Executive Summary of the Thesis

Prehistoric Archaeology of the Gundlakamma and Adjoining River Basins, Prakasam District, Andhra Pradesh

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EXECUTIVE SUMMARY

The thesis entitled “Prehistoric Archaeology of the Gundlakamma and Adjoining river basins, Prakasam District, Andhra Pradesh” focused on reconstrucing the Palaeolithic cultural sequence of the Gundlakkamma and adjoining river basins using multidisciplinary methods. South Asia, with its rich Palaeolithic remains, occupies an important place in human evolutionary studies. However, the region attracts little attention in global discussions on human biological and cultural evolution due to the lack of a firm chronological framework, high-resolution lithic analysis, and reliable palaeoenvironmental reconstructions. This study aims to establish a credible chronological framework and the environmental context of Palaeolithic cultural development in the Gundlakamma and adjoining river basins of the Prakasam District, Andhra Pradesh. Previous sporadic studies from the mid-1860s onwards have highlighted the region's archaeological potential by identifying rich Palaeolithic remains, animal fossils, and their unique geological associations (e.g., Youngest Toba Tuff deposits, inland sand dunes). The current research uses multidisciplinary methods that include excavations, chronometric age estimations (Luminescence and U series), high-resolution lithic technology studies, and geoarchaeology to examine the region's extensive prehistoric remains.

Intensive surveys were conducted in the study region to locate stratified palaeolithic sites, followed by a systematic investigation of seven sites representing a broad temporal range including the Middle and Late Pleistocene epochs. The current research marks the first attempt to use chronometric dating methods to reconstruct a regional Palaeolithic cultural sequence and to use the new data to address general issues in regional Palaeolithic studies in peninsular India. The explorations undertaken in the region under investigation led to the discovery of 68 Palaeolithic sites associated with different geological and cultural contexts. These sites represent different phases of the Palaeolithic culture including Lower, Middle and post-Middle. In addition, sites with Youngest Toba Tuff (YTT) deposits from the 74 ka Toba super-eruption were identified in the region. The Middle Palaeolithic cultural remains constitute the most dominant amongst the diverse cultural assemblages and represent a broad temporal range from ~247 to 59 ka. Sites showing post-Middle Palaeolithic cultural remains are the second dominant category and are mostly concentrated along the upper reaches of the Gundlakamma and Manneru river basins. The Lower Palaeolithic sites are mostly known from findspots and riverbeds with a small number of stratified localities. This could be due to the lesser exposure of Lower Palaeolithic horizons, which are associated with hard and compact sediments that are buried deeply under Late Pleistocene sediments.

The late Acheulian/early Middle Palaeolithic transitional assemblages in the region are unique to understand the emergence of prepared core technologies. The study of these transitional assemblages produced important datasets that contributed to the emerging framework of the origin of prepared core technologies, both at regional and global level. These assemblages show a combination of both bifacial and prepared core technologies, with a greater preference for the latter. Following on from these transitional industries, typical Middle Palaeolithic assemblages appear in the region as early as 247 ka and last until 59 ka, showing temporal variations in the Levallois technology and other artefact types. The Middle Palaeolithic record of the region is extensive and widely spread across the region. The temporal variations allow the Middle Palaeolithic to be divided into two phases: an early (between MIS 7-6 and 5e) phase and a late (post-MIS 5a/post-last interglacial) phase. The post-MIS 5a Middle Palaeolithic technology continues to exist up to the beginning of MIS 3. Blade based assemblages dominate the MIS 3, postdating the Middle Palaeolithic technology, and existed from 41 to 29 ka. The MIS 3 blade based asssemblages are stratigraphically different from those belonging to MIS 5a and MIS 4. This, currently under-researched record, hints at significant insights that could be gleaned from it, such as changes in local environment, technological advancements, and subsistence strategies. It also holds enormous potential for addressing broader issues of cultural change in the region.

The Palaeolithic record of Gundlakamma and adjoining river basins adds significant contributions to establishing a credible chronological framework as well as understanding hominin behavioural evolution in South Asia, and it helps fill up major gaps in our knowledge of the same.

Chapter 1 Introduction

This chapter presents how the current research draw inspiration from existing scholarship in prehistoric archaeology and other associated disciplines. It also discusses why the topic is important to the discipline, the gap in knowledge and the need to generate more systematic data. The chapter reviews previous work done on this topic, by citing relevant literature and also includes an overview of the objectives of the present work. The South Asian Palaeolothic record is complex and very diverse particulary during the Late Pleistocene epoch. Recent studies (Akhilesh et al 2018; Petraglia et al 2007; Mishra et al 2013) have highlighted the the same and called for reevaluation of the few concepts in South Asian Palaeolithic studies. The current status of few such concepts such as Late Acheulian to Middle Palaeolithic transitions,

Youngest Toba Tuff deposits in South Asia as a Late Pleistocene chronological marker, and initial Modern Human colonisation of South Asia, and the nature of Post Middle Palaeolithic cultural developments were summarised in the chapter.

Chapter 2 Study Area: Physiographic and Cultural Setting

This chapter gives an introduction to the physiographic setting of the region followed by cultural framework of the region. The geological history of the region was described with appropriate illustrations follwed by the geomorphological setting in which Prehistoric sites are found. The drainge network of the Gundlakamma and adjoining river basins was discussed in this chapter along with the previous work on the Prehistory of the region.

Chapter 3: Research Methods

This chapter outlines the field and laboratory techniques used in this study. It focuses on survey methods, excavations, section scraping and step-trenching strategies, sample preparation and technical procedures used in this thesis rather than providing a detailed treatment of the principles behind each technique as they are long-established methods. The chapter elaborates the survey strategies such as the the reading of the topographic sheets, satellite images; Optically Stimulated Luminescence and U series dating techniques to date the sediments; Geochemical analysis of Volcanic ash; Particle size analysis and mineral maggnetic studis and the methods used lithic artefact and faunal analysis. It further includes the classification of the data and methods exercised in analysing the data recovered using multiple methods.

Chapter 4: Results

A total number of 61 new Palaeolithic sites have been reported during the explorations. Based on the extent of sites, the freshness of the artefacts, and the presence of debitage (< 2 cm) and hammerstones, most of the sites are of primary context. It is observed that a maximum of the sites located in badland areas were exposed due to rill and sheet erosion. Among 61 sites, 33 are from the upper Paleru basin, 27 are from the upper Gundlakamma basin, and two are from the upper Manneru basin. A few microlithic sites are also reported from the Upper Paleru basin, which was unknown previously. Microliths were found in association with the inland dune deposits. Site distribution patterns and the composite stratigraphy were discussed in this chapter.

To reconstruct the Prehistoric cultural sequence of the Gundlkamma and adjoining river basins, seven newly reported sites were investigated in detail. The sites were selected based on the

criteria of having rich cultural material from in situ contexts and assuming they can provide material from oldest to youngest time ranges. These sites are Vemulapadu (VMP), A. Agraharam (AAH), Nandanavanam (NNV), Hanumanthunipadu (HMP), Retlapalle (RTP), Motravulapadu and Ardhaveedu (AVD). Excavations, section scrapings and step trenches were conducted at these sites to recover sediment samples for Luminescence dating and cultural material. For each of these seven sites Stratigraphy, Luminescence Chronology, Lithic technology was discussed in this chapter.

Chapter 5: Discussion

This chapter discusses the results of the analysis and interpretation of data presented in the preceding chapters. The themes discussed here include the Palaeolithic cultural sequence of the studied region by situating the same within South Asia; the origin and evolution of Middle Palaeolithic technologies in South Asia; the Youngest Toba Tuff beds as a Late Pleistocene chronological marker; the initial Modern human colonization of South Asia; post-Middle Palaeolithic cultural developments in South Asia; the nature of lithic assemblages before and after the Toba eruption; and Archaic – Modern human interactions in South Asia.

The research was aimed at generating a robust chronological framework for the Palaeolithic cultures in the region under investigation along with high resolution lithic analysis. At the beginning of the research, after going through the available literature, it was identified that the lack of chronometric ages for the South Asian Palaeolithic studies limits our understanding of human cultural evolution on both the global and regional level. Therefore, the primary focus of the current research was to obtain chronometric ages for the Palaeolithic remains in the region. Secondly, more emphasis was placed on understanding lithic artefacts from an assemblage perspective to better appreciate the technology rather than mere descriptions of artefacts. Geoarchaeological analysis were limited to specific cases (e.g. YTT deposits) where ever it was necessary. The researcher was able to report 61 new Palaeolithic sites, however, only seven sites were studied intensely for analytical purpose. The research recognises that focusing on a few sites by excavating and step trenching will result in more robust chronology and secure context for the artefacts than studying surface collections from many sites. Even though this research also incorporated surface collected artefacts, specific caution was taken while selecting sites for the study of surface collections. These included selecting sites with single artefact/cultural horizon, which was further ascertained through small scale excavations and step trenching. Further, the methodological approach also included limiting surface

collections by laying out systematic grids to exclude the possibility of biased random collections. The seven sites on which the research focused upon were selected as they represented a wide temporal range, resulting from sites distributed across the Gundlakamma and adjoining river basins.

