

Fieldwork Report – Galapagos Islands, Ecuador

Fieldwork team:

Palaeoecology: Dr Simon Haberle, Iona Flett (ANU), Dr Henk Heijnis (ANSTO), Dr Kathy Willis, Dr Cynthia Froyd (Oxford University, UK), Mr Jim Neale (Soft Core Technologies, Australia)

Archaeology: Prof Atholl Anderson, Mrs Rosanne Anderson (ANU), Dr Karen Stothert (University of Texas, San Antonio), Mr Cesar Veintimilla (ESPOL, Guayaquil), Dr Paul Wallin, Dr Helene Martinson-Wallin (Kon-Tiki Museum)

The Galápagos Islands, 1000km off the coast of Ecuador, are a National Park, UNESCO World Heritage site and a Biosphere Reserve. They are globally renowned for their ecological value and as a symbol of scientific discovery. The twelve researchers listed above have been lucky enough to have the Galapagos as a fieldwork site for the past four weeks. Funded by an ARC grant held by Simon Haberle, Atholl Anderson and Henk Heijnis, the Galapagos work is part of a larger investigation into pre-European Pacific migration. The project aims to determine the extent that remote eastern Pacific Islands (Cocos, Galapagos, Desventuradas and Juan Fernandez archipelagos) were used as ‘stepping-stones’ for interaction and material exchange between Amerindian and Polynesian people.

The Galapagos research will combine fine resolution archaeological, palaeoecological and dating techniques to determine the age and nature of the first human occupation in the archipelago. Evidence of pre-European human activity, climatic variability (including El Nino) and its possible effects on Pacific colonisation are of primary interest.

For the most part, the fieldwork was conducted in two separate groups, moving between the islands of Santa Cruz, Santiago, Floreana and Isabela (See Figure 1) by live-aboard boat.



Fig 1. Map of the Galapagos Islands, with islands visited during this fieldtrip labeled

Palaeoecology

Sediment cores were taken from three *Sphagnum* bogs in the highlands of Santa Cruz; all are 3.5 to 4m long, bottoming in grey clay. They were extracted using a 50mm diameter Livingston corer and Cap'n Jim Neale's 100mm diameter "Bog Killa" (See Fig 2). Previous investigations by Paul Colinvaux indicate that the basal sediment may be about 1500 years old in a similar Santa Cruz bog (Colinvaux 1968).



Fig 2. (Front to Back) Henk, Jim, Simon, Iona

As well as the highland sites, the edges of two ephemeral saline lakes in volcanic craters on Santiago (Fig 3, below) were cored. Using the Livingston corer in one of these craters, formerly used as a salt mine, we extracted 3.5m of sediment, and in the other, 1m of sediment was taken using a C-section probe.



Fig 3. Crazy smile on the face of Dr Cindy Froyd on her first sighting of the lake in "El Crater del Morte", 200m below.

Three coastal lagoons, one each on Santiago (Espumilla Lagoon, James Bay), Floreana (Flamingo Lagoon, Punta Cormoranta) and Isabela (Isabela wetlands, Puerto Villamil) also yielded sediment. Espumilla and Flamingo Lagoons were both cored with the Livingston corer, and produced about 3.5m and 4m of sediment respectively. At the Isabela wetlands (a RAMSAR site, and excellent flamingo-watching location), we managed to make use of a paddle-boat normally used for tourist trips around the lake. It proved to be a perfect coring platform, and we extracted 6m of sediment using the Livingston corer in about 1m of water (See Fig 4).



Fig 4. (Left to right) Simon, Iona, Jim, Boat owner, Henk, Cindy, the other boat paddler.

Duplicate cores were taken in all locations, and they will be divided up between Oxford and ANU for high resolution analysis of microfossils, macrofossils, charcoal (including species identification), ^{210}Pb and ^{14}C wiggle-match dating. We will examine changes in the vegetation of the Galápagos Islands over the last ~5000 years, particularly focusing on changes over the last 1000 years, the period over which anthropogenic activity has had an impact. The native ecosystems of the Galapagos are currently threatened by extensive marine and terrestrial habitat degradation and have incurred widespread introductions of non-native species since the time of European colonisation. The timing of these introductions and the natural fire history compared with any anthropogenic influence, is of importance to conservation managers working in the Charles Darwin Research Station in the Galapagos, and will be a major area of our research.

Archaeology

The archaeological team focused their efforts on coastal sites identified by Thor Heyerdahl and Arne Skjolsvold during their 1953 expedition. Heyerdahl and Skjolsvold investigated surface scatters of potsherds and excavations to a depth of 50 cm on Santiago and Santa Cruz islands. The collection is now held at The Kon-Tiki

Museum (Norway) and contains charcoal and pottery of Peruvian and Ecuadorian origin that was said to stratigraphically underly the Spanish artefact layers (Heyerdahl and Skjolsvold, 1990).

The aim of this field trip was to re-excavate sites in Whale Bay, Cabo Colorado (Santa Cruz), James Bay, Buccaneer Bay (Santiago), Black Beach (Floreana). Artefacts and charcoal material recovered in stratigraphic context will be used to test the hypothesis that the islands were visited or occupied by Amerindians prior to their European discovery in 1535 AD.

All Heyerdahl and Skjolsvold's sites, some of which had been damaged by recent construction, were mapped and systematically excavated to test propositions about the spatial and stratigraphic distribution of archaeological material. At several locations where no sites had previously been recorded, surface searches were conducted, and test pits dug. Sand augering was also carried out in dune areas. Local informants were questioned about water sources and whether they had found pottery or other archaeological material on their land.



Fig 5a. Cesar, Paul and Rosanne auger a sand dune.



5b. Helene excavating a hearth on Santiago.



5c. Karen and Cesar interview a local



5d. An example of 'Spanish Jar' pottery at James Bay, Santiago

Archaeological material retrieved during the trip will be analysed at Cautivo Archaeological Laboratory, Ecuador, and the ANU. Earthenware will be compared with other South American collections, for clues as to its age and history. ICPMS analysis on sherds will provide information about the type and origin of the fabric, and OSL dating will be carried out. Pollen, phytoliths and charcoal found in the archaeological excavations will also be analysed.

The final item to report is that Henk's birthday was celebrated in style with some delicious local pink champagne!



References

Colinvaux, P.A. 1968. *Nature* 219, 590-594.

Heyerdahl, T. and Skjølsvold, A. 1990. *Archaeological Evidence of Pre-Spanish Visits to the Galápagos Islands*. Institute for Comparative Research in Human Culture, Series B, No. 81. Norwegian University Press, Oslo.