

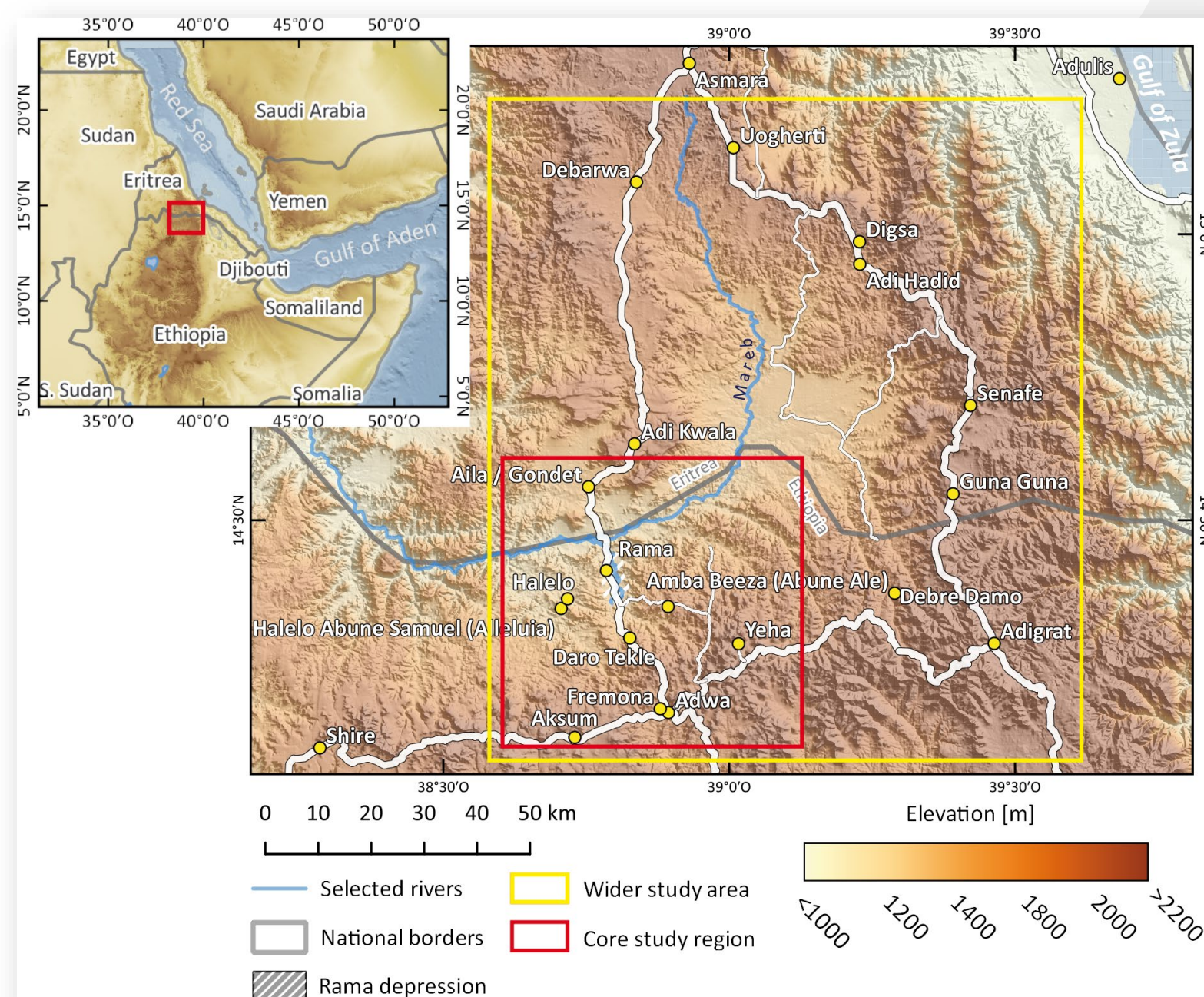
# ROUTES OF INTERACTION: ARCHAEOLOGICAL-GEOGRAPHICAL RESEARCH ON PATH NETWORKS IN NORTHERN ETHIOPIA

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## Abstract

Archaeological sites in the region of Tigray often show an occupation continuity of hundreds up to thousands of years, which is especially evident for churches and monasteries. In this context, extensive mapping of historical sites including the documentation of their geographic and topographic conditions was carried out. Together with ongoing studies of historic maps, travelogues and least-cost path models, the data provide insights in historic mobility systems, settlement patterns and communication routes between the Ethiopian highlands, Eritrea and the Sudanese lowlands that serve as a base for further prehistoric research. In addition, the spatial relationships between pathways and gully erosion are investigated, as gullies are typical factors of human interaction with the natural environment in rural areas of Africa.



