Studies on late Quaternary environmental dynamics on Mt Kilimanjaro - first results
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Introduction
In our project, we study pollen, charcoal and chemical composition derived from peat and sediment cores from different key areas at Mt. Kilimanjaro in order to reconstruct former and to predict future landscape dynamics. We would like to better understand local and regional ecosystems, climate and fire dynamics in a larger context as well as ecosystem dynamics and their reaction on environmental changes. Further, we would like to investigate their role for the development of the biodiversity hot spots in East Africa. Here, we are presenting the results of the pollen analysis of our first study site, the Maundi Crater.

Study Site
Mt Kilimanjaro is an inactive stratovolcano located in NE Tanzania. It rises from savanna plains at 700m to an ice-capped summit at 5895m asl. It was formed in the spreading zone of the East African Rift System. Our study site, Maundi Crater, is located at 2780m asl on the SE side of Mt Kilimanjaro in the transition between upper montane forest and the subalpine heathland zone. The climate is tropical diurnal and influenced by the Asian Monsoon penetrating into East Africa and causing two pronounced wet seasons. Annual mean temperature is 10°C and annual precipitation is around 1900mm1.

Method
We sampled every 10cm of the 6m long sediment core derived from the center of the Maundi Crater. The samples were prepared applying the standard method3. So far, we have determined and counted 100 pollen grains of the uppermost 32 samples which are dated back to ~38000 14C yrs BP. We assigned every pollen taxa to a vegetation zone known from the present and calculated percentages.

First Results
Our first results reveal that the vegetation belt composition, classified as savanna, submontane forest, Afromontane forest, Ericaceous belt, and alpine grassland, has remained rather stable during the past 38000 yrs. The taxa composition within the vegetation types has varied. The increase in Ericaceous vegetation in the late Holocene indicates more frequent (anthropogenic?) fire events. Three phases with no pollen records may be related to droughts that disabled pollen preservation. The high percentage of herbs and Ericaceous vegetation in between these periods also suggest dry conditions causing a decline of montane forest vegetation.

The dry period between 6200 and 7400 14C yr BP coincides with the development of the biodiversity hot spots in East Africa. The high percentage of herbs and Ericaceous vegetation records may be related to droughts that disabled pollen preservation. The high percentage of herbs and Ericaceous vegetation in between these periods also suggest dry conditions causing a decline of montane forest vegetation.

Conclusion and Future Perspective
Based on our pollen analytical results, we assume that the ecosystems on Mt Kilimanjaro have been rather stable during the past 38000 yrs. Despite pronounced past climate events which impacted other parts of the African continent, such as Heinrich Events and African Humid period, we can notice very little change in vegetation composition at our study site. This leads to the conclusion that this East African Mountain system must be predominantly influenced by a different climate driver, possibly the Asian Monsoon activity and its associated precipitation intensities and patterns5.

We will analyse further pollen, charcoal and chemical composition to investigate more samples of the Maundi core, and follow-up cores along the slopes of Mt Kilimanjaro. Modern vegetation and pollen rain data will help us calibrate, interpret and model our results.