



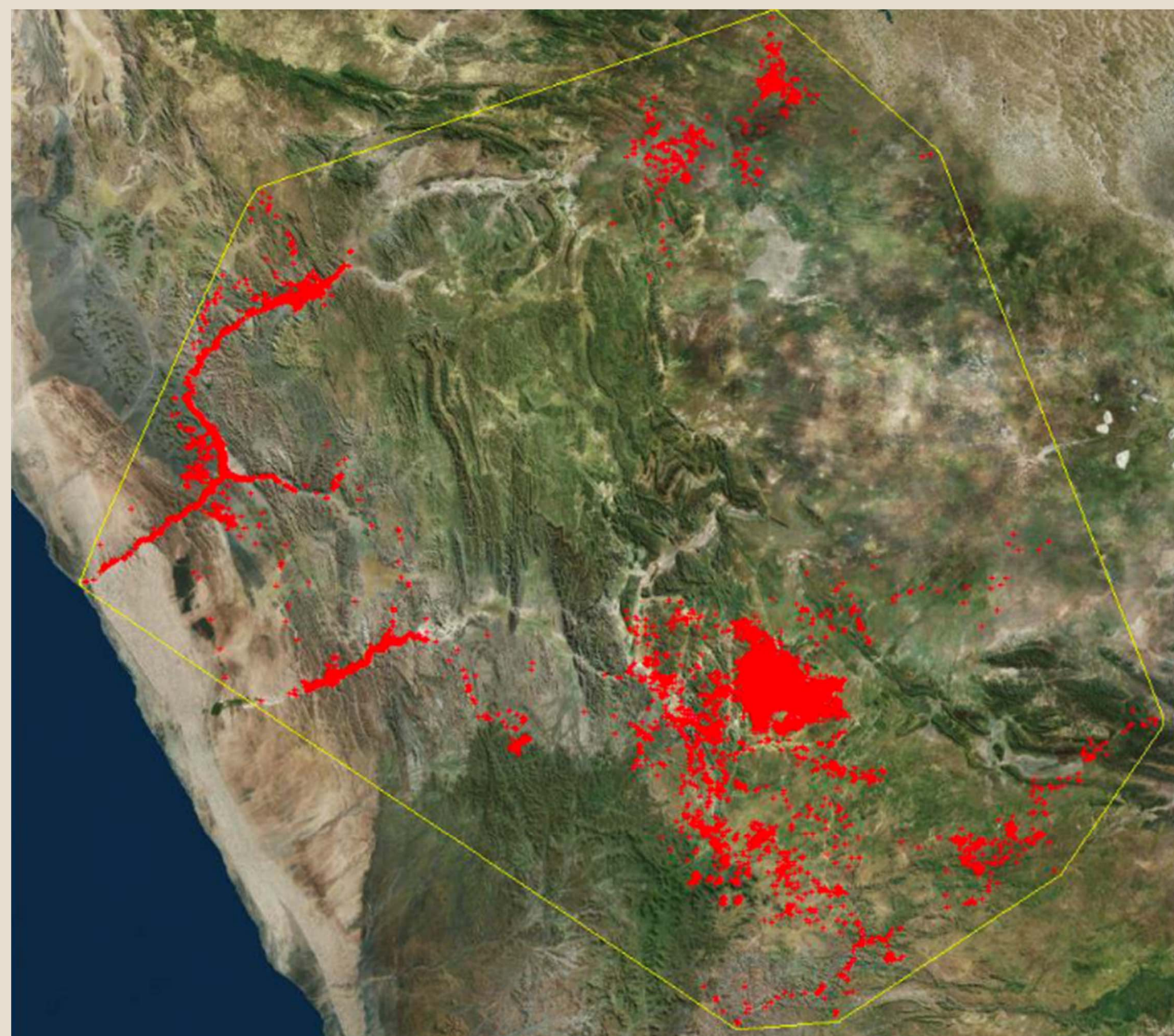
Montague-CTE Scholar Oliver W. Frauenfeld (2013–14) College of Geosciences



