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## Linking Large-scale Circulation Descriptors to Precipitation Variability in the Northern French Alps

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This work analyses the link between Western Europe large-scale circulation and precipitation variability in the Northern French Alps from 1950 to 2017. We consider simple descriptors characterizing the daily 500hPa geopotential height fields. They are the Maximum Pressure Difference - representing the range of geopotential heights over Western Europe -, and the singularity - representing the mean distance between a geopotential shape and its closest analogs, i.e. the way this geopotential shape is reproduced in the climatology. These descriptors are compared to the occurrence of different atmospheric influences - Atlantic, Mediterranean, Northeast, Anticyclonic - and to the leading mode of large-scale circulation variability over Europe - the North Atlantic Oscillation (NAO) - for explaining precipitation variability in the Isère River catchment from one day to 10 years. We show that the Maximum Pressure Difference and the singularity of geopotential shapes explain a significant part of precipitation variability in the Northern French Alps from 10 days to 10 years, especially in winter (correlation values of 0.7). These descriptors provide much better performance than NAO and the same performance as the occurrence of the Atlantic influence, which is the best performing atmospheric influence. This means that simple characteristics of large-scale circulation - that are easy to implement - provide as much information as weather pattern classification to explain precipitation variability in the Northern French Alps.