Chapter 6: Conclusion

The said chapter presented the findings of multidisciplinary studies undertaken along the Gundlakamma and adjoining valleys with the goal of situating the region within the context of peninsular India's Palaeolithic archaeology and the global context. The study highlights the region's potential for understanding hominin behavioural evolution in regional and global contexts. The South Asian Palaeolithic record was thought to lack significant evidence in hominin evolutionary studies, mainly due to the absence of hominin fossil records, a robust chronological framework, and associated paleoenvironmental reconstructions. However, more recent studies by Petraglia et al. (2007), Pappu et al. (2010), Mishra et al. (2013), and Akhilesh et al. (2018) have highlighted the significance of South Asia in human evolutionary studies. Following on from these studies, the current research explores the crucial role of the South Asian Palaeolithic record in understanding human behavioural evolution. Further, the study emphasises the complexity of the region's Palaeolithic record, which challenges and calls for a re-evaluation of the region's current human evolutionary framework. The research focused more on generating chronometric ages for the palaeolithic remains recovered from secure geological contexts, which are crucial in addressing general issues in South Asian Palaeolithic studies.

Key Findings

The Palaeolithic record of Gundlakamma and adjoining river basins adds significant contributions in understanding the hominin behavioural evolution in South Asia and fills major gaps in our knowledge of the same. Intensive surveys were conducted in the study region to locate stratified palaeolithic sites, followed by a systematic investigation of seven sites representing a broad temporal range including the Middle and Late Pleistocene. The current research marks the first attempt to use chronometric dating methods to reconstruct a regional Palaeolithic cultural sequence and to use the new data to address general issues in regional Palaeolithic studies in peninsular India. Multidisciplinary approaches involving excavations, luminescence chronology, U-series dating, geoarchaeology, geochemistry and faunal analysis were adopted in the current research to situate the Palaeolithic record of the region under

investigation in the broader regional and global context. Further, the high-resolution lithic analysis combined with statistical analyses of various attributes of lithic artefacts were conducted in this research. The lithic analysis, coupled with chronometric ages, offered significant insights into understanding the variations and similarities of the lithic technology through time.

The explorations undertaken in the region under investigation led to the discovery of 68 Palaeolithic sites associated with different geological and cultural contexts. These sites represent different phases of the Palaeolithic culture including Lower, Middle and post-Middle. In addition, sites with Youngest Toba Tuff (YTT) deposits from the 74 ka Toba super-eruption were identified in the region. The Middle Palaeolithic cultural remains constitute the most dominant amongst the diverse cultural assemblages and represent a broad temporal range from ~247 to 59 ka.

Recommendations/Suggestions

The current research focuses on seven temporally and spatially distinct Palaeolithic sites by approaching them with multidisciplinary methods including excavations, Luminescence and U-series chronology, geoarchaeology, geochemistry, and Palaeontology. These sites were selected based on their rich artefact presence, good preservation and expected to represent broad temporal range to build the cultural sequence of the study region. The study recognises the biases towards selecting these sites and potentially overlooks the spatial variation of the sites. To increase the artefact sample size, systematic grid collections were conducted from six sites which may influence the overall composition of the assemblage and frequencies of artefact types. However, these sites contain single techno-cultural artefact bearing horizons that potentially excludes the temporal mixing of the artefacts and eliminates the sites being palimpsest. The Luminescence method was unable to date the older sediments due to the signal saturation in feldspar and quartz grains.

The current research stresses the need for further investigation of these sites aimed at large scale excavations, other chronometric methods to date older sediments which can add significant insights into the South Asian Palaeolithic record. Paleoenvironmental reconstructions using sediments associated with artefacts and faunal remains are further needed to assess the role of climate in shaping the hominin behavioural evolution. As the region presents unique situations such as the presence of YTT deposits, Acheulian to Middle Palaeolithic transitional sites, and Palaeolithic assemblages spanning crucial events of climate

change, paleoenvironmental reconstructions can provide important information on human cultural and past environmental relations in a broader perspective. Further investigating the microlithic/Mesolithic assemblages associated with inland sand dunes in Paleru valley and other sediments in Gundlakamma and Manneru valley can provide significant insights on the post 30 ka cultural developments in the region.

References

Acharyya, S. K., & Basu, P. K. (1993). Toba Ash on the Indian Subcontinent and Its Implications for Correlation of Late Pleistocene Alluvium. *Quaternary Research*, *40*(1), 10–19. https://doi.org/10.1006/qres.1993.1051

Adler, D. S., Wilkinson, K. N., Blockley, S., Mark, D. F., Pinhasi, R., Schmidt-Magee, B. A., Nahapetyan, S., Mallol, C., Berna, F., Glauberman, P. J., Raczynski-Henk, Y., Wales, N., Frahm, E., Jöris, O., MacLeod, A., Smith, V. C., Cullen, V. L., & Gasparian, B. (2014). Early Levallois technology and the Lower to Middle Paleolithic transition in the Southern Caucasus. *Science*, *345*(6204), 1609–1613. https://doi.org/10.1126/science.1256484

Ajithprasad, P. (2005). Early Middle Palaeolithic: A Transition Phase Between the Upper Acheulian and Middle Palaeolithic Cultures in the Orsang Valley, Gujarat. *Man and Environment* , *30*((2)), 1–11.

Akhilesh, K., & Pappu, S. (2015). Bits and pieces: Lithic waste products as indicators of Acheulean behaviour at Attirampakkam, India. *Journal of Archaeological Science: Reports*, *4*, 226–241. https://doi.org/10.1016/J.JASREP.2015.08.045

Akhilesh, K., Pappu, S., Rajapara, H. M., Gunnell, Y., Shukla, A. D., & Singhvi, A. K. (2018). Early Middle Palaeolithic culture in India around 385–172 ka reframes Out of Africa models. *Nature*, *554*(7690), 97–101. https://doi.org/10.1038/nature25444

Ambrose, S. H. (1998). Late Pleistocene human population bottlenecks, volcanic winter, and differentiation of modern humans. *Journal of Human Evolution*, *34*(6), 623–651. https://doi.org/10.1006/jhev.1998.0219

Andhra Pradesh Space Applications Centre. (2018). *District Survey Report: Prakasam District*.

Anil, D., Ajithprasad, P., Vrushab, M., & Zakir, K. (2022). Acheulian to Middle Palaeolithic Transitions at Anandapuram Agraharam Complex: eastern Foothills of Velikonda Range, Andhra Pradesh. In R. Korisettar (Ed.), *Beyond Stones and More Stones* (Vol. 3, pp. 1–32). Mythic Society.

Anil, D., Ajithprasad P, Vrushab Mahesh, & Ravindra Devra. (2018). Stratified Palaeolithic sites from the Upper Paleru River Basin, Prakasam District, Andhra Pradesh: A Preliminary Report. *Heritage: Journal of Multidisciplinary Studies in Archaeology.*, *6*, 93–108.

Anil, D., Chauhan, N., Ajithprasad, P., Devi, M., Mahesh, V., & Khan, Z. (2022a). An Early Presence of Modern Human or Convergent Evolution? A 247 ka Middle Palaeolithic Assemblage from Andhra Pradesh, India. *Journal of Archaeological Science: Reports*, *45*. https://doi.org/10.1016/j.jasrep.2022.103565

Anil, D., Pottentavida, A., & Mahesh, V. (2022). Palaeolithic assemblages associated with Youngest Toba Tuff deposits from the upper Gundlakamma River basin, Andhra Pradesh, India. *Geological Society, London, Special Publications*, *515*(1). https://doi.org/10.1144/SP515-2020-187

Appenzeller, T. (2012). Human migrations: Eastern odyssey. *Nature*, *485*(7396), 24–26. https://doi.org/10.1038/485024a

Auclair, M., Lamothe, M., & Huot, S. (2003). Measurement of anomalous fading for feldspar IRSL using SAR. *Radiation Measurements*, *37*(4–5), 487–492. https://doi.org/10.1016/S1350-4487(03)00018-0

Balter, M. (2010). Of Two Minds About Toba's Impact. *Science*, *327*(5970), 1187–1188. https://doi.org/10.1126/science.327.5970.1187-a

Bar-Yosef, O. (2000). The Middle and Upper Palaeolithic in Southwest Asia and Neighbouring regions. In O. Bar-Yosef & D. Pilbeam (Eds.), *The Geography of Neanderthals and Modern Humans in Europe and the Greater Mediterranean* (pp. 107–156). Peabody Museum of Archaeology and Ethnology, Harvard University.

Basak, B., & P. Srivastava. (2014). Earliest dates and implications of microlithic industries of Late Pleistocene from Mahadebbera and Kana, Purulia District, West Bengal. *Current Science*, *107*, 1167–1171.

Baskaran, M., Marathe, A. R., Rajaguru, S. N., & Somayajulu, B. L. K. (1986). Geochronology of Palaeolithic cultures in the Hiran Valley, Saurashtra, India. *Journal of Archaeological Science*, *13*(6), 505–514. https://doi.org/10.1016/0305-4403(86)90037-3

Bednarik, R. G., G. Kumar, A. Watchman, & R. G. Roberts. (2005). Preliminary results of the EIP Projec. *Rock Art Research* , *22*, 147–197.

