

Defending the Defensible: A Rebuttal of Scott Fitzpatrick’s (2010) Critique of the AD 1300 Event Model with Particular Reference to Palau

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ABSTRACT

In a recent article [*Journal of Pacific Archaeology*, vol 1(2), 2010], Scott Fitzpatrick contends that the AD 1300 event model is unhelpful as a key to understanding environmental and societal change in the Pacific during the past 1500 years. We reject this contention on the grounds that there are ample and persuasive grounds for supposing otherwise. The AD 1300 event model proposes that climate change (especially cooling) and sea-level fall affected most of the Pacific Basin during the transition between the Medieval Warm Period and Little Ice Age, and that the impacts of these changes on food resources were so profound that they led to enduring impacts on human societies in this region, particularly Pacific Islands. We aver that the AD 1300 event model remains a powerful tool for understanding last-millennium environmental and societal change in the Pacific Islands and that all the charges Fitzpatrick levels against it can be readily dismissed.

Keywords: AD 1300 event, climate change, sea-level change, food crisis, Pacific Islands, settlement pattern, warfare, voyaging

INTRODUCTION

We thank Scott Fitzpatrick³ for his critique of the AD 1300 event model, particularly for his discussion of additional archaeological and palaeontological data from recent work in the Palau archipelago. Yet we reject his conclusion that the model is invalid and we encourage him to present the ‘great deal of archaeological and palaeoenvironmental evidence suggesting the inverse of the proposed model’ (Fitzpatrick 2010: 168).

It is clear that Fitzpatrick did not read Nunn’s (2007) book on the subject of the AD 1300 event before he penned his critique because he would have found in it reason to temper sweeping generalisations like the model ‘ignores a large corpus of information’ (p 168) and that last-millennium climate in the Pacific was ‘extremely [spatially] variable’ (p 169). The range of examples and data in the 2007 book is understandably far greater than could be presented in the papers on which Fitzpatrick’s criticism focuses and it is difficult to identify any tropical Pacific

Island group which does not exhibit societal changes during the last millennium consistent with model predictions.

In addition, the case study of Palau presented in Nunn (2007) incorporates several contentious issues identified by Fitzpatrick, particularly the establishment of stonework villages along the Babeldaob coast during the AD 1300 event which is ‘interpreted as a compromise between access to [newly-formed] wetlands for agriculture and the need for enhanced security in the open setting’ (p 190). There is also explicit mention in this book (p 192) that the societal response to the AD 1300 event in parts of Hawaii, Kosrae and Palau was different from other Pacific island groups, so Fitzpatrick is not new in noting this.

LAST-MILLENNIUM CLIMATE CHANGE IN THE PACIFIC

Fitzpatrick’s criticisms of the interpretation of last-millennium climate change that underlies the AD 1300 event model echo Allen (2006) in arguing that there is doubt about the existence of the Medieval Warm Period (MWP) and the Little Ice Age (LIA) in the Pacific. Fitzpatrick also suggests that the LIA throughout the Pacific Basin may have been ‘warmer ... than previously thought’ (p 169), something that ‘recent palaeoenvironmental data⁴ seem to support’ (p 169).

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4 No examples of these ‘recent palaeoenvironmental data’ were given by Fitzpatrick (2010).

Allen's argument applied only to the central (equatorial) Pacific and depended on the work of Cobb *et al.* (2003) who were candid about the limits of their data interpretation, noting that 'increased [solar] irradiance ... did not result in immediate warming of the central tropical Pacific during the MWP' (p 275). It is unclear then why Allen (2006) and Fitzpatrick (2010) use the no-show of the MWP in this part of the Pacific as a springboard for criticising the notion that the other 95% of the Pacific Basin did in fact experience a warm MWP followed by a cool LIA (Nunn, 2007). Cobb *et al.* (2003) were interested principally in ENSO periodicity not climate change during the last millennium; a better study of climate change within this period is that of Oppo *et al.* (2009) on sea-surface temperatures in the Indo-Pacific Warm Pool which shows, contrary to Fitzpatrick's doubts that the MWP and LIA could actually show up in 'tropical palaeorecords' (p 169), that they really can.

