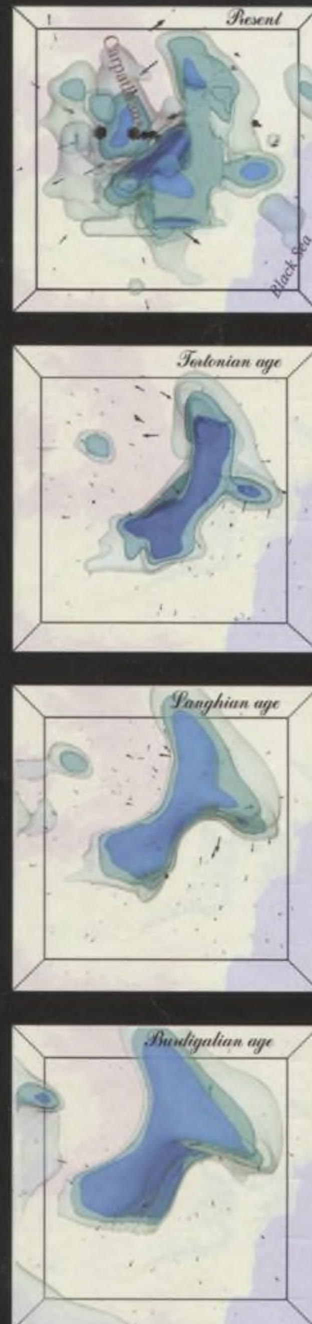
Computational Methods for GEODYNAMICS



Computational Methods for Geodynamics describes all the numerical methods typically used to solve problems related to the dynamics of the Earth and other terrestrial planets – including lithospheric deformation, mantle convection and the geodynamo.

It starts with a discussion of the fundamental principles of mathematical and numerical modelling, which is then followed by chapters on finite difference, finite volume, finite element and spectral methods; methods for solving large systems of linear algebraic equations and ordinary differential equations; data assimilation methods in geodynamics; and the basic concepts of parallel computing. The final chapter presents a detailed discussion of specific geodynamic applications in order to highlight key differences between methods and demonstrate their respective limitations. Readers learn when and how to use a particular method in order to produce the most accurate results.

This combination of textbook and reference handbook brings together material previously only available in specialist journals and mathematical reference volumes, and presents it in an accessible manner, assuming only a basic familiarity with geodynamic theory and calculus. It is an essential text for advanced courses on numerical and computational modelling in geodynamics and geophysics, and an invaluable resource for researchers looking to master cutting-edge techniques. Links to online source codes for geodynamic modeling can be found at www.cambridge.org/zadeh.

"An outstanding synthesis of contemporary issues in geodynamics with a rigorous but highly accessible treatment of modern methods in numerical modeling. I have no doubt that this book will be an invaluable resource for students and researchers entering the field of computational geophysics for years to come."

PROFESSOR DAVID BERCOVICI, Yale University

"This is the most current and complete book on computational geodynamics. I would recommend this book to every aspiring student or researcher interested in computations."

PROFESSOR DAVID YUEN, University of Minnesota

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