

## SUPPLEMENTAL MATERIAL FOR:

### Concurrent extreme events of atmospheric moisture transport and precipitation: the role of atmospheric rivers.

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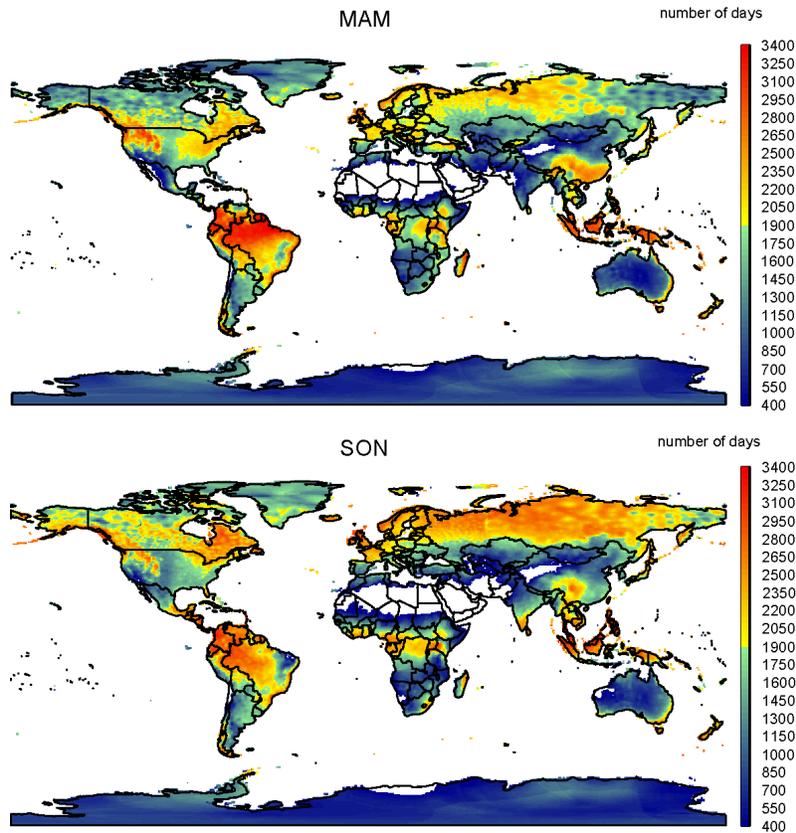


Figure S1: Total number of days for the period 1981-2017 with non-zero precipitation at each grid point for March-April-May (top) and September-October-November (bottom).

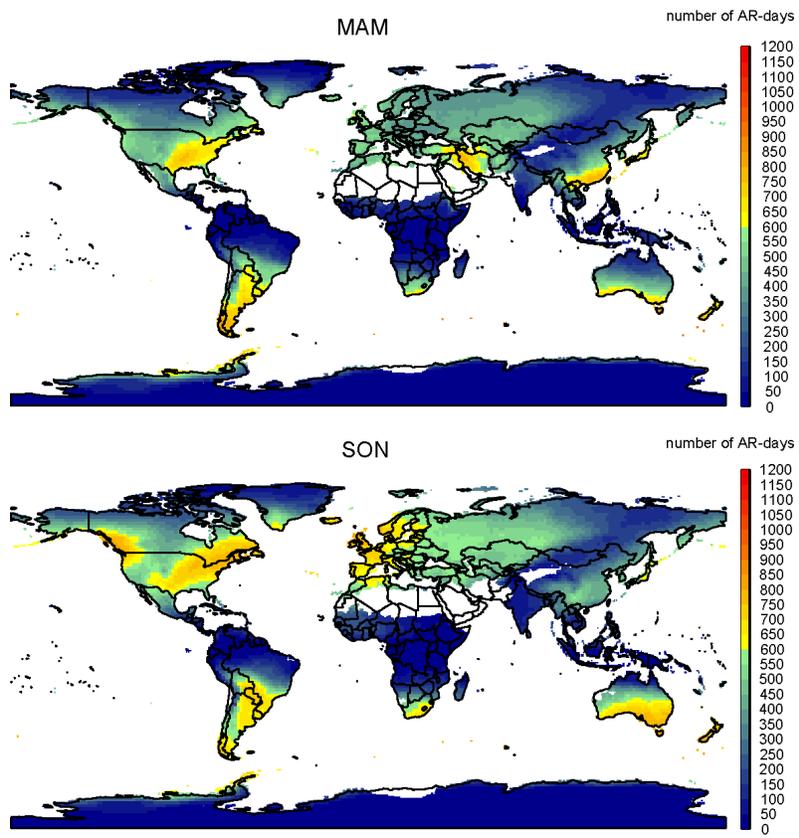


Figure S2: Number of days of occurrence of ARs for the period 1981-2017 at each grid point, for March-April-May (top) and September-October-November (bottom).

