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Alplce - Towards an Alps-wide database of empirical geo(morpho)logical and geochronological data constraining Last Glacial Maximum to Holocene glacier fluctuations

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Latest advances in numerical modelling using machine learning sped-up glacier models by several orders of magnitude, thus facilitating glacier evolution models to run at high resolutions (hundreds of metres) over timescales of several tens of millennia and over mountain range scales. The RECONCILE project seeks to use the Instructed Glacier Model (IGM) to simulate the maximum state and deglaciation of the last glaciation of the European Alps and to test model output against the geological record. A robust framework against which to test Alps-wide and transient paleoglacier model simulations is however missing. Despite the long history of Quaternary research in the Alps and abundant publications on the topic, the integration of field evidence for model validation has thus far largely been restricted to the Last Glacial Maximum (LGM) ice extent. Inspired by work on the (former) British, Fennoscandian, Patagonian and Greenland ice sheets, we aim to build a comprehensive and standardized dataset on paleoglacier variations for the European Alps. Coupling geo(morpho)logical data and geochronological markers, the Alplce database will act as an empirical basis for future quantitative model-data comparisons. Published empirical evidence that restrains the build-up, culmination, and disintegration of the Alpine LGM glaciers as well as subsequent Alpine Lateglacial and Holocene glacier advances are considered. Relevant surface exposure and radiocarbon datings are currently gathered and fed into the database. Data reliability assessments and paleoglaciological context classifications are undertaken concurrently. The database structure also allows the inclusion of additional chronological methods (e.g. luminescence dating, dendrochronology, archeological and historical sources) into Alplce. Where applicable, the chronological constraints will be linked to related geo(morpho)logical features (e.g. former ice margins, trimlines) using GIS software. Alplce is designed as an open-access resource hoping to prove useful for both empirical and modelling communities and beyond the scope of model validation.