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Multidecadal variability of the summer length in Europe

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This study analyzes the multidecadal variability of the European summer timing and length. The dates of the summer onset and end are computed through an objective algorithm based on locally-defined temperature thresholds applied to the E-OBS gridded dataset during the period 1950-2012. The results reveal a European mean summer lengthening of 2.4 days decade-1 for the period 1950-2012. However, this trend is confined to the post-1979 period, when lengthening rates range between 5 and 12 days decade-1 over western Europe and the Mediterranean region. On the contrary, a widespread summer shortening occurred for the 1950-1978 period. The reported changes in the summer length are in agreement with temperature trends during June and September, which affect the summer onset and end dates.

We show that the shortening and lengthening with a turning point around 1979 is a leading mode of the summer length multidecadal variability. The trends in the summer length can be explained by the superposition of an Atlantic Multidecadal Oscillation signal, and a long-term trend towards more persistent summers in Europe associated to global warming.