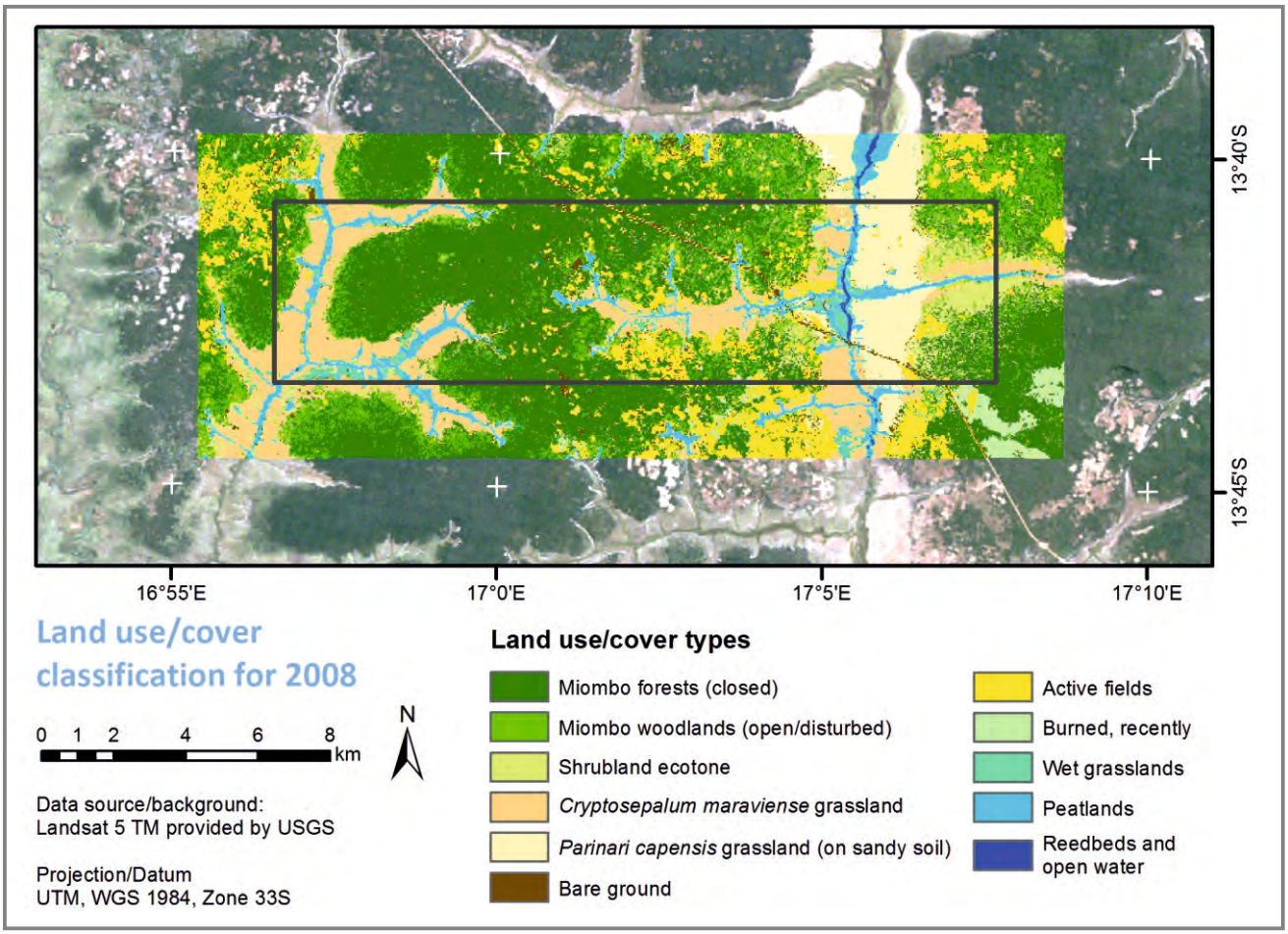

Fig. 1: Land use/cover classification based on Landsat 5 TM data for 2008/2009.

