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A hybrid CNN-LSTM based model for the prediction of sea surface temperature using time-series satellite data.

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Sea surface temperature (SST) is a key variable of the global ocean, which affects air-sea interaction processes. Forecasts based on statistics and machine learning techniques did not succeed in considering the spatial and temporal relationships of the time series data. Therefore, to achieve precision in SST prediction we propose a deep learning-based model, by which we can produce a more realistic and accurate account of SST 'behavior' as it focuses both on space and time. Our hybrid CNN-LSTM model uses multiple processing layers to learn hierarchical representations by implementing 3D and 2D convolution neural networks as a method to better understand the spatial features and additionally we use LSTM to examine the temporal sequence of relations in SST time-series satellite data. Widespread studies, based on the historical satellite datasets spanning from 1980 - present time, in Indian Ocean region shows that our proposed deep learning-based CNN-LSTM model is extremely capable for short and mid-term daily SST prediction accurately exclusive based on the error estimates (obtained from LSTM) of the forecasted data sets.

Keywords: Deep Learning, Sea Surface Temperature, CNN, LSTM, Prediction.