

# The Arts and Science of Discovery: Archaeological Research in the Philippines

Armand Salvador Mijares, PhD



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# Archaeology is....

- Partly the discovery of the treasures of the past, partly the meticulous work of the scientific analyst, and partly the exercise of the creative imagination

»

Renfrew and Bahn

- This paper will be presenting four research projects that ASP is involved in.
- All of these projects are either fully or partially funded by University of the Philippines.

- Project: The Excavation of the Old Town of San Juan, Batangas
- Proponent: Dr Grace Barretto-Tesoro
- Funding: OVCRD
- Year: 2009-2011

- Main objectives:
- Determine the developmental history of the old town of San Juan, Batangas
- 
- Objectives for Structures A and B
- To determine the nature and extent of the Structure
- To map all features of the Structure
- To identify activity areas in the northern part of Structure A
- To recover datable materials
- To search for archaeological deposits older than Structure A
- To identify construction technology
- To determine reasons for destruction and abandonment
- To investigate the 'plaza complex'
-



Structure A - bahay na bato sa San Juan, Batangas



**Structure B - bahay na bato sa San Juan, Batangas**  
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- Results
- 1. Stone houses constructed in the late 1800s
- 2. Identification of different floors i.e. adobe floors, tiled floors, series of dirt and mortar floors
- 3. Identification of rooms i.e. water well, *zaguan*, *kamalig*, kitchen, patio, bodega
- 4. Used volcanic tuff blocks, as main construction materials, bounded with lime and mortar
- 5. No deposits older than 1800s
- 6. Found ceramic sherds, square nails, bottle shards, coins, bone toothbrush, roof tile fragments, floor tile fragments, capiz shells
- 7. Stone blocks collected
- 8. Interpreted the area to be a reduccion
-

- Objectives for the Old Church Complex Site
- Investigate the church complex and assess the relationships between identified structures.
- Determine reason/s for abandonment of the main ruins
- Compare excavation results of the church complex with excavations of the stone houses in the vicinity
- Results
- 1. Identified the different ruins in the site: church, L-shaped stone floor, lime kiln
- 2. The construction was not completed due to flooding which lead the town to move to its current location which is 7km inland
- 3. Building technology similar with how the stone houses were constructed



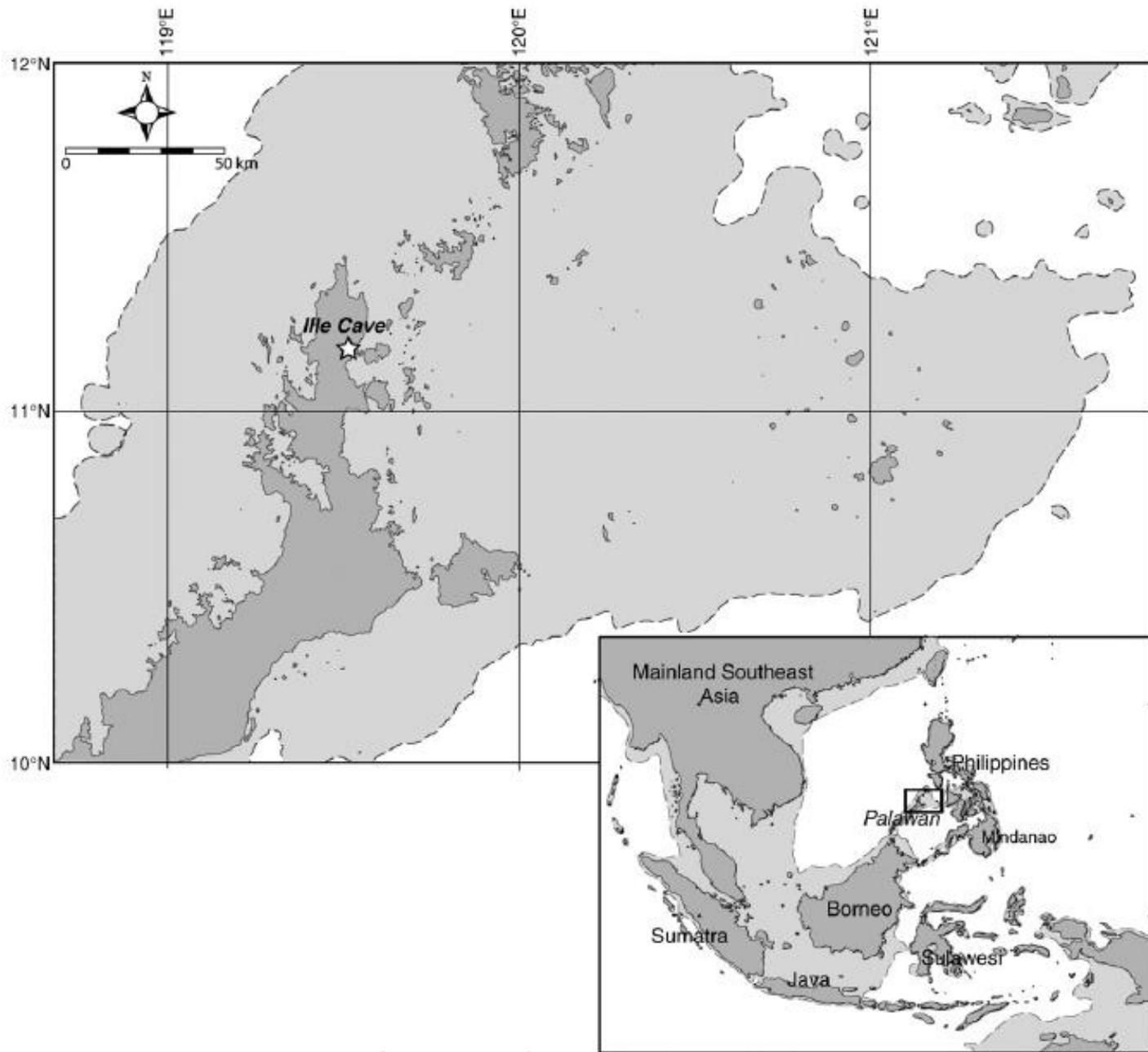
Image view from northwest pillar - old church of San Juan

- Project: Dewil Valley Palawan Island Bioarchaeology Project
- Proponent: Armand Salvador B Mijares, PhD  
Victor Paz, PhD  
Philip Piper, PhD

Funding: OVCRD

Year: 2009-2011

- The program entails using environmental archaeological approaches to understand the human-environment relationship. Thus the Philippine Bioarchaeological Initiatives (PBI) started using archaeobotany and zooarchaeology as the corner stone approach to address the following research problems.
- What can the macro-botanical remains recovered from Ille tell us about human plant resource procurement patterns and the changing natural environments around Ille site in the past?
- What is the composition and structure of the zooarchaeological communities identified during different phases of human occupation at Ille Cave, and what can this tell us about human subsistence behavior and the local and regional aquatic and terrestrial environments?