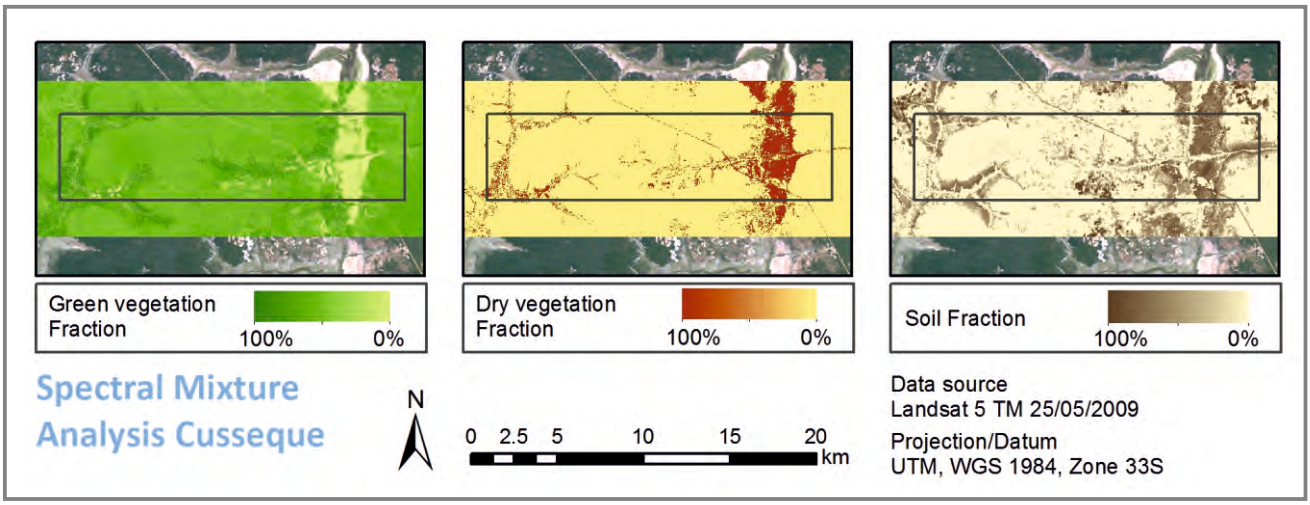

Fig. 2: Spectral unmixing result of Landsat 5 TM data (2008). Displayed are the fractions of the three endmembers "green vegetation" (left), "dry vegetation" (centre) and "soil" (right).

The Cusseque land cover map of the year 2008/2009 was derived from a multi-seasonal Landsat dataset (path 179, row 70) with images from July 2008, September 2008, March 2009 and May 2009 (Fig. 1). Land cover in the Cusseque region is dominated by peatlands, grasslands and closed Miombo woodlands that are assembled in a characteristic herringbone pattern following the topography. The substrate of the western and eastern valleys differs strongly. In the western part the fluvial valleys are covered by *Cryptosepalum maraviense* grasslands whereas on the eastern banks of the river Cusseque *Parinari capensis* grasslands on sandy soils prevail. Traditional slash-and-burn subsistence farming develops mainly in the transition zone between the valleys and the forested areas and spreads out deeper into the Miombo woodland.

High fractions of photosynthetic active vegetation occur in *Cryptosepalum maraviense* grasslands whereas *Parinari capensis* grasslands on sandy substrate are characterized by high fractions of dry vegetation (Fig. 2). Active fields, settlements and roads are dominated by a high fraction of bare soil. Consequently, overall vegetation cover in May is very low.

Figure 3 shows examples of time profiles of the Enhanced Vegetation Index (EVI) for Miombo woodland and two types of open grasslands. The diagram illustrates that the seasonality of the open grasslands differs strongly from the Miombo woodlands. Whereas the open lands show a strong annual cycle, the Miombo woodlands show only minor interannual variability. The *Cryptosepalum maraviense* grasslands show overall higher values of EVI compared to the *Parinari capensis* grasslands. This could result from an overall higher vegetation cover and density but could also be an effect of the different soil substrates on the EVI signal. Maximum EVI values occur for both land cover classes during the summer period with maximum rainfall amounts, whereas EVI minima occur in the dry period.

