

Application export permit – Project outline and short CV

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For a research project, entitled “*What’s in a plant? Tracking early human behaviour through plant processing -and exploitation*” I want to study 74 stone scrapers from Sibudu Cave (KwaZulu-Natal). Below is the research outline of a proposal that was rewarded by The Netherlands Organisation for Scientific Research (NWO) with a 4 year fellowship at Leiden University. In this project I apply micro-residue analysis and micro-wear analysis to stone scrapers in order to understand their function and use. For this analysis I use a light microscope; the tools are not damaged in any way. The Sibudu scrapers will be stored in the Lithic Laboratory (Leiden University, the Netherlands), directed by prof Annelou van Gijn.

Due to time constraints this study cannot be conducted in South Africa because. Residue analysis is a time consuming method and one tool requires several days of microscopy; unfortunately my grant only allows for shorts stays in South Africa for. In addition, I am currently being trained in micro-wear analysis under the supervision of prof Annelou van Gijn and Ms Annemieke Verbaas (lab technician). These researchers are based at Leiden University and their help and skill are paramount to this project. The Lithic Laboratory also hosts an extensive micro-wear comparative collection on which I will rely during analysis, this collection is unique in the world.

Over the past year I have already worked on part of the Sibudu scraper assemblage (permit number: 9/2/412/0018, AE480) and this resulted in an initial publication in the South African Archaeological Bulletin (Wadley and Langejans accepted). I would like to complete and expand this study.

I hereby apply for an export permit for 74 Middle Stone Age (MSA) scrapers from Sibudu Cave. The tools will be returned to South Africa within two year of issuing the permit. Please see the attached object description.

Research outline

Today, plants form an important part of hunter-gatherer diets, but plant foods have been largely neglected in Stone Age research. Therefore, to elucidate the role of plants, I aim to track potential changes of the plant food component of MSA diets. To do so I will analyse scrapers from various southern African sites, dated between ~115.000 and ~12.000 years ago. I will identify the processed materials applying residue analysis and reconstruct how these stone tools were used. This study is the first to use residue/starch analysis on MSA scrapers. Residue analysis studies microscopic organic remains, left on tools after use (e.g. Langejans 2011, 2012a, 2012b).

Objectives:

1. To understand what materials were processed with MSA scrapers.
2. To reconstruct the function of the scrapers.
3. To explain possible differences between scrapers in terms of subsistence.

A scraper is a unifacial tool type, generally with one steep/backed side that facilitates an abrading action. It is unclear what role MSA scrapers played in subsistence strategies. Previous work suggests that recent Later Stone Age (LSA; ~35 - ~1 ka) scrapers were hafted and used for hide working (Deacon and Deacon 1980). Studies on older material suggests that scrapers were also used on plant (e.g. Hardy et al. 2008, Mandujano et al. 2002).

MSA scrapers are larger and less formalised than LSA ones (Mitchell 2002). However, at Sibudu Cave ~100 sophisticated scrapers were found in layers dating to ~78.8 - ~56.7 ka. If MSA scrapers were used on plants, this would provide the oldest African evidence for wood-working and give insight into plant exploitation. However, considering their enigmatic character, if MSA scrapers were used on other materials this would be equally interesting. Therefore, I will use residue and micro-wear analysis to study a total of 77 Sibudu scrapers (stored at the University of the Witwatersrand). Prof. L. Wadley has agreed to collaboration.

Materials and methods:

- Analyse stone scrapers with indirect light microscopy for residues and micro-wear. Map and qualify residues and wear to reconstruct processed materials and tool action.
- By comparing the results I hope to identify recurring patterns and use these to identify the tool function.
- Literature study on MSA climate, ecology and subsistence indicators to place the tools in context.

By analysing tools from different periods I aim to observe changes in plant exploitation through time. Combined with knowledge on population responses to environmental change and seasonal organisation of foraging, these results will provide novel insights into the niche of ancient hunter-gatherers.

References

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- Langejans, G.H.J., 2011. Discerning use-related micro-residues on tools. Testing the multi-stranded approach for archaeological studies. *Journal of Archaeological Science* 38, 985-1000.
- Langejans, G.H.J., 2012a. Middle Stone Age *pièces esquillées* from Sibudu Cave, South Africa: an initial micro-residue study. *Journal of Archaeological Science* 39, 1694-1704.
- Langejans, G.H.J., 2012b. Micro-residue analysis on Early Stone Age Tools from Sterkfontein South Africa: A Methodological enquiry. *South African Archaeological Bulletin* 67: 120-144.
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- Mitchell, P. 2002. *The Archaeology of Southern Africa*, Cambridge University Press, Cambridge.

Short CV

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Education

- Doctor of Philosophy (23-6-2009). University of the Witwatersrand, School of Geography, Archaeology and Environmental Studies, South Africa.
- Master of Science with distinction (3-4-2003). University of the Witwatersrand, School of Geography, Archaeology and Environmental Studies, South Africa
- Bachelor of Arts (31-8-2006). Leiden University, Faculty of Archaeology, the Netherlands

Employment

- Post-doctoral Veni researcher (1-3-2012 to 28-3-2016). Topic: plant resources during the South African Middle Stone Age. Host: Leiden University, the Netherlands.
- Post-doctoral researcher (1-5-2011 to 29-2-2012). Topic: Micro-residue analysis on Middle Stone Age scrapers. Host: University of Johannesburg, South Africa.
- Post-doctoral researcher (5-5-2009 to 1-5-2011). Topic South African Middle Stone Age shellfish subsistence. Host: University of the Witwatersrand.
- Archaeologists (1-6-2008 to 30-4-2009). Cultural Resource Management. Company: Hazenberg Archeologie, the Netherlands.

