Decision and perceived shift in Indian summer monsoon synoptic activity in a warming climate

Abstract

Indian summer monsoon (ISM) is a crucial aspect of regional and global climate change. Its intensity can be influenced by large-scale atmospheric circulations, such as the North Pacific Oscillation (NPO), and regional events like the South Asian summer monsoon (SASM). This study investigates the impact of these atmospheric phenomena on the ISM, focusing on the period from 1990 to 2009. It employs statistical methods, including correlation analysis, to explore the relationships between the ISM and NPO. The results indicate a significant correlation between the ISM and NPO, suggesting a potential shift in the monsoon's behavior. This change could be attributed to climate change, as observed in recent decades.

Keywords: Indian summer monsoon, North Pacific Oscillation, climate change, statistical analysis.
Extracting and prediction of indices for monsoon intra-seasonal oscillations: an approach based on multilayer Laplacian spectral analysis

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Abstract

Monsoon intra-seasonal oscillations (MISOs) are important for understanding the interannual variability of the Indian summer monsoon. The purpose of this study is to extract and predict MISOs from the NASA MWR observations. We introduce a method for extracting MISOs based on multilayer Laplacian spectral analysis (MLSA). The MLSA method is applied to a set of observed MISOs to identify the dominant frequencies and modes of MISOs. The results show that the MLSA method can accurately extract MISOs from the observed data. The predicted MISOs are then compared with the observed MISOs to assess the performance of the MLSA method.

Introduction

The Indian summer monsoon is one of the most important atmospheric phenomena, and its variability has significant implications for the economy and society of India and neighboring countries. The monsoon is characterized by large-scale atmospheric circulation patterns that are driven by the interaction between the ocean and atmosphere. The monsoon variability is influenced by a variety of factors, including the ocean heat content, the sea surface temperature, and the wind stress. The study of MISOs is important for understanding the variability of the monsoon and for improving the accuracy of monsoon forecasts.
The NRO in a Coarse-Resolution GCM with a Stochastic Multidimensional Parameterization

Abstract

The North American Regional Climate (NRO) project is being pursued within the context of the Coarse-Resolution GCM with a Stochastic Multidimensional Parameterization (CMIP5) framework. The project aims to develop and evaluate climate models that are able to capture key aspects of climate variability and change at coarse resolution, while incorporating stochastic representations of key physical processes. The models are designed to simulate the global climate system, focusing on key processes such as atmospheric circulation, ocean dynamics, and land surface processes, while accounting for uncertainties in these processes through the use of stochastic parameterizations.

Role of orographic heating on the organization of convection over the mountain ranges

Abstract

Orographic heating plays a crucial role in the organization of convection over mountain ranges. The interaction between the mountains and the atmosphere results in the generation of orographic clouds, which can strongly impact the local and regional climate. In this study, we investigate the role of orographic heating in organizing convection over the mountain ranges, focusing on the dynamics and thermodynamics of the convective systems. The results highlight the importance of orographic heating in shaping the mesoscale atmospheric circulation, and provide insights into the mechanisms that govern the organization of convection over complex topographies.

On the Relationship between Mean Maximum Precipitation and Low Sea Surface Temperatures

Abstract

The relationship between mean maximum precipitation and low sea surface temperatures is examined in this study. The analysis reveals a significant correlation between these two variables, suggesting that low sea surface temperatures can influence the intensity and distribution of precipitation. The results have implications for understanding climate variability and change, and provide insights into the mechanisms that govern the linkage between oceanic and atmospheric processes.
Origin of cold bias over the Arabian Sea in Climate Models

1. Introduction

This paper investigates the reason for the cold bias over the Arabian Sea in climate models and proposes a method to improve the simulation of the surface climate in the Arabian Sea. The Arabian Sea is a crucial region for understanding the climate system, as it is a part of the global ocean circulation and plays a significant role in the global climate system. However, the cold bias over the Arabian Sea has been a long-standing issue in climate models, and understanding its cause is essential for improving the accuracy of climate predictions.

The cold bias over the Arabian Sea is often attributed to the misrepresentation of the oceanic processes in climate models. The oceanic processes, such as the sea-surface temperature (SST) and sea-ice, are crucial for the surface climate in the Arabian Sea. Therefore, accurately simulating the oceanic processes is essential for improving the surface climate simulation in the Arabian Sea.

The main objective of this paper is to investigate the reason for the cold bias over the Arabian Sea and propose a method to improve the simulation of the surface climate in the Arabian Sea. The paper provides a comprehensive analysis of the surface climate in the Arabian Sea and proposes a new approach to improve the oceanic processes in climate models.

Results and Discussion

The analysis indicates that the cold bias over the Arabian Sea is caused by the misrepresentation of the oceanic processes in climate models. The results suggest that improving the oceanic processes in climate models is essential for accurately simulating the surface climate in the Arabian Sea. The proposed approach is expected to improve the oceanic processes in climate models, leading to a more accurate simulation of the surface climate in the Arabian Sea.

Conclusion

In conclusion, the cold bias over the Arabian Sea is a significant issue in climate models, and understanding its cause is essential for improving the accuracy of climate predictions. The analysis indicates that the misrepresentation of the oceanic processes in climate models is the primary cause of the cold bias over the Arabian Sea. Therefore, improving the oceanic processes in climate models is crucial for accurately simulating the surface climate in the Arabian Sea.