## Ille Karstic Tower, Dewil Valley, Palawan

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- Macrobotanical remains which are mostly in charred or mineralized state were painstakingly identified and sorted using a stereomicroscope. Materials that are viable were then subjected to SEM imaging and later compared with the ASP macrobotanical reference collection.



- The identification of both wild and domesticated yam (*Dioscorea cf. alata*, *Dioscorea hispida* and cf. *Dioscorea* prob. *cumingii*.) at Ille site during the terminal Pleistocene to Holocene is an important discovery in terms of reconstructing early human diet.

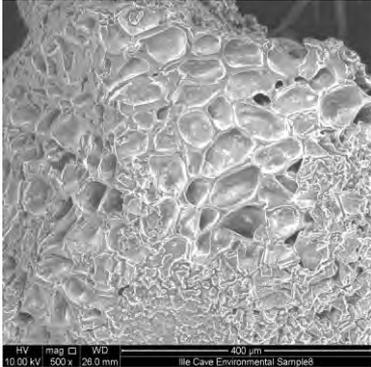


Figure 2.12. SEM micrograph from context 2122 <104>

|                                                        |              |
|--------------------------------------------------------|--------------|
| <b>Cell shape:</b>                                     |              |
| Angular to elongated with minimal intercellular spaces |              |
| <b>Cell size:</b>                                      | <b>Ave.:</b> |
| <b>long:</b> 30.95 - 74.27 um                          | 55.38 um     |
| <b>short:</b> 27.85 - 53.41 um                         | 40.95 um     |
| <b>perimeter:</b> 126.9 - 253.07 um                    | 183.39 um    |
| <b>cell wall thickness:</b> 1.23 - 4.85 um             | 2.50 um      |

- Canarium is major plant specie that needs to be highlighted. This nut is a multifunctional plant that can be consumed as food, source for oil or fuel and can also be used as indicator for vegetation reconstruction. Canarium is an indicator for a forested area.

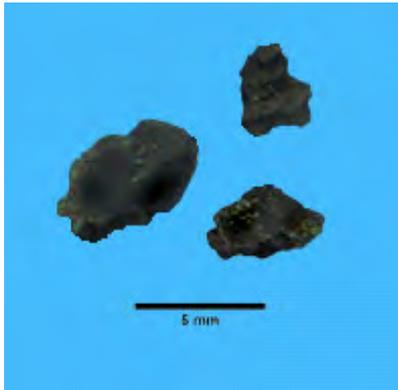


Figure 2.30. Charred *Canarium* (prob. *C. odontophyllum*) fragments from context 769

- Zooarchaeology has been a developed specialization in archaeology, although in the Philippines it has stagnated for quite some time.
- The establishment of the zooarchaeological laboratory at ASP had been an important development.
- Archaeological research, which entails excavation, will always encounter animal remains. Identification of these animal remains is therefore essential in reconstructing site function and human-animal interaction.
- Identifying the animal remains up to its specie level could enhance the quality of our archaeological interpretation.



| Order        | Family           | Genus/Species                     | Local names      | English name                 | TP | EH | MH | LH | Status   |
|--------------|------------------|-----------------------------------|------------------|------------------------------|----|----|----|----|----------|
| Insectivora  | Soricomorpha     | <i>Crocidura cf. batakorum</i>    | Bising           | Shrew                        |    |    | ×  |    | Extant   |
| Chiroptera   | Pteropodidae     | <i>Pteropus sp.</i>               |                  | Flying fox                   |    |    |    | ×  | Extant   |
|              |                  | <i>Cynopterus brachyotis</i>      | Kabag            | Short-nosed fruit bat        | ×  | ×  | ×  |    | Extant   |
|              | Rhinolophidae    | <i>Rhinolophus cf. creaghi</i>    | Kabatkabat/Kabag | Creagh's horseshoe bat       |    | ×  | ×  |    | Extant   |
|              | Hipposiderae     | <i>Hipposideros diadema</i>       | Kabatkabat/Kabag | Diadem roundleaf bat         | ×  | ×  | ×  | ×  | Extant   |
|              |                  | <i>Hipposideros cf. ater</i>      | Kabatkabat/Kabag | Dusky roundleaf bat          |    | ×  |    |    | Extant   |
|              | Vespertilionidae | <i>Myotis cf. macrotarsus</i>     |                  | Phil. large-footed myotis    |    | ×  | ×  |    | Extant   |
| Primates     | Cercopithecidae  | <i>Macaca fascicularis</i>        | Unggoy           | Long-tailed macaque          | ×  | ×  | ×  | ×  | Extant   |
| Pholidota    | Manidae          | <i>Manis culionensis</i>          | Balintong        | Palawan pangolin             | ×  | ×  | ×  | ×  | Endemic  |
| Rodentia     | Sciuridae        | <i>Hylopetes nigripes</i>         | Pula Tuka        | Arrow-tailed flying squirrel |    | ×  | ×  | ×  | Endemic  |
|              |                  | <i>Sundasciurus sp(p).</i>        | Bising           | Tree squirrels               | ×  | ×  | ×  | ×  | Endemic  |
|              | Muridae          | <i>Maxomys panglima</i>           | Daga             | Palawan spiny rat            |    |    | ×  |    | Endemic  |
|              |                  | <i>Rattus cf. tiomanicus</i>      | Daga             | Malaysian field rat          |    | ×  | ×  |    | Extant   |
|              |                  | <i>Sundamys muelleri</i>          | Daga             | Great Sunda rat              | ×  | ×  | ×  |    | Extant   |
|              | Hystriidae       | <i>Hystrix pumila</i>             | Durian           | Palawan porcupine            | ×  | ×  | ×  | ×  | Endemic  |
| Carnivora    | Canidae          | <i>Cuon/Canis sp.</i>             |                  | Wild dog?                    | ×  | ×  |    |    | Extinct* |
|              |                  | <i>Canis familiaris</i>           | Aso              | Domestic dog                 |    |    |    | ×  | Extant   |
|              | Mustelidae       | <i>Amblonyx (Aonyx) cinereus</i>  | Dingguin         | Oriental small-clawed otter  |    | ×  | ×  |    | Extant   |
|              | Mephitidae       | <i>Mydaus marchei</i>             | Pantot           | Palawan stink badger         | ×  | ×  | ×  | ×  | Endemic  |
|              | Herpestidae      | <i>Herpestes brachyurus</i>       |                  | Short-tailed mongoose        | ×  | ×  | ×  | ×  | Extant   |
|              | Viverridae       | <i>Arctictis binturong</i>        | Binturong        | Binturong                    |    | ×  | ×  | ×  | Extant   |
|              |                  | <i>Paradoxurus hermaphroditus</i> | Musang           | Common palm civet            | ×  | ×  | ×  | ×  | Extant   |
|              | Felidae          | <i>Panthera tigris</i>            | Tiger            | Tiger                        | ×  | ×  |    |    | Extinct* |
|              |                  | <i>Prionailurus bengalensis</i>   | Maral            | Leopard cat                  |    | ×  | ×  |    | Extant   |
| Artiodactyla | Cervidae         | <i>Axis calamianensis</i>         | Usa              | Calamian hog deer            | ×  | ×  | ×  | ×  | Extinct* |
|              |                  | <i>Cervus sp(p).</i>              | Usa              | Deer                         | ×  | ×  | ×  |    | Extinct* |
|              | Suidae           | <i>Sus ahoenobarbus</i>           | Baboy            | Palawan bearded pig          | ×  | ×  | ×  | ×  | Endemic  |