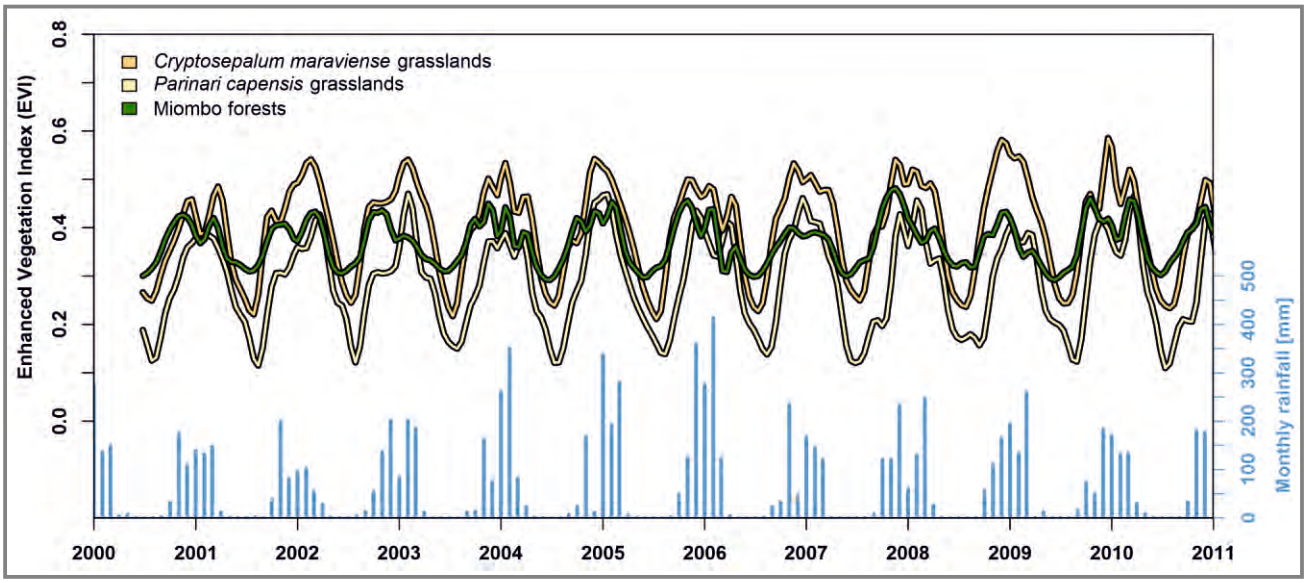

Fig. 3: MODIS EVI profiles for *Parinari capensis* grasslands (on sandy soil), Miombo forests, *Cryptosepalum maraviense* grasslands from 2000 to 2010. Also given is the monthly rainfall for this time period.

