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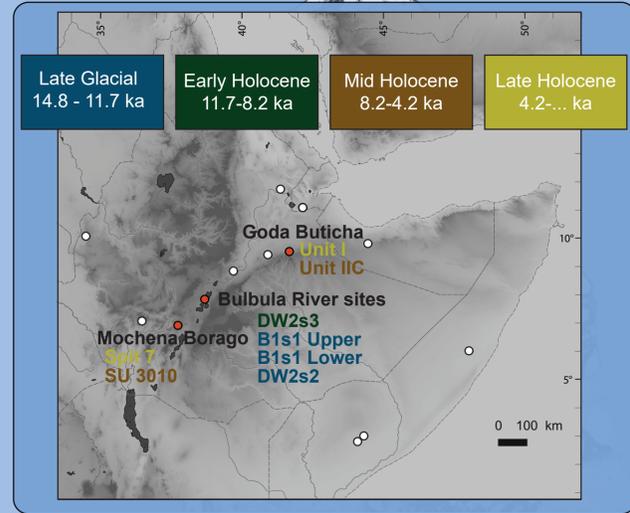
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PROJECTILES and their variability in the Later Stone Age of the Horn of Africa

Why our study?

- The emergence of backed pieces is associated with major Late Pleistocene technological innovations and behavioural changes.
- Backed pieces are often linked to **hafting** and **composite tool technologies** as well as the development of **projectiles**.
- Backed pieces frequently occur in large numbers in most **Later Stone Age (LSA)** assemblages and therefore allow for **inter-site comparisons**.

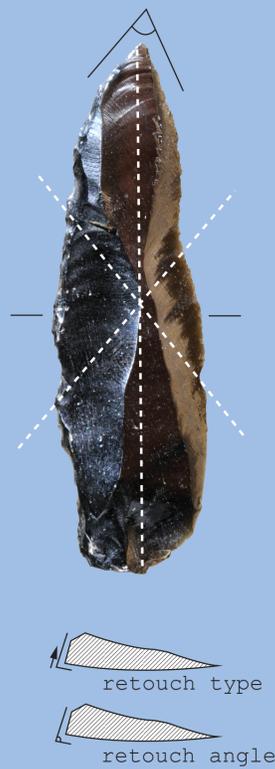
In the **Horn of Africa**, the study of the emergence and development of backed pieces is hampered by the use of **varied definitions and equivocal terms** (microliths, crescents, segments, curved backed blades, etc.). This paper aims to facilitate inter-site comparisons by proposing a set of attributes to describe and analyse the variability of backed pieces in an objective and reproducible way.



Location of the archaeological assemblages analysed (red dots) and main MIS 3-1 sites with backed pieces (white dots).

Definition of backed pieces

Any product with at least one edge, or part of it, modified by **abrupt to semi-abrupt continuous retouch** roughly **parallel** to the **longest morphological axis** of the blank.