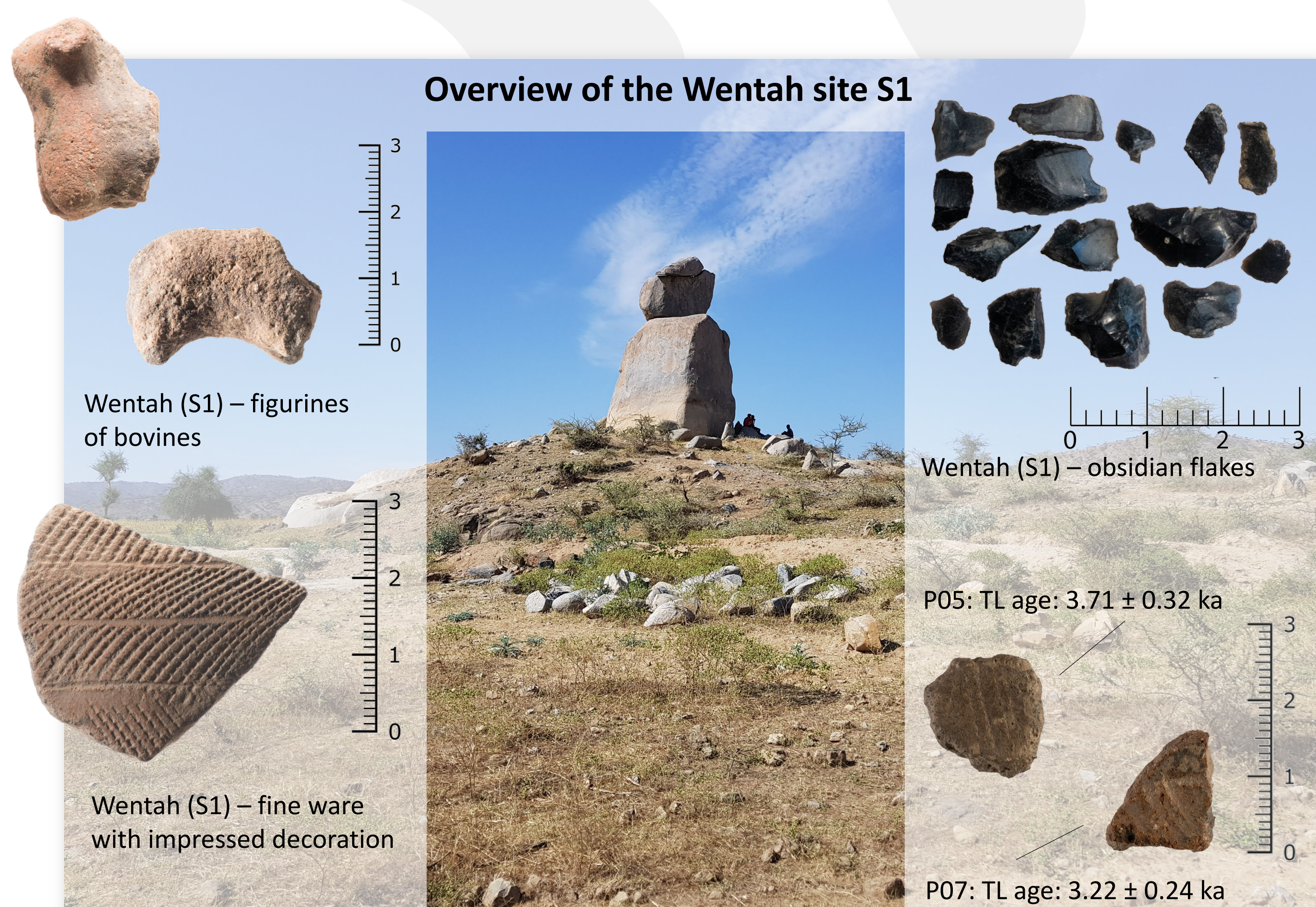
Map of the study area in northern Ethiopia (Tigray)



