Anomalies in seasonal runoff patterns of Costa Rica

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Knowledge about seasonal runoff patterns is indispensable for water management, for example, for sustainable hydropower regulation schemes. Seasonal runoff patterns have been identified for 56 27-years long monthly runoff series for Costa Rica. The high intrinsic dimensionality of many monthly runoff series analysed reveals high instability of their seasonal patterns suggesting differences in patterns demonstrated during individual years and the average seasonal pattern. In this study the focus was put on patterns observed during individual years and their relation to teleconnections. To match the scale of variations of these latter the analyses were performed on five grouped samples of monthly runoff that represent different geographical regions. In some of the groups there was a significant correlation between the presence of the seasonal patterns studied and individual teleconnections but the values of the correlation coefficient were rather low. Analyses of the contingency tables showing the phase (higher/lower than the mean) of teleconnection or their combinations and the frequency of seasonal patterns in a group with different lags showed that for certain combinations of phases these frequencies increase considerably. This finding opens for a possibility of probabilistic forecasts of seasonal patterns using information on teleconnections.