

## Drimolen Hominin Site – Annual Report to SAHRA (July 2014)

**Permit #: 80/12/02/024/51**



**Dr. C.G. Menter, Ms. S. Baker & Professor T. de Wet**  
Centre for Anthropological Research (CfAR)  
House 10, Humanities Research Village  
University of Johannesburg  
P. O. Box 524  
Auckland Park 2006  
Email: [menterc@drimolen.org](mailto:menterc@drimolen.org)

1 July 2014

---

### Introduction

Drimolen is a hominin-bearing fossil site in the “Cradle of Humankind” World Heritage Site, South Africa. It is best known for DNH 7, the most complete skull of *Paranthropus robustus* yet discovered (Keyser, 2000).

Drimolen is only one of two sites that has produced a large sample of the robust australopiths as well as a species of our early human ancestors, *Homo*. Although Drimolen is very rich in primate craniodental material, postcranial bones are relatively rare. Continued excavation at the site will undoubtedly improve this situation and allow for increased understanding of the postcranial anatomy and differences between *Homo* and the robust australopiths.

### Excavation

Our excavation in 2013 was concentrated into an intense 5-week period from July to early August. The excavation seasons were with La Trobe University for three weeks and with the University of Florence for two weeks. Students from Italy, Australia and South Africa were taught field excavation techniques in a dolomitic cave site.

1. Geological Excavations: The chronological control of the fossil deposits in the “Cradle” has always been a major issue. Our continued focus over the last two years has been to resolve this. The difficulty that we have encountered is that there are few remaining speleothems that are in association with the fossil deposits.

Our excavation focused on trying to expose both the northern and southern siltstones at the site to try and link them across the deposit from north to south and against the Western Wall of the Main deposit. In previous years, these siltstones were sampled for Palaeo-magnetic dating, which was very successful. We are now trying to build a geological section of the siltstones across the deposits and determine how they relate to the breccia deposits. Further, we mapped part of the lower cave to further understand how these siltstones relate to the siltstones in the Main Quarry.

The main geological excavations were conducted in association with two geo-archaeologists, Professors Boschian (University of Pisa) and Herries (La Trobe University).

2. Makondo Deposit: We also focused our excavation efforts on the most western deposit at the site. This is at the extreme west of the E-W trench above the Main Quarry. This deposit is a solution tube. Our initial efforts were simply to recover and safe the material decalcifying off of the Makondo walls. This is an interesting deposit as articulated specimens, mainly Bovids, were recovered. A primate partial skull was also recovered. In addition to recovering the decalcified material, we excavated a 3x6 metre area to the South of the main part of the Makondo. This grid was tied into the Drimolen local grid system. The area that was excavated was from W260-W265 and S200-S205. During this excavation, we tried to uncover the extent of the breccia deposits.

3. ESR sampling: We have taken gamma dose rate readings in both the Main Quarry (including soil samples) and at the Makondo deposit to explore possible ESR dating of Drimolen dental samples. We will be applying for the subsequent export permits in due course.

4. Breccia Samples: Collapsed blocks of breccia were recorded via a total station and either prepared manually or taken to Ditsong Museum to be prepared via acetic acid preparation.

5. Main Quarry Excavations: As part of the University of Johannesburg and University of La Trobe Drimolen Field School, we put in 5, 1x1 metres squares in the Main Quarry. This is the decalcified part of the collapsed area of the site. In addition, we have started to reduce the height of the western wall under the Main Pinnacles to alleviate any possibility of collapse.

6. As per discussions with SAHRA, we continued to apply a small layer of concrete on the terraced sections. We also added some concrete steps into the main excavation area. This has helped stop any collapse or trampling of the excavated sections and increased safety into and out of the site.

## **Excavation Methodology**

All excavations squares were excavated in a 1x1 metre square or in “quads”. All 4 corners were shot in with one of the two total stations that are permanently on site. If the square was smaller than a 1x1 metre square, all dimensions of the square were also recorded. Excavation was conducted in either 5 or 10 cm spits and all material was sieved through three different mesh sizes, down to 1mm mesh. The medium fraction is also wet sieved. The fine mesh fraction was then sorted on a sorting table, which is an incredibly time consuming part of the excavations and is normally the reason that we only manage 4-5 squares per year by 3-4 spits.

