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Impact of climate change in Mediterranean river basins: relation between droughts, vegetation and reduction of waterdischarge

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Abstract:

The Languedoc-Roussillon region is a Mediterranean area located Southern France and composed of 6 main coastal river catchments about 1000 to 4800 km² each and discharging to the Gulf of Lion. A first study investigating evidences of climatic changes in the river basins showed a significant reduction of the waterdischarge of 20 % in average in the whole area during the period 1965-2004 (40 years).By including the most recent years (up to 2018), the time series demonstrate that the decline in water discharge still continues and could consequently have been reduced by more than 40% since the years 1960. Thus, understanding the relation and effect of climatic changes on hydrology is essential for the development of water resource strategies.

In this study, we examine and analyse the long-term dynamics of the drought indices as climatic parameters and the impact of their changes on the 6 coastal river waterdischarge at the annual and seasonal scales. We investigate the meteorological, and agricultural droughts as well as the vegetation density's evolution through time and compute statistical analysis to understand the linkage with the reduction of waterdischarge. First results show a trend toward dryer years as well as a strong correlation between mean annual hydrological variations and drought indices.