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Investigating SST's Role in Seasonal Climate Variations: A WRF Model Analysis in the Tropical Zone, Thailand

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The phenomenon of climate change, with its unique alterations in global temperatures and weather trends, presents a mounting obstacle for accurate weather prediction and climate simulation. This study uses the Weather Research and Forecasting (WRF) model to investigate the impact of variations of Sea Surface Temperature (SST) during the rainy season (17 May to 31 Oct 2016). The research aims to quantify the effect of changes in SST (0.5 to 2.0 degrees Celsius) in a climate-sensitive period. Utilising model configured for Thailand's specific geographic and climatic conditions, the study integrates SST data derived from satellite measurements and observations assess temperature, precipitation, and extreme weather events. Our results indicate the pronounced sensitivity of the WRF model to SST variations, with notable discrepancies in predicting rainfall patterns and temperature anomalies. These findings emphasise that SST is a critical factor in climate modelling and the need for accurate SST input in forecasting models, especially in the context of climate change. The study contributes to a better understanding of the WRF model's capabilities and limitations in simulating seasonal climate variations in tropical regions. It may also stress the importance of the governments to engage in effective water and irrigation management strategies, including improved drainage systems and adaptive agricultural practices, to mitigate climate change impacts like flooding and drought. Further research is recommended for other seasons and extended periods for a deeper understanding of the WRF model's performance against evolving climate dynamics.