## Identified animal remains from Dewil Valley



Contents lists available at ScienceDirect

## Quaternary International

journal homepage: [www.elsevier.com/locate/quaint](http://www.elsevier.com/locate/quaint)



### Palaeozoology of Palawan Island, Philippines

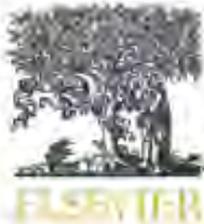
Philip J. Piper<sup>a,d,\*</sup>, Janine Ochoa<sup>b</sup>, Emil C. Robles<sup>a</sup>, Helen Lewis<sup>c</sup>, Victor Paz<sup>a,d</sup>

<sup>a</sup> *Archaeological Studies Program, Palma Hall, University of the Philippines, Diliman, Quezon City 1101, Philippines*

<sup>b</sup> *Department of Anthropology, Palma Hall, University of the Philippines, Diliman, Quezon City 1101, Philippines*

<sup>c</sup> *School of Archaeology, Newman Building, University College Dublin, Belfield, Dublin 4, Ireland*

<sup>d</sup> *Research Associate, National Museum of the Philippines, P. Burgos Avenue, Manila, Philippines*



Contents lists available at ScienceDirect

## Palaeogeography, Palaeoclimatology, Palaeoecology

journal homepage: [www.elsevier.com/locate/palaeo](http://www.elsevier.com/locate/palaeo)



### The first evidence for the past presence of the tiger *Panthera tigris* (L.) on the island of Palawan, Philippines: Extinction in an island population

Philip J. Piper<sup>a,\*</sup>, Janine Ochoa<sup>a,\*</sup>, Helen Lewis<sup>b</sup>, Victor Paz<sup>a</sup>, Wilfredo P. Ronquillo<sup>c</sup>

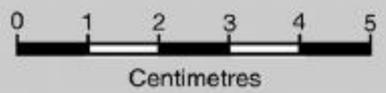
<sup>a</sup> Archaeological Studies Program, Palma Hall, University of the Philippines, Diliman, 1101 Quezon City, Philippines

<sup>b</sup> School of Archaeology, University College Dublin, Dublin 4, Ireland

<sup>c</sup> National Museum of the Philippines, P. Burgos Street, Manila 1000, Philippines