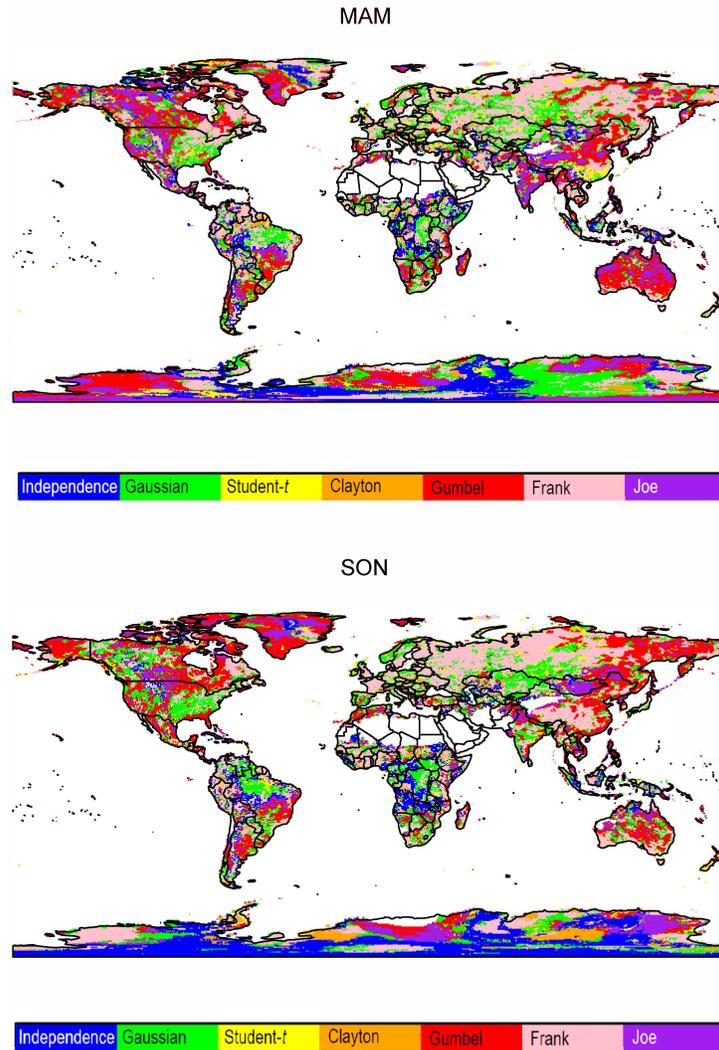


Figure S3: Fitted copula type with the lowest AIC value for March-April-May (top) and September-October-November (bottom).

