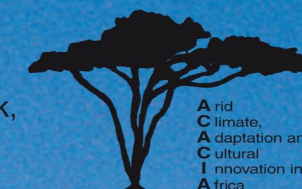


Shades of the Past

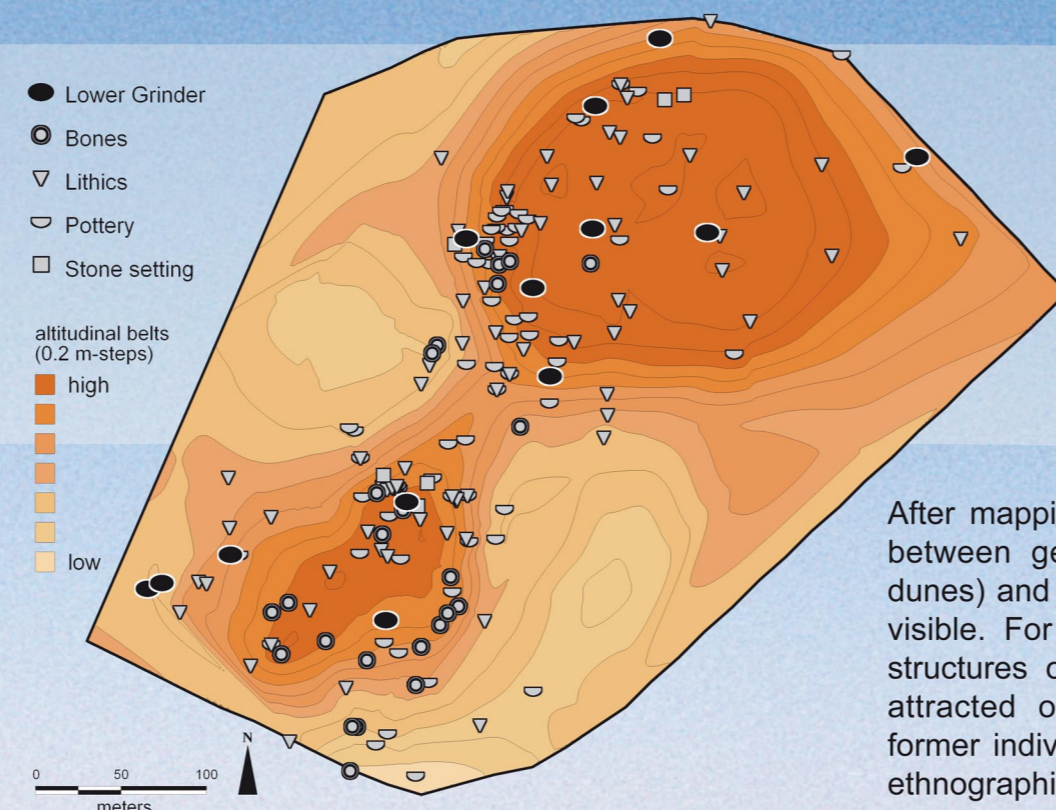
GIS-based Spatial Analysis of Prehistoric Surface Sites in the Lower Wadi Howar (Northern Sudan)

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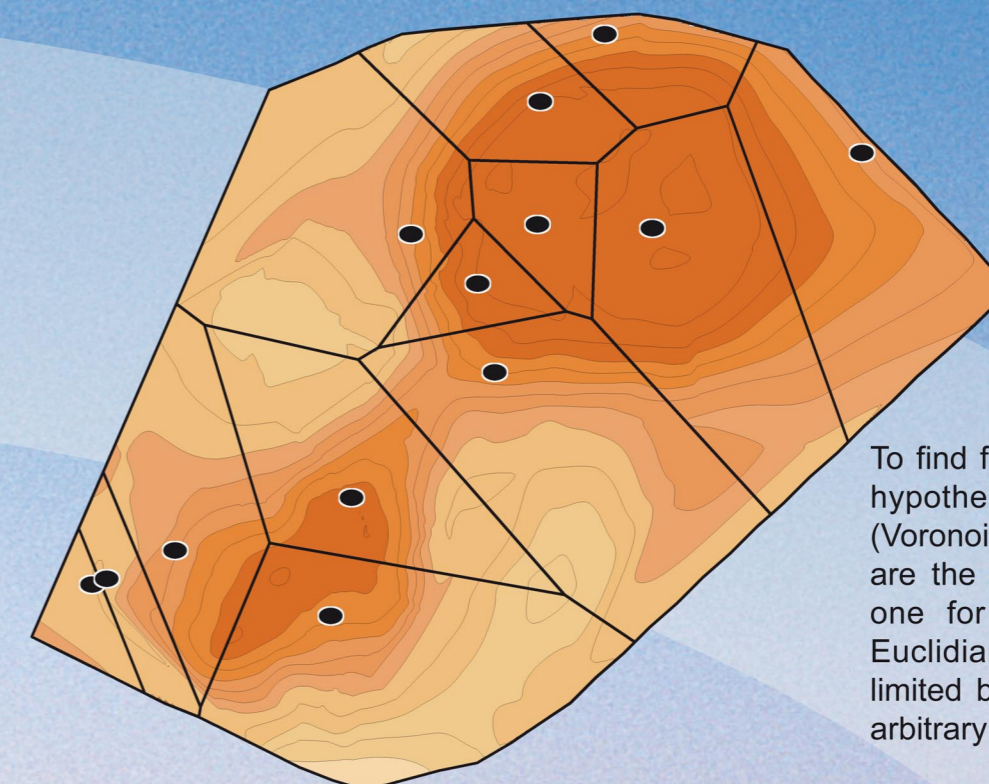


