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Climate and tectonic impacts on the development of two Pleistocene alluvial fans, Vienna Basin, eastern Austria – a numerical modelling approach.

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Tectonic, climate and base-level related factors are generally assumed to act as main influencing factors on alluvial fan development. Sequence development and geometry of two Pleistocene alluvial fans in eastern Austria, Southern Vienna Basin, are mainly controlled by climate but also by subsidence and changing level of axial the main river. In the study area, cold periods generally led to a decrease in vegetation cover and to an increase of periglacial weathering processes causing abundant sediment supply release of mountain catchments and aggradation on fan surface. In contrast, decreasing sediment supply and increasing precipitation during warmer periods led to fan incision, to a lower accumulation space and to change in river pattern. In this study a numerical model approach was used to investigate climate induced aggradation and degradation cycles, the influence of subsidence and the impact of an axial main river (Danube) on Austria's largest Pleistocene alluvial fan setting (Vienna Basin) within a time frame of 25 ka. Climatic variations were mainly modelled through variations in sediment supply, whereas the impact of subsidence was modelled through variations in slip rates. Incision and aggradation tendencies of the axial main river were modelled by heightening or lowering of water level.

Our models showed that adjustments in sediment supply mainly impact alluvial fans

evolution. Climate is found to be the main control factor on the alluvial fan development. The impact of subsidence and influence of the axial main river becomes important at simulated warm periods.