



## **Understanding drivers of vegetation condition in African rangelands**

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Rangeland degradation is a growing issue around the world. Main drivers of rangeland conditions include population growth and land use change, and increasing climate variability is likely to put more pressure on these fragile ecosystems. Rangelands provide essential ecosystem services for communities inhabiting them, but also for a wider group of people as these services are often transported to markets. Importantly, rangelands also represent the habitat of a great variety of wild flora and fauna. Better understanding how rangeland systems are responding to global changes is important to better address future management and monitoring practices in order to preserve long-term resources for both people and wildlife. We used the AVHRR GIMMS3g.v1 NDVI data to investigate how rangeland vegetation across Africa varied between 1982 and 2015, and to understand the relationship of this variation with precipitation. From our annual-mean anomaly analysis (good-value pixels and annual mean NDVI > 0.1 values only) we show the presence of two distinct trends in vegetation greenness. From the early 1980s to mid-1990s, there appears to be a browning trend (particularly clear in the Sahel as a likely result of the strong droughts of the 70s and 80s), which seems to reverse to a greening trend from the mid-1990s onwards. Interestingly, using the second version of the CHIRPS dataset we show that precipitation does not seem to be responsible for such NDVI trends in extended areas of African rangeland. In some areas where prominent greening trends were observed (South Sudan, eastern Ethiopia and parts of western Sahel), there was no relationship between this greening and changes in precipitation, suggesting that other processes are taking place (e.g. invasive species, conversion to cropland, agroforestry, reforestation, land abandonment, etc.). On the contrary, in some other areas (mainly Mozambique and Angola) a browning trend was observed even though there were no significant changes in precipitation, thus suggesting the presence of land degradation or desertification processes. Further investigation will identify the specific drivers of these changes in greenness across the African rangelands.