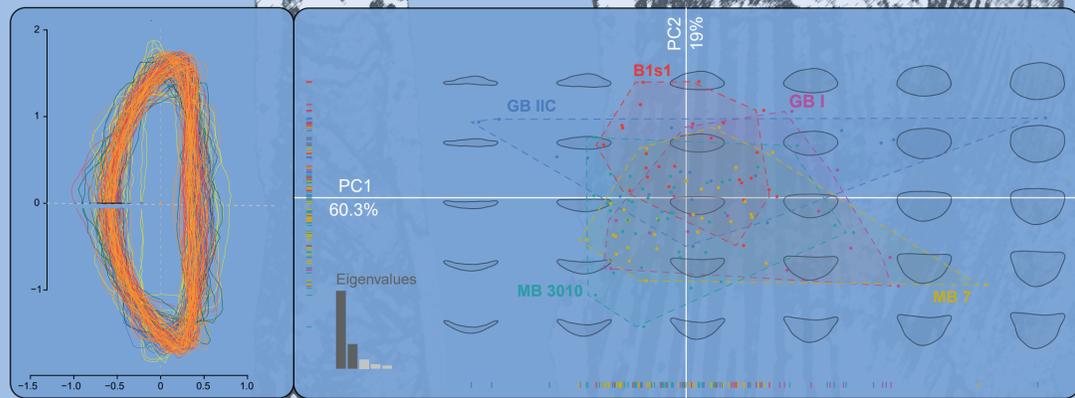


Materials and methods

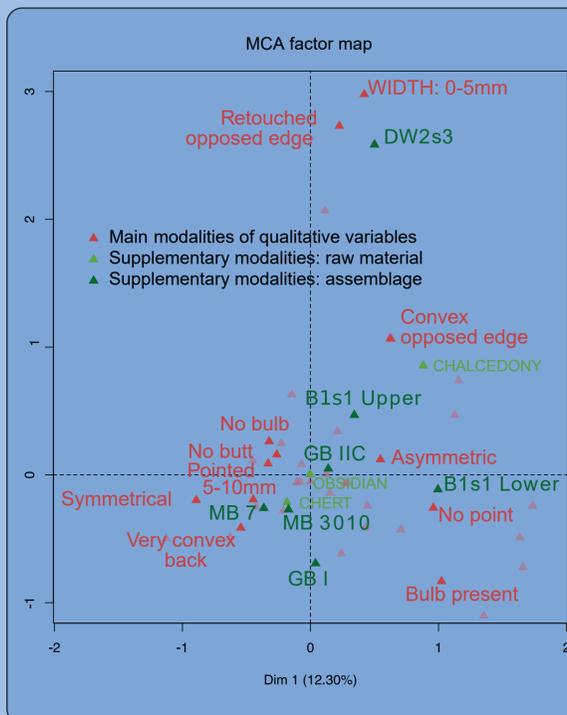
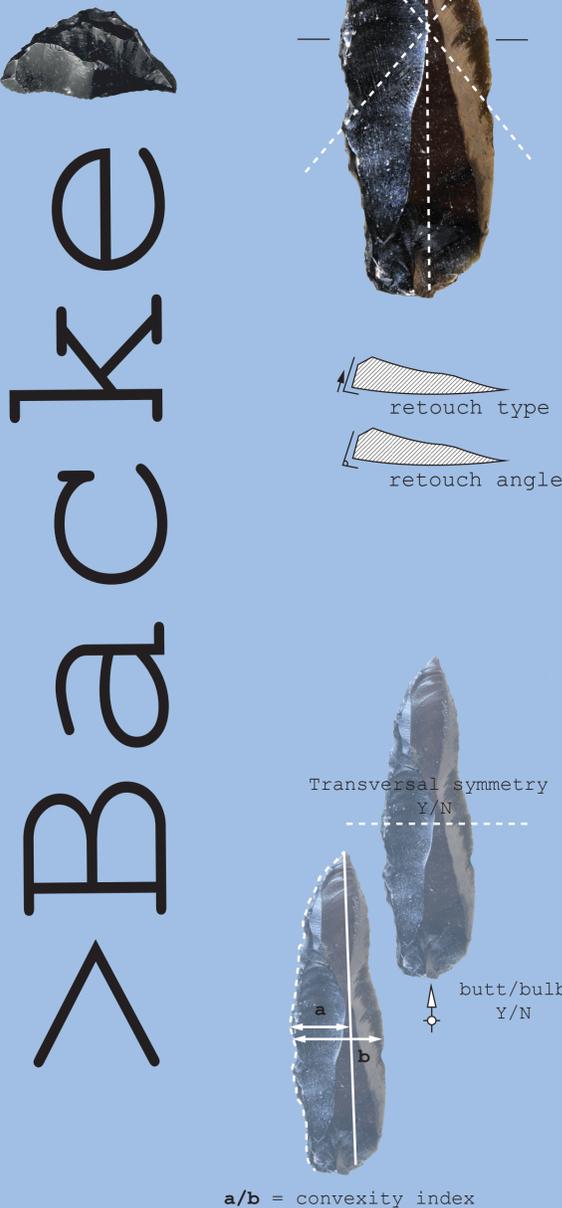
A critical review of the occurrences of backed pieces during MIS 3-1 indicates:

- the **absence** of any robust evidence **before 14 ka cal BP**.
- backed pieces become significant only during the Middle and Late Holocene.

We analysed all complete backed pieces from **eight archaeological assemblages** belonging to sites recently excavated and securely dated that cover the last **15 ky**. For each of the **191 artifacts** identified we recorded 31 variables and took standardised photographs. Our analysis includes but is not limited to **multivariate analyses** (performed with R using **FactoMineR**) and **geometric morphometrics** (using **Momocs**).



Left: Superimposition of scaled outlines of 127 complete backed pieces analysed. Backed edges towards the left. Right: Principal component analysis (PCA) conducted on elliptic Fourier descriptions of complete backed pieces shapes using the first 10 harmonics. Backed edges towards the bottom.



Multiple correspondence analysis (MCA) performed on 121 backed pieces (limited to completely retouched edges), with 15 active variables and two supplementary variables (archaeological assemblage and raw material).

Results and perspectives

Our analysis enables us to describe chronological trends and regional variations without relying on any pre-existing typology.

- No significant miniaturisation through time
- Increase of frequencies of symmetrical and more convex pieces
- Local patterns of shape variation

Acknowledgements

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