

# Archaeology in the New Guinea Highlands

Rethinking climate,  
paleoecology and site use



# The Highlands of New Guinea



highland landscape –  
photo credit : David Cole, 1965

Maps of the Eastern Province, Papua Guinea



WikiCommons, 2012

# Highland PNG archaeology & paleoecology

## Archaeology: Watson & Cole

Transition to cultivation ~3kya

## Christensen

Transition to cultivation ~6kya

## Bulmer

Transition to cultivation ~3kya

## Golson/Hughes/Yen

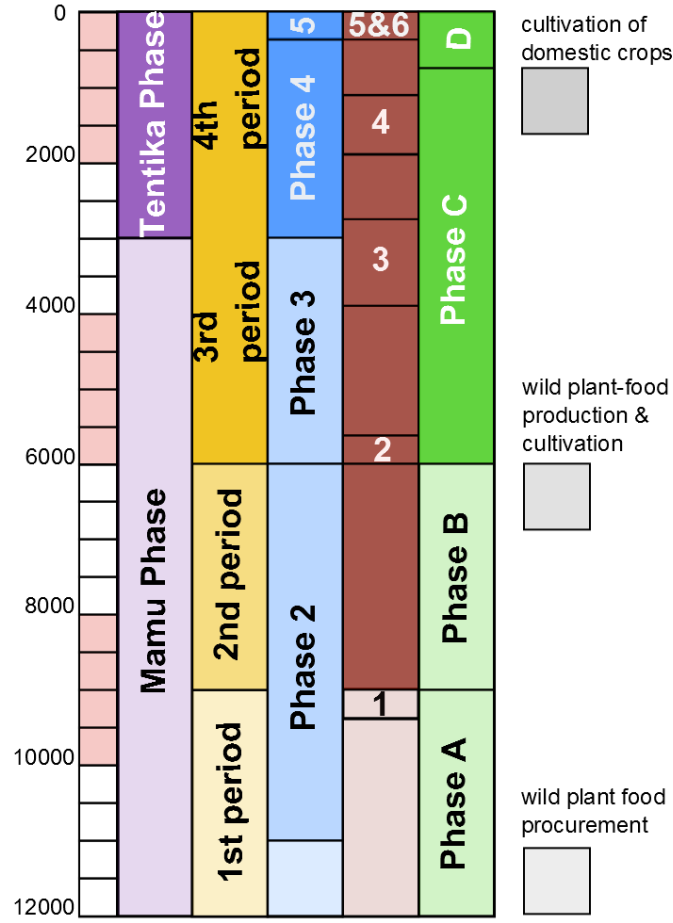
Transition to cultivation ~9kya

## Gorecki

Transition to cultivation ~6kya

## Paleoecology:

Several peaks in charcoal interpreted as anthropogenic burning; transition about 6.5kya from a forested landscape to an open landscape with swamps developing in the valley floors.



from Bayliss-Smith p. 502 in Harris (ed.) 1996

cultivation of domestic crops

wild plant-food production & cultivation

wild plant food procurement

from Haberle 1996

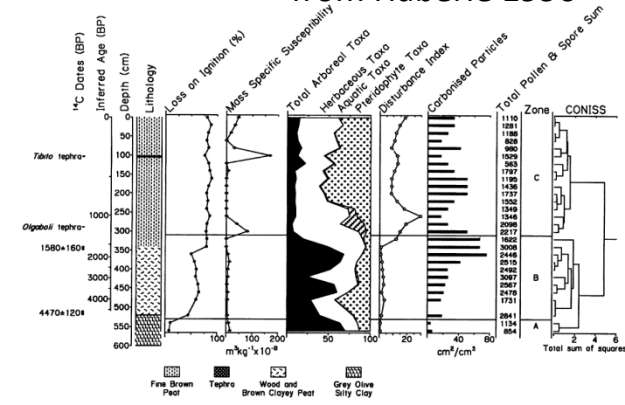
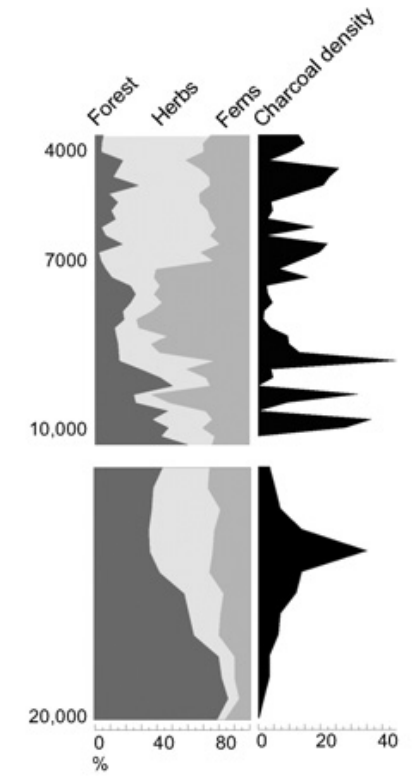