Berger, L. R., Hawks, J., de Ruiter, D. J., Churchill, S. E., Schmid, P., Delezene, L. K., Kivell, T. L., Garvin, H. M., Williams, S. A., DeSilva, J. M., Skinner, M. M., Musiba, C. M., Cameron, N., Holliday, T. W., Harcourt-Smith, W., Ackermann, R. R., Bastir, M., Bogin,

B., Bolter, D., … Zipfel, B. (2015). Homo naledi, a new species of the genus Homo from the Dinaledi Chamber, South Africa. *ELife*, *4*. https://doi.org/10.7554/eLife.09560

Biswas, R. H., Williams, M. A. J., Raj, R., Juyal, N., & Singhvi, A. K. (2013). Methodological studies on luminescence dating of volcanic ashes. *Quaternary Geochronology*, *17*, 14–25. https://doi.org/10.1016/J.QUAGEO.2013.03.004

Black, B. A., Lamarque, J.-F., Marsh, D. R., Schmidt, A., & Bardeen, C. G. (2021). Global climate disruption and regional climate shelters after the Toba supereruption. *Proceedings of the National Academy of Sciences*, *118*(29). https://doi.org/10.1073/pnas.2013046118

Blinkhorn, J. (2013). A new synthesis of evidence for the Upper Pleistocene occupation of 16R Dune and its southern Asian context. *Quaternary International*, *300*, 282–291. https://doi.org/10.1016/J.QUAINT.2013.01.023

Blinkhorn, J. (2014). Late Middle Palaeolithic surface sites occurring on dated sediment formations in the Thar Desert. *Quaternary International*, *350*, 94–104. https://doi.org/10.1016/j.quaint.2014.01.027

Blinkhorn, J. (2018). Buddha Pushkar revisited: Technological variability in Late Palaeolithic stone tools at the Thar Desert margin, India. *Journal of Archaeological Science: Reports*, *20*, 168–182.

Blinkhorn, J. A. (2012). *The Palaeolithic Occupation of the Thar Desert*. University of Oxford.

Blinkhorn, J., Achyuthan, H., Petraglia, M., & Ditchfield, P. (2013). Middle Palaeolithic occupation in the Thar Desert during the Upper Pleistocene: the signature of a modern human exit out of Africa? *Quaternary Science Reviews*, *77*, 233–238. https://doi.org/10.1016/j.quascirev.2013.06.012

Blinkhorn, J., Ajithprasad, P., Mukherjee, A., Kumar, P., Durcan, J. A., & Roberts, P. (2019). The first directly dated evidence for Palaeolithic occupation on the Indian coast at Sandhav, Kachchh. *Quaternary Science Reviews*, *224*, 105975. https://doi.org/10.1016/J.QUASCIREV.2019.105975

Blinkhorn, J., Groucutt, H. S., Scerri, E. M. L., Petraglia, M. D., & Blockley, S. (2021). Directional changes in Levallois core technologies between Eastern Africa, Arabia, and the Levant during MIS 5. *Scientific Reports*, *11*(1), 11465. https://doi.org/10.1038/s41598-021-90744-z

Blinkhorn, J., Parker, A. G., Ditchfield, P., Haslam, M., & Petraglia, M. (2012). Uncovering a landscape buried by the super-eruption of Toba, 74,000 years ago: A multi-proxy environmental reconstruction of landscape heterogeneity in the Jurreru Valley, south India. *Quaternary International*, *258*, 135–147. https://doi.org/10.1016/j.quaint.2011.12.008

Blinkhorn, J., & Petraglia, M. D. (2017a). Environments and Cultural Change in the Indian Subcontinent: Implications for the Dispersal of Homo sapiens in the Late Pleistocene. *Current Anthropology*, *58*(S17), S463–S479. https://doi.org/10.1086/693462

Blinkhorn, J., & Petraglia, M. D. (2017b). Environments and Cultural Change in the Indian Subcontinent. *Current Anthropology*, *58*(S17), S463–S479. https://doi.org/10.1086/693462

Blinkhorn, J., Smith, V. C., Achyuthan, H., Shipton, C., Jones, S. C., Ditchfield, P. D., & Petraglia, M. D. (2014). Discovery of Youngest Toba Tuff localities in the Sagileru Valley, south India, in association with Palaeolithic industries. *Quaternary Science Reviews*, *105*, 239–243. https://doi.org/10.1016/J.QUASCIREV.2014.09.029

Boëda, E. (1992). Approche de la variabilité des systèmes de production lithique des industries du paléolithique inférieur et moyen : chronique d'une variabilité attendue. *Techniques & Culture*, *17–18*. https://doi.org/10.4000/tc.685

Boëda, E. (1995). Levallois. A Volumetric Construction, Methods, a Technique. In H.L. Dibble & O. Bar-Yosef (Eds.), *The Definition and Interpretation of Levallois Technology* (pp. 41–68). Prehistory Press.

Bolton. L. (2015). *Assessing the Origins of Levallois through Lower Palaeolithic Core Variation: A Comparative Study of Simple Prepared Cores in Northwest Europe*. University of Southampton.

Bøtter-Jensen, L., Andersen, C. E., Duller, G. A. T., & Murray, A. S. (2003). Developments in radiation, stimulation and observation facilities in luminescence measurements. *Radiation Measurements*, *37*(4–5), 535–541. https://doi.org/10.1016/S1350-4487(03)00020-9

Brown, J. A. (1889a). On Some Highly Specialized form of Stone Implements found in Asia, North Africa and Europe. *JRAI*, *28*.

Brown, J. A. (1889b). On Some Small Highly Specialized Forms of Stone Implements, Found in Asia, North Africa, and Europe. *The Journal of the Anthropological Institute of Great Britain and Ireland*, *18*, 134. https://doi.org/10.2307/2842407

Brown, J. C. (1917). *Catalogue Raisonne of the Prehistoric Antiquities in the Indian Museum of Calcutta*. Archaeological Survey of India.

Brown, K. S., Marean, C. W., Jacobs, Z., Schoville, B. J., Oestmo, S., Fisher, E. C., Bernatchez, J., Karkanas, P., & Matthews, T. (2012). An early and enduring advanced technology originating 71,000 years ago in South Africa. *Nature*, *491*(7425), 590–593. https://doi.org/10.1038/nature11660

Brown, P., Sutikna, T., Morwood, M. J., Soejono, R. P., Jatmiko, Wayhu Saptomo, E., & Awe Due, R. (2004). A new small-bodied hominin from the Late Pleistocene of Flores, Indonesia. *Nature*, *431*(7012), 1055–1061. https://doi.org/10.1038/nature02999

Buylaert, J. P., Thiel, C., Murray, A. S., Vandenberghe, D. A. G., Yi, S., & Lu, H. (2011). Irsl and post-ir irsl residual doses recorded in modern dust samples from the chinese loess plateau. *Geochronometria*, *38*(4), 432–440. https://doi.org/10.2478/s13386-011-0047-0

Buylaert, J.-P., Murray, A. S., Thomsen, K. J., & Jain, M. (2009). Testing the potential of an elevated temperature IRSL signal from K-feldspar. *Radiation Measurements*, *44*(5–6), 560–565.

Buylaert, J.-P., Thiel, C., Murray, A., Vandenberghe, D., Yi, S., & Lu, H. (2011). IRSL and post-IR IRSL residual doses recorded in modern dust samples from the Chinese Loess Plateau. *Geochronometria*, *38*(4), 432–440. https://doi.org/10.2478/s13386-011-0047-0

Cammiade, L. A., & Burkitt, M. C. (1930). Fresh Light on the Stone Ages in Southeast India. *Antiquity*, *4*(15), 327–339. https://doi.org/10.1017/S0003598X00004919

Chauhan, P. R. (2009). The South Asian Paleolithic Record and Its Potential for Transitions Studies. In *Sourcebook of Paleolithic Transitions* (pp. 121–139). Springer New York. https://doi.org/10.1007/978-0-387-76487-0_7

Chauhan, P. R. (2010). Metrical Variability Between South Asian Handaxe Assemblages: Preliminary Observations. In *New Perspectives on Old Stones* (pp. 119–166). Springer New York. https://doi.org/10.1007/978-1-4419-6861-6_6

Chen, F., Welker, F., Shen, C.-C., Bailey, S. E., Bergmann, I., Davis, S., Xia, H., Wang, H., Fischer, R., Freidline, S. E., Yu, T.-L., Skinner, M. M., Stelzer, S., Dong, G., Fu, Q., Dong, G., Wang, J., Zhang, D., & Hublin, J.-J. (2019). A late Middle Pleistocene Denisovan mandible from the Tibetan Plateau. *Nature*, *569*(7756), 409–412. https://doi.org/10.1038/s41586-019-1139-x

Chesner, C., Rose, W., Deino, A., Drake, R., & Westgate, J. A. (1991). Eruptive history of Earth's largest Quaternary caldera (Toba, Indonesia) clarified. *Geology*, *19*, 200–203.

Clark, J. G. D. (1977). *World Prehistory: A New Outline*. Cambridge University Press.

Clarkson, C. and ., & S. O'Conner. (2004). An introduction to stone artefact analysis. In Jane Balme & Alistair Paterson (Eds.), *Archaeology in Practice: A Student guide to Archaeological Analysis* (second, pp. 151–206). John Wiley & Sons.