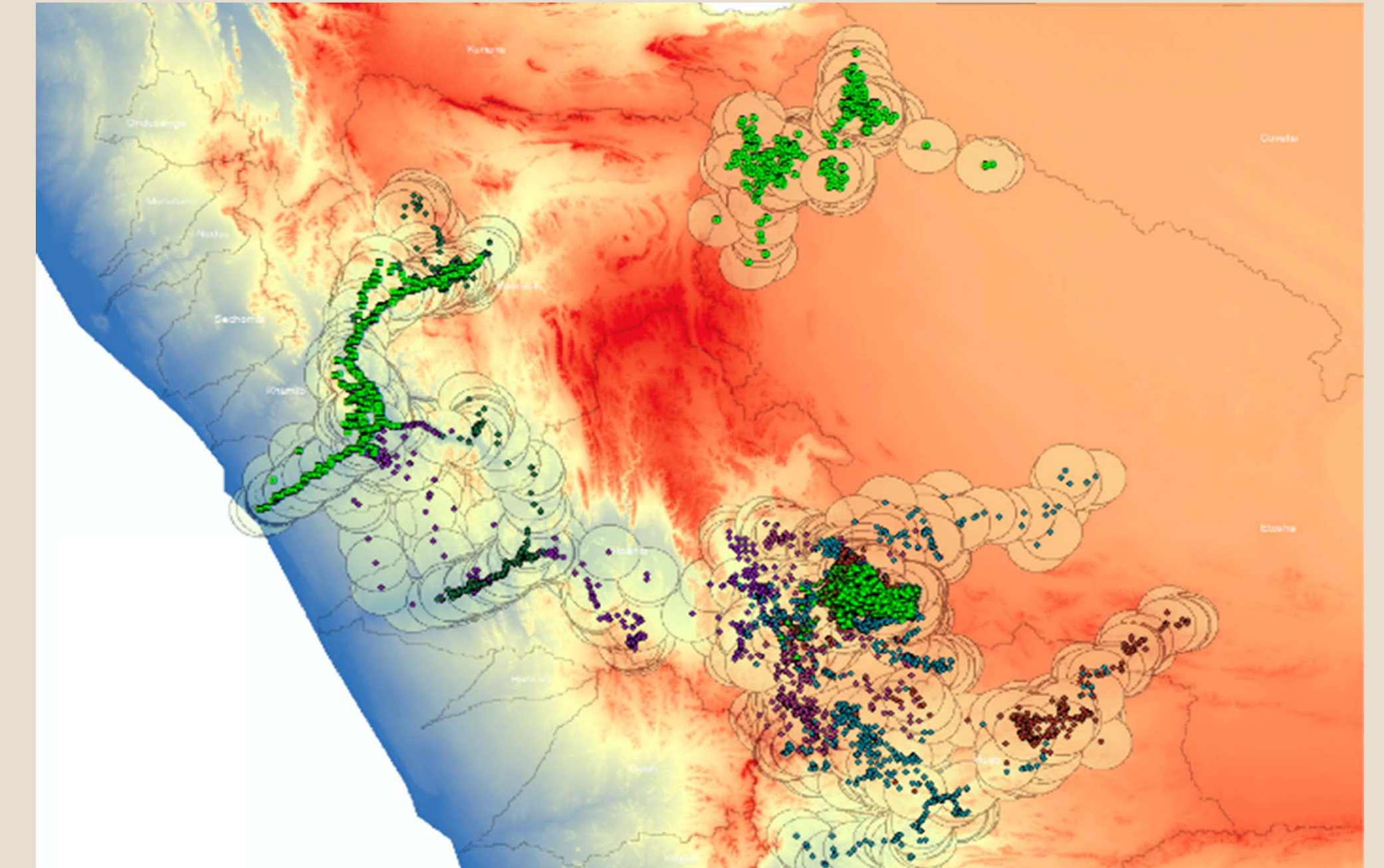
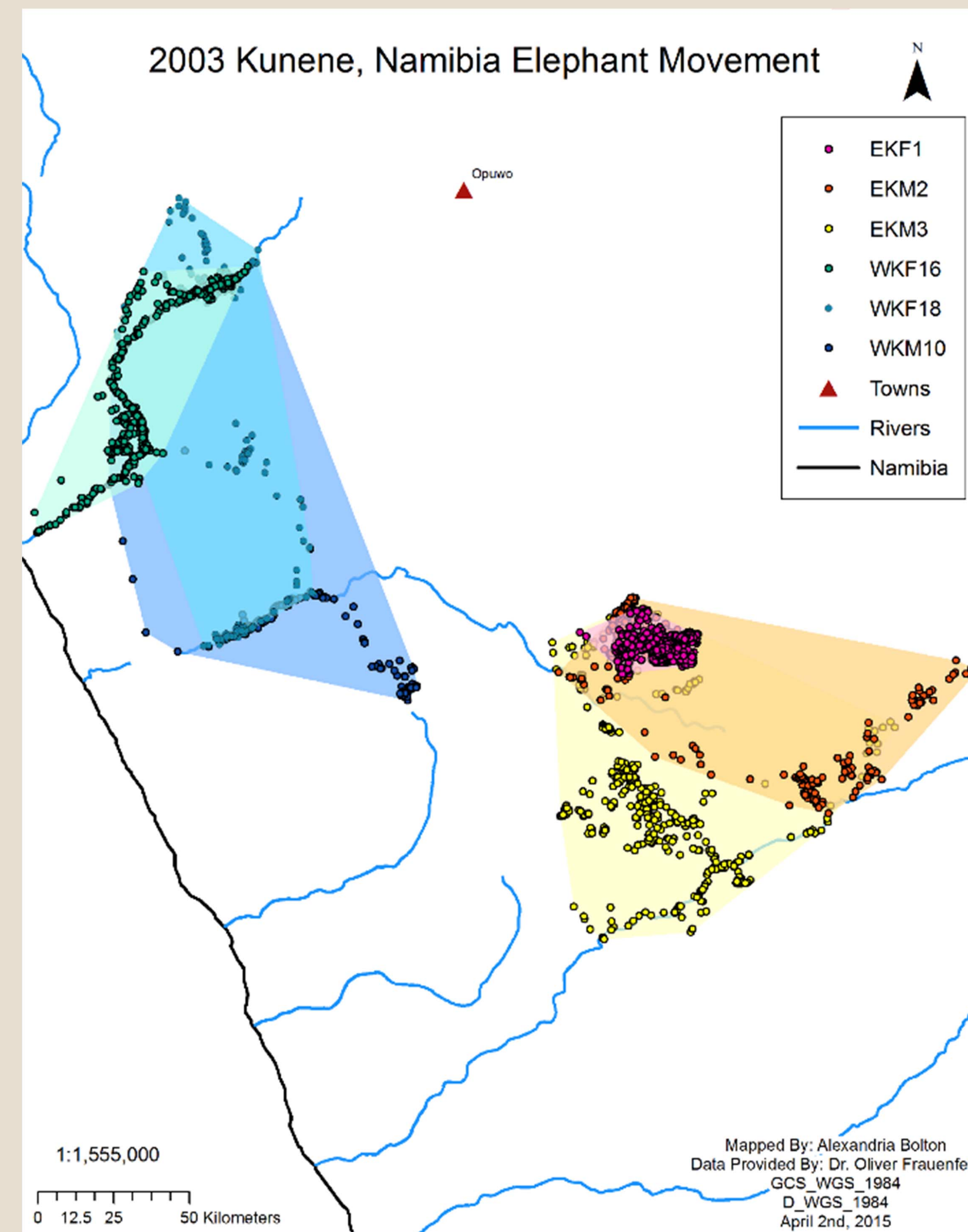
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Funding from the Montague-CTE Scholar program provided a number of undergraduate students in geosciences the opportunity to participate in an ongoing interdisciplinary research project that seeks to understand what motivates the long-distance migrations of Namibia's desert elephants, with the ultimate goal aiding in elephant conservation.



Using up to seven years (2002–2008) of daily GPS location data for nine collared elephants (and their family units), the students applied and improved their Geographic Information Science (GIS) skills to calculate different estimates of the elephants' home range. The figure below shows the *minimum convex polygon (MCP)* approach, commonly used to quantify home range, applied to the 2003 tracking locations. Note this method's inclusion of large areas where elephants never spend any time, one of this method's main drawbacks.



As an alternative to a purely statistical MCP quantification of home range, we propose that a physically and biologically based home range estimate is needed. Elephants have a unique ability to communicate via low-frequency infrasound, which can be heard by other elephants at distances of up to 10 km away. We therefore calculate their sound-based home range by summing the non-overlapping 10-km radius areas traversed by each elephant (above). With this improved measure of their home range, we can now better quantify their habitat.



The undergraduate students who have contributed to various aspects of this project are **Paul Black** (GEOG '14), **Alexandria Bolton** (GEOG '15), **Tiffany Hertzler** (GIST '16), **Kendall Hartman** (GIST '16), and **Stephen Hilton** (ENGS '17).