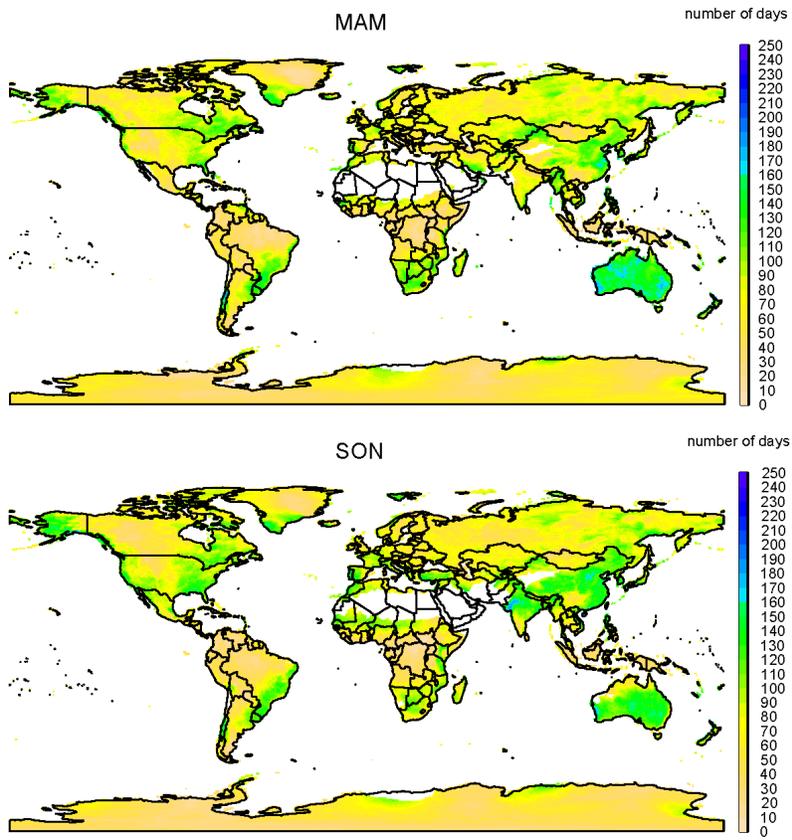


Figure S4: Number of days exceeding the bivariate threshold ( $q_{90_{IVT}}, q_{90_{prec}}$ ) for March-April-May (top) and September-October-November (bottom) for the period 1981-2017.

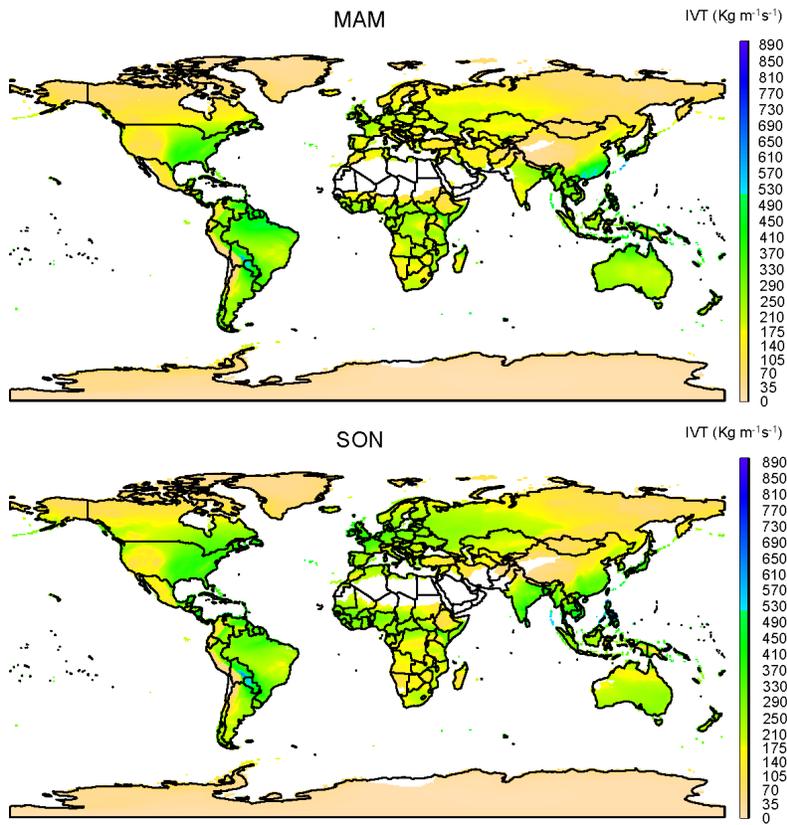


Figure S5: 90th percentile of IVT for March-April-May (top) and September-October-November (bottom) for the period 1981-2017.

