CLIVAR Climate Dynamics Panel (CDP) Annual Workshop 2022
External versus Internal Variability on Decadal and Longer Timescales

Abstract Submission for Poster Presentation
Session 4: External and Internal Variability on Extreme Events

Title: Relative Contributions of Internal and External Drivers for Decadal Rainfall Extremes in Mainland Southeast Asia Over the Last Millennium

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Abstract: Throughout the last millennium, decades of extended drought and flooding periods related to modulations in monsoonal rainfall severely affected societies in Mainland Southeast Asia (MSEA). In this study, we utilize the Community Earth System Model Last Millennium Ensemble (CESM-LME) to quantify the relative contributions of both external forcings and internal climate variability to anomalous rainfall periods seen in MSEA throughout the last millennium.

Results suggests that internal variability in the Indo-Pacific can lead to MSEA rainfall anomalies comparable to those in the historical record through variations in the Interdecadal Pacific Oscillation (IPO) that modulate interannual climate modes in the Indian and Pacific Basins. Specifically, there is evidence that IPO variability leads to alterations in the seasonal cycle of MSEA rainfall as well as the changes in the magnitude of rainfall variability on interannual timescales. In addition to internally driven rainfall extremes, the CESM-LME suggests that external forcings played a role in driving the Strange Parallels Drought, lasting from approximately 1756-1768 CE. This study provides insights into the dynamical drivers of drought and pluvial periods in MSEA and motivates a more comprehensive understanding of interactions between the IPO and climate on shorter timescales. This study also allows us to better constrain the drivers of iconic drought periods, such as the Strange Parallels Drought.