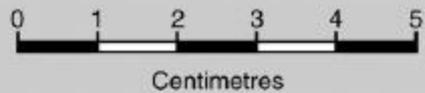
Volar Aspect

**a**



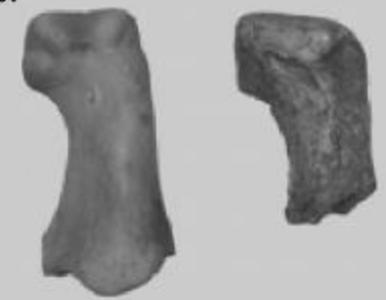
Plantar Aspect

**b**



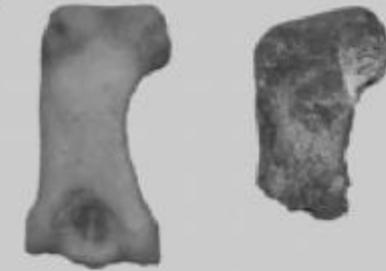
Volar Aspect

**a**

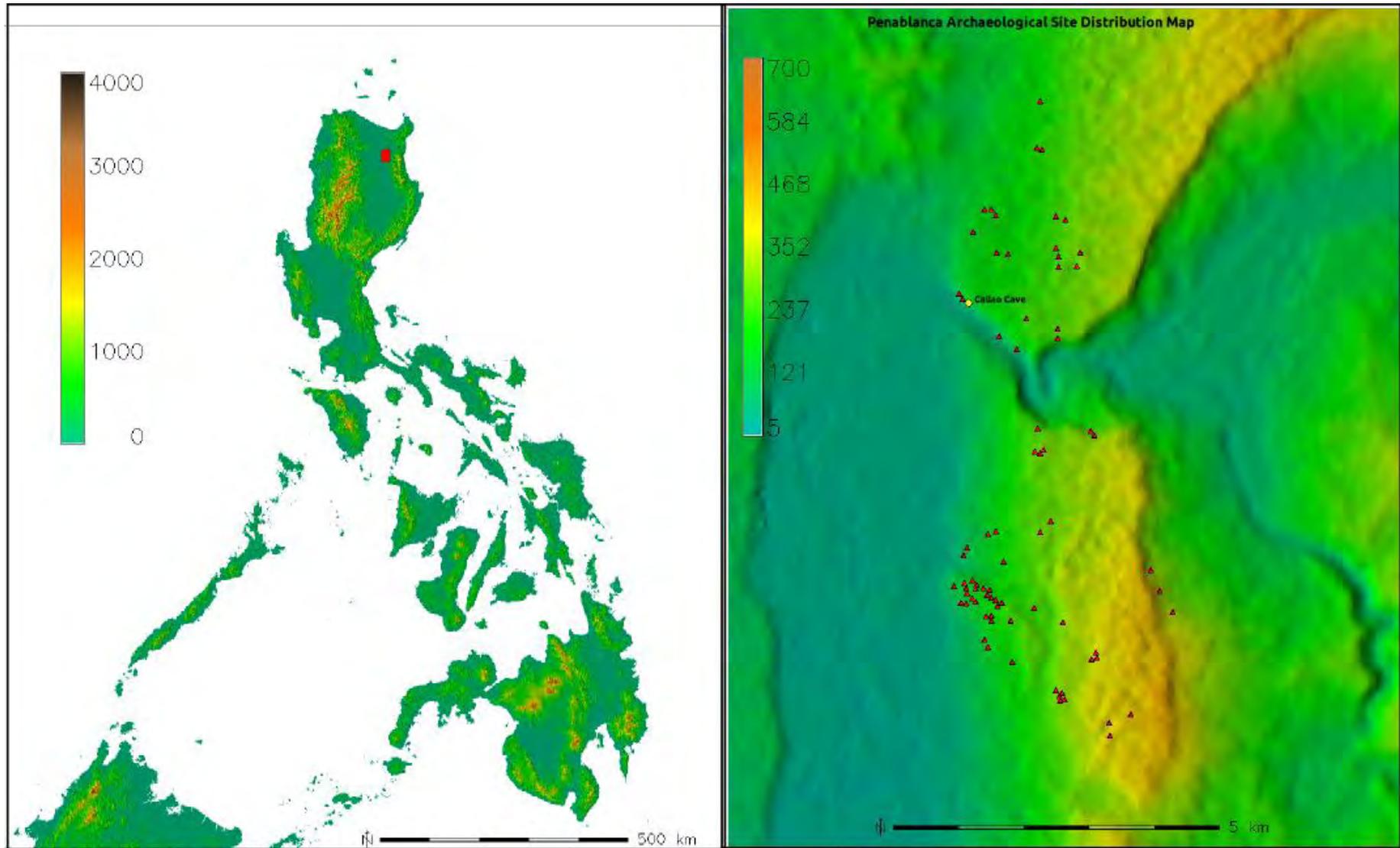


Plantar Aspect

**b**



- Project: Going Deep in Time: The Archaeology of Callao Cave
- Proponent: Armand Salvador Mijares, PhD
- Date: 2007 (2009, 2011)
- Funding : UP System PhD Lateral Entry Grant
- Australia Research Council Grant



*Digital Elevation Model of the Philippines showing location of study area and archaeological sites plotted (red triangles). Location of Callao Cave is shown as a yellow circle. Created using GRASS*

# Callao Cave



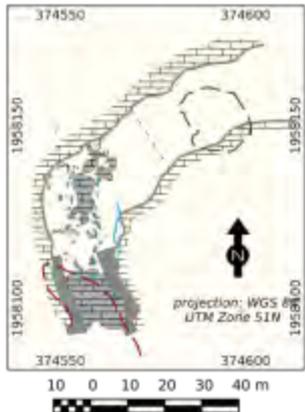
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# CALLAO CAVE

## Legend

- |  |            |  |             |
|--|------------|--|-------------|
|  | cave wall  |  | Excavations |
|  | rockfall   |  |             |
|  | stalactite |  |             |
|  | concrete   |  |             |
|  | sediments  |  |             |
|  | cave wall  |  |             |
|  | profile    |  |             |
|  | overhang   |  |             |
|  | sink hole  |  |             |
|  | drip line  |  |             |
|  | profile A  |  |             |
|  | profile B  |  |             |
|  | profile C  |  |             |

