Role of soil moisture heating on the organization of convection over the monsoon region

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ABSTRACT

The monsoon régime is characterized by high variability and interannual oscillations. Understanding the mechanisms governing the interannual variability of the monsoon system is of great importance for predicting its future behavior. This study investigates the role of soil moisture heating on the organization of convection over the monsoon region. We use a high-resolution (4.4 km) global atmospheric model coupled with a 3-dimensional variational data assimilation system to explore the impact of soil moisture heating. The results indicate that soil moisture heating plays a significant role in modulating the organization of convection over the monsoon region. The model simulations show that increased soil moisture heating leads to a more organized and symmetric convection pattern, consistent with observations. The findings have implications for improving the understanding of monsoon dynamics and predicting its future behavior.

Keywords: Monsoon, Soil Moisture, Convection, Organization, Dynamics, Prediction.

1. Introduction

The monsoon régime is characterized by high variability and interannual oscillations. Understanding the mechanisms governing the interannual variability of the monsoon system is of great importance for predicting its future behavior. This study investigates the role of soil moisture heating on the organization of convection over the monsoon region. We use a high-resolution (4.4 km) global atmospheric model coupled with a 3-dimensional variational data assimilation system to explore the impact of soil moisture heating. The results indicate that soil moisture heating plays a significant role in modulating the organization of convection over the monsoon region. The model simulations show that increased soil moisture heating leads to a more organized and symmetric convection pattern, consistent with observations. The findings have implications for improving the understanding of monsoon dynamics and predicting its future behavior.

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2. Effect of Soil Moisture Heating on the Organization of Convection

The model simulations show that increased soil moisture heating leads to a more organized and symmetric convection pattern, consistent with observations. The findings have implications for improving the understanding of monsoon dynamics and predicting its future behavior.
Origin of cold bias over the Arabian Sea in Climate Models

R. K. Gupta*, R. Venkatram, and A. J. Miller

1. Introduction

The Arabian Sea is a large marginal sea located southeast of the Indian subcontinent. It is an important part of the global climate system due to its unique dynamical characteristics and its role in the monsoon circulation. The cold bias over the Arabian Sea in climate models has been a subject of study for several years. This bias is important because it affects the simulation of the regional climate, which in turn influences the larger-scale climate system. The cold bias is likely due to a combination of factors, including the representation of the monsoon circulation, the representation of the oceanic mixed layer, and the representation of the sea surface temperature (SST) in the models. The goal of this study is to investigate the origin of the cold bias over the Arabian Sea in climate models and to identify potential improvements to the models.

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Simulation of monsoon intraseasonal oscillations in a coarse-resolution atmosphere GCM

A. Majumdar, A. Kumar, and R. Gupta

1. Introduction

The monsoon is a climatic phenomenon that is characterized by the seasonal intensification of the South Asian monsoon circulation. The monsoon is driven by the interaction of the atmosphere and the ocean, and it is influenced by factors such as the sea surface temperature (SST), the land surface temperature, and the sea level pressure. The monsoon is an important component of the global climate system, and it affects the regional climate and weather patterns.

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Polarward shift in Indian summer monsoon low level jetstream under global warming

A. Majumdar, A. Kumar, and R. Gupta

1. Introduction

The Indian summer monsoon (ISM) is a climatic phenomenon that is characterized by the seasonal intensification of the ISM circulation. The ISM is driven by the interaction of the atmosphere and the ocean, and it is influenced by factors such as the sea surface temperature (SST), the land surface temperature, and the sea level pressure. The ISM is an important component of the global climate system, and it affects the regional climate and weather patterns.