There is abundant evidence that most of our planet experienced a warm MWP and cool LIA (Figure 1). It is unfortunate that Fitzpatrick selects the early work of Jones *et al.* (1998) and Jones & Mann (2004)⁵ to support his position that the Pacific did not experience these periods without looking at more recent work (e.g. Mann *et al.*, 2009). There is ample evidence, now largely accepted by climate scientists, that the 'hockey stick' model which was current 5–10 years ago derived from an unacceptably high degree of smoothing of climate-data variability for the last millennium. There is little doubt that the LIA affected almost every part of the world (Wanner *et al.* 2008) and, while there is greater uncertainty about the global extent of the MWP, several notable authors have argued in favour of this (Broecker 2001; Esper & Frank 2009).

Abundant climatic and societal data in favour of a warm MWP and cool LIA in the Pacific Basin are given in Nunn (2007). It is unfortunate that Fitzpatrick fails to address these data or indeed to cite more recent palaeoclimate studies in the Pacific Basin which find unequivocal evidence for both the MWP and LIA. These include that from Andean ice cores (recent summary in Vimeux *et al.* 2009), the lacustrine sedimentary record from Easter Island (Sáez *et al.* 2009), and the palaeoclimate reconstructions of Tierney *et al.* (2010) for Southeast Asian seas. The list is a long one and comprehensively refutes Fitzpatrick's hint of a warmer (or wetter) LIA 'than previously thought' in the Pacific (p 169).

THE AD 1300 EVENT

In the 2007 book, Nunn gives abundant evidence that cooling and sea-level fall took place during the AD 1300 event. In addition, it is clear that this 'event' marked a transition between a warmer and a cooler period that is part of a solar cycle with a period of 1300/1500 years (Camp-

bell *et al.* 1998). Most such transitions have been more gradual than the AD 1300 event which represents 'the most dramatic change in atmospheric circulation and surface temperature conditions in the last 4000 years' (Kreutz *et al.* 1997:1294). More recent palaeoclimate work concluded that the AD 1300 event (called the MM [modern millennial] event) was 'an example of a rapid climate change under near modern boundary conditions' (Meyerson *et al.* 2003:1).

A more controversial aspect of the AD 1300 event model is the proposition that the undoubted cooling caused sea-level fall yet besides (understandably sparse) data from the tropical Pacific Islands (Nunn 2000, 2007; Moriwaki *et al.* 2006; Goodwin & Harvey 2008), there are datasets from elsewhere that are consistent with this proposition (van de Plassche *et al.* 1998; González & Törnqvist 2009; Grinsted *et al.* 2009). The idea of sea-level fall between the MWP and LIA was adjudged 'not unreasonable' by Gehrels (2009:30).

Fitzpatrick contends that the AD 1300 event model is 'not well-founded' (p 168) and is 'ill-conceived' (p 169). These comments ring hollow when applied to the climatic foundations of the model (see above), so we shall address them here in reference to their proposed association, indubitably controversial, with profound and enduring human-societal responses in the Pacific Islands where such responses are argued as having been amplified (owing to the oceanic context) compared to other coastal areas of the world.

The AD 1300 event model assumes that the major (not all) impacts on human societies in the Pacific Islands came about as a result of the sea-level fall (maybe 50–80 cm) which accompanied the cooling. It is argued that for societies dependent on nearshore marine resources and coastal/lowland food crops, a sustained sea-level fall of such a magnitude would have led to a food crisis. It is difficult to understand how such a proposition is 'not well-founded'. The effects of sea-level fall on fringing-reef bioproductivity are well-known (e.g. Smithers *et al.* 2006). Food crises have been linked to short-lived sea-level falls associated with El Niño events (Glynn 1990) although the best analogy in the Pacific Islands with the AD 1300 event may be the abrupt uplift of fringing reefs around Ranongga Island (Solomon Islands) in April 2007 which led to an immediate food crisis for its inhabitants (Albert *et al.* 2007).