Figure 2. Noreikora Swamp, core NOR1/A/18. Summary diagram of lithology, dating, sediment analysis (Loss on ignition and X), pollen and spore analysis and carbonised particle density. Pollen and spore percentages are based on total pollen and spore sum. Disturbance Index derived from second growth arboreal pollen taxa as a percentage of total arboreal pollen sum. Inferred age is derived by linear interpolation of 14C dates and presumed tephras dates.



from Fig 1, Denham & Mooney 2008

# NBZ/Kafiavana

NBZ is a rockshelter

David Cole originally dug two test pits at NBZ. Peter White later conducted a full excavation and analysis.

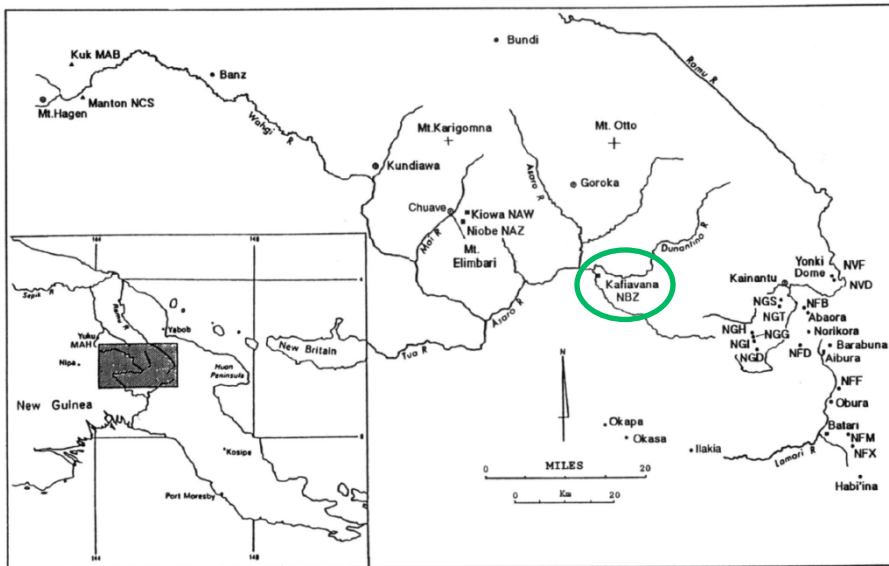
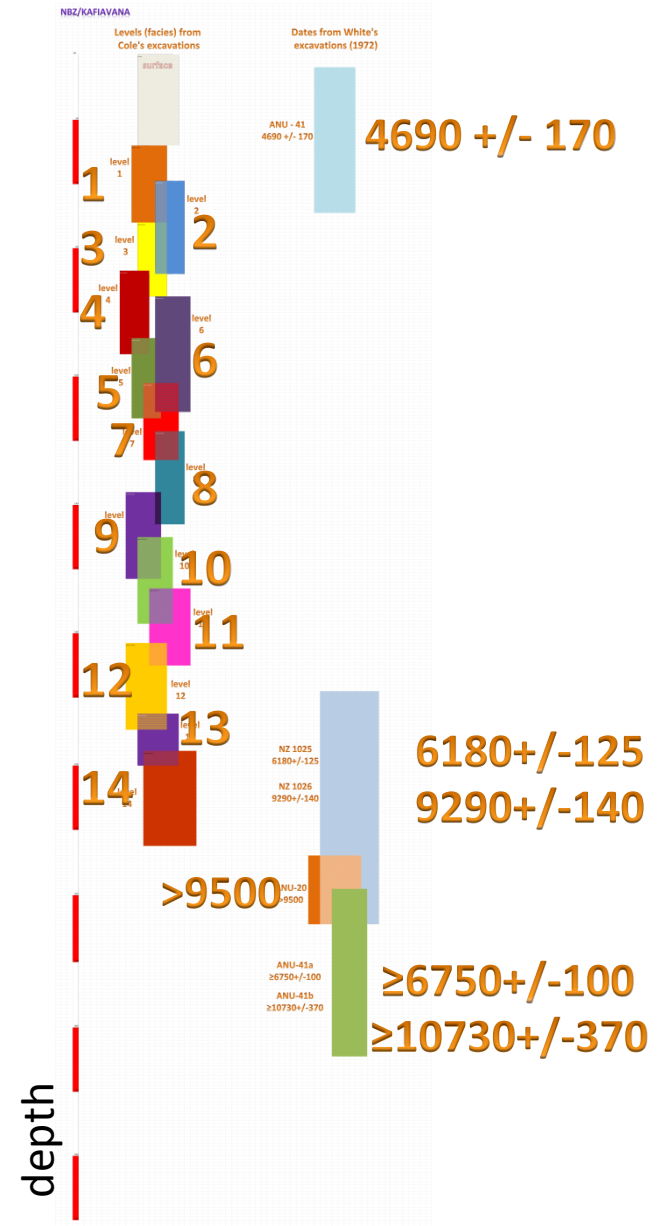


