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Recent Vertical Movements in the Northern Alpine Foreland as Expression of Processes in the Surface

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Even in times of high-precision GPS-measurements the analysis of repeated precise levelling data is suitable to determine recent crustal movements. Regarding the german and swiss nothern alpine foreland these data are available in the timespan between 1896 and 2006 and build a long and serious time series of data. In the present study levelling networks of southern Germany and nothern Switzerland are combined across the borders and investigated in a time-dependent model.
The results of the analysis will be presented in different ways. Pointwise bar charts present the rates of movement and their standard deviations with a highly spatial resolution, whereas laminar interpolated contour shapes allow a good overview. The linewise comparison of topography and movement rates allows the derivation of their correlation, and to associate them with geological structures. Due to the long time period of data and multiple repeated measurements the estimation of linear movements is of high accuracy ($\pm$ 0.2 mm/a). All figures show a subsidence of the southern Rheingraben and the Dinkelberg area, compared to the crystalline Black Forest. The difference in the rates of motion increase up to 0.6 mm/a and draw the eastern Rhinegraben border fault clearly. The Dinkelberg area is marked by significant subsidence up to -0.4 mm/a surrounded by wellknown structures. Details are presented in selected figures. The areas of southern Hegau and the Bodmanrück show significant uplift up to 0.3 mm/a, wheras the figures of the northern Lake Constance present variable and mostly not significant movement rates. Only in the regions of Bad Saulgau and Ravensburg significant uplift is found. It will be shown that the whole Swiss molasse-basin is a stable area with very small and alternating rates of subsidence and uplift. But significant uplift is dominating in the Faltenjura, especially in the region of Olten and along the southern intersection to the molasse-basin.