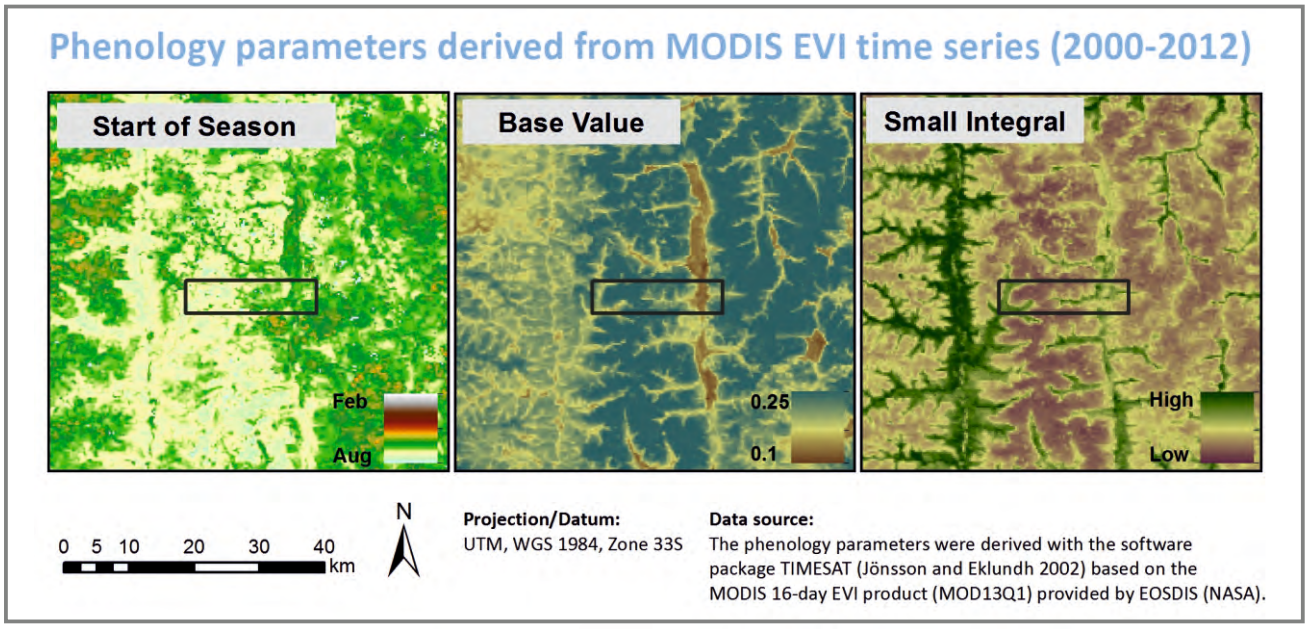

Fig. 4: Phenology parameters derived from MODIS EVI time series with the software package TIMESAT. Displayed are the "start of the season" (left), the "base EVI value" (centre) and the "small integral" (right).

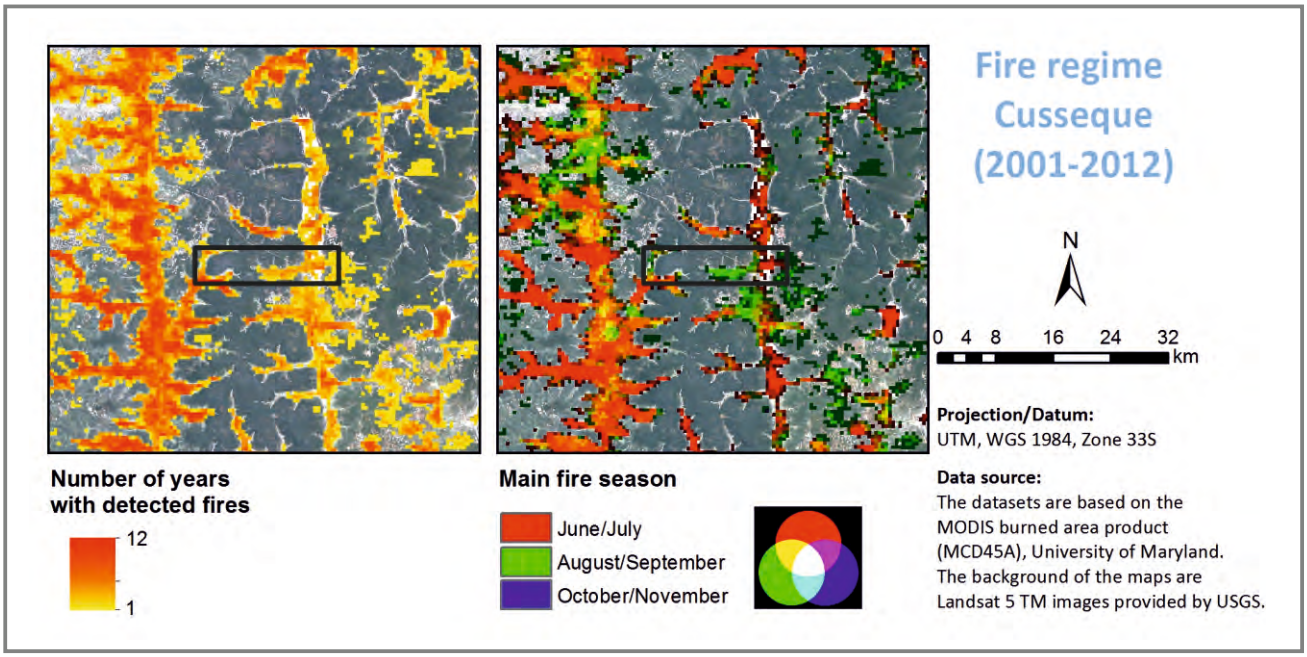

Fig. 5: Number of years with detected fires (left) and main fire season (right) derived from the MODIS burned area product within the observation period 2001 to 2012.

The peatlands and grasslands are characterized by a low to medium "base value" but a very high "small integral" due to the strong seasonality (Fig. 4). Active fields take an intermediate position between these two land cover classes. The "start of the season" varies from August to September and can be observed earlier for the *Cryptosepalum maraviense* grasslands than the *Parinari capensis* grasslands.

The fire maps reflect the relative distribution of woodland and open land, which in turn reflects the topography (Fig. 5). The grasslands of the slopes and valleys burn every year, mainly during the months of June and July (denoted in red), but fires also occur in August and September (depicted by green colours). In contrast, fires in the Miombo woodlands are rare and are restricted to a small extent. Most of the fires in the woodlands can be attributed to slash-and-burn agriculture, mainly occurring in August/September.

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