



European long lasting dry and wet phases and atmospheric circulation – Variability and trends

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Many climate parameters show a distinct (multi-)decadal variability that strongly influences computed trends. We study the temporal variability as well as detected trends and their stability of long lasting dry and wet phase characteristics in Europe for 1901–2010. We are using the decile index delivering similar drought events and wet periods as defined by the Standardized Precipitation Index on the time scale of three months (SPI-3).

A long-term decrease in duration, frequency and spatial extent of long-lasting dry phases emerges over entire Europe despite the pronounced (multi-)decadal variability. Decile wet phases show an opposite development. A north-south gradient becomes visible in the trends with contrasting developments in Northern and Southern Europe when considering individual European sub-regions. While the general European trends are much more pronounced in Northern Europe, the Mediterranean area shows opposite trends with slightly increasing decile dry phases and decreases in the wet phase occurrence.

Links between the observed variability to atmospheric circulation were additionally examined. While decile dry phases are negatively correlated with the North Atlantic Oscillation in Northern Europe they show strongly positive correlations in Southern Europe. There are also strong links to large-scale circulation pattern, as indicated by the automated Großwetterlagen. Although some clear link between decile phase occurrence and atmospheric circulation emerged, they cannot simply be reduced to simple cause-effect relationships.