The AD 1300 event model then links the (sea-level driven) food crisis to conflict, a proposition which is also well-founded (Zhang *et al.* 2007). On larger higher islands with coastal populations, an understandable response to conflict would be to move from less-defensible locations (along the coast) to more defensible locations (inland). The fact that this proposition is consistent with the overwhelming evidence for the widespread establishment of fortifications in the Pacific Islands 0–200 years after the AD 1300 event (e.g. Schmidt 1996; Kirch 2000; Pearl 2004; Nunn 2007; Field & Lape 2010) lends it veracity.

⁵ Cited but not referenced by Fitzpatrick (2010).

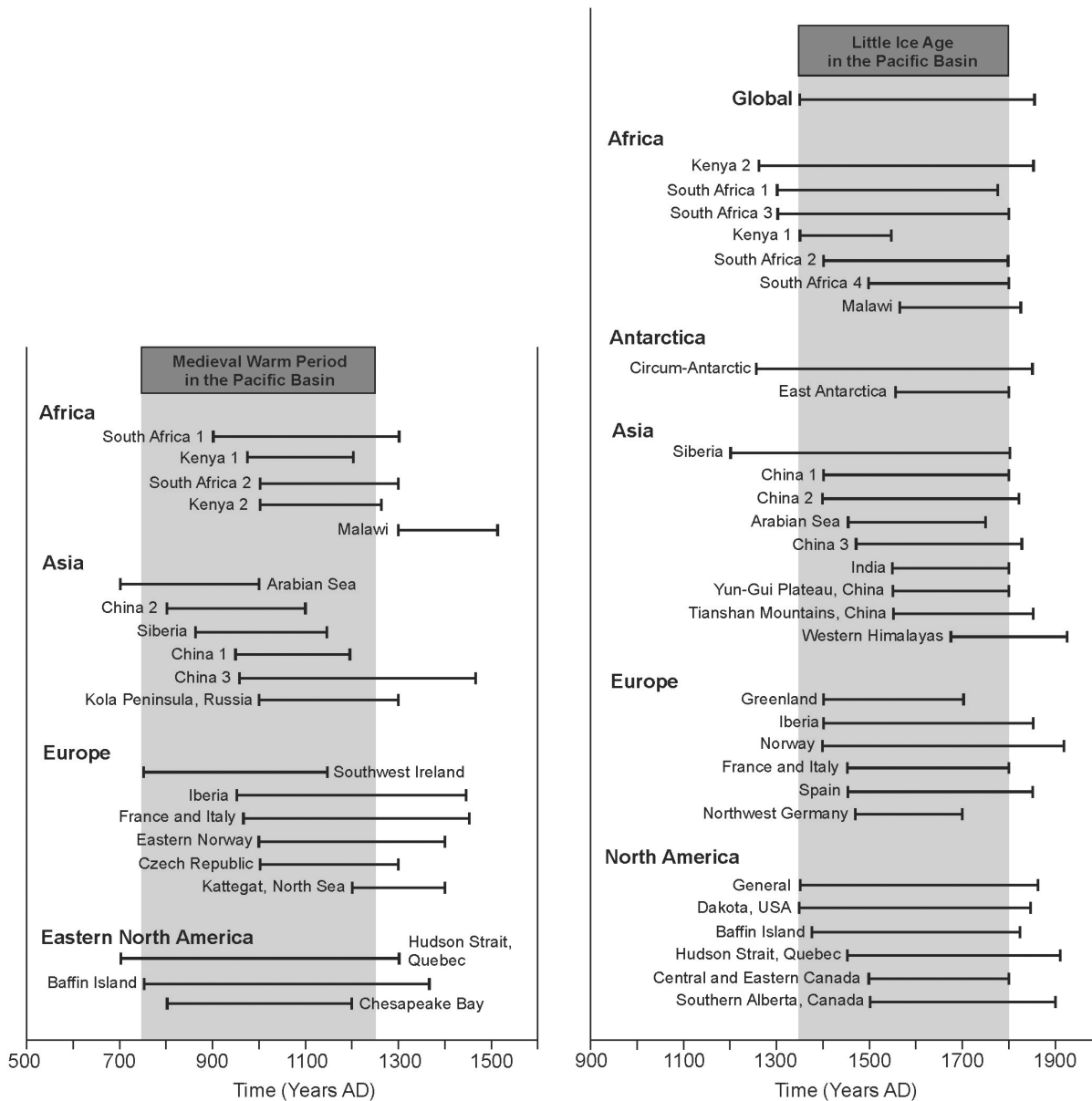


Figure 1. The global extent of the Medieval Warm Period and the Little Ice Age (after Nunn, 2007, with sources of data therein). All datasets shown require a warm MWP succeeded by a cool LIA, thereby requiring an intervening cooling (the AD 1300 event). Fitzpatrick (2010: 169) believes that the ‘climatic characteristics surrounding the AD 1300 event ... [are] highly variable’ and that the LIA may have been ‘actually warmer and wetter than previously thought’. This view would seem to be contradicted by the data consensus illustrated.

PALAU

There is ample evidence that the northwest quadrant of the Pacific Ocean was affected by sea-level fall during the AD 1300 event (Nunn 2007) including in Palau the decline in level of Lake Ngerdok on Babeldaob (Masse *et al.* 2006). In addition, these authors note that their analyses of near-coastal cores on Babeldaob ‘may reflect lowered sea level’ (p 127). Other studies in support of a sea-level fall during the AD 1300 event in this part of the Pacific are the coastal emergence of Kosrae (including the Lelu Island periphery–

Athens 1995), the reduction in extent of Lake Hagoi on Tinian Island (Athens & Ward 1998), and the conversion of open-sea bays to wetlands at Kawai Nui and the Bellows Backplain on O’ahu Island in Hawaii (Allen 1997).

It is understandable why many archaeologists regard such observed coastal changes as having been driven by human actions, typically the release of inland sediment through deforestation or earthwork construction. Others might instead see such coastal changes as evidence for climate change. The one view cannot afford to ignore or disparage the other, and the resolution lies with precise