Clarkson, C., Harris, C., Li, B., Neudorf, C. M., Roberts, R. G., Lane, C., Norman, K., Pal, J., Jones, S., Shipton, C., Koshy, J., Gupta, M. C., Mishra, D. P., Dubey, A. K., Boivin, N., & Petraglia, M. (2020a). Human occupation of northern India spans the Toba super-eruption ~74,000 years ago. *Nature Communications*, *11*(1). https://doi.org/10.1038/s41467-020-14668-4

Clarkson, C., Harris, C., Li, B., Neudorf, C. M., Roberts, R. G., Lane, C., Norman, K., Pal, J., Jones, S., Shipton, C., Koshy, J., Gupta, M. C., Mishra, D. P., Dubey, A. K., Boivin, N., & Petraglia, M. (2020b). Human occupation of northern India spans the Toba super-eruption ~74,000 years ago. *Nature Communications*, *11*(1), 961. https://doi.org/10.1038/s41467-020-14668-4

Clarkson, C., Jacobs, Z., Marwick, B., Fullagar, R., Wallis, L., Smith, M., Roberts, R. G., Hayes, E., Lowe, K., Carah, X., Florin, S. A., McNeil, J., Cox, D., Arnold, L. J., Hua, Q., Huntley, J., Brand, H. E. A., Manne, T., Fairbairn, A., … Pardoe, C. (2017). Human occupation of northern Australia by 65,000 years ago. *Nature*, *547*(7663), 306–310. https://doi.org/10.1038/nature22968

Clarkson, C., Jones, S., & Harris, C. (2012a). Continuity and change in the lithic industries of the Jurreru Valley, India, before and after the Toba eruption. *Quaternary International*, *258*, 165–179. https://doi.org/10.1016/j.quaint.2011.11.007

Clarkson, C., Jones, S., & Harris, C. (2012b). Continuity and change in the lithic industries of the Jurreru Valley, India, before and after the Toba eruption. *Quaternary International*, *258*, 165–179. https://doi.org/10.1016/j.quaint.2011.11.007

Clarkson, C., Petraglia, M., Harris, C., Shipton, C., & Norman, K. (2018). *The South Asian Microlithic: Homo sapiens Dispersal or Adaptive Response?* (pp. 37–61). https://doi.org/10.1007/978-3-319-64407-3_3

Clarkson, C., Petraglia, M., Korisettar, R., Haslam, M., Boivin, N., Crowther, A., Ditchfield, P., Fuller, D., Miracle, P., Harris, C., Connell, K., James, H., & Koshy, J. (2009). The oldest and longest enduring microlithic sequence in India: 35 000 years of modern human occupation and change at the Jwalapuram Locality 9 rockshelter. *Antiquity*, *83*(320), 326–348. https://doi.org/10.1017/S0003598X0009846X

Corvinus, G. (1983). *A Survey of the Pravara River System in Western Maharashtra, India: Volume 2 – The Excavation of the Acheulian Site of Chirki-on-Pravara, India*. Archaeologica Venatoria : Institut fur Urgeschichte der Universitat.

Corvinus, G. (2002). Arjun 3, a Middle Palaeolithic Site in the Deokhuri Valley, Western Nepal. *Man and Environment*, *27*((2)), 31–44.

Costa, A., Smith, V. C., Macedonio, G., & Matthews, N. E. (2014). The magnitude and impact of the Youngest Toba Tuff super-eruption. *Frontiers in Earth Science*, *2*. https://doi.org/10.3389/feart.2014.00016

Dani, A. H. (1964). Sanghao Cave Excavation: The First Season, 1963. *Ancient Pakistan* , *1*, 1–50.

Daniel, G. (1962). *The Idea of Prehistory* (first). The World Publishing Company.

Deino, A. L., Behrensmeyer, A. K., Brooks, A. S., Yellen, J. E., Sharp, W. D., & Potts, R. (2018). Chronology of the Acheulean to Middle Stone Age transition in eastern Africa. *Science*, *360*(6384), 95–98. https://doi.org/10.1126/science.aao2216

Delagnes, A. (1993). Un mode de production inédit au Paléolithique moyen dans l'industrie du niveau 6e du Pucheuil (Seine-Maritime). *Paléo*, *5*(1), 111–120. https://doi.org/10.3406/pal.1993.1106

Demeter, F., Shackelford, L. L., Bacon, A.-M., Duringer, P., Westaway, K., Sayavongkhamdy, T., Braga, J., Sichanthongtip, P., Khamdalavong, P., Ponche, J.-L., Wang, H., Lundstrom,

C., Patole-Edoumba, E., & Karpoff, A.-M. (2012). Anatomically modern human in Southeast Asia (Laos) by 46 ka. *Proceedings of the National Academy of Sciences*, *109*(36), 14375–14380. https://doi.org/10.1073/pnas.1208104109

Dennell, R. (2008). *The Palaeolithic Settlement of Asia*. Cambridge University Press. https://doi.org/10.1017/CBO9780511818882

Dennell, R. W., Rendell, H. M., Halim, M., & Moth, E. (1992). A 45,000-Year-Old Open-air Paleolithic Site at Riwat, Northern Pakistan. *Journal of Field Archaeology*, *19*(1), 17–33. https://doi.org/10.1179/009346992791548996

Deraniyagala, S. U. (1992). *The prehistory of Sri Lanka: an ecological perspective*. Department of Archaeological Survey, Government of Sri Lanka.

Détroit, F., Mijares, A. S., Corny, J., Daver, G., Zanolli, C., Dizon, E., Robles, E., Grün, R., & Piper, P. J. (2019). A new species of Homo from the Late Pleistocene of the Philippines. *Nature*, *568*(7751), 181–186. https://doi.org/10.1038/s41586-019-1067-9

Dirks, P. H., Roberts, E. M., Hilbert-Wolf, H., Kramers, J. D., Hawks, J., Dosseto, A., Duval, M., Elliott, M., Evans, M., Grün, R., Hellstrom, J., Herries, A. I., Joannes-Boyau, R., Makhubela, T. v, Placzek, C. J., Robbins, J., Spandler, C., Wiersma, J., Woodhead, J., & Berger, L. R. (2017). The age of Homo naledi and associated sediments in the Rising Star Cave, South Africa. *ELife*, *6*. https://doi.org/10.7554/eLife.24231

Douka, K., Slon, V., Jacobs, Z., Ramsey, C. B., Shunkov, M. v., Derevianko, A. P., Mafessoni, F., Kozlikin, M. B., Li, B., Grün, R., Comeskey, D., Devièse, T., Brown, S., Viola, B., Kinsley, L., Buckley, M., Meyer, M., Roberts, R. G., Pääbo, S., … Higham, T. (2019). Age estimates for hominin fossils and the onset of the Upper Palaeolithic at Denisova Cave. *Nature*, *565*(7741), 640–644. https://doi.org/10.1038/s41586-018-0870-z

Duval, M., Guilarte, V., Campaña, I., Arnold, L., Miguens, L., Iglesias, J., & González-Sierra, S. (2018). *Quantifying hydrofluoric acid etching of quartz and feldspar coarse grains based on weight loss estimates: implication for ESR and luminescence dating studies*.

Foley, R., & Lahr, M. M. (1997). Mode 3 Technologies and the Evolution of Modern Humans. *Cambridge Archaeological Journal*, *7*(1), 3–36. https://doi.org/10.1017/S0959774300001451

Foote, R. B. (1866). On the Occurrence of Stone Implements in Lateritic Formations in Various Parts of Madras and North Arcot Districts. With an Appendix by William King on “Notes on the occurrence of Stone Implements in North Arcot District”. *The Madras Journal of Literature and Science*, *3*, 1–41.

Foote, R. B. (1916). *The Foote Collection of Indian Prehistoric and Protohistoric Antiquities: Notes on their Ages and Distribution*. Madras Government Museum.

Gaillard, C., M. Singh, & K. Rishi. (2008). Technological Analysis of the Acheulian Assemblage from Atbarapur in the Siwalik Range (Hoshiarpur District, Punjab), . *Man and Environment* , *33*, 1–14.

Gaillard, C., Raju, D. R., Misra, V. N., & Rajaguru, S. N. (1986). Handaxe Assemblages from the Didwana region, Thar Desert, India: A Metrical Analysis. *Proceedings of the Prehistoric Society*, *52*, 189–214. https://doi.org/10.1017/S0079497X00006654

Galway-Witham, J., Cole, J., & Stringer, C. (2019). Aspects of human physical and behavioural evolution during the last 1 million years. *Journal of Quaternary Science*, *34*(6), 355–378. https://doi.org/10.1002/jqs.3137

Gatti, E. (2013). *Geochemical and sedimentological investigations of Youngest Toba Tuff ashfall deposits* . University of Cambridge.

Gatti, E., Durant, A. J., Gibbard, P. L., & Oppenheimer, C. (2011). Youngest Toba Tuff in the Son Valley, India: a weak and discontinuous stratigraphic marker. *Quaternary Science Reviews*, *30*(27–28), 3925–3934. https://doi.org/10.1016/J.QUASCIREV.2011.10.008

Ge, Y., & Gao, X. (2020). Understanding the overestimated impact of the Toba volcanic super-eruption on global environments and ancient hominins. *Quaternary International*, *559*(June), 24–33. https://doi.org/10.1016/j.quaint.2020.06.021

Geethanjali, K., Achyuthan, H., & Jaiswal, M. K. (2019). The Toba tephra as a late Quaternary stratigraphic marker: Investigations in the Sagileru river basin, Andhra Pradesh, India. *Quaternary International*, *513*, 107–123. https://doi.org/10.1016/J.QUAINT.2019.03.032

Geological Survey of India. (2000). *District Resource Map: Prakasam District, Andhra Pradesh*.

