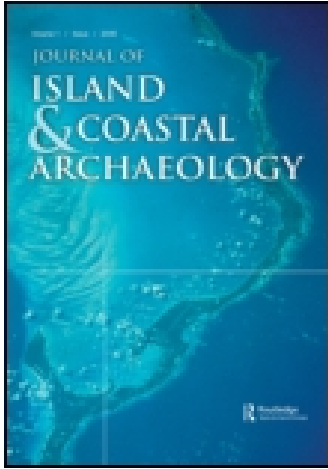


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The Journal of Island and Coastal Archaeology

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/uica20>

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Published online: 06 Nov 2014.

To cite this article: Shaun Williams, James Goff & Tim Davies (2014) Deep Charcoal Found at Fagali'i Village, Upolu Island, Samoa: Natural or Anthropogenic in Origin?, *The Journal of Island and Coastal Archaeology*, 9:3, 425-429, DOI: [10.1080/15564894.2014.961665](https://doi.org/10.1080/15564894.2014.961665)

To link to this article: <http://dx.doi.org/10.1080/15564894.2014.961665>

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NEWS AND NOTES

Deep Charcoal Found at Fagali'i Village, Upolu Island, Samoa: Natural or Anthropogenic in Origin?

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Keywords C-14, charcoal, coastal, contemporaneous, Lapita, Samoa

While it is generally accepted that Lapita groups reached West Polynesia ca. three millennia ago, there are very few archaeological sites in Samoa that date back this early. The one exception is the Mulifanua site in NW Upolu from which a turtle bone associated with a Lapita pottery deposit was dated to 2,970–2,640 cal BP (NZA-5800 [2 σ]; 2,838–2722 cal BP [1 σ]). This is currently the only and earliest ¹⁴C age related to prehistoric human settlement in Samoa (Cochrane et al. 2013; Petchey 2001; Rieth and Hunt 2008) (Figure 1).

Recently, we obtained a radiocarbon date on a taxonomically unknown charcoal sample found on the north coast of Upolu Island, Samoa, which has a calibrated mean ¹⁴C age of 3325 \pm 60 cal BP (Wk30087: 3385–3265 cal BP [1 σ]; 3445–3215 cal BP [2 σ]) (Table 1; Figure 2). The sample was discovered during a palaeotsunami investigation (Williams et al. 2013) and was obtained from a blackish peat at 2.87 m depth in a 3 m core sampled from a wetland less than 10 m in elevation, and approximately 150 m inland of the Fagali'i village coastline. The

Received 7 July 2013; accepted 22 August 2014.

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Table 1. Radiocarbon data for sample Wk30087.

Laboratory no. ¹	Depth (m)	CRA ² (¹⁴ C yr BP)	$\delta^{13}\text{C}$ ‰	68.2% CAR ³ (cal yr BP)	95.4% CAR ³ (cal yr BP)	Material ^{4,5}	Context
Wk30087	2.87	3112 ± 50	-27.8 ± 0.2	3385-3265 (1435-1315 BC)	3444-3215 (1494-1265 BC)	Charcoal	Single charcoal piece ~5 cm a-axis in blackish peat; ~14 cm from upper contact

¹Wk = University of Waikato, Radiocarbon Dating Laboratory (RDL).

²Conventional Radiocarbon Age calculated as per Stuiver and Polach (1977).

³Calibrated Age Range—all ages were calibrated by Fiona Petchey of RDL using OxCal v.4.2.2 software © Bronk Ramsey (2013) [initially developed in Bronk Ramsey (1995)]; and atmospheric data from Reimer et al. (2009).

⁴Refer to Figure 1 for a description of the core data.

⁵Sample pretreatment: Possible contaminants were removed, and it was washed in an ultrasonic bath. Further washed in hot 10% HCl, rinsed, and treated with hot 1% NaOH. The NaOH insoluble fraction was treated with hot 10% HCl, filtered, rinsed, and dried.