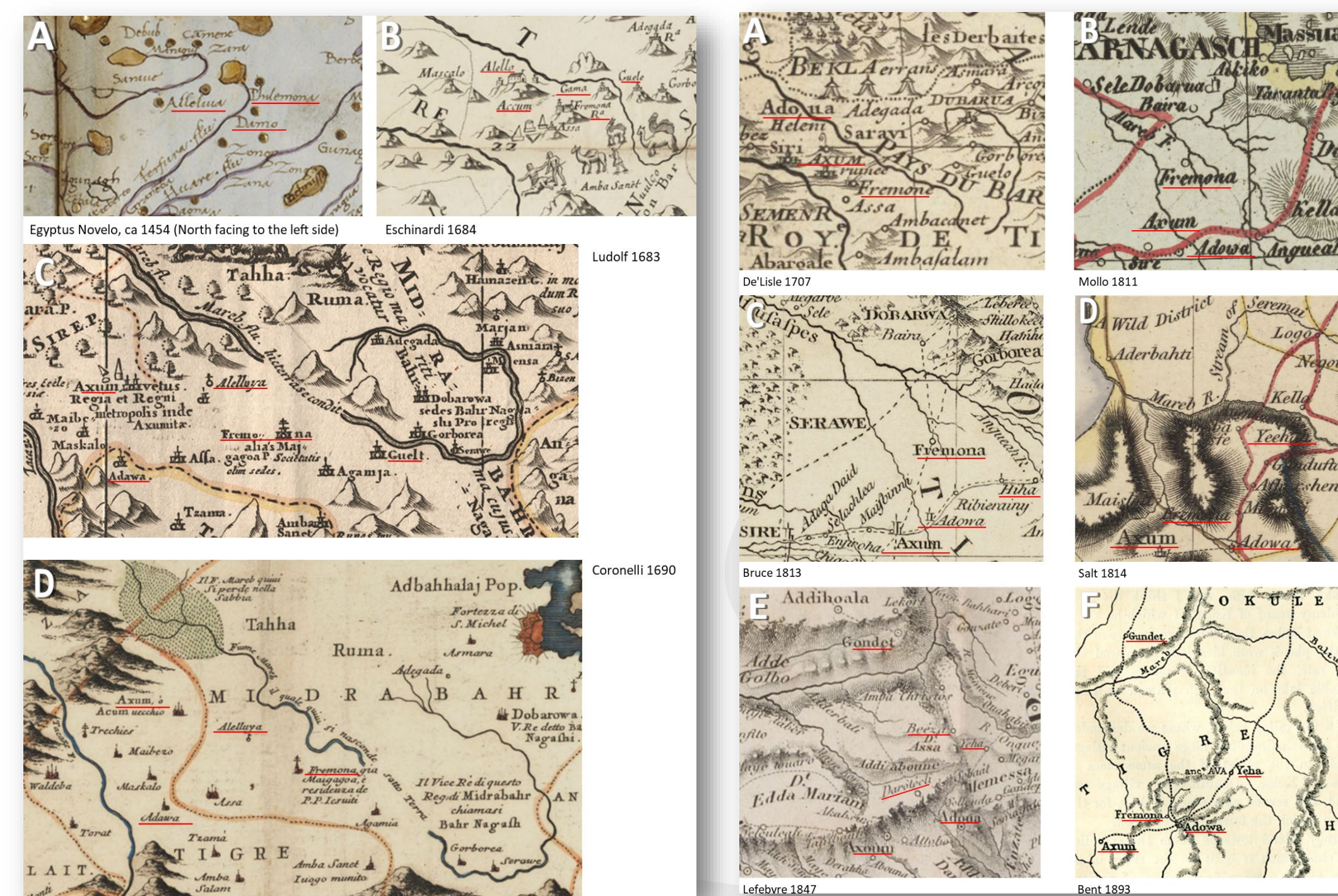
## Archaeological aspects

The Rama area functioned as a “route of interaction” in the 2nd mil BCE, connecting the Egyptian and Sudanese Nile Valley, the Sudanese lowlands via the Mereb River through the Rama area to the highlands in

Tigray. For the first time a material culture of that period can be proven by different dating methods (e.g., thermoluminescence [TL]). Especially the pottery sherd sample P07 bears similarities not only with the material culture of the eastern Sudan regions. Its date ( $3.22 \pm 0.24$  ka) corresponds to the Mokram Group / Middle Kassala Phase in the Sudanese lowlands. Furthermore, this fragment links to pottery finds that were  $^{14}\text{C}$ -dated to about 1200 BCE in Yeha (manuscript currently under review).