## Floor Plan of the 1st and 2nd Chamber



## Archaeological Site Plan

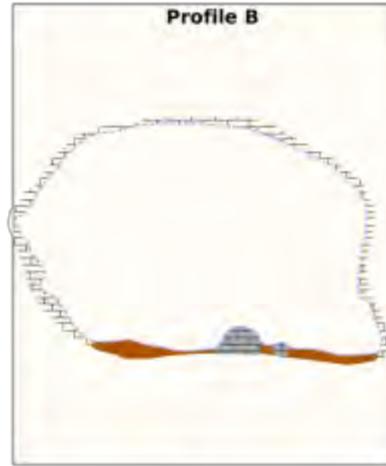


## Profile of Callao Cave

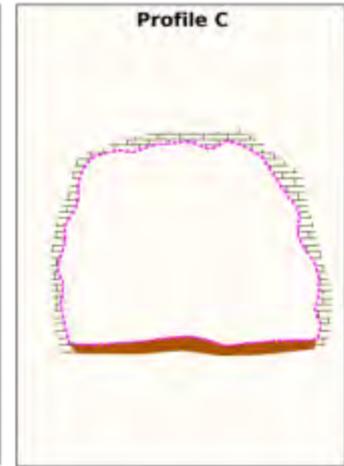
### Profile A



### Profile B



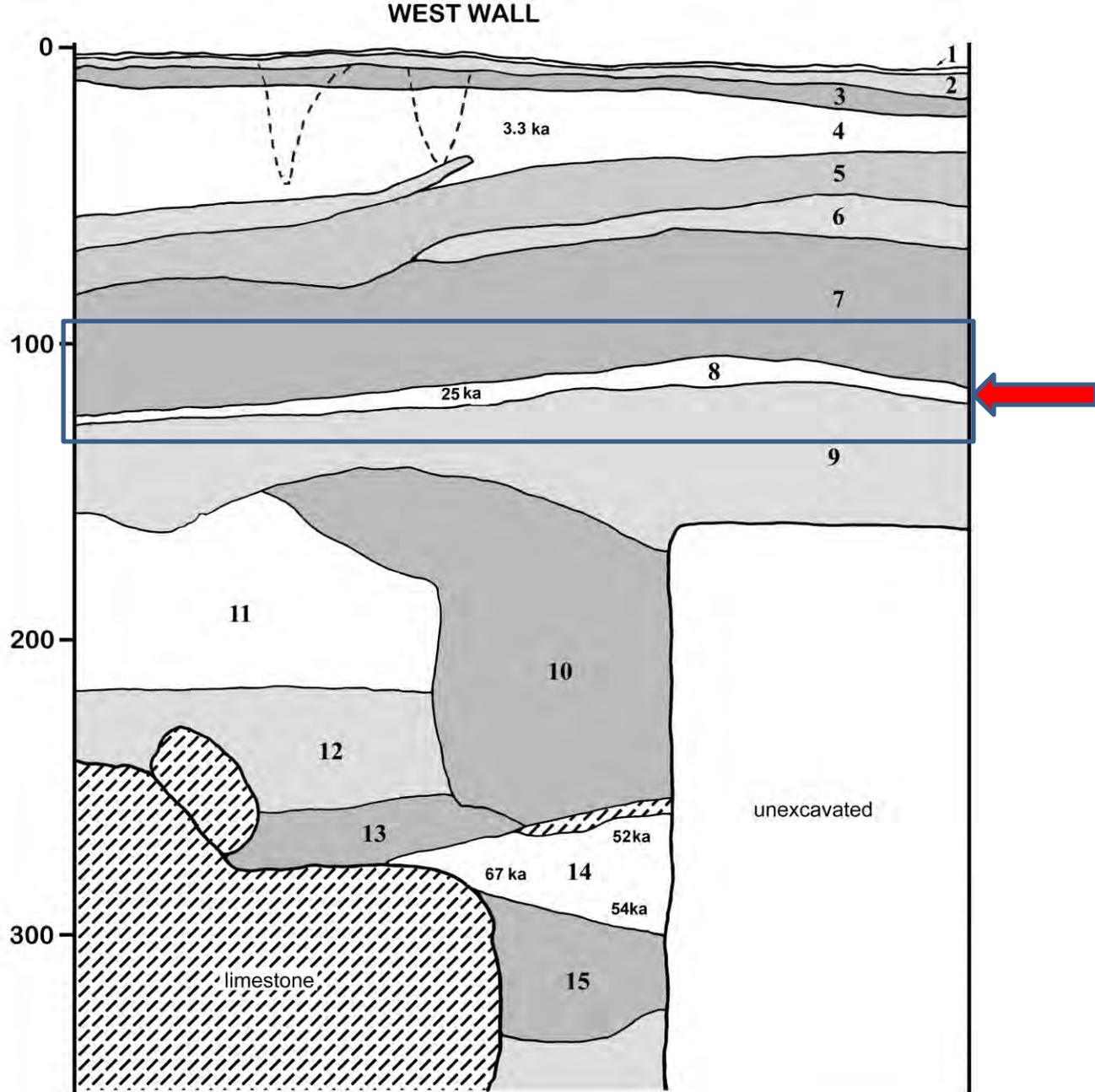
### Profile C





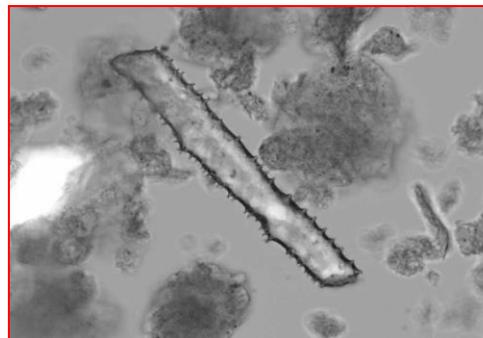
## 2003 Excavation of Callao Cave

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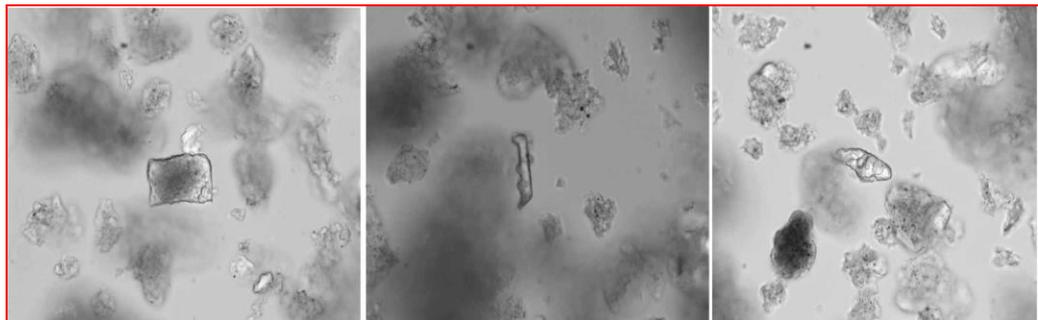
Burnt Cervid bones



Possible Moraceae phytolith



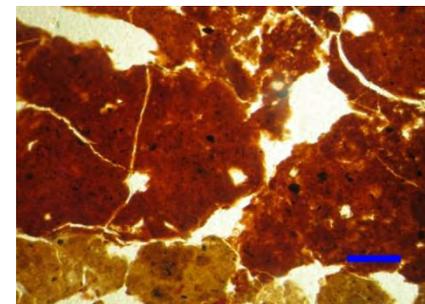
Chert Flake tools



Poaceae phytolith



Parenchymatous tissues (wild roots?)



Burnt sediment (hearth)

