



Iron and fire: Geoarchaeological history of a Khmer peripheral centre during the decline of the Angkorian Empire, Cambodia



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ABSTRACT

Preah Khan of Kompong Svay (Preah Khan) was a vast peripheral outpost of the Angkorian Khmer Empire, managed with either strong influence from the capital or semi-autonomously between the 11th and 13th centuries AD. It is believed to have held significant economic importance to the Angkorian elite given its assumed trade partnerships with the neighbouring Kuay hill tribes as well as its proximity to Phnom Dek, or “Iron Mountain”, one of Cambodia’s richest known sources of iron oxide. However, the dating of a number of iron metallurgy sites found within the complex placed the heaviest period of industrial activity between the 13th and 17th centuries AD – during the decline of the Angkorian period and beyond into Cambodia’s Middle Period. In this paper we present a more extensive record of occupation and use of the site, using a series of geoarchaeological and geochemical records, and show that occupation likely occurred in three stages (Stage 1, Stage 2 and Stage 3). We suggest that in Stage 1 Preah Khan was initially established as a politico-religious expression of power in this strategically important region, and during this time maintained a small, non-industrial population. By the mid-late 14th century AD (Stage 2) macrocharcoal levels increase suggesting that Preah Khan’s purpose may have shifted as it became increasingly occupied or utilised for iron smelting activity, before it was finally abandoned in Stage 3, approximately half a century before the supposed abandonment of Angkor. An important question raised from this transition is whether the increased activity in the later phase represents a new wave of Khmer occupants or parasitic occupation of an abandoned temple complex by neighbouring forest-based minority groups. These results highlight the benefit of using geoarchaeological approaches in reconstructing the histories of Angkorian settlements and in increasing our understanding of the response of Khmer peripheral cities to the abandonment of the capital.

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1. Introduction

At its height between the 11th and 13th centuries AD, the Khmer Empire extended across much of mainland Southeast Asia (Jacques and Lafond, 2004). The royal court and central administration resided in and around the city of Angkor, on the central plains to the north of the Tonle Sap Lake (Fig. 1). Large centres and regional settlements also developed across the area that demarcate their territories (Groslier, 1986, Groslier, 1980) and were linked to Angkor and one another by an extensive road and riverine transportation network (Hendrickson, 2011). The purpose of these provincial centres varied; many maintained civic-ceremonial functions, subsidiary to the central temples and administration of Angkor (Hall, 1985), some appear to be industrial or

commercial (Welch, 1998, Hendrickson et al., 2013), while others represented strategic declarations of power (Groslier, 1973, Lustig et al., 2007, Hendrickson, 2010). All, however, existed as hubs for hinterland village groupings, often supplying the central administration with the resources and products of its region (Hall, 1985; Zhou, 2001, Lustig et al., 2007). Relative to the sprawling and ‘edgeless’ urbanism at Angkor (Evans et al., 2007), these secondary settlements contained well-defined urban and formal ritual spaces that are far more distinctive and more easily interpreted than the complex palimpsest of the capital (Evans, 2010, Evans et al., 2013).

The 15th century abandonment of Angkor by the royal court and its administration in favour of a succession of smaller cities in the southern river plains, marks the demise of the great inland agrarian empire that had endured officially since the 9th century. Investigations into this great transition in Southeast Asian history have, appropriately, focused on Angkor itself (Groslier, 1958, Groslier, 1979, Lustig et al., 2008, Buckley et al., 2010, Diamond, 2011). In contrast, the fate of provincial

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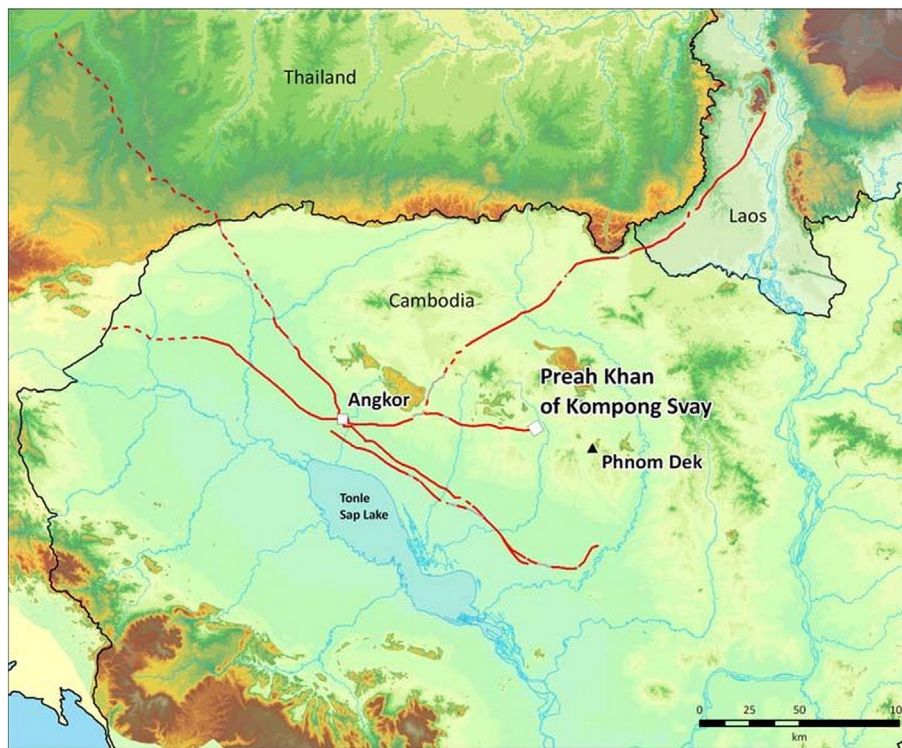