Figure 1. Eastern Highlands area of Papua New Guinea showing all sites referred to, major centres and landmarks.

Map from Cole 1996



Dates as originally published (White 1972)

# NFX

NFX is an open site

David Cole conducted extensive excavation, and collaborated with Virginia Watson's analysis.

NFX was dated to  $11.5 \pm 140 - 18 \pm 750$  uncal kya by the Watson & Cole analysis, with a recent date of 17 uncal kya confirming the time range.

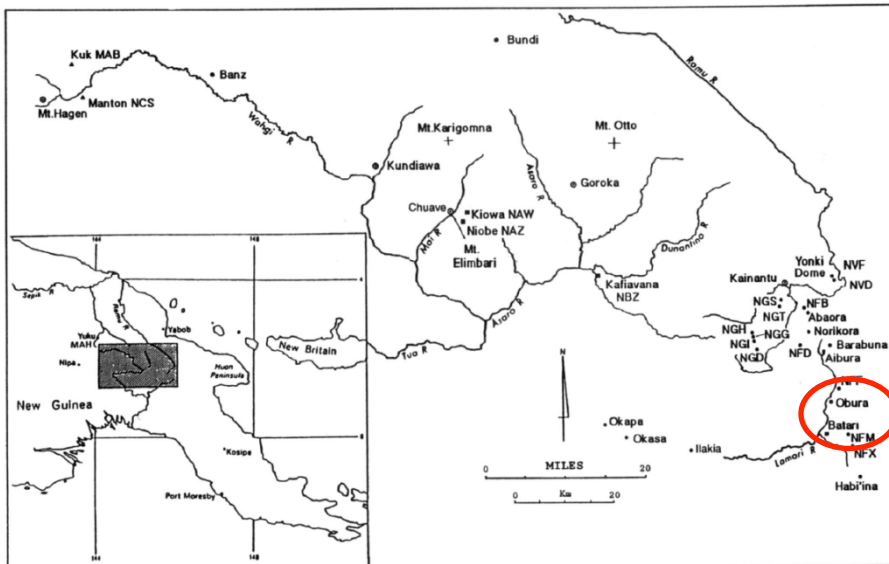
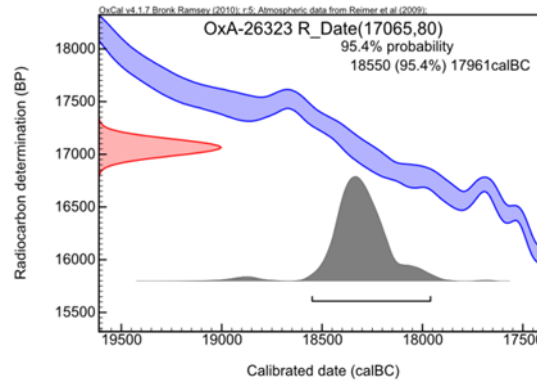
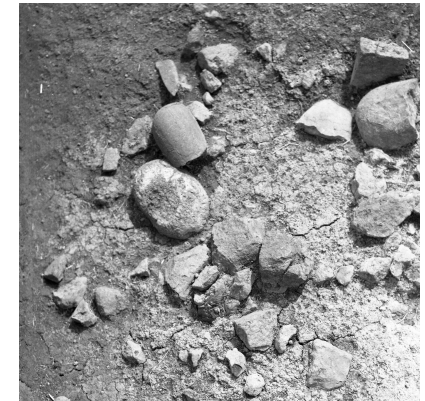


