

[UPPSALA UNIVERSITET](#) : [Arkeologi och antik historia](#) : [Afrikansk och jämförande arkeologi](#) : [Projekt](#)



[Hoppa över länkar](#)

[Introduction](#)

[Cooperation](#)

[Participants](#)

[Dissertation proposals](#)

[Themes](#)

[Training](#)

[Reports](#)

[Downloads](#)

## The Archaeology of Southern Sri Lanka

### Human Responses and Contributions to Environmental Change in Sri Lanka

[Paul J.J. Sinclair](#), Department of Archaeology and Ancient History, Uppsala University  
[Raj Somadeva](#), Rathnasiri Premathilake; Gamini Adikari and Arjuna Thantilage, Postgraduate Institute of Archaeology, University of Kelaniya.

The HRAC project aims at a better understanding of long term socio-environmental interactions in Africa and Sri Lanka. In the case of Sri Lanka, the project links the Post Graduate Institute of Archaeology ([PGIAR](#)), University of Kelaniya, Colombo with the [Universities of Uppsala](#) and Stockholm in Sweden. It is funded by [SAREC](#) (the Swedish Agency

for Scientific Co-operation with Developing Countries) and commenced in mid 1998. Research themes include 1. Paleo-environmental reconstruction and identification of critical points where the effects external forcing mechanisms are clearly apparent, 2. Assess shifts in settlement patterns associated with these events using GIS technology and 3. Investigating long term effects on resource availability resulting from the practice of agriculture and metallurgy based primarily on detailed archaeological investigation of the Tissanharama area of Southern Sri Lanka (see Map 1).

Paleo-environmental research in the Horton Plains in the southern Sri Lanka highlands includes the extraction of cores from peat deposits. These are being analysed for their content of pollen, mineral magnetic concentrations and organic carbon. Radiocarbon dates have been processed from two mires, indicating a large variety in the beginning of peat accumulation in this area. The work is carried out by Rathnasiri Premathilake and is the subject of his MSc and PhD thesis at the Department of Quaternary Research, University of Stockholm. The research, which is supported by Ass. Prof. Jan Risberg and Professor Urve Miller of Stockholm University and Dr S. Epitawatta of the University of Sri Jayawardenapura, provides the first paleo-environmental framework for Late Pleistocene and Holocene times based on pollen analysis. Because of the lack of a pollen flora, recent pollen are being subject to collection and description (Premathilake 1999). Significant changes from the Late Pleistocene to the present day are noted. Climate changes have been identified in terms of alternating dry and wet phases. Also variations in the relative temperature have been interpreted from the vegetation changes. A pre-farming culture with slash and burn and grazing starts already c. 14,000 BP. At around 8000 BP it seems as if farming becomes permanent. Cultivated plants are *Hordeum* and *Triticum*. Further work is planned to link the coastal wetland/lagoonal sequence based on the archaeological and geo-morphological work of Derianagala (1976) Fairbridge (1976), Katupota (1987) and Risberg (2000). In a new development paleo-environmental modeling based on the method of Bryson and Bryson (1998) has been applied to the Colombo, Kandy and Trincomalee areas of Sri Lanka. The approach based on estimating positions of the inter-tropical convergence zones through a global heat budget model using polar ice volume estimates cores and dated volcanic events provides estimates of mean annual temperature and precipitation (with monthly variations) at ca 200 year averages for the last 2000 years and 500 year averages for the last 40 000 years. These are useful for comparisons with available proxy data (see above). For the Holocene, two periods have been identified ca 800 BP and 2000 BP where the effects of external forcing mechanisms seem particularly apparent. The latter of these is known from historical sources as marking the downfall of both the Anuradhapura and the Tissamaharama urban states complexes.

In the Tissanharama area, Spot and Landsat TM satellite imagery have been used to define Land Systems and Land Units according to the method of Larsson and Stromquist (1992). Information on the location of more than 300 irrigation tanks has been compiled from available 1: 50 000 scale maps. This work forms part of the MSc thesis of Steffan Haglund and Fedrick Haag (2000). Raj Somadeva and Gamini Adikari both of the PGIAR have conducted systematic archaeological field surveys in the flood plain area of the river Kirindi Oya. More

than 300 archaeological sites have been recorded. Judging from surface remains these are associated with prehistoric stone tool using communities, proto historic and early historic farming communities and historic urban settlements. Two important cist grave cemeteries probably dating to ca 700 BC add significantly to previous interpretations of cultural developments in southern Sri Lanka. In addition new excavations have been carried out in 5 localities providing a detailed chrono-stratigraphic framework and evidence for periods of increased inundation of the area. Finds include extensive collections of ceramics, metal working remains, imported glass trade goods and evidence of food procurement based on rice cultivation, animal husbandry of cattle and buffalo and hunting and fishing.