Goedicke, C. (1984). Microscopic investigations of the quartz etching technique for TL dating. *Nuclear Tracks and Radiation Measurements (1982)*, *9*(2), 87–93. https://doi.org/10.1016/0735-245X(84)90026-7

Gordon, D. H. (1950). The stone industries of the Holocene in India and Pakistan. *Ancient India*, *6*, 64–90.

Green, R. E., Krause, J., Briggs, A. W., Maricic, T., Stenzel, U., Kircher, M., Patterson, N., Li, H., Zhai, W., Fritz, M. H.-Y., Hansen, N. F., Durand, E. Y., Malaspinas, A.-S., Jensen, J. D., Marques-Bonet, T., Alkan, C., Prüfer, K., Meyer, M., Burbano, H. A., … Pääbo, S. (2010). A Draft Sequence of the Neandertal Genome. *Science*, *328*(5979), 710–722. https://doi.org/10.1126/science.1188021

Groucutt, H. S., Petraglia, M. D., Bailey, G., Scerri, E. M. L., Parton, A., Clark-Balzan, L., Jennings, R. P., Lewis, L., Blinkhorn, J., Drake, N. A., Breeze, P. S., Inglis, R. H., Devès, M. H., Meredith-Williams, M., Boivin, N., Thomas, M. G., & Scally, A. (2015a). Rethinking the dispersal of Homo sapiens out of Africa. *Evolutionary Anthropology*, *24*(4). https://doi.org/10.1002/evan.21455

Groucutt, H. S., Petraglia, M. D., Bailey, G., Scerri, E. M. L., Parton, A., Clark-Balzan, L., Jennings, R. P., Lewis, L., Blinkhorn, J., Drake, N. A., Breeze, P. S., Inglis, R. H., Devès, M. H., Meredith-Williams, M., Boivin, N., Thomas, M. G., & Scally, A. (2015b). Rethinking the dispersal of *Homo sapiens* out of Africa. *Evolutionary Anthropology: Issues, News, and Reviews*, *24*(4), 149–164. https://doi.org/10.1002/evan.21455

Hammer, Ø., & Harper, D. A. T. (Eds.). (2005). *Paleontological Data Analysis*. Wiley. https://doi.org/10.1002/9780470750711

Hardaker, T., & S. Dunn. (2005). The Flip Test – a New Statistical Measure for Quantifying Symmetry in Stone Tools. *Antiquity* , *79*((306)).

Harvati, K., Röding, C., Bosman, A. M., Karakostis, F. A., Grün, R., Stringer, C., Karkanas, P., Thompson, N. C., Koutoulidis, V., Moulopoulos, L. A., Gorgoulis, V. G., & Kouloukoussa, M. (2019). Apidima Cave fossils provide earliest evidence of Homo sapiens in Eurasia. *Nature*, *571*(7766), 500–504. https://doi.org/10.1038/s41586-019-1376-z

Haslam, M., Clarkson, C., Petraglia, M., Korisettar, R., Jones, S., Shipton, C., Ditchfield, P., & Ambrose, S. H. (2010). The 74 ka Toba super-eruption and southern Indian hominins:

archaeology, lithic technology and environments at Jwalapuram Locality 3. *Journal of Archaeological Science*, *37*(12), 3370–3384. https://doi.org/10.1016/J.JAS.2010.07.034

Haslam, M., Clarkson, C., Roberts, R. G., Bora, J., Korisettar, R., Ditchfield, P., Chivas, A. R., Harris, C., Smith, V., Oh, A., Eksambekar, S., Boivin, N., & Petraglia, M. (2012). A southern Indian Middle Palaeolithic occupation surface sealed by the 74 ka Toba eruption: Further evidence from Jwalapuram Locality 22. *Quaternary International*, *258*, 148–164. https://doi.org/10.1016/j.quaint.2011.08.040

Haslam, M., Roberts, R. G., Shipton, C., Pal, J. N., Fenwick, J. L., Ditchfield, P., Boivin, N., Dubey, A. K., Gupta, M. C., & Petraglia, M. (2011). Late Acheulean hominins at the Marine Isotope Stage 6/5e transition in north-central India. *Quaternary Research*, *75*(3), 670–682. https://doi.org/10.1016/j.yqres.2011.02.001

Herries, A. I. R. (2011). A Chronological Perspective on the Acheulian and Its Transition to the Middle Stone Age in Southern Africa: The Question of the Fauresmith. *International Journal of Evolutionary Biology*, *2011*, 1–25. https://doi.org/10.4061/2011/961401

Hershkovitz, I., Weber, G. W., Quam, R., Duval, M., Grün, R., Kinsley, L., Ayalon, A., Bar-Matthews, M., Valladas, H., Mercier, N., Arsuaga, J. L., Martinón-Torres, M., Bermúdez de Castro, J. M., Fornai, C., Martín-Francés, L., Sarig, R., May, H., Krenn, V. A., Slon, V., … Weinstein-Evron, M. (2018). The earliest modern humans outside Africa. *Science*, *359*(6374), 456–459. https://doi.org/10.1126/science.aap8369

Huntley, D. J. (2006). An explanation of the power-law decay of luminescence. *Journal of Physics: Condensed Matter*, *18*(4), 1359–1365. https://doi.org/10.1088/0953-8984/18/4/020

Huntley, D. J., & Lamothe, M. (2001). Ubiquity of anomalous fading in K-feldspars and the measurement and correction for it in optical dating. *Canadian Journal of Earth Sciences*, *38*(7), 1093–1106. https://doi.org/10.1139/cjes-38-7-1093

Inizan, M. L., M. Reduron-Ballinger, H. Roche, & J. Tixier. (1999). *Technology and Terminology of Knapped Stone*. CREP.

Issac, N. (1960). *The Stone age Cultures of Kurnool. Unpublished* . University of Poona.

James, H. A., & Petraglia, M. (2005). Modern human origins and the evolution of behavior in the later Pleistocene record of South Asia. *Current Anthropology*, *46*(S5), S3–S27.

James, H., & Petraglia, M. D. (2009). The Lower to Middle Paleolithic Transition in South Asia and Its Implications for Hominin Cognition and Dispersals. In *Sourcebook of Paleolithic Transitions* (pp. 255–264). Springer New York. https://doi.org/10.1007/978-0-387-76487-0_16

James, H. V. A. (2003). *Testing Theories of Modern Human Origins: The Middle Palaeolithic of South Asia* [MPhil Thesis]. University of Cambridge.

James, H. V. A., & Petraglia, M. D. (2005). Modern Human Origins and the Evolution of Behavior in the Later Pleistocene Record of South Asia. *Current Anthropology*, *46*(S5), S3–S27. https://doi.org/10.1086/444365

Jones, S. C. (2007). *A human catastrophe? The impact of the 74,000-year-old supervolcanic eruption of Toba on hominin populations in India*. University of Cambridge.

Jones, S. C., & Pal, J. N. (2009). The Palaeolithic of the Middle Son valley, north-central India: Changes in hominin lithic technology and behaviour during the Upper Pleistocene. *Journal of Anthropological Archaeology*, *28*(3), 323–341. https://doi.org/10.1016/j.jaa.2009.05.003

Kars, R. H., & Wallinga, J. (2009). IRSL dating of K-feldspars: Modelling natural dose response curves to deal with anomalous fading and trap competition. *Radiation Measurements*, *44*(5–6), 594–599.

Kars, R. H., Wallinga, J., & Cohen, K. M. (2008). A new approach towards anomalous fading correction for feldspar IRSL dating—tests on samples in field saturation. *Radiation Measurements*, *43*(2–6), 786–790.

Kennedy, K. (2000). *God-Apes and Fossil Men*. University of Michigan Press. https://doi.org/10.3998/mpub.16180

Kennedy, K. A. R. (2000). *God-apes and fossil men: Paleoanthropology of South Asia*. American Mathematical Soc.

Kumari, A. (1987). *Palaeolithic Archaeology of the Gundlakamma basin, Andhra Pradesh*. Acharya Nagarjuna University.

