Manish Kumar Goyal · Shivam Singh

Understanding Atmospheric Rivers Using Machine Learning

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Preface

Atmospheric rivers (ARs) are intriguing phenomena that intricately connect climate extremes and the management of water resources. This book delves into the heart of these rivers in the sky, exploring their profound influence on our environment and society. ARs, often termed as the "conveyors of water vapor," play a pivotal role in shaping precipitation patterns, droughts, floods, and water availability across regions. Understanding their characteristics, behaviors, and interactions with large-scale climate oscillations is essential for advancing climate science, water resource management, and disaster risk reduction strategies.

Through a multidisciplinary lens, this book navigates through the complexities of ARs, unraveling their significance in the broader context of climate variability and change. From terrestrial rivers to the far-reaching impacts of climate oscillations, each chapter unfolds a distinct facet of ARs, shedding light on their detection, characterization, impacts, and potential future trajectories. Case studies provide real-world insights into the practical applications of data analytics, machine learning, and innovative technologies in deciphering AR dynamics and enhancing predictive capabilities.

The convergence of science, technology, and innovation in AR research opens new horizons for mitigating risks, improving water management strategies, and fostering resilience in the face of climate challenges. This book is a culmination of collaborative efforts, bringing together experts, researchers, policymakers, and practitioners to delve into the intricate web of atmospheric rivers and their profound implications for our planet's future.

We hope this book serves as a comprehensive guide, igniting curiosity, sparking discussions, and inspiring innovative solutions in the realm of atmospheric rivers and climate extremes.

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