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## **Influence of regional anthropogenic changes over Nile region on the climate system during the late Holocene (~2500 years before present)**

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The societal impacts of climate change during the late Holocene leads to regional anthropogenic changes over the Nile region floodplain and could have acted in tandem with natural factors like major volcanic eruptions on the regional climate system to magnify the local climatic impacts. This study aims to explore and investigate the sensitivity of climatic changes to the regional anthropogenic changes due to various factors over the Nile river floodplains during the late-Holocene (2.5K years before present). The GISS ModelE Earth system model will be used to simulate the various scenarios of regional increasing/decreasing river fraction, changes in vegetation type and cover, along with changes in land surface type against the no-changes scenario in absence of volcanic eruptions. The spatial coverage of the Nile river basin is estimated using the GIS shapefile based on elevation data from Shuttle Radar Topography Mission (SRTM) at 3 Arc-seconds (approx. 90-meter) horizontal resolution. The extent of flooding in the model grid (2.0°x2.5° in latitude and longitude) is estimated using the existing high-resolution (0.125°x0.125°) gridded topographic elevation information and mapped over the Nile river floodplains. This study also focuses on evaluating the NASA GISS ModelE for resolving the climate feedbacks and response on climate system due to anthropogenic changes and volcanic eruptions. It is also aimed to analyze and quantify the impact of various anthropogenic factors over the African monsoon system and rainfall over the region, which feeds the Nile River.