chronological data. To us, the demonstrable contemporaneity of sea-level fall with the conversion of shoreline inlets (bays) to brackish wetlands across the Pacific during the AD 1300 event (Nunn 2007) is strong evidence for a causal connection.

That said, the AD 1300 event was accompanied by rapid climate changes throughout the Pacific Basin. The most widespread of these was cooling, but there was also increased storminess in some island groups. There was also an increase in frequency of ENSO-negative (El Niño) events around this time. And, as explained by Nunn *et al.* (2007), the effects of the net stressors on island societies would depend on a range of antecedent conditions associated with the vulnerability and resilience of their food-resource bases. We now examine some of these issues for Palau (Figure 2).

Settlement-Pattern Change

In Palau, the outbreak of conflict (around AD 1250– Masse *et al.* 2006) may have led people to shift from unprotected sites on (the coasts of) large islands like Babeldaob to more readily defensible sites in (places like) the Rock Islands. This proposition can of course incorporate movement from unprotected sites in the interior of large islands like Babeldaob to fortified sites along their coasts, as well as the movement from Babeldaob to the Rock Islands.

The AD 1300 event model was never intended to be prescriptive and it is of course understandable that the precise nature and timing of human responses to climate-driven food crisis and conflict varied from island group

to island group depending on a range of antecedent factors. So if Fitzpatrick intends to persuade readers that the AD 1300 event model is wrong because some people lived in the Rock Islands before AD 1300 or that others stayed (in stonework villages) on Babeldaob after AD 1300, then we would argue that he is misguided. Any model applied to the real world, especially a part so diverse as the Pacific Islands, must by necessity make generalisations which should then be tested against specific areas. Fitzpatrick suggests that during the AD 1300 event, people moved to locations with ‘better coastal access’ (p 170) but in no way does this refute the suggestion that this change was ultimately a response to the independently-verifiable climate change that took place at this time.

