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Homogeneous regions in Italy: an analysis of the mean and extreme climate characteristics and their impact on agriculture.

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Adverse environmental conditions, lasting for several days in a row, can cause stress over ecosystems, humans and animals with a negative impact on crop yield, human health, and on animal production and reproduction, to name few aspects, and therefore leading to severe economic losses.
Namely, in the last decades, the enhanced frequency and intensity of summer heat waves in Italy have increased the importance of assessing the damages they cause. Another example is the occurrence of late spring frost causing damages not only to subsistence crops, but moreover for the so-called cash-crops. An example is the kiwifruit production in Italy specifically grown to fulfil the global demand, more than the national market, being the Italian production out of phase with the other major producers, such as New Zealand and South America.

Using a Principal Component Analysis (PCA) applied to daily maximum and minimum temperature and precipitation and then a hierarchical cluster analysis, based on Ward's method, on a set of 100 stations covering the period 1971-2006, we divided the 100 sites into 8 homogeneous classes. For each cluster the climate characteristics have been analyzed, in order to have a description of the mean climate of the cluster. In addition, we analyzed the occurrence of the extreme events in each cluster, their duration and intensity, and their trend over the last decades.

Focusing on the kiwifruit production regions in Italy a first attempt is presented to compare actual/suitable production regions in Italy and similar regions in New Zealand from the point of view of their respective climate trends and variability. Long term trends in agroclimatic indices and results of comparison analysis will be discussed for regions in the two Countries.

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