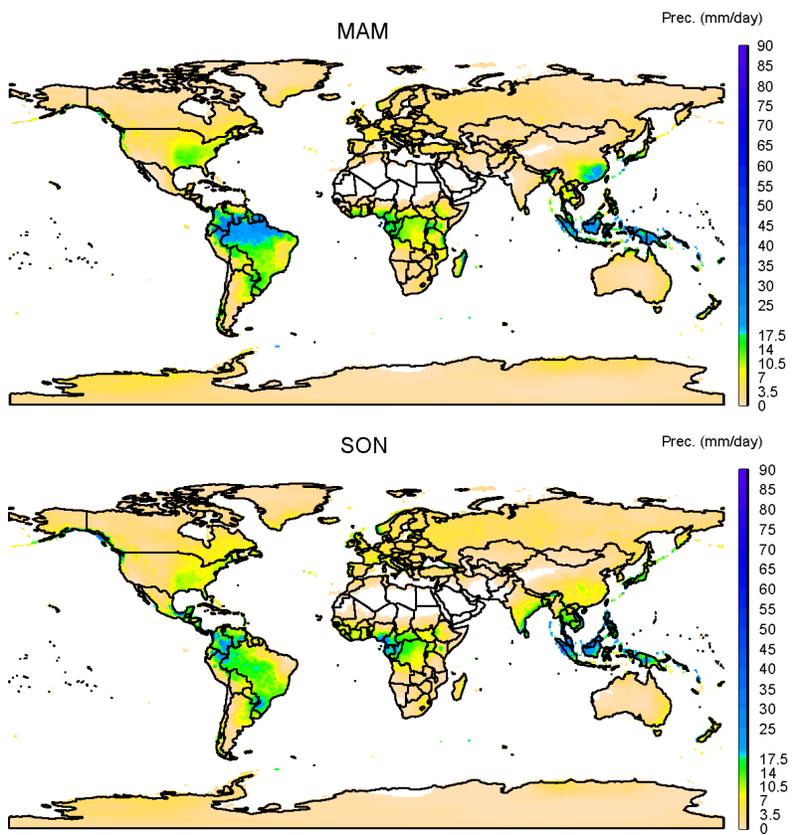


Figure S6: 90th percentile of precipitation for March-April-May (top) and September-October-November (bottom) for the period 1981-2017.

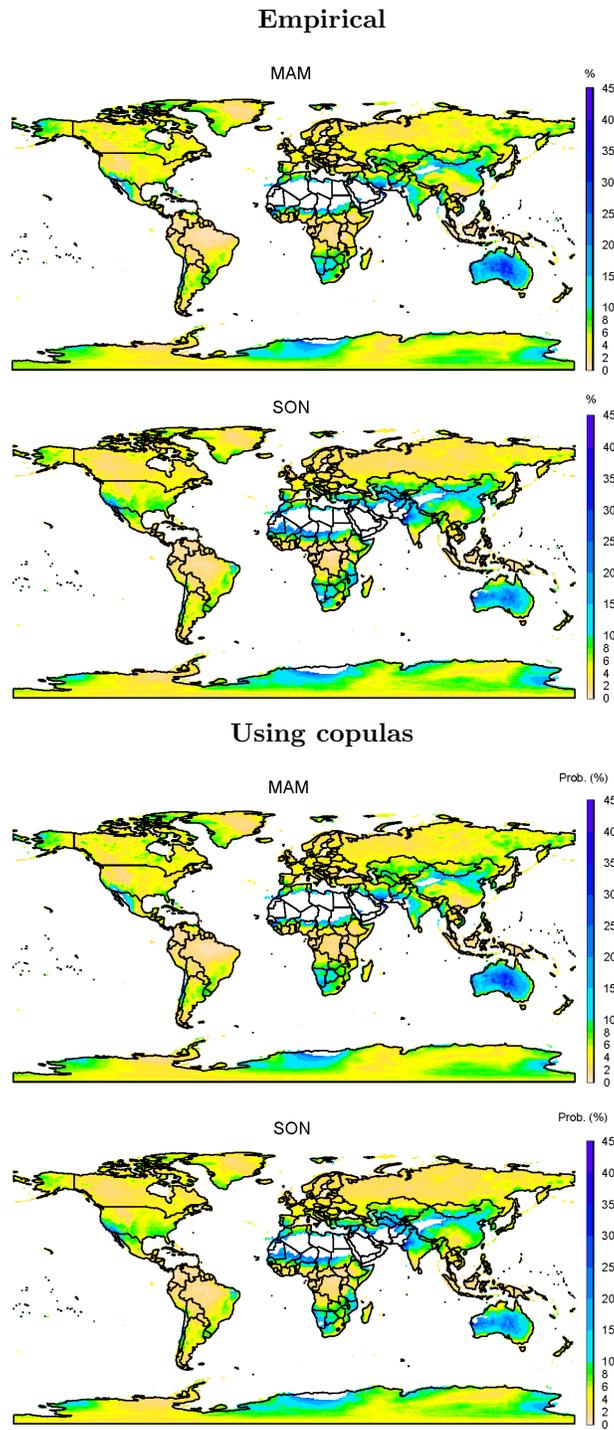


Figure S7: Estimated probability of achieving a concurrent extreme of IVT and precipitation (percent), for March-April-May and September-October-November for the period 1981-2017. The "empirical probability" refers to the percentage of concurrent extremes with respect to the number of days with non-zero precipitation. The copula-based probability is computed using the copula model with the lowest AIC value for each grid point.