Warfare

Masse *et al.* (2006) found that there was an ‘emphasis on warfare and defense’ (p 128) on Palau in the post AD-1250 era, an observation that agrees with the AD 1300 event model. Yet these authors and others (including Fitzpatrick) argue that there was an earlier period of warfare (500 BC to AD 650) represented by earthwork construction. Even if this is correct it does not invalidate the AD 1300 event model as applied to Palau, but there are grounds for supposing that the ancient earthwork complexes are not *de facto* proof of warfare during the earthwork era. There is no archaeological evidence of violence, no weapons and no traumatic injuries among the few known burials excavated from earthwork-era sites. A simpler explanation is that the spacing of the earthwork features and complexes

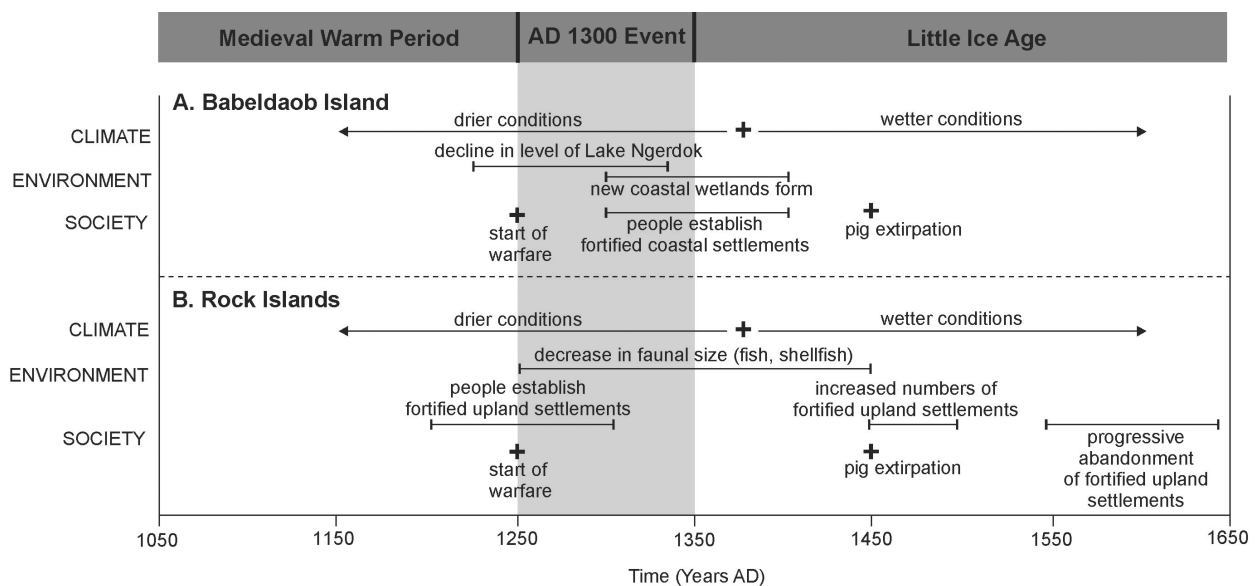


Figure 2. Changes in climate and environment in Palau across the AD 1300 event and the possible societal responses (after Nunn, 2007; all data from Masse *et al.*, 2006). We see no evidence in this figure to support Fitzpatrick’s assertion that for Palau, ‘there is in fact a great deal of archaeological and palaeoenvironmental evidence suggesting the inverse of the proposed [AD 1300 event] model’ (2010:168).

reflects territoriality under competitive conditions, and the strength of the territory-claiming groups was demonstrated unambiguously by the monumental size of these features.

Constructing monumental features is a way of deterring land-taking. It seems that this tactic was successful in Palau during the earthwork era, since archaeological evidence for actual fighting is lacking. The case of the Marianas is instructive; despite the increasing size of stonework architectural features (*latte*) erected during the late Latte Period (c. post-AD 1450), violence and the threat of violent attacks seem to have been a reality in the large southern islands, as evidenced by ubiquitous sling stones on the ground surface and cached at inland and coastal sites, burials showing violent death, and ethnohistoric accounts of warfare training of youth and contests of skill at fighting (Hunter-Anderson 2010, in prep.).

