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Linking Paleo Vegetation Modelling with a Phytolith Record for the African Humid Period (15 - 5 ka BP) of the Omo-River-Lowlands and the Chew Bahir Basin, southern Ethiopia

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Modern-day southern Ethiopia exhibits a complex mosaic of vegetation types. These types range from desert scrubland along the shores of Lake Turkana, to woodlands and wooded grasslands in the Omo-River-Lowlands and Chew Bahir catchment, and Afromontane forests of the Ethiopian Highlands. Over the past 20 ka, this region has experienced a variable climate, from the dry Last Glacial Maximum (25-18 ka BP) to the wet African Humid Period (15-5 ka BP), and back to present-day dry conditions. These oscillations likely had an impact on the biosphere and its human inhabitants. The biosphere, especially climate-induced changes in vegetation, in turn have a feedback effect on the local climate – and must therefore be considered in climate models and hydro-balance models. However, there are hardly any data on changes in vegetation during the dry-humid-dry transition of the AHP that could be used to parameterize such models.

As a contribution to an enhanced understanding of the role that paleo-vegetation could have played during those transitions, we present here a new comprehensive vegetation model. This study links a Predictive Vegetation Model (PVM) with the available vegetation-proxy records from southern Ethiopia, including a new phytolith record from Chew Bahir. The PVM uses an 18-year averaged time series of the Global Precipitation Measurement as well as SRTM elevation data to predict an 18-year averaged time series of MODIS landcover and vegetation parameters using boosted regression trees. We linked the PVM and resulting surface parameters (moisture availability, surface drag coefficient, albedo) with an existing hydro-balance model of the southern Ethiopian Rift to calculate precipitation during the AHP and hence also model the paleo-vegetation during this period. Available paleo-vegetation data including a new grass phytolith record from the sediments of an 11 m-meter long sediment core from the margin of paleo-Lake Chew Bahir were then used to compare model and proxy results. Being able to validate our new model data with actual vegetation proxy data for the first time enables us to gain valuable insights into the paleo-dimension of the vegetation mosaic of southern Ethiopia, a possible habitat of early *Homo*

sapiens.

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