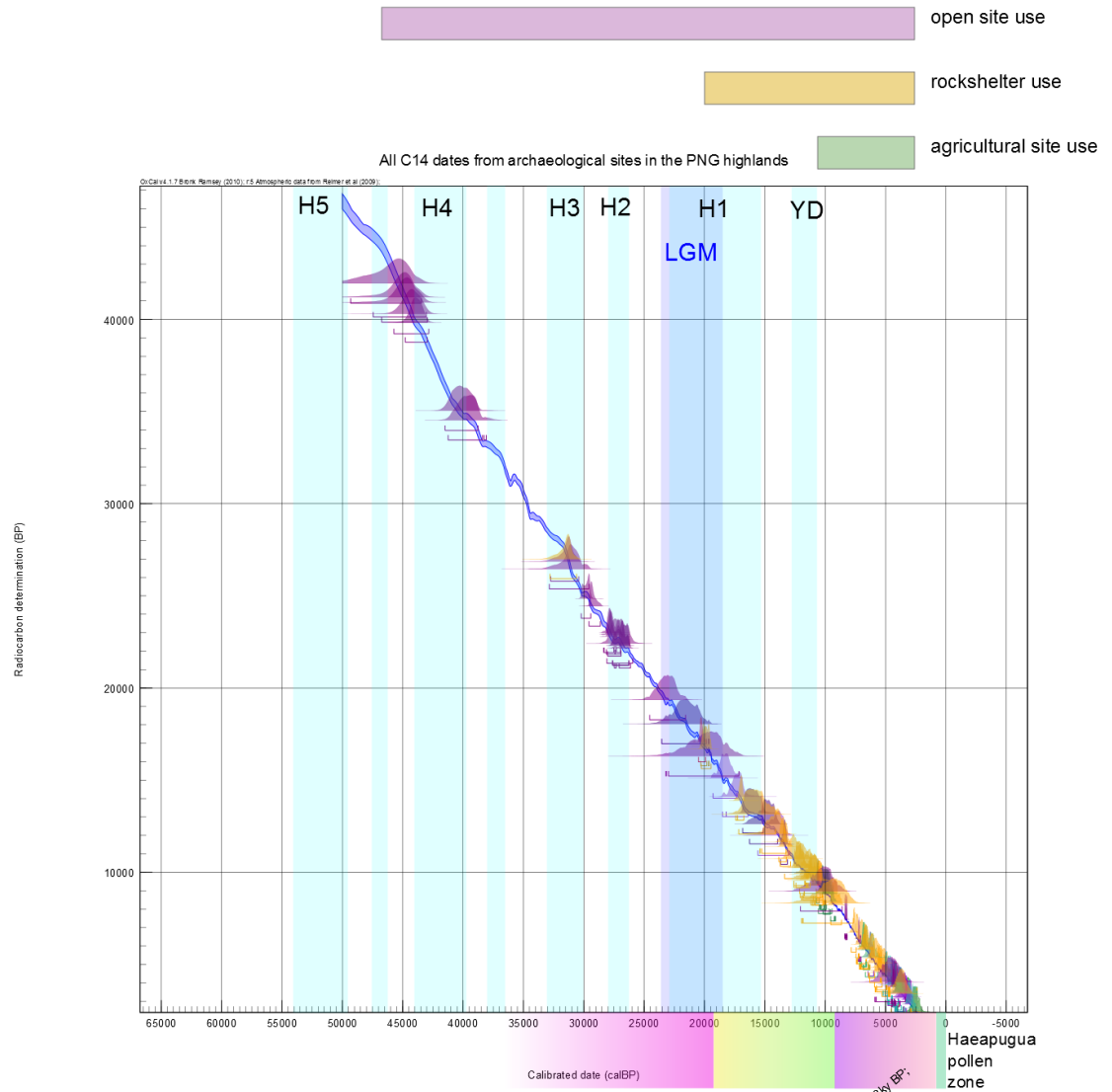
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Map from Cole 1996