Detailed GIS coverages using ARCVIEW have been produced of the Tissamaharama area and extended to national level. These projects form [PhD training programmes](#) of Somadeva and Adikari at the Department of Archaeology and Ancient History, Uppsala University, both supervised by P. Sinclair and S. Banadaranayake (PGIAR). This approach based on broad scale context definition using satellite imagery, random stratified archaeological site survey and excavation of selected features together with micro stratigraphical investigation through drilling provides an alternative complementary approach to excavation of more limited areas as practiced by the KAVA group in the town centre of Tissamaharama (Weisshaar and Wijeyapala 1994). A first approach to the long term effects of copper working in the Tissamaharama area and more generally for Sri Lanka as a whole comprises the subject of a [PhD thesis by Arjuna Thantillage](#) of the PGIAR. This work supervised by S. Bandaranayake (PGIAR) and P Sinclair (Uppsala) and F. Daim (Vienna) aims at a better understanding of copper alloy production techniques by investigating ca 300 samples of copper artifacts from the Tissamaharama area and the rest of Sri Lanka using electron emission spectroscopic analysis. A first attempt at sourcing of ores used will be based on lead isotope ratio analysis of 30 samples. This work adds to the previous work on iron metallurgy conducted by Forenius and Solangaarachchi (1994) and Jill Juleff (1998) all of which show that Sri Lanka had a sophisticated iron processing capacity throughout its history. Metal working and smelting activities which have been practiced in southern Sri Lanka for more than 2000 years constitute a significant source of human induced environmental stress.

Together these projects in southern Sri Lanka provide a new dimension to previous work focused on the central highland area of Sri Lanka at the important urban complexes of Sirigriya (Bandaranayake 1990:24; Bandaranayake, Mogren and Epitawatte 1990; Bandaranayake and Mogren 1994), Anuradhapura (Bandaranayake in press) and detailed work by Eva Myrdal-Runebjer (1996) on paleo botanical research and the role of rain-fed irrigation tanks for maintaining the complex hydrological systems supporting subsistence agriculture in the dry zone of Sri Lanka.

The authors thank Dr Jan Risberg, Stockholm University for comments on this paper.

## References

- Bandaranayake, S., 1990 "Approaches to the Settlement Archaeology of the Sigiriya-Dambulla Region". In *The Settlement Archaeology of the Sigiriya-Dambulla Region*, edited by S. Bandaranayake et al 1990. Colombo: Postgraduate Institute of Archaeology.
- Bandaranayake, S. and Mogren, M. 1990. *The settlement archaeology of the Sigiriya-Dambulla region*. Colombo: Post Graduate Institute of Archaeology.
- Bandaranayake, S., Mogren, M. and Epitawatte, S. 1990 *Studies in the settlement archaeology of the Sigiriya-Dambulla region*. Colombo: Post Graduate Institute of Archaeology;
- Bandaranayake and Mogren 1994.
- Bandaranayake, S., (in press) *The Premodern City in Sri Lanka: the first and second urbanization*. In Paul Sinclair et al (ed.) *The development of urbanism in Africa from a global perspective* ([Development of Urbanism](#))
- Deraniyagala, S.U., 1976 *The Geomorphology and Pedology of three sedimentary formations containing a Mesolithic industry in the Lowlands of the dry zone of Sri Lanka (Ceylon): 1972*. In *Ecological background of South Asian Prehistory*, edited by K.A.R. Kennedy and G.L. Posshel. Cornell University, South Asian program.
- Fairbridge, R.W. 1976 "Effects of Holocene climatic change on some tropical geomorphic processes". *Quaternary Research* 6:529-56.
- Forenius, S. and Solangaarachchi, S., 1994 *Dehigaha-ala-kanda (K014) at Alakolavava: An Early Iron production site with a highly developed technology*. In *Further Studies in the Settlement Archaeology of the Sigiriya-Dambulla Region*, edited by S. Bandaranayake et al 1994. Postgraduate Institute of Archaeology, University of Kelaniya.
- Gilliam, Juleff., 1998 *Early Iron and Steel in Sri Lanka, A study of the Samanalavava area*. Verlag Philipp von Zabern. Mainz Am Rhein. Koln.
- Haglund, S. and Fredrik, H., 2000 *Practical Landscape Appraisal Methodology. An Approach towards environmental security*. Research Report No.10 from EPOS, Linköping University.
- Katupota, J., 1987 *Evidence of high sea level during the mid Holocene on the Southwest coast of Sri Lanka: Boreas* 17, Oslo.
- Premathilake, R., 1997 *Recent and fossil pollen*
- Premathilake, R., Nilsson, S. & Epitawatte, S. 1999. *Pollen morphology of some selected plant species from Horton Plains, Sri Lanka*. In *Grana* 38:289-295, 1999.