In Palau, the 'lack of evidence for settlement and warfare between AD 650 and 1250' may be indeed 'frustrating and curious' (Masse *et al.* 2006:128) but not inexplicable. This includes the span of the MWP, the 'times of plenty' of Nunn *et al.* (2007), when coastal adaptations were developed following the failure of previous adaptive strategies. We suggest that the violence cited in Palauan legends and stories pertains only to the subsequent 'times of less.' The trend toward intense rivalries, unstable social rankings and brittle alliances was not restricted to Palau at this time, similar phenomena being apparent in the other major western Micronesian island groups of Yap (Hunter-Anderson field notes, 1980–1982; Lingenfelter 1975) and the Marianas (Hunter-Anderson in prep.).

Long Distance Voyaging

The AD 1300 event model proposes that Pacific-wide ocean voyaging ceased shortly after the AD 1300 event (Nunn 2007). Fitzpatrick counters this argument by citing the prehistoric voyaging between Yap and Palau (for quarrying 'stone money' by the Yapese) which is known from ethnographic and early historic accounts by European traders. Yet this was a highly localised exchange system rather than a long-distance voyaging enterprise, and it appears to have been developed relatively late in prehistory, when acquiring exotic valuables became necessary to participate in the Yapese social system. Tellingly, none of the radiocarbon dates from rock island quarry excavations are earlier than the AD 1500s (Fitzpatrick 2008: 135, Note 3). Thus this particular instance of inter-island voyaging can be seen as affirming that during the LIA (late prehistory) within Yap, the competitive stakes were becoming increasingly high. In order to maintain or elevate socio-political status, people were willing to take on the expenses and risks of canoe travel to Palau, labour under extremely difficult circumstances (see discussion in Fitzpatrick 2008), and sail back to Yap through treacherous seas where loss of life (and of the stone valuables being transported) was

not uncommon (Hunter-Anderson & Zan 1996).

Another localised inter-island voyaging case cited by Fitzpatrick as contradicting the assumption of the AD 1300 event model is the *sawei* exchange system, which appears to be a relatively recent development (Hunter-Anderson & Zan 1996) analogous with earlier shorter-distance interactions between Yap and Fais (Intoh & Dickinson 2000) and between Yap and Lamotrek (Fujimura & Alkire 1984). These instances of localised inter-island voyaging can be understood in at least two ways. As argued by Alkire (1965), they may have been akin to an 'insurance policy' or 'mutual aid society' on the part of the Carolinians, especially during the LIA when typhoon frequency was higher and El Niño droughts more frequent (Anderson 1992; Camargo & Sobel 2005). Alternatively, they may have been means of obtaining exotic valuables for use within Yap during heightened competition for limited land, something that became especially acute under the conditions of unstable agricultural production during the LIA.

It should be remembered that all these voyages were of relatively short sailing distances (c. 250 nautical miles in the Yap-Palau case and c. 100 nautical miles between Yap and Ulithi Atoll, and similar distances between the coral islands participating in the *sawei*). The longer-distance voyaging cases cited by Nunn *et al.* (2007) were undertaken for exploration or as part of earlier established interaction spheres in the south Pacific. It is clear that they ended by ca. AD 1450 (Figure 3). We maintain that the cessation of these voyages was linked to the adverse climate conditions of the LIA and further suggest that some of these instances could parallel what happened on a smaller scale in Palau as the LIA wore on into the AD 1600s: a contraction of previously wide social networks due to difficulties in meeting obligations for mutual assistance.

Marine-Resource Reduction

The AD 1300 event model expects reductions in marine food resources as formerly productive reef flats were exposed during sea-level decline, something that is consistent with the analysis of reef-faunal remains from Uchularois Cave on Palau. The 'downturn of species size ... during the early phase of the stonework village era (AD 1250–1450) is striking' (Masse *et al.* 2006: 128). Fitzpatrick argues that this conclusion should not be taken as supporting the AD 1300 event model because it was drawn from 'only a short temporal range in one geographical locale within an archipelago that stretches for over 150 km' (2010: 170) which is a contention we reject.

