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Impact of rainfall variability on land cover changes in the Ethiopian Rift Valley escarpments

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Magnitudes of land cover changes nowadays can be assessed properly, but their driving forces are subject to many discussions. Next to the accepted role of human influence, the impact of natural climate variability is often neglected. In this study, the impact of rainfall variability on land cover changes (LCC) is investigated for the western escarpment of the Raya graben along the northern Ethiopian Rift Valley. First, LCC between 2000 and 2014 were analysed using Landsat imagery. Based on the obtained LCC maps, the link was set with rainfall variability, obtained by means of the satellite-derived Rainfall Estimates (RFEs) from NOAA-CPC. After a correction by the incorporation of local meteorological station data, these estimates prove to be good estimators for the actual amount of precipitation. By performing several bivariate correlation analyses, a significant positive relationship between the precipitation parameter DIFF 5Y (i.e. the at-RFE pixel scale difference in five-year average annual precipitation for the two periods preceding the land cover maps) and the changes in the woody vegetation cover was found (= 0.23, p = 0.02, n = 108). Despite the dominance of direct human impact, further regreening of the study area can be expected for the future concomitantly to a wetter climate, if all other factors remain constant.