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Nonstationary frequency analyses of hydroclimatological extremes over Turkey

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Title
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Abstract
Under changing climate, the probabilities of hydroclimatological extremes can no more be assumed as constant. We may observe an increasing, decreasing trends or a random shift in extreme events. These changes in probabilities cause changes in return periods and return levels. In this study, we initially applied Mann-Kendall trend test for minimum and maximum temperature extremes for winter and summer to find their significancy throughout 78 stations distributed in Turkey from 1970 to 2015. In order to evaluate the impacts of non-stationarities on these significant stations, stationary and non-stationary forms of several distribution functions are applied for different return levels of seasonal temperature and precipitation extremes. The difference in return levels for both cases (with and without non-stationarity) are analyzed throughout Turkey. Future effects from non-stationarity are also assessed using ensemble climate model projections from CORDEX. It was found that the non-stationarity has important effect on determining the return levels for temperature and precipitation extremes particularly for minimum temperature in winter over eastern part of Turkey.