# Investigating the effect of seasonal and long-term SST change on mean precipitation in Thailand

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## Motivation and Questions

**Increasing temperature due to climate change** may cause some areas to have more rainfall or be dryer than usual. **Sea Surface Temperature (SST)** is one indicator of climate change and **may increase** precipitation [1-4]. Our research uses **WRF model to determine**:

- **How SST scenarios influence precipitation patterns over rainy season (mid-May to October) in Thailand 2016.**
- **Is it wetter or dryer when SST increases?**

## Model and Experiments

**ERA-Interim reanalysis** for comparison climatology (May-October 2016) [5]

**IMERG** (The Integrated Multi-satellitE Retrievals for the Global Precipitation Measurement driven by NASA) for precipitation between mid-May 2016 and October 2016 (**Fig. 2: centre**) [6]

**Weather and Research Forecasting (WRF)** model [7], **36 km resolution** applied over mainland of Thailand between **17 May 2016 00:00 UTC and 31 October 2016 00:00 UTC** using parameter schemes from [8-10]

## Results

- **Both constant and transient** (varying) SST models **overestimate significantly** mean precipitation over Thailand compared to observation data (**Fig. 1: left** and **Fig. 2**).
- **Transient SST** model reflects observed precipitation changes **33% more accurately and reliably** than constant SST model (**84%**) (**Fig. 1: left** and **Fig. 2**).
- **Changes in SST** are associated with **marked increases in precipitation**: enhancements of **0.5 degrees** result in an **8.71% increase**, while **1.0** and **2.0 degrees** result in **increases of 18.26%** and **36.91%**, respectively (**Fig. 1: right** and **Fig. 3**).

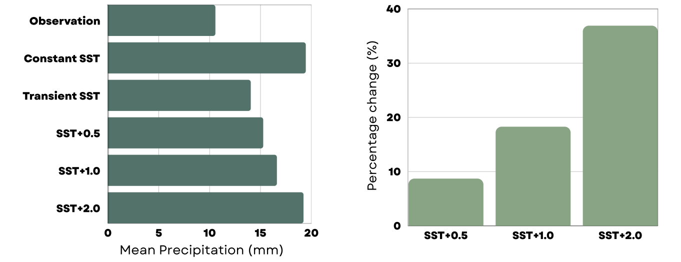

***Fig. 1: left:** Mean precipitation in different scenarios; **right:** Percentage change in mean precipitation compared to baseline SST±0.0 with SST+0.5, SST+1.0 and SST+2.0.*

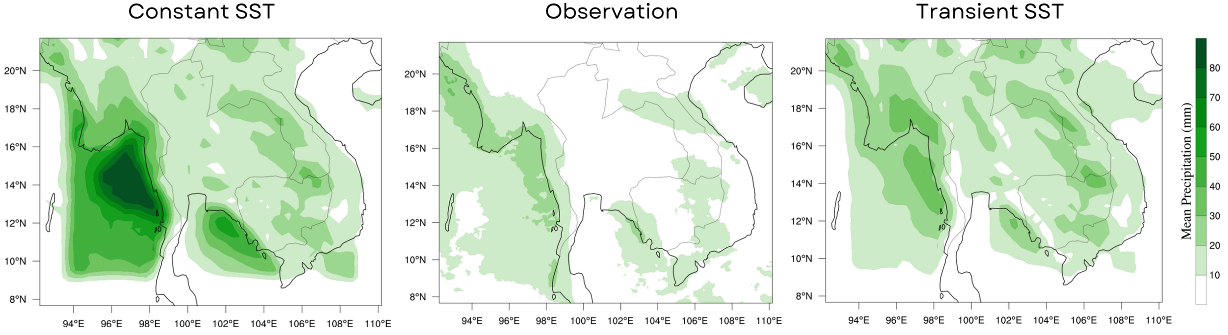

***Fig. 2:** Mean precipitation over Thailand in rainy season 2016: constant SST(**left**), observation data (**centre**) and transient SST (**right**).*

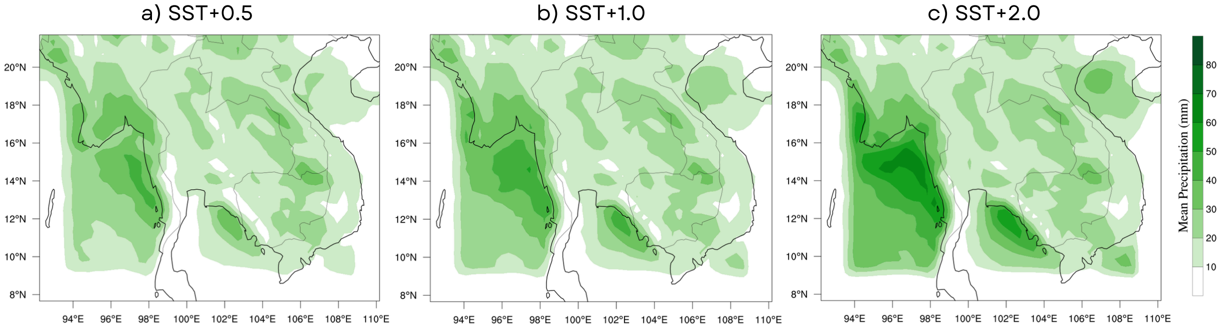

***Fig. 3:** Mean precipitation over Thailand in rainy season 2016 with SST scenario: (**a**) SST+0.5 (**b**) SST+1.0 and (**c**) SST+2.0.*

## Conclusions

- **Both constant and transient** SST models **impact on precipitation** field.
- **Transient SST** model **yields more accurate** and **reliable precipitation** than **constant SST.**
- **The observed signal of increased precipitation** in response to **rising SSTs emphasise** the **critical role of SST scenarios** in **influencing hydrologic cycles** under changing climate conditions.

## Future work

- Model runs at **finer resolution** and including **specific locations** will be completed.
- **Longer simulation** (e.g. one year to cover the seasonal cycle) are needed to **understand how SST influences** in **precipitation** in Thailand

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