Título: Climate Dynamics

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Sinopsis

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Climate Dynamics is an advanced undergraduate-level textbook that provides an essential foundation in the physical understanding of the earth's climate system. The book assumes no background in atmospheric or ocean sciences and is appropriate for any science or engineering student who has completed two semesters of calculus and one semester of calculus-based physics.

Describing the climate system based on observations of the mean climate state and its variability, the first section of the book introduces the vocabulary of the field, the dependent variables that characterize the climate system, and the typical approaches taken to display these variables. The second section of the book gives a quantitative understanding of the processes that determine the climate state--radiation, heat balances, and the basics of fluid dynamics. Applications for the atmosphere, ocean, and hydrological cycle are developed in the next section, and the last three chapters of the book directly address global climate change. Throughout, the textbook makes connections between mathematics and physics in order to illustrate the usefulness of mathematics, particularly first-year calculus, for predicting changes in the physical world.

Climate change will impact every aspect of life in the coming decades. This book supports and broadens understanding of the dynamics of the climate system by offering a much-needed introduction that is accessible to any science, math, or engineering student.

Makes a physically based, quantitative understanding of climate change accessible to all science, engineering, and mathematics undergraduates
Explains how the climate system works and why the climate is changing
Reinforces, applies, and connects the basic ideas of calculus and physics
Emphasizes fundamental observations and understanding
An online illustration package and solutions manual for professors is available.