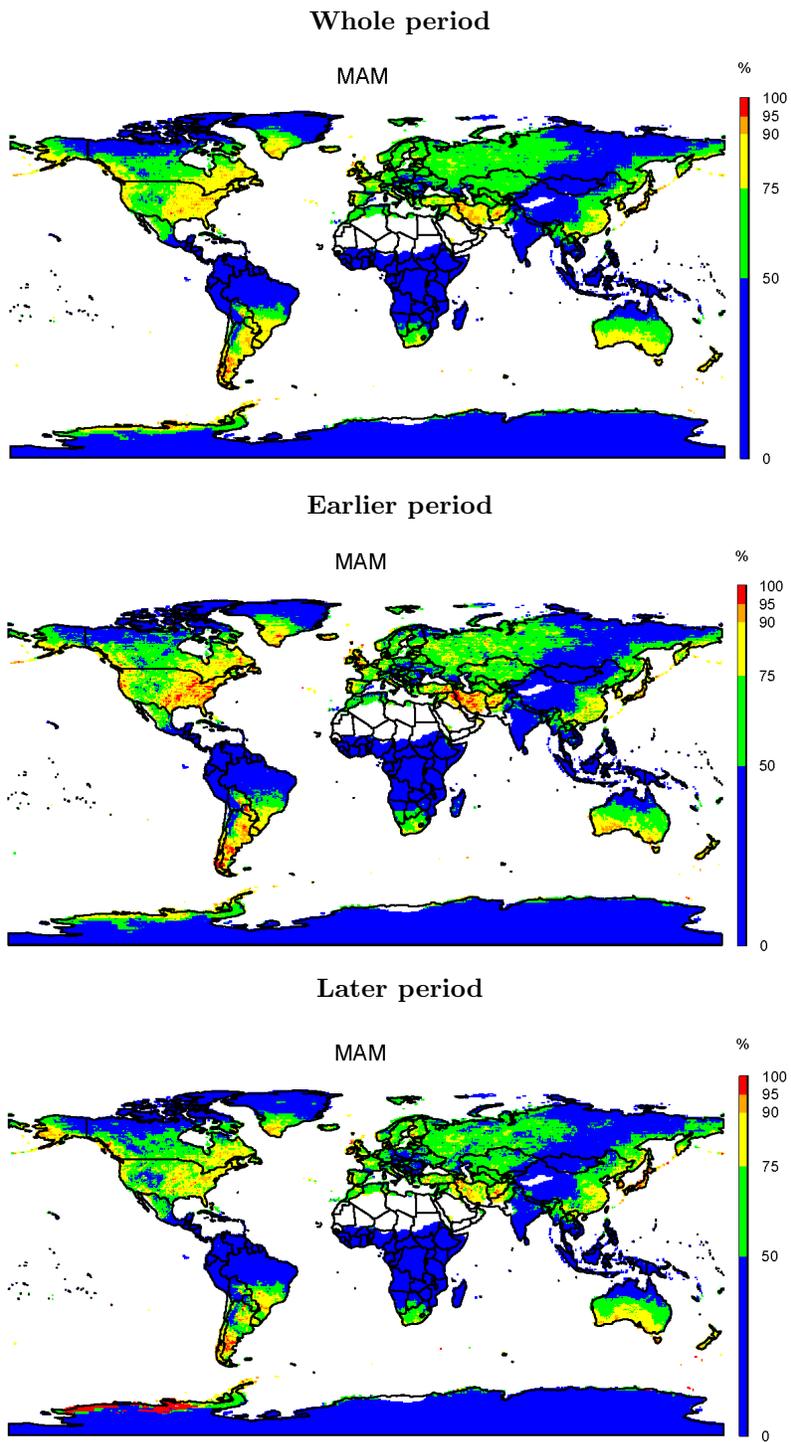


Figure S8: Percentage of concurrent extreme days of IVT and precipitation that coincide with the occurrence of ARs, for **March-April-May**, for the whole period 1981-2017, and the earlier and later studied periods.

