



Analyses of Turbulence in the Neutrally and Stably Stratified Planetary Boundary Layer

By Cedrick Ansgorge

Springer-Verlag GmbH Sep 2016, 2016. Buch. Condition: Neu. Neuware - This thesis presents a study of strong stratification and turbulence collapse in the planetary boundary layer, opening a new avenue in this field. It is the first work to study all regimes of stratified turbulence in a unified simulation framework without a break in the paradigms for representation of turbulence. To date, advances in our understanding and the parameterization of turbulence in the stable boundary layer have been hampered by difficulties simulating the strongly stratified regime, and the analysis has primarily been based on field measurements. The content presented here changes that paradigm by demonstrating the ability of direct numerical simulation to address this problem, and by doing so to remove the uncertainty of turbulence models from the analysis. Employing a stably stratified Ekman layer as a simplified physical model of the stable boundary layer, the three stratification regimes observed in nature- weakly, intermediately and strongly stratified-are reproduced, and the data is subsequently used to answer key, long-standing questions. The main part of the book is organized in three sections, namely a comprehensive introduction, numerics, and physics. The thesis ends with a clear and concise conclusion that distills specific implications...



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