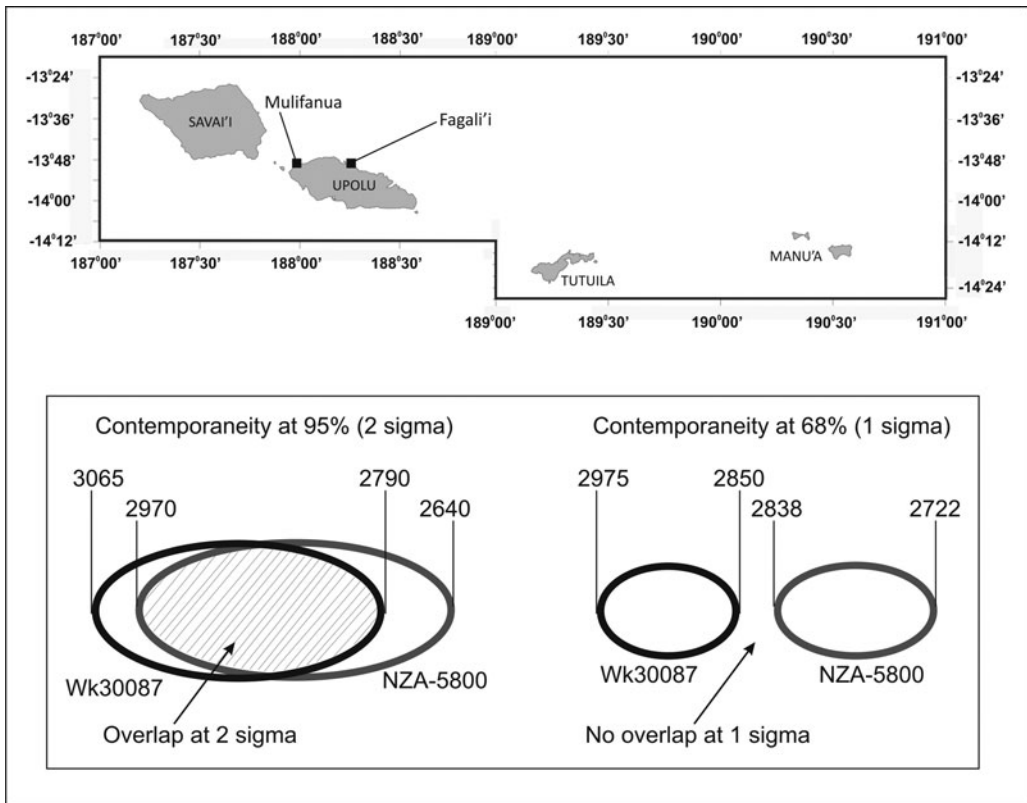


Figure 1. Possible contemporaneity of samples Wk30087 from Fagali'i and NZA-5800 from Mulifanua. If an in-built age of 300 ^{14}C years is factored into the age calibration for Wk30087, the samples would overlap at 2 sigma between the lower limit of NZA-5800 (2970 cal BP) and the upper limit of Wk30087 (2790 cal BP).

in-built age could possibly be up to 300 + ^{14}C years (Allen and Wallace 2007; Nunn and Petchey 2013). If this were the case, its recalibrated conventional radiocarbon age (CRA) could be as recent as 2810 ± 50 BP (2975–2850 cal BP [1σ]; 3065–2790 cal BP [2σ]), and raises questions about its origin.

First, it is possible that the charcoal resulted from a natural forest fire, which was perhaps associated with drought conditions during an extreme climatic event (e.g., El Niño/Southern Oscillation). However, Fagali'i village is not within the northwest drought-prone region of Samoa (Australian Bureau of Meteorology and CSIRO 2011) and the present climate range in the Samoan archipelago is similar to that for the

past 4,000 years or so (Nunn 2012). This generally sees northern and northeastern Upolu receive an average annual rainfall of around 3,000 mm and implies that the chances of natural forest fires occurring in the Fagali'i area over the last 4,000 years are low.