Lahr, M. M., & Foley, R. (2005). Multiple dispersals and modern human origins. *Evolutionary Anthropology: Issues, News, and Reviews*, *3*(2), 48–60. https://doi.org/10.1002/evan.1360030206

Lahr, M. M., & Foley, R. A. (1998). Towards a theory of modern human origins: geography, demography, and diversity in recent human evolution. *American Journal of Physical Anthropology*, *Suppl 27*, 137–176. https://doi.org/10.1002/(sici)1096-8644(1998)107:27+<137::aid-ajpa6>3.0.co;2-q

Lane, C. S., Chorn, B. T., & Johnson, T. C. (2013a). Ash from the Toba supereruption in Lake Malawi shows no volcanic winter in East Africa at 75 ka. *Proceedings of the National Academy of Sciences*, *110*(20), 8025–8029. https://doi.org/10.1073/pnas.1301474110

Lane, C. S., Chorn, B. T., & Johnson, T. C. (2013b). Ash from the Toba supereruption in Lake Malawi shows no volcanic winter in East Africa at 75 ka. *Proceedings of the National Academy of Sciences*, *110*(20), 8025–8029. https://doi.org/10.1073/pnas.1301474110

Louys, J. (2012). Mammal community structure of Sundanese fossil assemblages from the Late Pleistocene, and a discussion on the ecological effects of the Toba eruption. *Quaternary International*, *258*, 80–87. https://doi.org/10.1016/j.quaint.2011.07.027

Lycett, S. J. (2009). Are Victoria West cores "proto-Levallois"? A phylogenetic assessment. *Journal of Human Evolution*, *56*(2), 175–191. https://doi.org/10.1016/J.JHEVOL.2008.10.001

Mark, D. F., Petraglia, M., Smith, V. C., Morgan, L. E., Barfod, D. N., Ellis, B. S., Pearce, N. J., Pal, J. N., & Korisettar, R. (2014). A high-precision 40Ar/39Ar age for the Young Toba Tuff and dating of ultra-distal tephra: Forcing of Quaternary climate and implications for hominin occupation of India. *Quaternary Geochronology*, *21*, 90–103. https://doi.org/10.1016/j.quageo.2012.12.004

Matthews, N. E., Smith, V. C., Costa, A., Durant, A. J., Pyle, D. M., & Pearce, N. J. G. (2012). Ultra-distal tephra deposits from super-eruptions: Examples from Toba, Indonesia and Taupo Volcanic Zone, New Zealand. *Quaternary International*, *258*, 54–79. https://doi.org/10.1016/j.quaint.2011.07.010

Matthews, N., Smith, V., & Costa, A. (2012). Ultra-distal tephra deposits from super-eruptions: examples from Toba, Indonesia and Taupo Volcanic Zone, New Zealand. *Quaternary ...*, *258*(0). https://doi.org/10.1016/j.quaint.2011.07.010

Mcbrearty, S., & Brooks, A. S. (2000). The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution*, *39*(5), 453–563. https://doi.org/10.1006/jhev.2000.0435

McBrearty, S., & Tryon, C. (2006). From Acheulean to Middle Stone Age in the Kapthurin Formation, Kenya. In *Transitions Before the Transition* (pp. 257–277). Springer US. https://doi.org/10.1007/0-387-24661-4_14

McNabb, J. (2001). The Shape of Things to Come: A Speculative Essay on the Role of the Victoria West Phenomenon at Canteen Koppie, during the South African Stone Age. In S. Milliken & J. Cook (Eds.), *A Very Remote Period Indeed: Papers on the Palaeolithic Presented to Derek Roe* (pp. 37–46). Oxbow Books.

Mellars, P. (2006). Going East: New Genetic and Archaeological Perspectives on the Modern Human Colonization of Eurasia. *Science*, *313*(5788), 796–800. https://doi.org/10.1126/science.1128402

Mellars, P., Gori, K. C., Carr, M., Soares, P. a., & Richards, M. B. (2013a). Genetic and archaeological perspectives on the initial modern human colonization of southern Asia. *Proceedings of the National Academy of Sciences of the United States of America*, *110*, 10699–10704. https://doi.org/10.1073/pnas.1306043110

Mellars, P., Gori, K. C., Carr, M., Soares, P. A., & Richards, M. B. (2013b). Genetic and archaeological perspectives on the initial modern human colonization of southern Asia. *Proceedings of the National Academy of Sciences*, *110*(26), 10699–10704. https://doi.org/10.1073/pnas.1306043110

Mijares, A. S., Détroit, F., Piper, P., Grün, R., Bellwood, P., Aubert, M., Champion, G., Cuevas, N., de Leon, A., & Dizon, E. (2010). New evidence for a 67,000-year-old human presence at Callao Cave, Luzon, Philippines. *Journal of Human Evolution*, *59*(1), 123–132. https://doi.org/10.1016/j.jhevol.2010.04.008

Mishra, R., & v. Singaraju. (2009). *Quaternary Geological Studies of Inland Dunes of Prakasam District, Andhra Pradesh*.

Mishra, S. (1995). Chronology of the Indian Stone Age: The impact of recent absolute and relative dating attempts. *Man and Environment.* , *20*, 11–16.

Mishra, S., Chauhan, N., & Singhvi, A. K. (2013a). Continuity of Microblade Technology in the Indian Subcontinent Since 45 ka: Implications for the Dispersal of Modern Humans. *PLoS ONE*, *8*(7), e69280. https://doi.org/10.1371/journal.pone.0069280

Mishra, S., Chauhan, N., & Singhvi, A. K. (2013b). Continuity of Microblade Technology in the Indian Subcontinent Since 45 ka: Implications for the Dispersal of Modern Humans. *PLoS ONE*, *8*(7), e69280. https://doi.org/10.1371/journal.pone.0069280

Misra, V. N. (1982). Evolution of the blade element in the stone industries of the rock shelter III F23, Bhimbetka. In K. Sharma (Ed.), *Indian archaeology: new perspectives* (pp. 7–13). Agam Kala Prakashan.

Misra, V. N., & Bellwood, P. S. (1985). *Recent advances in Indo-Pacific prehistory*. Oxford & IBH Pub. Co.

Misra, V. N., & Rajaguru, S. N. (1978). The Acheulian Industry of Rock Shelter IIIF-23 at Bhimbetka, Central India - A Preliminary Study [1]. *Australian Archaeology*, *8*(1), 63–106. https://doi.org/10.1080/03122417.1978.12093343

Moore, M. W., Sutikna, T., Jatmiko, Morwood, M. J., & Brumm, A. (2009). Continuities in stone flaking technology at Liang Bua, Flores, Indonesia. *Journal of Human Evolution*, *57*(5), 503–526. https://doi.org/10.1016/J.JHEVOL.2008.10.006

Morwood, M. J., Brown, P., Jatmiko, Sutikna, T., Wahyu Saptomo, E., Westaway, K. E., Awe Due, R., Roberts, R. G., Maeda, T., Wasisto, S., & Djubiantono, T. (2005). Further evidence for small-bodied hominins from the Late Pleistocene of Flores, Indonesia. *Nature*, *437*(7061), 1012–1017. https://doi.org/10.1038/nature04022

Morwood, M. J., Soejono, R. P., Roberts, R. G., Sutikna, T., Turney, C. S. M., Westaway, K. E., Rink, W. J., Zhao, J. -x., van den Bergh, G. D., Due, R. A., Hobbs, D. R., Moore, M. W., Bird, M. I., & Fifield, L. K. (2004). Archaeology and age of a new hominin from Flores in eastern Indonesia. *Nature*, *431*(7012), 1087–1091. https://doi.org/10.1038/nature02956

Murty, M. L. K. (1966). *Stone Age cultures of Chittoor District, Andhra Pradesh*. University of Pune.

Murty, M. L. K. (1979). Recent research on the Upper Palaeolithic phase in India. *Journal of Field Archaeology*, *6*(3), 301–320.

Neudorf, C. M. (2012). Assessing the time of final deposition of a Youngest Toba Tuff deposit in the Middle Son Valley, India – a luminescence approach using multiple methods. *Quaternary International*, *279–280*, 349–350. https://doi.org/10.1016/J.QUAINT.2012.08.1046

Neudorf, C. M., Roberts, R. G., & Jacobs, Z. (2014). Testing a model of alluvial deposition in the Middle Son Valley, Madhya Pradesh, India — IRSL dating of terraced alluvial sediments and implications for archaeological surveys and palaeoclimatic reconstructions. *Quaternary Science Reviews*, *89*, 56–69. https://doi.org/10.1016/j.quascirev.2014.02.004

Newcomer, M. H. (1971). Some quantitative experiments in handaxe manufacture. *World Archaeology*, *3*(1), 85–94. https://doi.org/10.1080/00438243.1971.9979493

Oppenheimer, C. (2002). *Limited global change due to the largest known Quaternary eruption , Toba E74 kyr BP ? 21*, 1593–1609.

Owen, W. E. (1938). 218. The Kombewa Culture, Kenya Colony. *Man*, *38*, 203. https://doi.org/10.2307/2791552

Paddayya, K. (1982). *The Acheulian Culture of the Hunsgi Valley (Peninsular India)– A Settlement System Perspective*. Deccan College Postgraduate and Research Institute.

Paddayya, K. (1984). India. In Bar-Yosef (Ed.), *Neue Forschungen Zur-Altsteinzeit* (pp. 345–403). Verlag C. H. Beck.

Paddayya, K., B. Blackwell, R. Jhaldiyal, M. Petraglia, S. Fevrier, D. Chaderton, J. Blickstein, & A. Skinner. (2002). Recent Findings on the Acheulian of the Hunsgi and Baichbal Valleys, Karnataka, with Special Reference to the Isampur Excavation and its Dating. *Current Science*, *83*, 641–647.

Paddayya, K., & Petraglia, M. D. (1993). Formation processes of Acheulean localities in the Hunsgi and Baichbal Valleys, Peninsular India. In P. Goldberg & D. Nash (Eds.), *Formation Processes in Archaeological Context* (pp. 61-82.). Prehistory Press.

Pal, J. N. (2002). The Middle Palaeolithic Culture of South Asia. In S. Settar & R. Korisettar (Eds.), *Indian Archaeology in Retrospect- Archaeology and Interactive Disciplines: Vol. (Volume 1)* (pp. 67–83). Manohar and Indian Council of Historical Research.

Pal, J. N., Williams, M., Jaiswal, M., & Singhvi, A. K. (2005). Infra Red Stimulated Luminescence ages for prehistoric cultures in the Son and Belan valleys, north central India. *Journal of Interdisciplinary Studies in History and Archaeology*, *1*, 51–62.