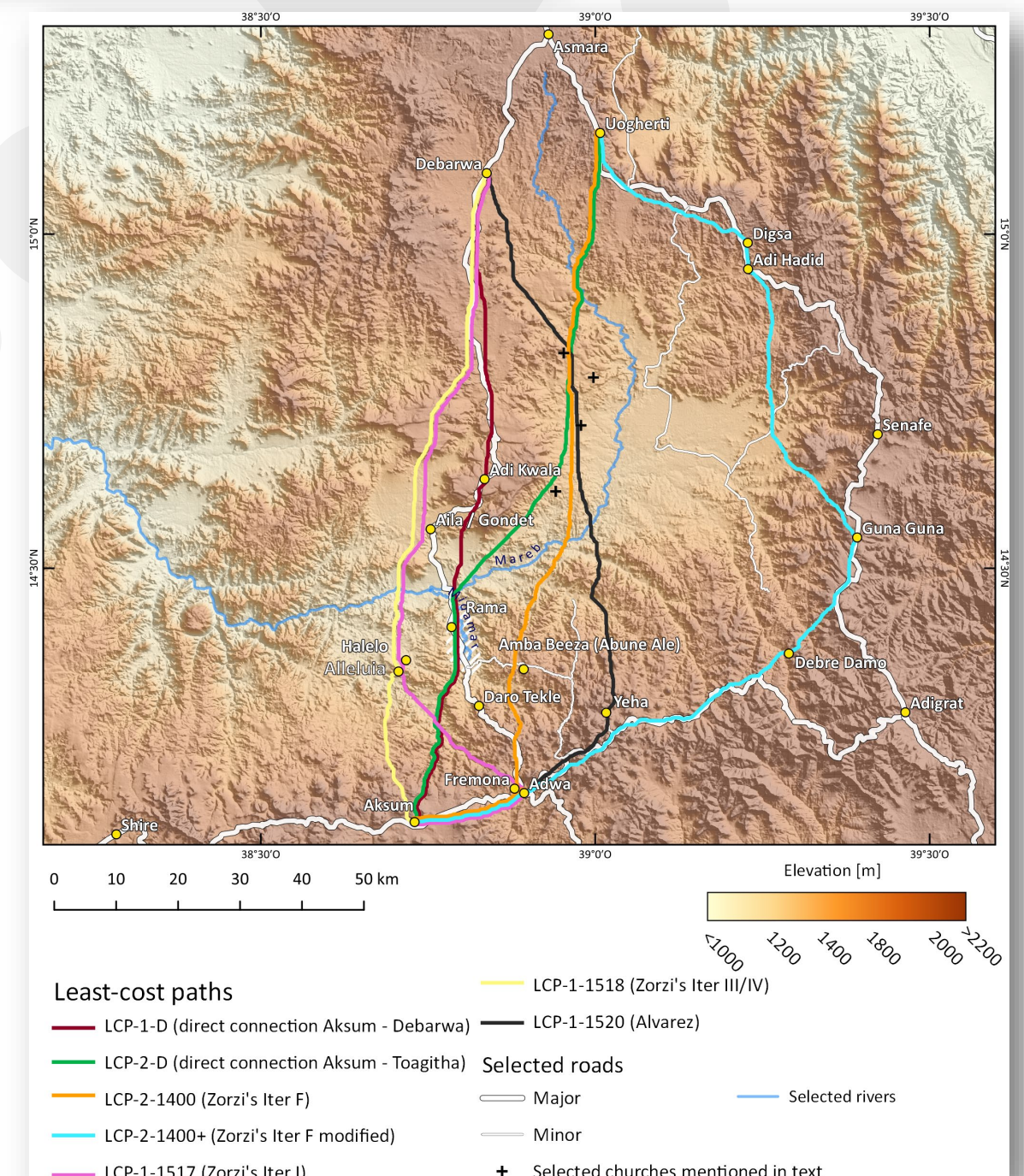


## Historical maps and itineraries



Historical references as input data for least-cost path modeling

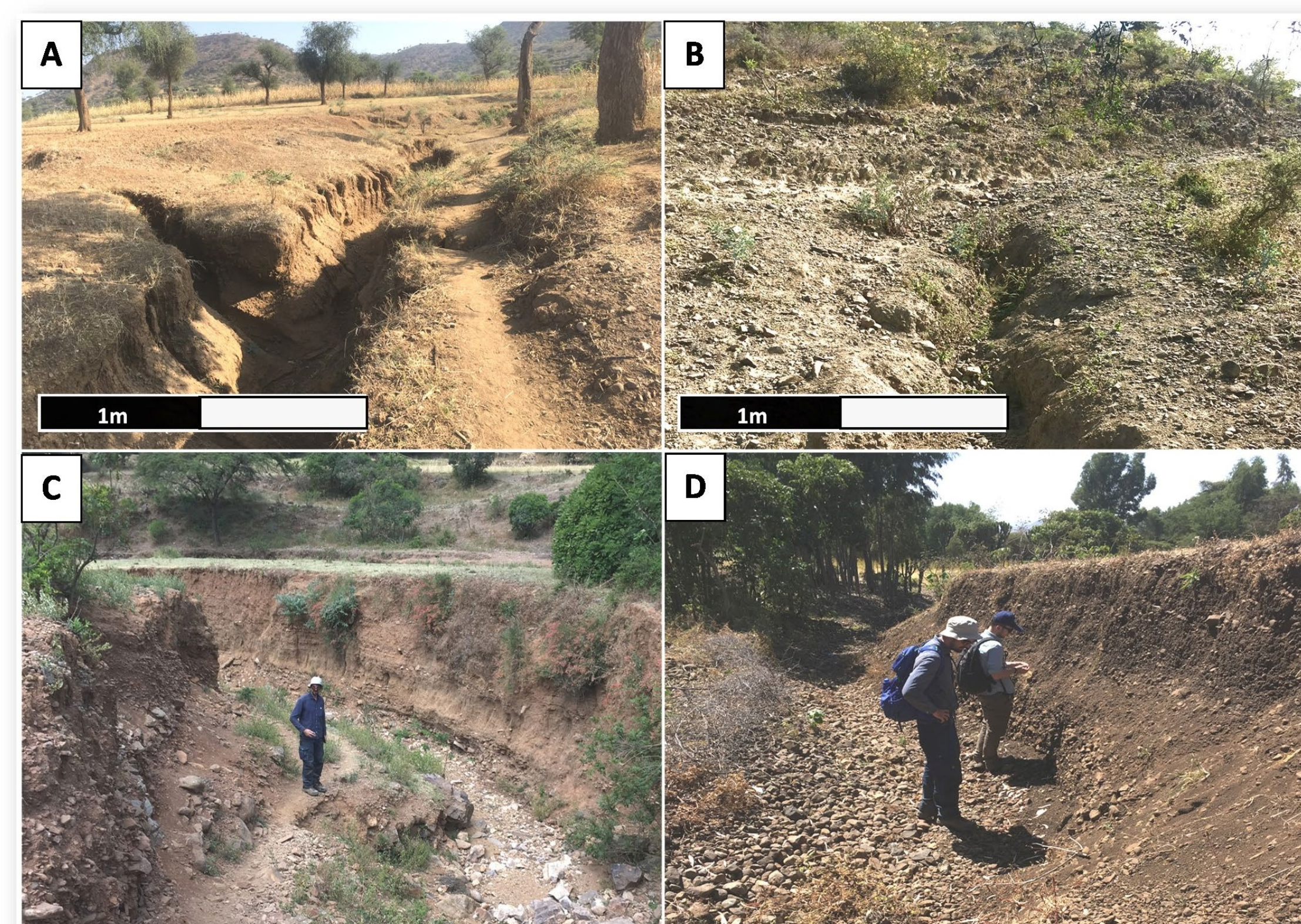
Hardt, J., Nir, N., Schütt, B., (in press), Combining historical maps, travel itineraries and least-cost path modelling to reconstruct pre-modern travel routes and locations in northern Tigray (Ethiopia). The Cartographic Journal. 10.1080/00087041.2022.2150363



## Geomorphological aspects

Trampling on the same piece of land over a certain period of time leads to soil compaction and incision of the footpath itself (holloways, sunken lanes). The compacted soil favors

surface runoff, which can trigger gully erosion. Under certain conditions (pathways parallel to the stream network), the holloways can also stabilize the landscape, as they channel the surface runoff (Nir et al., 2022). In our case study, nearly 30% of the mapped gullies could be attributed to anthropogenic influence (Busch et al., 2021).



Different examples for relations between pathways and gullies (Nir et al., 2021).

Headward erosion of the gullies can in turn undercut the pathways and destroy them, which requires a potentially less cost effective new route setting (Nir et al., 2021).