It is also possible that the specimen may have formed due to volcanic processes (e.g., burned vegetation from lava). However, the lack of evidence for active volcanism on Upolu contemporaneous with the age of Wk30087 suggests that this is not the case (Németh and Cronin 2009). Thus, we must consider that anthropogenic activity offers a reasonable origin for the charcoal.

The ^{14}C age obtained for Wk30087, if it had an in-built age of 300 ^{14}C years, would

Deep Charcoal Found at Fagali'i Village

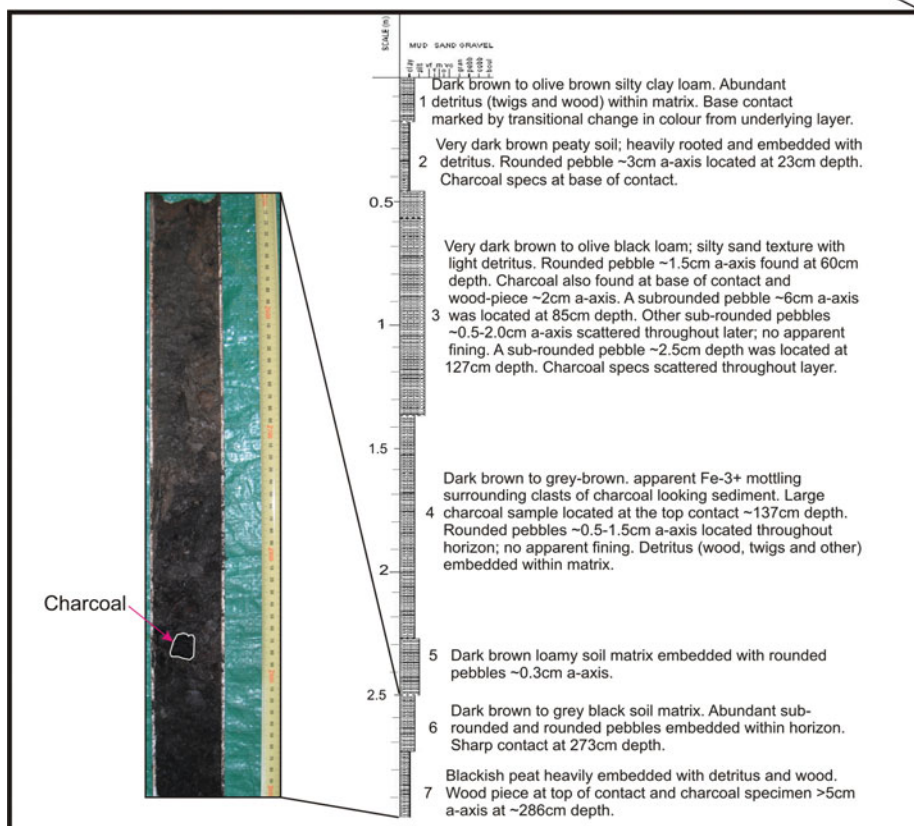


Figure 2. Core site location at Fagali'i, east of the capital Apia. Located at $13^{\circ}50.628' S$; $171^{\circ}44.131' W$. Bottom 2.53.0 m of the core is shown, including the sub-sampled location of charcoal sample Wk30087 towards the base. (Base map: Google Maps).

be contemporaneous with the age of the Mulifanua site. Further, the contemporaneity of this estimate with Lapita colonization in Vanuatu, Fiji, and Tonga (e.g., Burley et al. 2012; Clark and Anderson 2009; Nunn and Petchey 2013), tentatively supports the accepted timing of initial colonization in this region.

This interpretation likely supports the hypothesis by Green (2002) that Fagali'i might be an area containing potential Lapita deposits. More palaeoenvironmental, geoarchaeological, and taxonomic work at this site would provide a better understanding of the context and true calendar age of Wk30087. This would help to validate a possible anthropogenic origin, and may contribute to understanding the distribution of early colonization of the Samoan Islands.

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