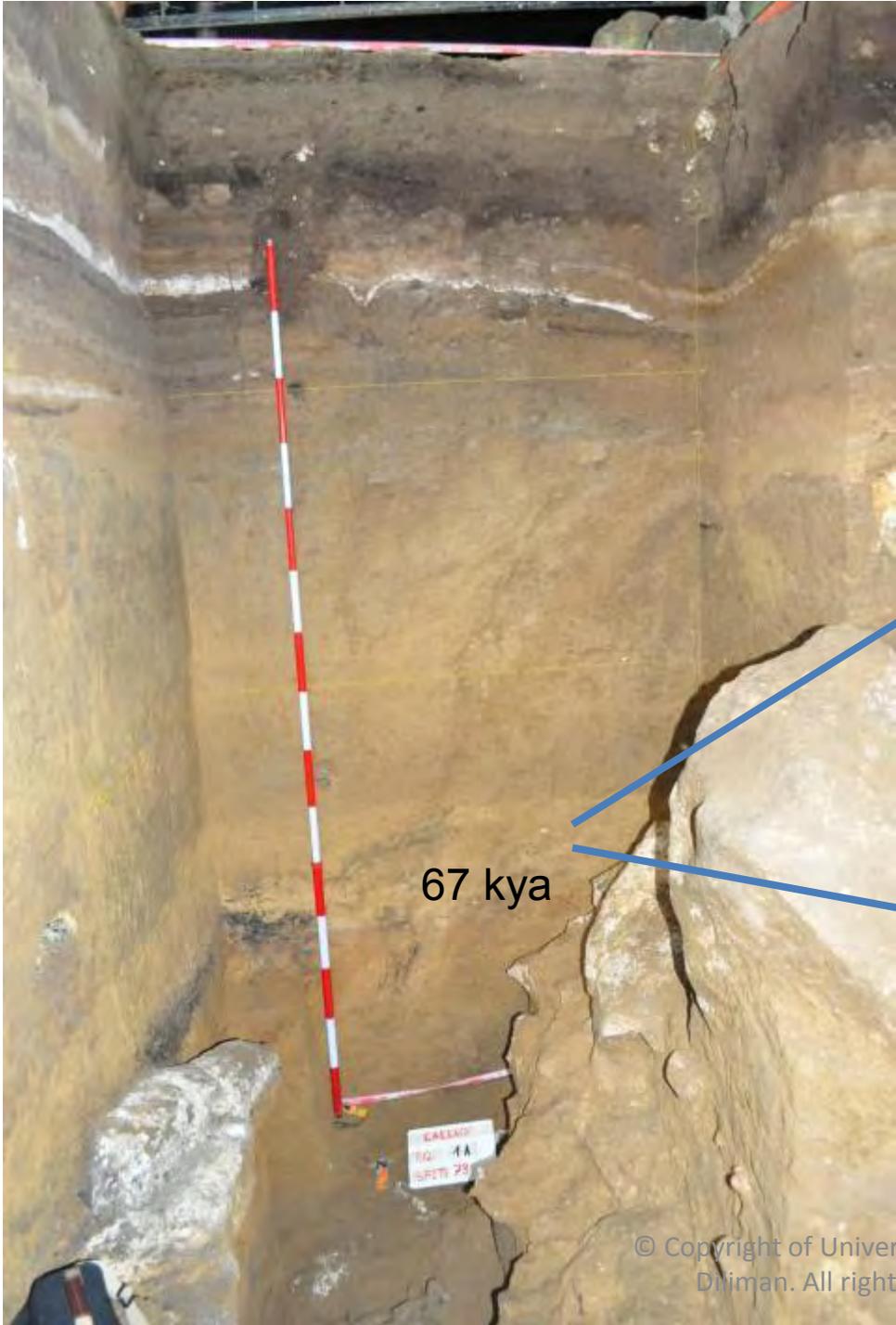


2007 Callao excavation  
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Excavation of the 67k layer





67 kya



Cervid



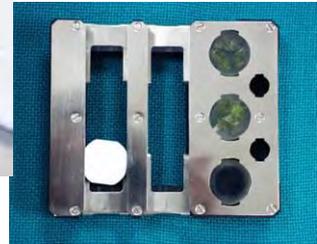
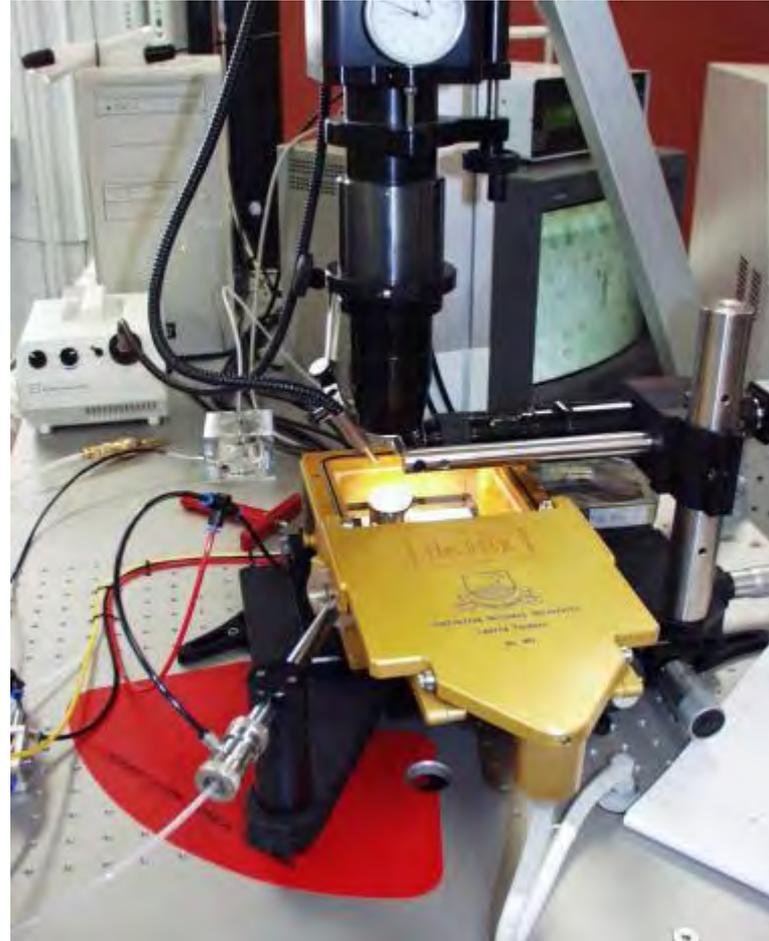
Bovid



## The Callao MT3

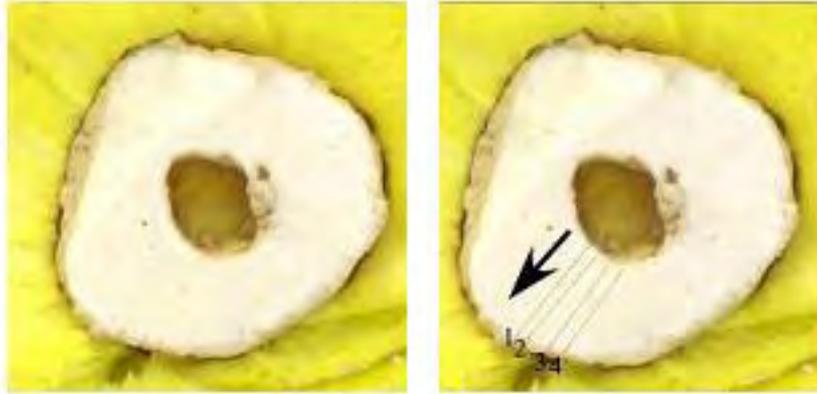
# Dating the Callao MT3 using U Series at the Research School for Earth Science Australian National University

# Laser ablation MC-ICPMS



|        | L1                    | C                 | H1               | H2               | H3               | H4               |
|--------|-----------------------|-------------------|------------------|------------------|------------------|------------------|
| Line 1 | $^{232}\text{T}$<br>h | $^{234}\text{U}$  | $^{235}\text{U}$ | $^{238}\text{U}$ |                  |                  |
| Line 2 |                       | $^{230}\text{Th}$ |                  | $^{234}\text{U}$ | $^{235}\text{U}$ | $^{238}\text{U}$ |