Publications

Wadley, L., Langejans, G.H.J., Accepted. The use of scrapers around combustion features in layer SS, Sibudu, 58,000 year ago. South African Archaeological Bulletin July 2014.

Langejans, G.H.J., Dusseldorp, G.L., van Niekerk, K.L., Henshilwood, C.S., 2013. A hazy shade of winter: Late Pleistocene environments and behavioural adaptations at Blombos Cave, South Africa. *Palaeoecology of Africa* 32: 19-51.

Dusseldorp, G.L., Langejans, G.H.J., 2013. Carry that weight: coastal foraging and transport of marine resources during the South African Middle Stone Age. *Southern African Humanities* 25: 105-135.

Langejans, G. H. J. 2012. Micro-residue analysis on Early Stone Age Tools from Sterkfontein South Africa: A Methodological enquiry. *South African Archaeological Bulletin* 67(196): 120-144.

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- Langejans, G.H.J., Dusseldorp, G.L., Henshilwood, C.S., 2012. Terrestrial gastropods from Blombos Cave, South Africa: Research Potential. *South African Archaeological Bulletin* 67, 120-123.
- Langejans, G.H.J., van Niekerk, K.L., Dusseldorp, G.L., Thackeray, J.F., 2012. Middle Stone Age shellfish exploitation: Potential indications for mass collecting and resource intensification at Blombos Cave and Klasies River, South Africa. *Quaternary International* 270, 80-94.
- Dusseldorp, G.L., Langejans, G.H.J., 2012. Reconstructing Middle Stone Age life-ways. *Quaternary International* 270, 1-3.
- Langejans, G.H.J., 2011. Discerning use-related micro-residues on tools. Testing the multi-stranded approach for archaeological studies. *Journal of Archaeological Science* 38, 985-1000.
- Langejans, G.H.J., 2010. Remains of the day - Preservation of organic micro-residues on stone tools. *Journal of Archaeological Science* 37, 971-985.
- Langejans, G.H.J., 2007. PIXE and residues: Examples from Sterkfontein and Sibudu, South Africa. *South African Archaeological Bulletin* 62, 71-73.
- Langejans, G.H.J., 2006. Starch grain analysis on Late Iron Age grindstones from South Africa. *Southern African Humanities* 18, 71-91.
- Kuman, K., Gibbon, R.J., Kempton, H., Langejans, G., Le Baron, J., Pollarolo, L., Sutton, M., 2005. Stone Age signatures in northernmost South Africa: archaeology of the Vhembe-Dongola National Park and Vicinity. In: Backwell, L., D'Errico, F. (Eds.), *From Tools to Symbols: From Early Hominids to Modern Humans*. Witwatersrand University Press, Johannesburg, pp. 163-182.

Conference organisation

2013: Member of local organising committee Association for Southern African Professional Archaeologists (ASAPA) conference (Gaborone, Botswana). Tasks: Planning and conference abstract book (July 2013).

Sessions

2013: Session co-organiser, Association for Southern African Professional Archaeologists (ASAPA) conference (Gaborone, Botswana). Title: Progress in Stone Age archaeology, dating and paleoenvironment studies (July 2013).

2012/13: Session co-organiser, Association of Southern African Professional Archaeologists (ASAPA) conference 2013 (Gaborone, Botswana). Title: Progress in Stone Age archaeology, dating and palaeoenvironmental studies.

2010/11: Session co-organiser, international INQUA 2011 conference (Bern, Switzerland). Title: Human-Climate-Ecosystem Interactions: The African Quaternary.

2010: Session co-organiser international PanAfrican Archaeological Association (PAA) and Society of Africanist Archaeologists (SAfA) conference (Dakar, Senegal). Title: Late Pleistocene Lifeways. November 2010.

Selected conference presentations

2013: International Union for Quaternary Research (INQUA) workshop for project group

‘Context and controls on modern human behaviour in southern Africa: Human-environment interactions in the Late Pleistocene’, Cederberg, South Africa. Paper: “I am the very model of...” - Late Pleistocene sea surface temperatures, terrestrial proxies and climate models.

2013: Association of Southern African Professional Archaeologists (ASAPA) conference, Gaborone, Botswana. Paper: The human factor: Another look at Early Stone Age micro-residues from Sterkfontein (South Africa).

2012: Use-wear 2012, Faro, Portugal. Presentation: The human factor: Another look at Early Stone Age micro-residues from Sterkfontein (South Africa).

2012: Southern African Society for Quaternary Research Analysis (SASQUA), Gobabeb, Namibia. Poster: Terrestrial gastropods from Blombos Cave, South Africa: Research Potential.

2012: Society of Africanist Archaeologists (Safa), Toronto, Canada. Paper with Gerrit Dusseldorp: Field processing and transport behaviour of marine resources during the South African Middle Stone Age.

2011: International Union for Quaternary Science (INQUA), Bern, Switzerland. Paper with Gerrit Dusseldorp: A hazy shade of winter: The influence of climatic changes in Middle Stone Age foraging behaviour in South Africa.

2010: PAA/SAfA, Dakar, Senegal. Paper: Finding proxies for Middle Stone Age foraging behaviour. Preliminary examples using shellfish remains from Blombos Cave, South Africa.

2010: Australian Archaeological Association (AAA), Batemans Bay, Australia. Paper: Discerning use-related micro-residues on archaeological tools.

Memberships and affiliations

Since 1-3-2012: Honorary research fellow, University of Johannesburg, Centre for Anthropological Research

Since 2009: Southern African Society for Quaternary Research (SASQA).

Since 2007: Society for Africanist Archaeologists (SAfA).

Since 2006: Association of Southern African Professional Archaeologists (ASAPA).