

# RELATIONSHIP BETWEEN EL-NINO AND ASIAN SUMMER MONSOONS DURING LAST 9.5 KA FROM MODEL SIMULATIONS

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The aim of this study is to analyze the relationship between El Nino - Southern Oscillation (ENSO) and the Asian summer monsoon under changing orbital configuration over the last 9,500 years. The transient climate simulations with the Kiel Climate Model (KCM, Park et al., 2009) are used for analysis (see e.g. Jin et al., 2014). Two indices characterizing different regional subsystems of the ASM are analyzed. The Indian summer monsoon (ISM) was defined as the all-India rainfall during the summer (June-July-August). The East Asian summer monsoon (EASM) was defined according to Han and Wang (2007). The strength of ENSO phenomena is characterized by the sea surface temperature (SST) for the Nino3.4 region (e.g. Jin et al., 2014).

Figure 1 shows local coherence between the ISM and EASM indices from model simulations over the last 9,500 years. According to Fig. 1 south and east parts of the Asian monsoon system display both significant relationship and remarkable difference from long-term model simulations. A significant coherence is noted for variations with periods about  $10^2$  years with a less coherent variations near mid-Holocene (about 6000 years ago).

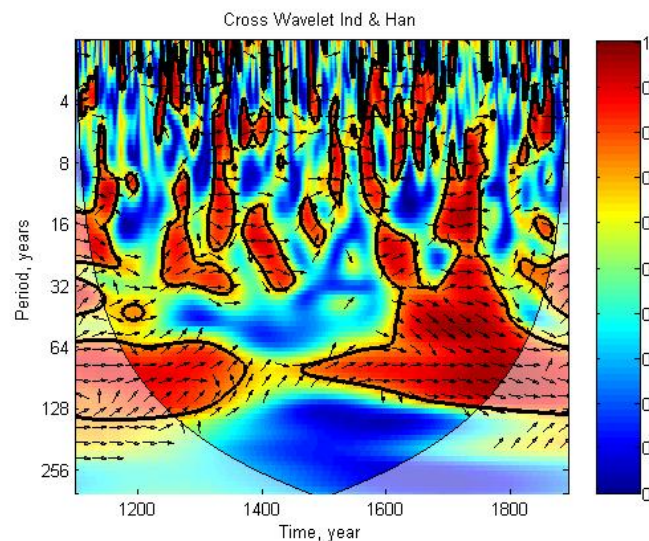


Figure 1. Wavelet coherence between ISM and EASM indices from model simulations for the last 9.5 ka. Direction of time axis begins at 9.5 ka BP towards the present.

Figures 2 and 3 show local coherence for Nino3.4 SST in December-January-February with EASM (Fig. 2) and ISM (Fig. 3) indices from model simulations over the last 9,500 years. The most significant coherence (with negative correlation) with the Nino3.4 SST is noted for variations with periods about  $10^2$  years of the EASM and ISM indices after mid-Holocene. No significant coherence was found for such variations between the ISM index and Nino3.4 SST before mid-Holocene.

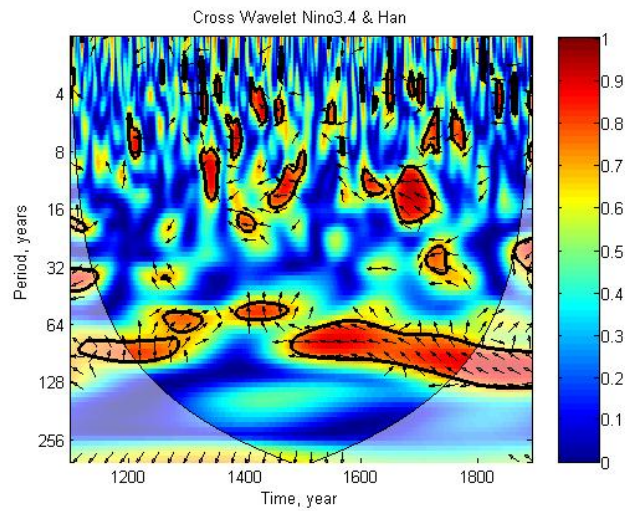


Figure 2. Wavelet coherence between Nino3.4 SST in December-January-February and EASM index from model simulations for the last 9.5 ka.

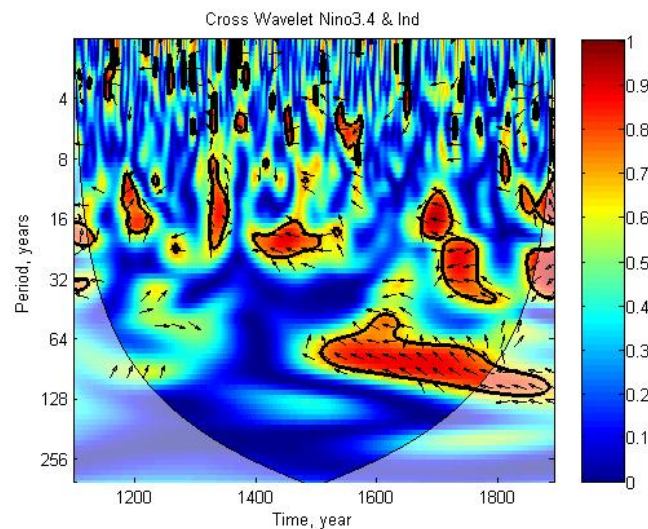


Figure 3. Wavelet coherence between Nino3.4 SST in December-January-February and ISM index from model simulations for the last 9.5 ka.

## References

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