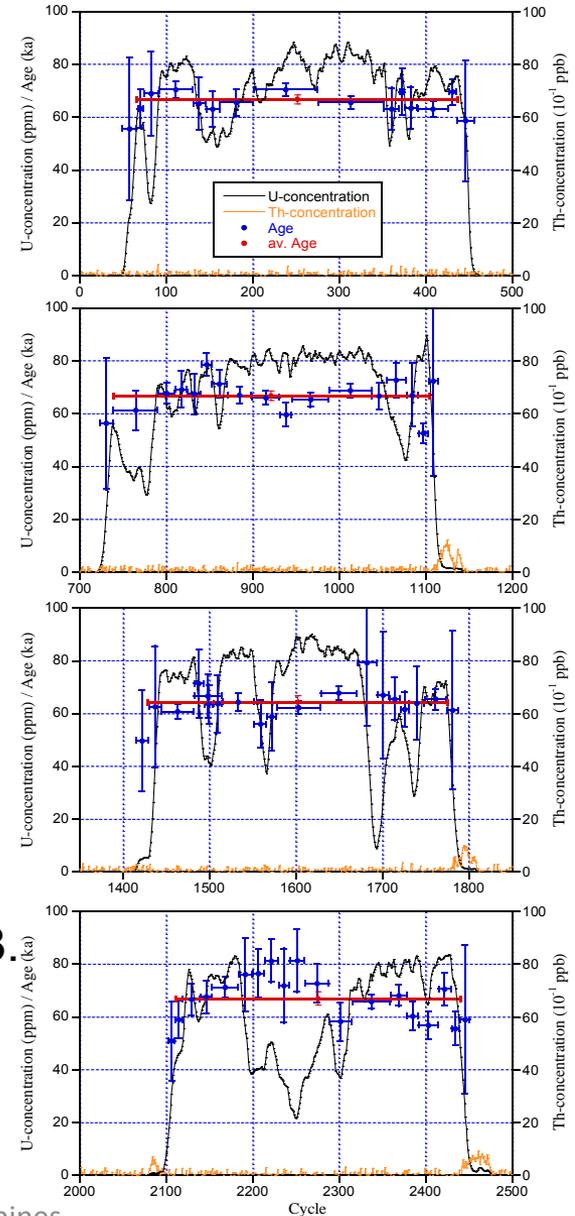
# Laser ablation U-series analysis



Four laser ablation scans were then recorded on the cross-section

**Track 1-71.3±12.3**  
**Track 2-70.0±15.0**  
**Track 3-67.5±19.1**  
**Track 4-62.2±17.8**

**66.7±1 ka, as a minimum age estimate for the MT3.**





ELSEVIER

Contents lists available at ScienceDirect

## Journal of Human Evolution

journal homepage: [www.elsevier.com/locate/jhevol](http://www.elsevier.com/locate/jhevol)



### New evidence for a 67,000-year-old human presence at Callao Cave, Luzon, Philippines

Armand Salvador Mijares<sup>a,\*</sup>, Florent Détroit<sup>b</sup>, Philip Piper<sup>a</sup>, Rainer Grün<sup>c</sup>, Peter Bellwood<sup>d</sup>, Maxime Aubert<sup>c</sup>, Guillaume Champion<sup>b</sup>, Nida Cuevas<sup>e</sup>, Alexandra De Leon<sup>e</sup>, Eusebio Dizon<sup>e</sup>

<sup>a</sup> Archaeological Studies Program, Palma Hall, University of the Philippines, Diliman, Quezon City 1101, Philippines

<sup>b</sup> CP 140 Département de Préhistoire du Muséum national d'histoire naturelle, 57, rue Carvier, 75005 Paris, France

<sup>c</sup> Research School of Earth Sciences, Bldg 61 Mills Road The Australian National University, Canberra ACT 0200, Australia

<sup>d</sup> School of Archaeology and Anthropology, AD Hope Building, The Australian National University, Canberra ACT 0200, Australia

<sup>e</sup> Archaeology Division, National Museum of the Philippines, P Burgos Ave., Manila, Philippines

# 2009 Callao Cave Excavation





## The east wall of the ante chamber (2011)

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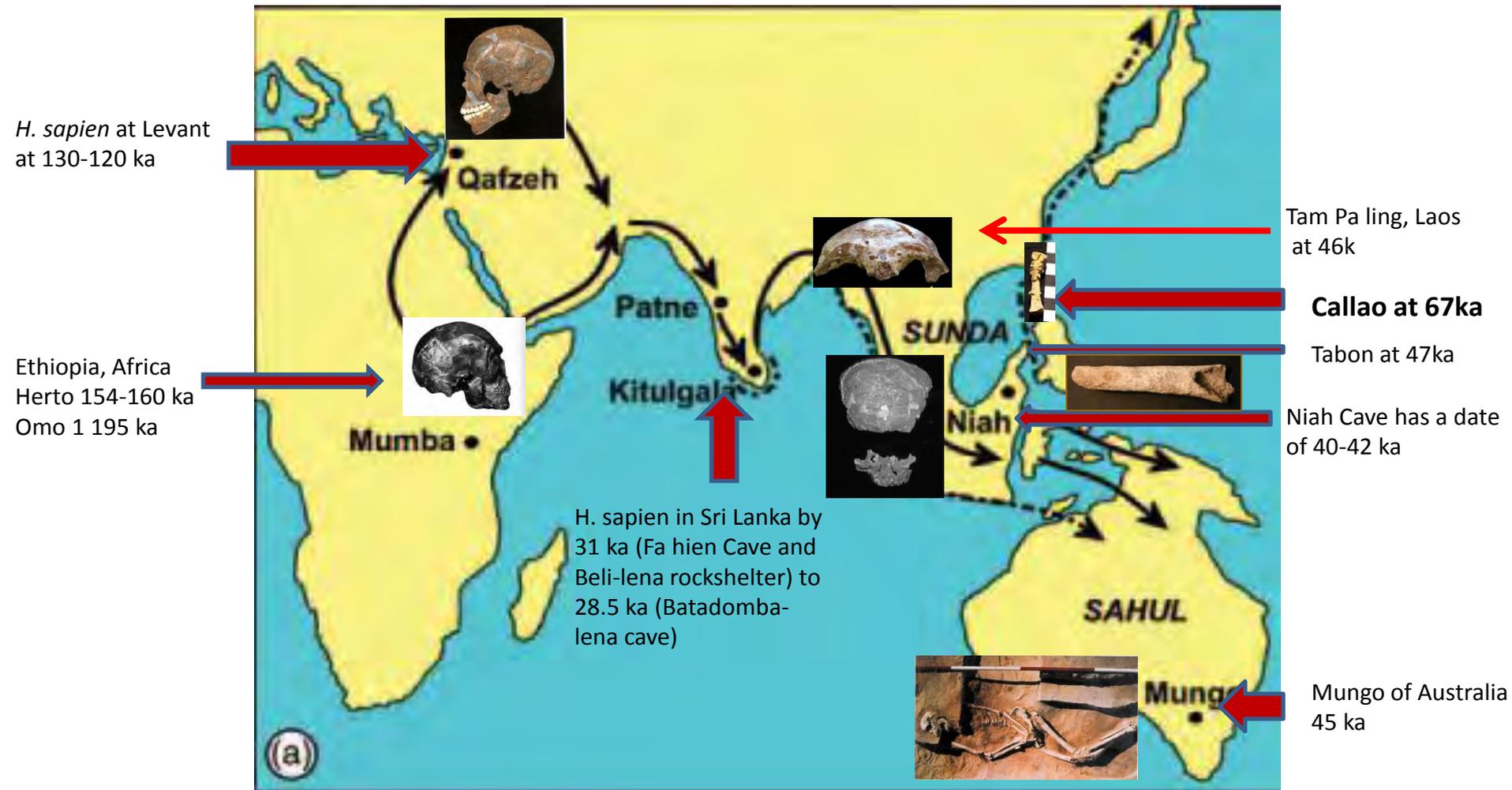


