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Seasonal prediction of Danube flow anomalies based on stable teleconnections with sea surface temperature anomalies

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This contribution describes a statistical scheme for seasonal prediction of Danube flow anomalies using SST anomalies from several key regions as predictors . These key regions are identified as the areas where lag-running correlations between flow anomalies and SST anomalies from each grid-point on a global grid, over longest available period, are stable. The time coefficients (PC1) of the first EOF of the SST anomalies from the stable regions is used as a predictor for the flow anomalies. The time series of spring Danube flow anomalies is stable positively (negatively) correlated with winter SST anomalies from several regions from the tropical oceans, eastern Mediterranean and northern Red Sea (western subtropical North Atlantic and northeastern North Atlantic). A forecast exercise reveals that more than 40% of the spring Danube flow anomalies can be predicted using winter SST anomalies from these regions as predictors. A similar analysis reveals that spring Danube flow anomalies are stable correlated with previous autumn SST anomalies from tropical Pacific and from several small regions from the North Atlantic. Also winter Danube flow anomalies are stable correlated with previous autumn SST anomalies from several regions of the North Atlantic. A similar forecast exercise reveals that an important part of spring and winter Danube flow anomalies can be predicted using previous autumn SST anomalies from these key regions as stable predictors. The predictability of summer (autumn) Danube flow anomalies from autumn (summer) SST anomalies is limited by the instability of the teleconnections. Our statistical scheme for seasonal prediction of Danube flow anomalies can be used for seasonal prediction of other river flow anomalies from Europe using SST anomalies from previous seasons as stable predictors.