Settlement sites in arid areas such as the Sahara often present themselves as large surface scatters of artefacts which at first sight do not seem to be very specific. Features structuring a site (e.g. hearths or post holes) are either missing or poorly preserved. Often the simple mapping of finds and features neither allows for statements concerning the internal settlement structures nor the spatial and chronological delimitation of settlement areas.

In the Wadi Howar region several surface sites have been examined by the ACACIA project. They are the base for a spatial study using a GIS-based approach. As an example the cattle-herder site Abu Tabari S02/28 dated to around 3000 BC is presented.



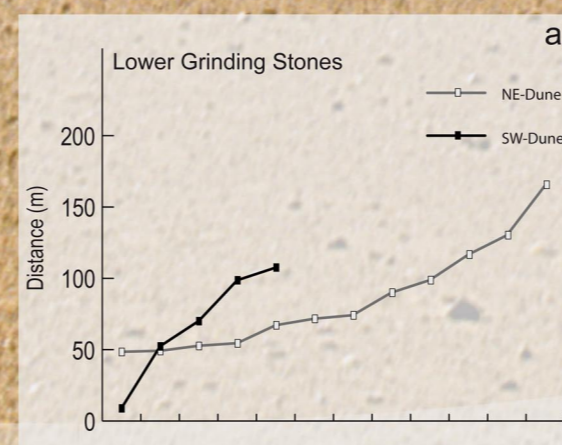
After mapping the artefacts a strong relationship between geomorphological features (two sand dunes) and artefact distribution patterns becomes visible. For further analysis of possible internal structures of the site the lower grinding stones attracted our attention. They might represent former individual household units as is known by ethnographic studies.



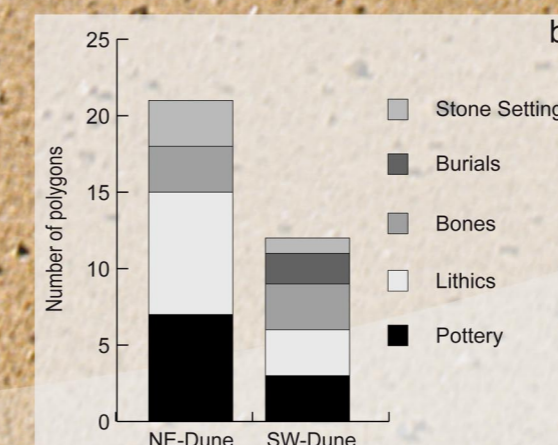
To find further arguments for or against our hypothesis we used Thiessen-Polygons (Voronoi diagrams). The Thiessen-Polygons are the subdivision of the plane into cells, one for each grinding stone, using the Euclidian distances. The polygons are limited by the surveyed area which causes arbitrary boundaries for the outer polygons.



The assumption that lower grinding stones indicate households seems reasonable regarding the mean values of area required and mean distance of lower grinding stones. The available radiocarbon evidence does not allow for a chronological differentiation of the spatial site patterns. Therefore at the moment we assume that the whole area was occupied during a relatively short time span. The pair of lower grinding stones recorded on the SW-dune might indicate an initial household of the settlement or a household of special status. The concentration of burials on the SW-dune indicate a functional structure of the site.



The mean of the Thiessen-Polygons' areas shows a great similarity between the northeast- and southwest-dunes (NE=6935.8 m²; SW=6731.9 m²). The same is true for the mean distance (NE=84.9 m; SW=82.2 m) of the lower grinding stones (a). These results show that there is both a standard for the area required by a household and their distances to each other. Additionally pottery, lithics and bones are present in nearly every polygon indicating settlement activities. A different pattern is established regarding the burials known so far. They concentrate on the SW-dune (b). On its periphery also the only case occurs that two lower grinding stones were found close to each other (< 10 m).



To improve the results of the spatial analysis the boundaries of the outer polygons were blended with a combination of the contour lines and the distribution of other artefacts (pottery, lithics and bones). For the NE and the SW dunes different contour lines were chosen to delimit the polygons.

