



## Diurnal precipitation patterns over Austria

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A back trajectory clustering method was previously developed to identify synoptic patterns associated with heavy precipitation in Austria (Seibert et al., 2007). Extending this work from daily precipitation sums to accumulation intervals from 12 to 48 hours, we came across an unexpected challenge. The data base for this purpose are twice-daily precipitation observations at the climate stations of the Austrian Meteorological Service (ZAMG). They are performed at 7 and 19 LT (mean local time) daily, giving two 12-hour intervals per day. However, before 1971 the evening observation was carried out at 21 LT.

In order to estimate the 7-19 LT precipitation values from available 7-21 LT and 21-7 LT data, we studied the fraction of the 7-21 LST precipitation falling between 19 and 21 LST. Such data are available from the automatic station network built in the last 20 years and a few stations with longer records of hourly precipitation data. 132 stations were available for this analysis. We found that this fraction exhibits a systematic regional pattern and seasonal cycle, obviously reflecting the intensity and timing of convective precipitation. The maximum fraction of 28%, about double the 1/7 to be expected in the case of a homogeneous distribution of precipitation rates over the day, was observed in summer over the Alpine main ridge in Tyrol, near the highest mass elevation in Austria. This can be explained by the long continuation of the in-valley wind phase of the thermal wind circulations in the inner Alps. In autumn, a maximum is found in the southeast, presumably corresponding to influence from Adriatic air masses. The regions east and north of the Alps show both lower values of the  $(19-21)/(7-21)$  precipitation fraction and a small amplitude in the seasonal cycle. This hints towards an important influence of valley winds in the diurnal precipitation pattern.

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*Reference:*

P. Seibert, A. Frank, and H. Formayer (2007): Synoptic and regional patterns of heavy precipitation in Austria *Theor. Appl. Climatol.*, **87** (1-4), 139-153.