Pappu, S., Gunnell, Y., Akhilesh, K., Braucher, R., Taieb, M., Demory, F., & Thouveny, N. (2011). Early Pleistocene Presence of Acheulian Hominins in South India. *Science*, *331*(6024), 1596–1599. https://doi.org/10.1126/science.1200183

Pattan, J. N., Shane, P., & Banakar, V. K. (1999). New occurrence of Youngest Toba Tuff in abyssal sediments of the Central Indian Basin. *Marine Geology*, *155*(3–4), 243–248. https://doi.org/10.1016/S0025-3227(98)00160-1

Pattan, J. N., Shane, P., Pearce, N. J. G., Banakar, V. K., & Parthiban, G. (2001). An occurrence of ~ 74 ka Youngest Toba tephra from the western continental margine of India. *Current Science* , *80 (10)*, 1322–1326.

Pelegrin J, C. Karlin, & P. Bodu. (1988). Chaˆınes op´eratoires: un outil pour le pr´ehistorien. In J. Tixier (Ed.), *Technologie Pr´ehistorique, (Notes et mongraphies techniques 25)* (pp. 55–62). CNRS/CRA.

Petraglia, M., Clarkson, C., Boivin, N., Haslam, M., Korisettar, R., Chaubey, G., Ditchfield, P., Fuller, D., James, H., Jones, S., Kivisild, T., Koshy, J., Lahr, M. M., Metspalu, M., Roberts, R., & Arnold, L. (2009). Population increase and environmental deterioration correspond with microlithic innovations in South Asia ca. 35,000 years ago. *Proceedings of the National Academy of Sciences*, *106*(30), 12261–12266. https://doi.org/10.1073/pnas.0810842106

Petraglia, M. D. (2001). The Lower Palaeolithic of India and its Behavioural Significance, . In Barham & Robson- Brown (Eds.), *Human roots: Africa and Asia in the Middle Pleistocene* (pp. 217–235). Western Academic and Specialist Press.

Petraglia, M. D., Ditchfield, P., Jones, S., Korisettar, R., & Pal, J. N. (2012). The Toba volcanic super-eruption, environmental change, and hominin occupation history in India over the last 140,000 years. *Quaternary International*, *258*, 119–134. https://doi.org/10.1016/J.QUAINT.2011.07.042

Petraglia, M. D., Haslam, M., Fuller, D. Q., Boivin, N., & Clarkson, C. (2010). Out of Africa: new hypotheses and evidence for the dispersal of *Homo sapiens* along the Indian Ocean

rim. *Annals of Human Biology*, *37*(3), 288–311. https://doi.org/10.3109/03014461003639249

Petraglia, M. D., Schuldenrein, J., & Korisettar, R. (2003). Landscapes, Activity, and the Acheulean to Middle Palaeolithic Transition in the Kaladgi Basin, India. *Eurasian Prehistory* , *1*((2)), 3–24.

Petraglia, M., Korisettar, R., Boivin, N., Clarkson, C., Ditchfield, P., Jones, S., Koshy, J., Lahr, M. M., Oppenheimer, C., Pyle, D., Roberts, R., Schwenninger, J.-L., Arnold, L., & White, K. (2007a). Middle Paleolithic Assemblages from the Indian Subcontinent Before and After the Toba Super-Eruption. *Science*, *317*(5834), 114–116. https://doi.org/10.1126/science.1141564

Petraglia, M., Korisettar, R., Boivin, N., Clarkson, C., Ditchfield, P., Jones, S., Koshy, J., Lahr, M. M., Oppenheimer, C., Pyle, D., Roberts, R., Schwenninger, J.-L., Arnold, L., & White, K. (2007b). Middle Paleolithic assemblages from the Indian subcontinent before and after the Toba super-eruption. *Science (New York, N.Y.)*, *317*(5834), 114–116. https://doi.org/10.1126/science.1141564

Porat, N., Chazan, M., Grün, R., Aubert, M., Eisenmann, V., & Horwitz, L. K. (2010). New radiometric ages for the Fauresmith industry from Kathu Pan, southern Africa: Implications for the Earlier to Middle Stone Age transition. *Journal of Archaeological Science*, *37*(2), 269–283. https://doi.org/10.1016/J.JAS.2009.09.038

Porat, N., Faerstein, G., Medialdea, A., & Murray, A. S. (2015). Re-examination of common extraction and purification methods of quartz and feldspar for luminescence dating. *Ancient TL*, *33*(1), 255–258.

Possehl, G. L. (1994). *Radiometric Dates for South Asian Archaeology. An Occasional Publication of the Asia Section*.

Raj, R. (2008). Occurrence of volcanic ash in the Quaternary alluvial deposits, lower Narmada basin, western India. *Journal of Earth System Science*, *117*(1), 41–48. https://doi.org/10.1007/s12040-008-0011-4

Ramam, P. K., & Murty V. N. (2012). *Geology of Andhra Pradesh*. Geological Society of India.

Rampino, M. R., & Self, S. (1992). Volcanic winter and accelerated glaciation following the Toba super-eruption. *Nature*, *359*(6390), 50–52. https://doi.org/10.1038/359050a0

Rao, V. V. M. (1979). *Stone Age Cultures of Prakasam District, Andhra Pradesh*. Andhra University.

Rao, V. V. M. (1987). Middle Palaeolithic sites in Paleur valley, Prakasam District, Andhra Pradesh. *Man and Environment* , *IX*, 41–47.

Reddy, D. V., Singaraju, V., Mishra, R., Kumar, D., Thomas, P. J., Rao, K. K., & Singhvi, A. K. (2013). Luminescence chronology of the inland sand dunes from SE India. *Quaternary Research*, *80*(2), 265–273. https://doi.org/10.1016/J.YQRES.2013.06.003

Reddy, M. K., & Shah, B. M. (2004). *Quaternary Geological Studies with Special Emphasis On Volcanic Ash And Neotectonism in Gundlakamma River Basin Of Guntur And Prakasham Districts, Andhra Pradesh*.

Richter, D., Grün, R., Joannes-Boyau, R., Steele, T. E., Amani, F., Rué, M., Fernandes, P., Raynal, J.-P., Geraads, D., Ben-Ncer, A., Hublin, J.-J., & McPherron, S. P. (2017). The age of the hominin fossils from Jebel Irhoud, Morocco, and the origins of the Middle Stone Age. *Nature*, *546*(7657), 293–296. https://doi.org/10.1038/nature22335

Rolland, N. (1995). Levallois Technology Emergence: Single or Multiple? A Review of the Euro-African Record. . In H.L. Dibble & O. Bar-Yosef (Eds.), *the Definition and Interpretation of Levallois Technology* . (pp. 333–360). Prehistory Press.

Sahnouni, M. (2012). Lower Palaeolithic settlements in the Maghreb: current state of knowledge and perspectives in the framework of the World Heritage Convention. In *Human origin sites and the World Heritage Convention in Africa* (pp. 128–150). UNESCO .

Sali, S. A. (1974). Upper Palaeolithic research since independence. *Bulletin of the Deccan College Research Institute*, *34*(1/4), 147–160.

Sali, S. A. (1989). *The Upper Paleolithic and Mesolithic cultures of Maharashtra.* Deccan College, Post-Graduate and Research Institute.

Sankalia, H. D. (1974). *Prehistory and protohistory of India and Pakistan*. Deccan College.

Scerri, E. M. L., Drake, N. A., Jennings, R., & Groucutt, H. S. (2014). Earliest evidence for the structure of Homo sapiens populations in Africa. *Quaternary Science Reviews*, *101*, 207–216. https://doi.org/10.1016/j.quascirev.2014.07.019

Schulz, , Hartmut, von Rad, , Ulrich, Erlenkeuser, , Helmut, & von Rad, , Ulrich. (1998). Correlation between Arabian Sea and Greenland climate oscillations of the past 110,000 years. *Nature*, *393*(6680), 54–57. https://doi.org/10.1038/31750

Schulz, H., Emeis, K. C., Erlenkeuser, H., von Rad, U., & Rolf, C. (2002). The Toba Volcanic Event and Interstadial/Stadial Climates at the Marine Isotopic Stage 5 to 4 Transition in the Northern Indian Ocean. *Quaternary Research*, *57*(1), 22–31. https://doi.org/10.1006/QRES.2001.2291

Scott, B. (2006). *The Early Middle Palaeolithic of Britain: Origins, Technology and Landscape*. University of Durham.

Sharon, G., & P. Beaumont. (2006). Victoria West: A Highly Standardized Prepared Core Technology. In N. Goren-Inbar & G. Sharon (Eds.), *Axe Age: Acheulian Tool-making from Quarry to Discard* (pp. 181–200). Equinox.

Shea, J. J. (2008). Transitions or turnovers? Climatically-forced extinctions of Homo sapiens and Neanderthals in the east Mediterranean Levant. *Quaternary Science Reviews*, *27*(23–24), 2253–2270. https://doi.org/10.1016/J.QUASCIREV.2008.08.015

Shipton, C. (2013). *A Million Years of Hominin Sociality and Cognition: Acheulean Bifaces in the Hunsgi-Baichbal Valley, India. BAR International series 2468*. Archaeopress.