Cole excavating;  
Hearth at NFX;  
Post holes at NFX

# Radiocarbon dating



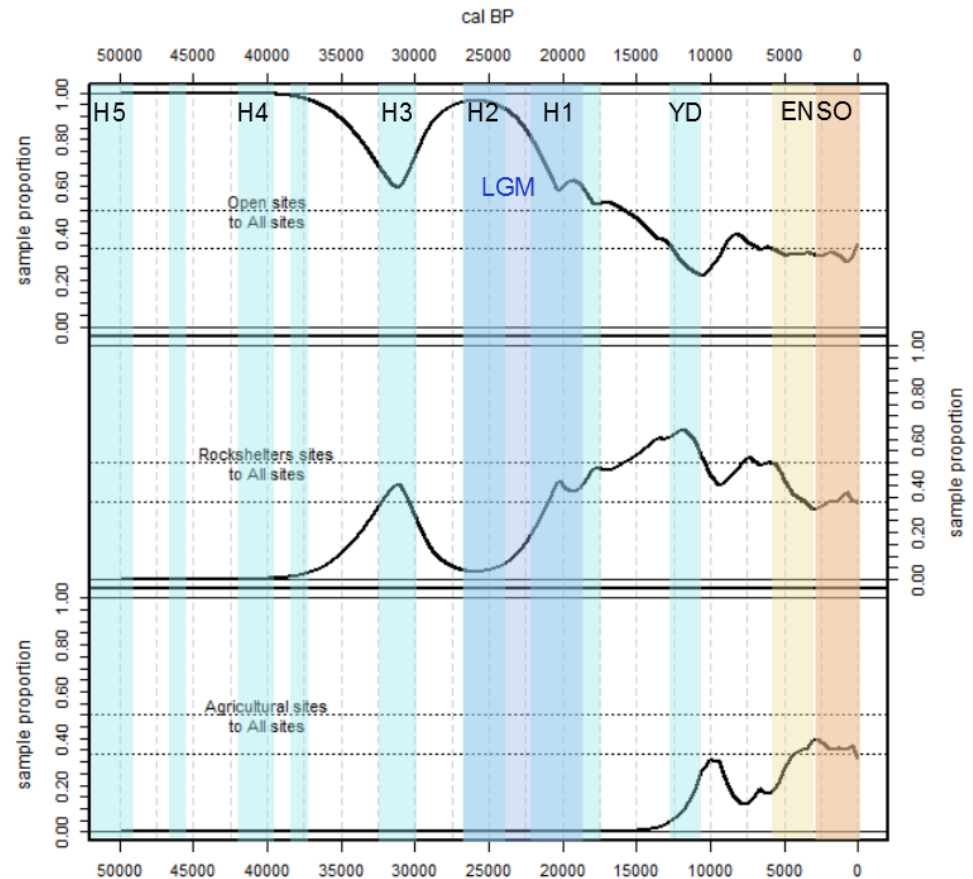
all  $^{14}\text{C}$  dates from highland PNG compared to paleoecological models

Haberle 2007 for pollen zone descriptions  
Lambeck et. al 2002 for Heinrich events  
Clark et. al 2009 for LGM

Nephrolepis-rich montane forest on valley floor (zone H3)  
grassland dominated, high fire incidence expansion of mixed montane taxa after 14.5 W BP (zone H4)  
mixed montane swamp Myrtaceae dominated Dactyloctenium & Paritarius dominated (zone H5)  
grass & sedge swampland: burning & drainage (zone H6)

# Understanding changing site types

- The first rockshelter use happens right before 30kya in Heinrich Event 3, but rockshelters don't become increasingly used until the Last Glacial Maximum (LGM)
- Rockshelters have their highest density at the beginning of the Younger Dryas (YD)
- Agricultural sites increase in density until beginning of ENSO intensification at 3kya



