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Influence of the ENSO on the probability of dry and wet seasons in Spain

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In many regions of the world, agricultural and water management is usually based on probabilities of seasonal or monthly rainfall, commonly grouped into 3 categories: drought, normal rainfall, and abundant rainfall. Changes in the probability of rainfall amounts within these climatic rainfall categories will influence decision-making by farmers and water managers. This study explores the changes induced by the El Niño-Southern Oscillation (ENSO) on the probability of seasonal rainfall in Spain. The evolution of the ENSO was analyzed using the seasonal SOI index, which was divided into 3 phases: positive (La Niña), neutral, and negative (El Niño). Seasonal rainfall series of different regions in Spain for the period 1912-2000 were divided into 3 groups corresponding to each SOI phase. Resulting empirical distribution functions allow an estimate of the changes in the probability of wet and dry seasons due to changes in the SOI phase. The analysis was made considering contemporaneous seasons and rainfall series lagged 1, 2 and 3 seasons. In relation with the Mediterranean area of the Iberian Peninsula, main results indicate that spring rainfall is influenced by the behaviour of the SOI index corresponding to the previous autumn and winter, with an important increase of the probability of spring drought following El Niño events, and abundant rainfall following La Niña events.