Fig. 1. The location of Preah Khan of Kompong Svay, approximately 100 km east of the ancient city of Angkor. The proximity of Phnom Dek is also illustrated.

settlements within the city-region network as Angkor began to fail has attracted relatively little attention, particularly in the Anglophone literature. This study therefore aims to begin addressing this lacuna, by providing an environmental history of Preah Khan of Kompong Svay (Preah Khan) – a peripheral centre with possible associations with industrial production located in the modern Preah Vihear province of Cambodia, approximately 100 km east of Angkor along one of the empire's major transportation routes – in order to determine how this part of Angkor's city-region responded to the demise of the capital.

Preah Khan, also known as Bakan, was the largest temple enclosure in the Khmer empire, at approximately 22 km² (Aymonier, 1900). According to the art-historical and epigraphic record, Preah Khan was founded in the 11th century AD, and remained important to the Khmer elite until at least the 13th century (Mauger, 1939). A later period of occupation is suggested by the construction of Preah Chatumukh, a tower depicting a standing Historical Buddha, and Theravada-Buddhist graffiti within the walls of the 2nd enclosure. Post-14th century AD Thai and blue-and-white ceramics in association with Post-Angkorian era metal production sites (see Hendrickson et al., 2013, Pryce et al., 2014) also suggests that the site was occupied and importing goods even as Angkor's power waned.

The layout of Preah Khan consists of a series of four concentric sets of enclosure walls that surround several important Angkor-period temples made from brick, laterite and sandstone, as well as numerous water management features such as canals, reservoirs and water tanks (Hendrickson and Evans, in press) (Fig. 2). Surveys inside the walls indicate little evidence for extensive residential occupation in or around the enclosures, suggesting small or ephemeral populations (Hendrickson and Evans, in press). The masonry chronology, initially devised by Mauger (1939) and recently reinterpreted by Jacques (Jacques and Lafond, 2004), begins in the 11th century and sees several periods of construction particularly in the early 12th and late-12th to early 13th centuries. Based on the style of the buildings built on top of the baray, the massive reservoir on its eastern side, this feature is also associated with the 12th century.

The scale and duration of the building programme, the size of the enclosure, and the infrastructure along the roadway connecting it to Angkor, imply that Preah Khan was a vital resource for the Khmer elite. Groslier (1973) argued that Preah Khan was established as an eastern outpost to protect against potential Cham invaders based in modern day Vietnam. A more economically-focused interpretation by Hendrickson (2011) is that Preah Khan served as an entrepôt to gain access to the iron being produced to the east. Of all the Angkorian sites, Preah Khan has a unique historical association with iron. The site is approximately 31 km WNW of the iron ore deposits at Phnom Dek ('Iron Mountain') and the Kuay ethnic communities that belong to that area. The Kuay have been associated with iron smelting for centuries (Levy, 1943, Dupaigne, 1987) and only ceased producing the metal in the mid-20th century. The production of iron within the outer enclosure itself, while limited in scale, is anomalous to Preah Khan among all other Angkorian sites. Based on the recent dating of many of the slag concentrations inside the site it appears that this industrial activity occurred after the religious foundation of the city had ceased to function (Hendrickson et al., 2013, Pryce et al., 2014). The evidence of production in Preah Khan most likely reflects brief and opportunistic industrial activity.

To test these suggestions and gain a more detailed picture of the occupation and use of this site, we aim to investigate the geoarchaeological history of Preah Khan of Kompong Svay. Local environmental histories reconstructed from sediment cores retrieved from artificial reservoirs in the Angkor region have led to significant revisions of the established chronologies of these sites – in particular the timing of their construction, settlement and abandonment (see Penny et al., 2006) – and with this intent we focus on data collected from the baray (reservoir) at Preah Khan for this study. These results will also provide the first radiometric dates for the reservoir. With this data the timing of the baray's construction within the context of the greater temple complex building programme, an understanding of the historical use and function of the baray, and how this may have changed through time, can be determined. Using these interpretations as proxies for

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