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An evaluation of rainfall regime changes in Italy over the last decades from literature

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The growing attention to modifications in climate in several societal sectors has led to an increasing number of studies and research on the topic of climate change and especially on changes in precipitation. The analysis presented here draws a “state of the art” of changes in the Italian precipitation regime through the review of the most relevant published studies, in peer-review journals. The aim of the study is to summarize a large quantity of information derived from specific studies, in a unique analysis and to highlight the main patterns of rainfall changes in Italy in the last decades. The results of 54 selected studies are discussed through the introduction of a weight factor, which considers the importance of each study according to its geographical area, stations density, and time series length, and provides a quantitative evaluation of the review. To offer a coherent climatic classification of the review findings, Italy is subdivided in three main macro areas and studies are also subdivided in 3 groups according to the Time-Series Length: Short TSL, less than 65 years; Long TSL, until 100 years; and centennial TSL, over 100 years. The analysis is focused on the Total Precipitation (TP) and the number of Wet Days (WDs) indices at the annual and seasonal scale. Looking at the overall results of the review, most of the studies agree about a decrease at the annual scale of the Wet Days index throughout the Italian territory for short and centennial TSL. The reduction of precipitation is confirmed by the Total Precipitation index that at the annual scale reflects this tendency except for the Northern Italy. This feature also emerges from the seasonal analysis, with some heterogeneity in the results due to difference in the number of studies used in the various areas, suggesting that there is an underlying climatic pattern driving trends toward a reduction in wet days and rainfall over the Italian territory.