties for accurate simulations. The methods are presented using standard models of atmospheric flows and are implemented using the Firedrake finite element library. Examples guide the reader through problem formulation, discretisation, and automated implementation. The so-called "compatible" finite element methods possess key numerical properties which are crucial for real-world operational

weather and climate prediction. The authors summarise the theory and practical implications of these methods for model problems, introducing the reader to the Firedrake package and providing open-source implementations for all the examples covered. Students and researchers with engineering, physics, mathematics, or computer science backgrounds will benefit from this book. Those readers who are less familiar with the topic are provided with an overview of geophysical fluid dynamics.