

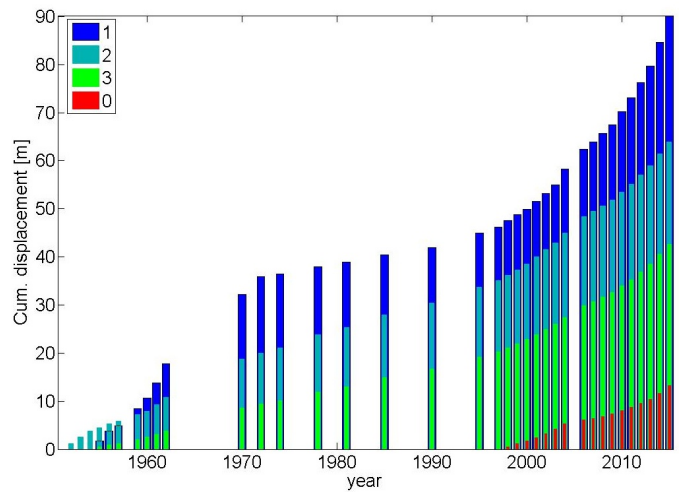
# Recent speed-up of an Alpine rock glacier: An updated chronology of the kinematics of Outer Hochebenkar rock glacier based on geodetic measurements

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Surface velocities have been regularly monitored at the rock glacier in Outer Hochebenkar, ötzal Alps, Austria, since the early 1950s. This study provides an update to previously published surface velocity time series Schneider and Schneider [2001], Nickus et al. [2015], showing mean profile velocities of four cross profiles since the beginning of the measurements (1951, 1954, 1997; depending on the profile), as well as single block displacements from 1998 to 2015. Profiles P1, P2 and P3 have moved between 42 and 90 meters, at mean velocities between 0.70 to 1.48 m/a, since they were first established in the early 1950s (1951/54). Profile P0, established in 1997, has since moved 13 m or 0.75 m/a. An acceleration can be observed at all profiles since the late 1990s, with a particularly sharp velocity increase since 2010. All profiles reached a new maximum velocity in 2015, with 1.98 m/a at the slowest profile (P0) and 6.37 m/a at the fastest profile (P1). Year-to-year variations in profile velocities cannot be clearly attributed to inter-annual variations of climatic parameters like MAAT, summer temperature, positive degree days, or precipitation. However, there is evidence pointing to a correlation between velocities and cumulative anomalies of air temperature (MAAT and positive degree days) and summer precipitation. The lower profiles (P0, P1) show more pronounced year-to-year variations than the upper profiles (P2, P3). It is considered likely that processes other than climatic forcing (e.g. sliding, topography) contribute to the different velocity patterns at the 4 profiles.



**Figure 1:** Cumulative displacement of the 4 block profiles used to measure movement at Hochebenkar rock glacier since the beginning of the measurements.

## References

- Nickus, U.; Abermann, J.; Fischer, A.; Krainer, K.; Schneider, H.; Span, N. and Thies, H. [2015]: Rock Glacier äußeres Hochebenkar (Austria) – Recent results of a monitoring network. *Zeitschrift für Gletscherkunde und Glazialgeologie*, 47:43–62.
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