LGM lowstand 26.519kya Clark 2009

Heinrich events from Lambeck et al. 2009

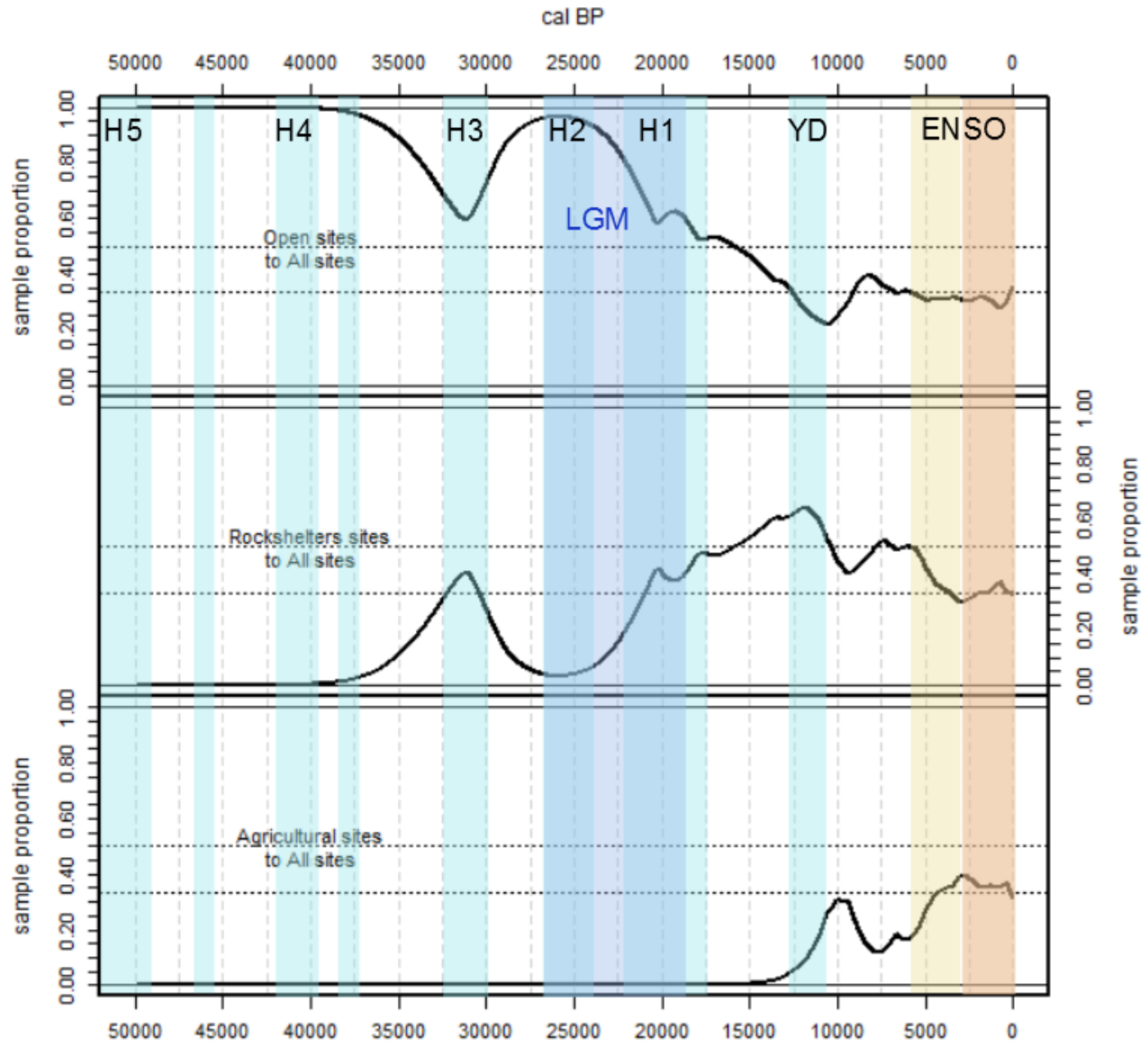
ENSO start ~6kya, intensifies ~3kya Donders et al. 2008

PNG dates calibrated with SHCal13 Hogg et al. 2013

# Site use to mobility and subsistence

People changed their subsistence and mobility patterns to be more sedentary and use logistical camps back in the LGM

The model for the transition to agriculture that most closely matches the changes in site use is the Golson model – but there is complexity that is not represented in the Golson model

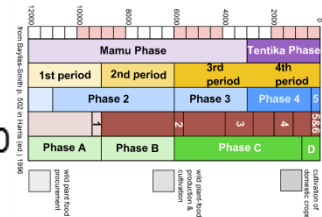


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**Thank you!**