All identifiable material is shot-in and recorded on a total station. Larger shaft fragments are also shot-in with two or more points to ascertain their slope. It needs to be noted that the excavation at Drimolen is taking part in a collapse and primary context is therefore lacking; however, the excavation proceeds as if it was

undisturbed. Further any chert, breccia or dolomite blocks are also shot-in in three dimensions.

In addition to the total station, the excavation is conducted as a digital excavation, the first in the “Cradle”. All contact sheets, level forms, photos and notes are recorded on an Apple Ipad via a database app that is backed-up to the cloud. This has been very successfully implemented at Drimolen.

## **Preparation**

Breccia preparation consists of manual preparation using a standard dental drill. The breccia material is from the excavated squares in the Main Quarry. The preparation mainly reduces the breccia surrounding the fossils and when we get close to the fossilized bone the manual preparation stops. The final breccia material is then removed via weak acetic acid. Acid preparation is done at Ditsong Museum. We find this combination of techniques to be quite successful. It reduces the time the fossils are exposed to acid but reduces any removal of taphonomic marks via manual preparation.

## **Curation**

The Drimolen Laboratory has been established at the University of Johannesburg Bunting Road Campus. The laboratory, under the management of Ms. Stephanie Baker, has begun to digitally catalogue all of the material excavated from the Drimolen Main Quarry as well as the few specimens from the Makondo. All the faunal material excavated since in the last two permits has been prepared, accessioned and curated. We have now started on the previous material and we envision being caught up within the next year or so. We have hired a full time laboratory technician (who previously worked at the Ditsong Museum) to help curate the Drimolen faunal assemblage. She has been trained in methods of cataloguing, bone labelling and basic faunal identification. In addition, we have help from an honours student.

**Export Permit:** We have recently received an export permit for a PhD student from La Trobe University, Australia that will be undertaking an extensive study of the bone tools from Drimolen.

## **Journal Article**

*Unique Patterns of Dental Ontogeny in Pliocene and Early Pleistocene Hominins* (Smith et al, 2014, submitted). Based on synchrotron data, age at death for a number of Drimolen and South African specimens have been calculated.

## **Site Issues**

The site needs either a fence around it or for gates to be installed at the entrances to the Main Quarry. We have recently been informed that a permit will be issued allowing us to erect gates around the Main Quarry and a fence around the upper trench. The permit has of yet not been issued. A grant has been obtained from the

University of Johannesburg to protect the site. Unfortunately, the money promised from SAHRA was not forthcoming.

SAHRA and the COHWHS have both been informed of the possibility of the lime kiln collapsing. Another small row of bricks have fallen off the eastern rim of the lime kiln. While Dr. Menter approached one of the archaeologists from UNISA that expressed an interest in studying the kiln and possibly conserving it, nothing further has happened.

## **Collaborators**

Drimolen has a strong multi-disciplinary approach with specialist collaborators working on a wide variety of projects. Our collaborators are based at a number of institutions worldwide, which include Italy, UK, Australia, France, Germany, Israel, Canada and South Africa.

### **Bone Tools**

Ms. Rhiannon Stammers (PhD student, La Trobe University)

### **Dating**

Professor Randall Parish (Geological Survey, UK)

Dr. Philip Hopley (Birkbeck College, Univ. of London, UK)

Professor Andy Herries (La Trobe University, Australia)

Professor Darryl Granger (Purdue University, USA)

Dr. Anne Skinner (Williams College, USA)

Dr. David Finks (ANSTO, Australia)

Dr. Robyn Pickering (University of Melbourne, Australia)

### **Geoarchaeology/Sedimentology**

Professor Giovanni Boschian (University of Pisa, Italy)

Professor Andy Herries (La Trobe University, Australia)

### **3d Laser Survey**

Professor Heinz Ruther (University of Cape Town, South Africa)

### **Carnivores**

Dr. Hannah O'Regan (Liverpool John Moores University, UK)

### **Bovidae**

Dr. James Brink (National Museum, Bloemfontein)

### **Primates**

Dr. Jason Heaton (Birmingham-Southern University, USA)

Dr. Colin Menter (University of the Witwatersrand)

### **Taphonomy**

Ms. Stephanie Baker (University of Johannesburg)