Shipton, C. (2016). Hierarchical Organization in the Acheulean to Middle Palaeolithic Transition at Bhimbetka, India. *Cambridge Archaeological Journal*, *26*(4), 601–618. https://doi.org/10.1017/S095977431600041X

Shipton, C., Clarkson, C., & Cobden, R. (2019). Were Acheulean Bifaces Deliberately Made Symmetrical? Archaeological and Experimental Evidence. *Cambridge Archaeological Journal*, *29*(1), 65–79. https://doi.org/10.1017/S095977431800032X

Shipton, C., Clarkson, C., Pal, J. N., Jones, S. C., Roberts, R. G., Harris, C., Gupta, M. C., Ditchfield, P. W., & Petraglia, M. D. (2013). Generativity, hierarchical action and recursion in the technology of the Acheulean to Middle Palaeolithic transition: A perspective from Patpara, the Son Valley, India. *Journal of Human Evolution*, *65*(2), 93–108. https://doi.org/10.1016/j.jhevol.2013.03.007

Singh, A., Srivastava, A. K., & Chauhan, N. (2022). Luminescence Dating and Bracketing Time of the Youngest Toba Tuff Deposits in the Quaternary Sediments of Purna Alluvial Basin,

Central India. *Journal of Earth Science*, *33*(4), 1007–1016. https://doi.org/10.1007/s12583-020-1357-z

Skoglund, P., & Mathieson, I. (2018). Ancient Genomics of Modern Humans: The First Decade. *Annual Review of Genomics and Human Genetics*, *19*(1), 381–404. https://doi.org/10.1146/annurev-genom-083117-021749

Smith, E. I., Jacobs, Z., Johnsen, R., Ren, M., Fisher, E. C., Oestmo, S., Wilkins, J., Harris, J. A., Karkanas, P., Fitch, S., Ciravolo, A., Keenan, D., Cleghorn, N., Lane, C. S., Matthews, T., & Marean, C. W. (2018a). Humans thrived in South Africa through the Toba eruption about 74,000 years ago. *Nature*, *555*(7697), 511–515. https://doi.org/10.1038/nature25967

Smith, E. I., Jacobs, Z., Johnsen, R., Ren, M., Fisher, E. C., Oestmo, S., Wilkins, J., Harris, J. A., Karkanas, P., Fitch, S., Ciravolo, A., Keenan, D., Cleghorn, N., Lane, C. S., Matthews, T., & Marean, C. W. (2018b). Humans thrived in South Africa through the Toba eruption about 74,000 years ago. *Nature*, *555*(7697), 511–515. https://doi.org/10.1038/nature25967

Smith, V. C., Pearce, N. J. G., Matthews, N. E., Westgate, J. A., Petraglia, M. D., Haslam, M., Lane, C. S., Korisettar, R., & Pal, J. N. (2011). Geochemical fingerprinting of the widespread Toba tephra using biotite compositions. *Quaternary International*, *246*(1–2), 97–104. https://doi.org/10.1016/j.quaint.2011.05.012

Srinivasulu, K. (2012). *Stone Age Cultures of Manneru Valley*. P.S. Telugu University.

Stringer, C. (2002). Modern human origins: progress and prospects. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, *357*(1420), 563–579. https://doi.org/10.1098/rstb.2001.1057

Sutikna, T., Tocheri, M. W., Morwood, M. J., Saptomo, E. W., Jatmiko, Awe, R. D., Wasisto, S., Westaway, K. E., Aubert, M., Li, B., Zhao, J., Storey, M., Alloway, B. v., Morley, M. W., Meijer, H. J. M., van den Bergh, G. D., Grün, R., Dosseto, A., Brumm, A., … Roberts, R. G. (2016). Revised stratigraphy and chronology for Homo floresiensis at Liang Bua in Indonesia. *Nature*, *532*(7599), 366–369. https://doi.org/10.1038/nature17179

Teixeira, J. C., & Cooper, A. (2019). Using hominin introgression to trace modern human dispersals. *Proceedings of the National Academy of Sciences*, *116*(31), 15327–15332. https://doi.org/10.1073/pnas.1904824116

Thiel, C., Buylaert, J. P., Murray, A., Terhorst, B., Hofer, I., Tsukamoto, S., & Frechen, M. (2011). Luminescence dating of the Stratzing loess profile (Austria) - Testing the potential of an elevated temperature post-IR IRSL protocol. *Quaternary International*, *234*(1–2), 23–31. https://doi.org/10.1016/j.quaint.2010.05.018

Thimma Reddy, K. (1971). Blade-burin industries from Yerragondapalem. In *S.C. Roy Centenary Volume*.

Thomsen, K. J., Murray, A. S., & Jain, M. (2011). Stability of IRSL signals from sedimentary K-feldspar samples. *Geochronometria*, *38*(1), 1–13. https://doi.org/10.2478/s13386-011-0003-z

Todd, K. R. U. (1932). Prehistoric man round Bombay. *Proceedings of the Prehistoric Society of East Anglia, , , 7(1)*, 35–42.

Tryon, C. A., & Faith, J. T. (2013). Variability in the Middle Stone Age of Eastern Africa. *Current Anthropology*, *54*(S8), S234–S254. https://doi.org/10.1086/673752

Tuffreau, A. (1995). The Variability of Levallois Technology in Northern France and Neighbouring Areas. In H.L. Dibble & O. Bar-Yosef (Eds.), *the Definition and Interpretation of Levallois Technology* (pp. 413–431). Prehistory Press.

van Peer, P. (1992). *The Levallois Reduction Strategy. Monographs in World Archaeology* (13th ed.). Prehistory Press.

Wedage, O., Amano, N., Langley, M. C., Douka, K., Blinkhorn, J., Crowther, A., Deraniyagala, S., Kourampas, N., Simpson, I., Perera, N., Picin, A., Boivin, N., Petraglia, M., & Roberts, P. (2019). Specialized rainforest hunting by Homo sapiens ~45,000 years ago. *Nature Communications*, *10*(1), 739. https://doi.org/10.1038/s41467-019-08623-1

Westgate, J. A., Shane, P. A. R., Pearce, N. J. G., Perkins, W. T., Korisettar, R., Chesner, C. A., Williams, M. A. J., & Acharyya, S. K. (1998). All Toba Tephra Occurrences across Peninsular India Belong to the 75,000 yr B.P. Eruption. *Quaternary Research*, *50*(1), 107–112. https://doi.org/10.1006/QRES.1998.1974

White, M., & Ashton, N. (2003). Lower Palaeolithic Core Technology and the Origins of the Levallois Method in North-Western Europe. *Current Anthropology*, *44*(4), 598–609. https://doi.org/10.1086/377653

White, M., Ashton, N., & Scott, B. (2011). *The Emergence, Diversity and Significance of Mode 3 (Prepared Core) Technologies* (pp. 53–65). https://doi.org/10.1016/B978-0-444-53597-9.00005-4

White, M., & P. Pettitt. (1995). Technology of Early Palaeolithic Western Europe: Innovation, Variability and a Unified Framework. *Lithics* , *16*, 27–40.

Williams, M. (2012a). The ∼73 ka Toba super-eruption and its impact: History of a debate. *Quaternary International*, *258*, 19–29. https://doi.org/10.1016/J.QUAINT.2011.08.025

Williams, M. (2012b). Did the 73 ka Toba super-eruption have an enduring effect? Insights from genetics, prehistoric archaeology, pollen analysis, stable isotope geochemistry, geomorphology, ice cores, and climate models. *Quaternary International*, *269*, 87–93. https://doi.org/10.1016/J.QUAINT.2011.03.045

Williams, M. A. J., Ambrose, S. H., van der Kaars, S., Ruehlemann, C., Chattopadhyaya, U., Pal, J., & Chauhan, P. R. (2009). Environmental impact of the 73ka Toba super-eruption in South Asia. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *284*(3–4), 295–314. https://doi.org/10.1016/j.palaeo.2009.10.009

Williams, M. A. J., Pal, J. N., Jaiswal, M., & Singhvi, A. K. (2006). River response to Quaternary climatic fluctuations: evidence from the Son and Belan valleys, north-central India. *Quaternary Science Reviews*, *25*(19–20), 2619–2631. https://doi.org/10.1016/j.quascirev.2005.07.018

Williams, M. A. J., & Royce, K. (1982). Quaternary geology of the middle son valley, North Central India: Implications for prehistoric archaeology. *Palaeogeography, Palaeoclimatology, Palaeoecology*, *38*(3–4), 139–162. https://doi.org/10.1016/0031-0182(82)90001-3

Wintle, A. G. (1997). Luminescence dating: laboratory procedures and protocols. *Radiation Measurements*, *27*(5–6), 769–817. https://doi.org/10.1016/S1350-4487(97)00220-5

Wynn, T. (2000). Symmetry and the evolution of the modular linguistic mind. In *Evolution and the Human Mind* (pp. 113–139). Cambridge University Press. https://doi.org/10.1017/CBO9780511611926.007

Zaidner, Y., Centi, L., Prevost, M., Shemer, M., & Varoner, O. (2018). An Open-Air Site at Nesher Ramla, Israel, and New Insights into Levantine Middle Paleolithic Technology and

Site Use. In *The Middle and Upper Paleolithic Archeology of the Levant and Beyond* (pp. 11–33). Springer Singapore. https://doi.org/10.1007/978-981-10-6826-3_2