From the late MWP, through the stonework village period of 1250–1450, and into the early LIA, Masse *et al.* (2006) found intriguing changes in which species of fish were caught. Across this period, there were increases in parrotfishes, leatherjackets, porcupine fishes and wrasses and decreases in squirrelfishes, snappers, emperors and sea breams. Masse *et al.* (2006) suggest this can be inter-

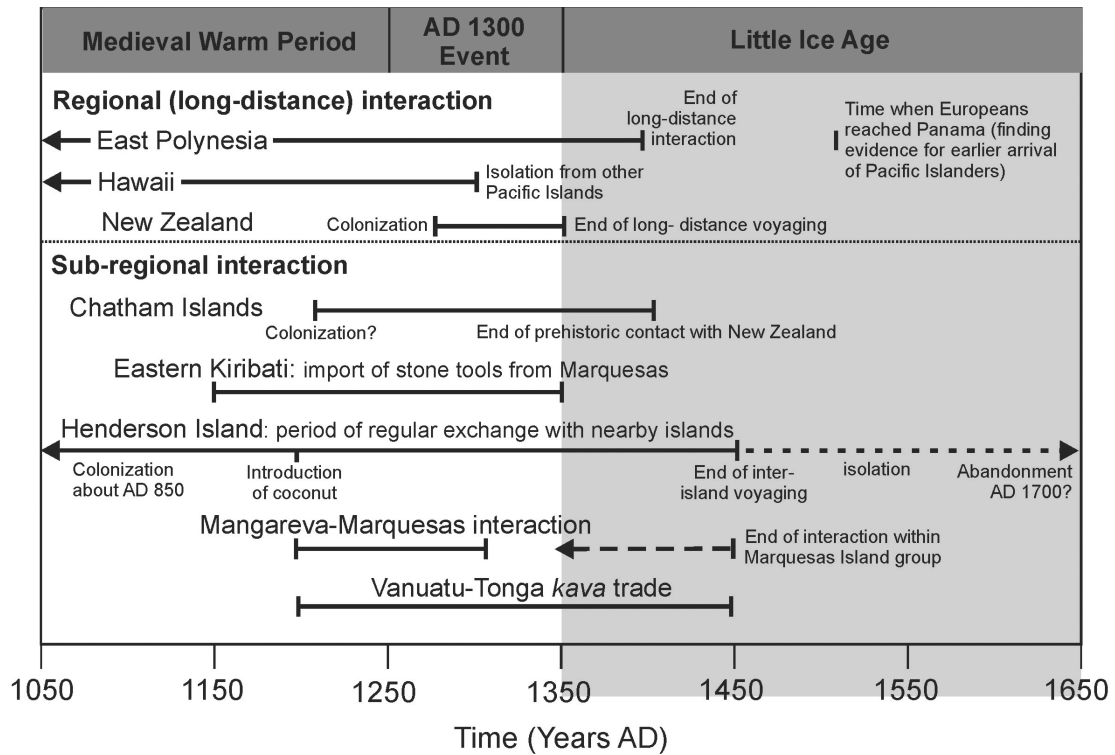


Figure 3. Chronologies of long-distance cross-ocean interaction in the Pacific Islands (after Nunn, 2007, with sources of data therein). There is a clear sign that this interaction ceased around AD 1450 not 'waxed and waned through time' as Fitzpatrick (2010:171) contends.

preted as 'a movement away from the use of less productive and reliable captures methods, such as dropline fishing ... to more reliable and productive techniques, such as netting and basket traps' (p 121). The percentage of fishes taken by trolling also steadily declined from the earliest assemblages across this period. These results suggest to us a trend away from pursuit of marine resources as protein supplements toward pursuit of species that yield maximum calories per unit effort. The replacement of a protein strategy by a caloric one suggests that the supply of land-based food resources was declining. This may have been due to falling water tables associated with sea-level decline and/or the precipitation deficits referred to by Masse *et al.* (2006). The timing of these changes supports the effects of the AD 1300 event in Palau.

CONCLUSION

While we comprehend the reasons for the distaste that some archaeologists have for environmental determinism *per se*, we hope the model of the AD 1300 event will be judged by individual researchers on the basis of its explanatory power. We welcome criticism and discussion of this model, which we do not regard as 'ill-conceived' but rather as a powerful tool for understanding last-millennium societal change in the Pacific Basin.

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