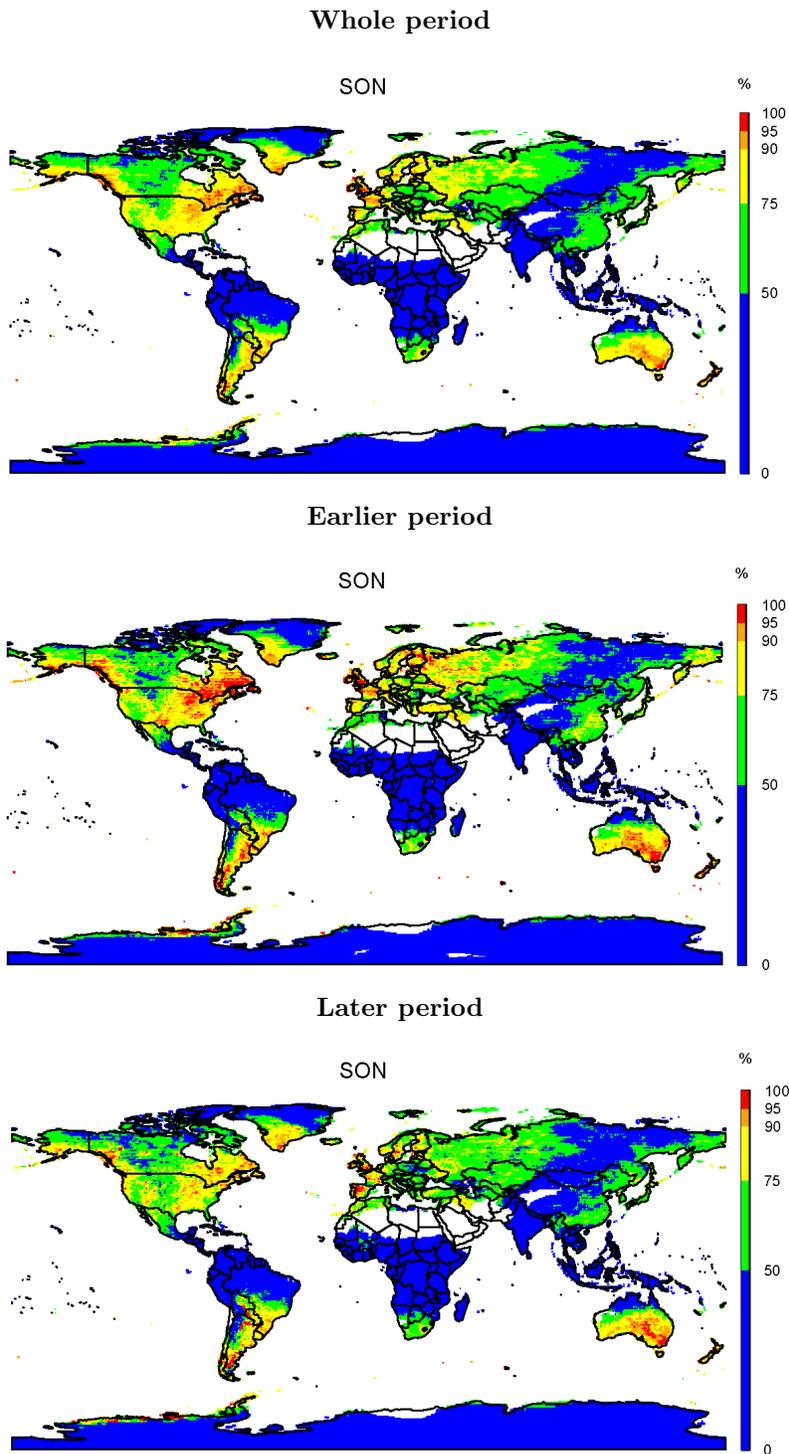


Figure S9: Percentage of concurrent extreme days of IVT and precipitation that coincide with the occurrence of ARs, for **September-October-November**, for the whole period 1981-2017, and the earlier and later studied periods.