### **Hominins**

Dr. Colin Menter in collaboration with the following scientists (for specific projects):

Professor Jacopo Moggi-Cecchi (University of Florence, Italy)  
 Dr. Sylvia Boccone (University of Florence, Italy)  
 Dr. Tanya Smith (Harvard University, USA)  
 Dr. P. Gunz (Max Planck Institute for Evolutionary Anthropology, Germany)  
 Dr. K. Kupczik (Max Planck Institute for Evolutionary Anthropology, Germany)  
 Dr. Matt Skinner (University College London, UK)  
 Dr. Paul Tafforeau (European Synchrotron Research Facility, France)  
 Dr. Louise Humphreys (Natural History Museum, London)  
 Dr. Andrew Gallagher (University of the Witwatersrand, South Africa)  
 Professor William H. Kimbel (Arizona State University, USA)  
 Professor Yoel Rak (Tel Aviv University, Israel)

### **Drimolen Publications and Abstracts: 2009-2013**

- Gallagher A, Menter C.G. (2011). DNH 109: A fragmentary hominin near-proximal ulna from Drimolen, South Africa. *S. Afr J Sci.* **107(5/6)**, Art. #456, 4 pages. doi:10.4102/sajs.v107i5/6.456.
- Hopley P.J., Parish, R.R., Maslin, Menter, C.G. (2009). Environment and chronology of South African early hominin localities. UK Archaeological Sciences Conference, British Geological Survey, Nottingham, UK. (Abstract).
- Moggi-Cecchi J., Menter C.G., Boccone S., Keyser A.W. (2010). Early hominin dental remains from the Plio-Pleistocene site of Drimolen, South Africa (1992-2000 excavations). *Journal of Human Evolution.* **58**, 374-405.
- Moggi-Cecchi J., Menter C.G., Boccone S., Keyser A.W. (2009). Early hominin dental remains from Drimolen, South Africa. Paleanthropology Society meetings. (Abstract).
- Mori T., Moggi-Cecchi J., Pickering T.R., Menter C.G. (2013). Distribution of Ages-at-Death of Fossil Hominins from the Early Pleistocene site of Drimolen, South Africa: Preliminary Results and Behavioral Implications. ESHE. (Abstract).
- O'Regan H & Menter C.G. (2009). Carnivora from the Plio-Pleistocene hominin site of Drimolen, Gauteng, South Africa. *Geobios.* **42**, 329-350.
- Pickering T.R., Heaton J.L., Menter C.G. (2011). Bone Surface Marks: Beyond inferences of carcass consumption? *Journal of Taphonomy* (The Taphonomist's Corner). Issue 2, 161-162.
- Smith T.M., Olejniczak A.J., Zermeno J.P., Tafforeau P., Skinner M.M., Hoffman A., Radović J., Toussaint M., Kruszynski R., Menter C.G., Moggi-Cecchi J., Glasmacher U.A., Kullmer O., Schrenk F., Stringer C., Hublin J.-J. (2012) Variation in Enamel Thickness within the Genus *Homo*. *Journal of Human Evolution.* **62**, 395-411.
- Smith, T.M. et al (2014). Resolving Pliocene and Pleistocene Hominin Dental Ontogeny with Synchrotron Virtual Histology. Annual Meeting issue, *American Journal of Physical Anthropology* (Abstract).
- Tafforeau P., Pouech J., Smith T.M., Moggi-Cecchi J, Menter CG. (2011). Dental development in juvenile fossil hominins from Drimolen South Africa using synchrotron virtual histology. Annual Meeting issue, *American Journal of Physical Anthropology* (Abstract).
- Vernon D.S., Tocheri M.W., Menter C.G. (2011). A hominin first metatarsal base from Drimolen, South Africa. Annual Meeting issue, *American Journal of Physical Anthropology* (Abstract).
- Vernon D.S., Menter C.G., Gallagher, A. (2012). The original description and analysis of the manual and pedal phalanges from the Drimolen hominin site, South Africa. Annual Meeting issue, *American Journal of Physical Anthropology* (Abstract).

Vernon, D.S., Menter C.G., Gallagher, A. (2013). The original analysis of the manual and pedal phalanges from the Drimolen hominin site, South Africa. Annual Meeting issue, American Journal of Physical Anthropology (Abstract).