**Wenner Gren Foundation International Collaborative Research:  
The Callao Project  
Florent Detroit and Armand Mijares**

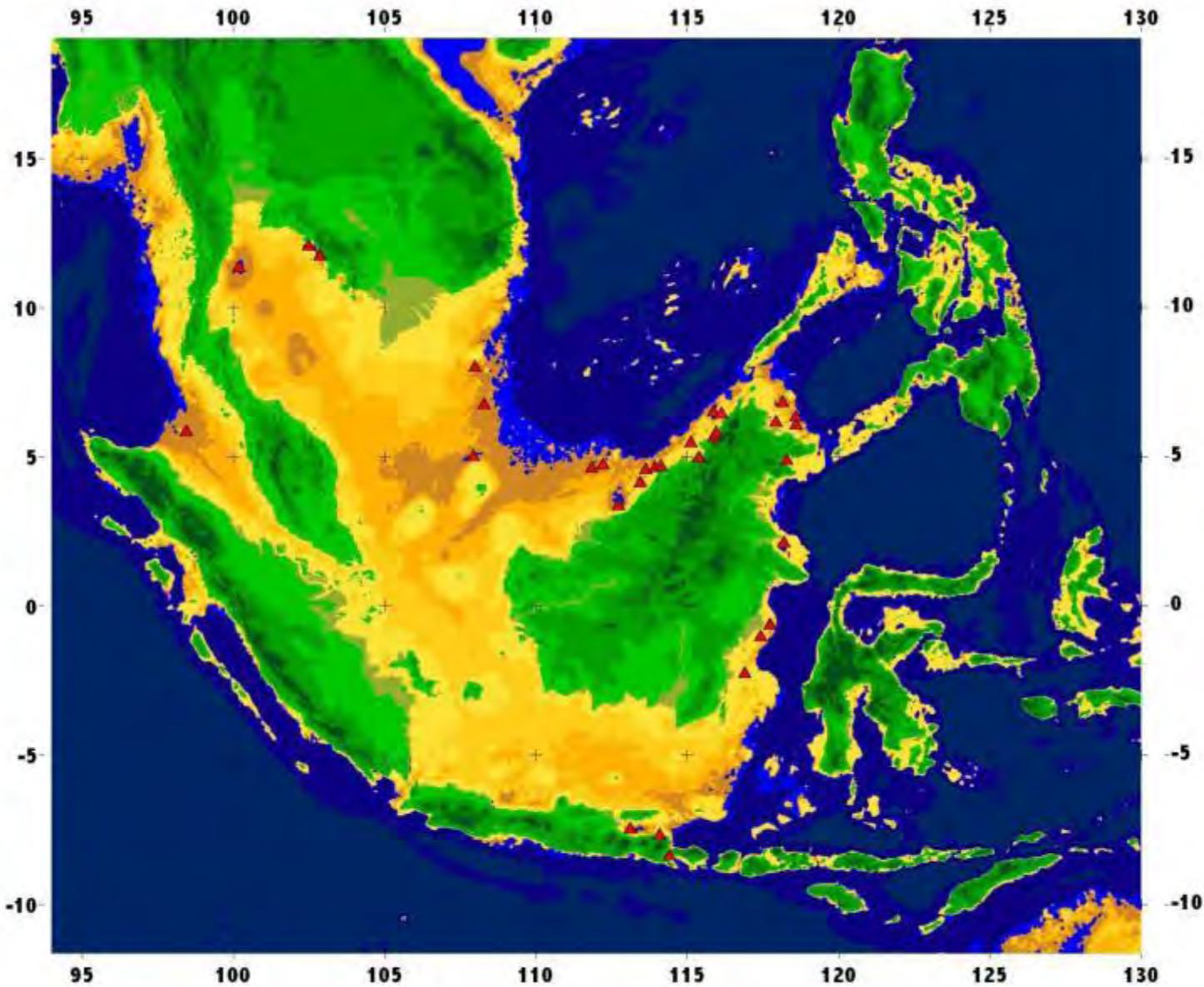
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# Implications of the Discovery of the Callao Man to current scientific debate

- The breaking of the imaginary 50k time barrier of human existence in Southeast Asia is an important first step in understanding and reconstructing human diaspora. There is still a need to fill in the gaps in terms of human fossil recovery and associated cultural materials.
- The Callao remains could contribute more to the on going debate and to the general theory of Human Evolution.

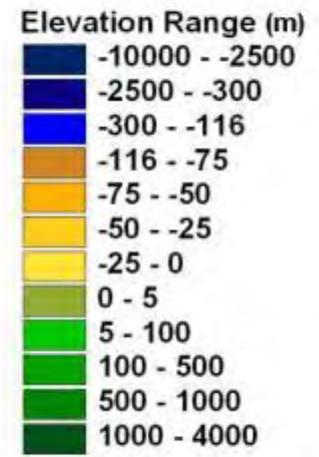


Arrows show plausible routes of anatomically modern human dispersal from Africa to Eurasia and Australasia [solid line: Forster & Matsamura, 2005, from Mellars, 2006; broken line: Oppenheimer's (2003) "beachcombers" route (Kourampas et al 2009)]

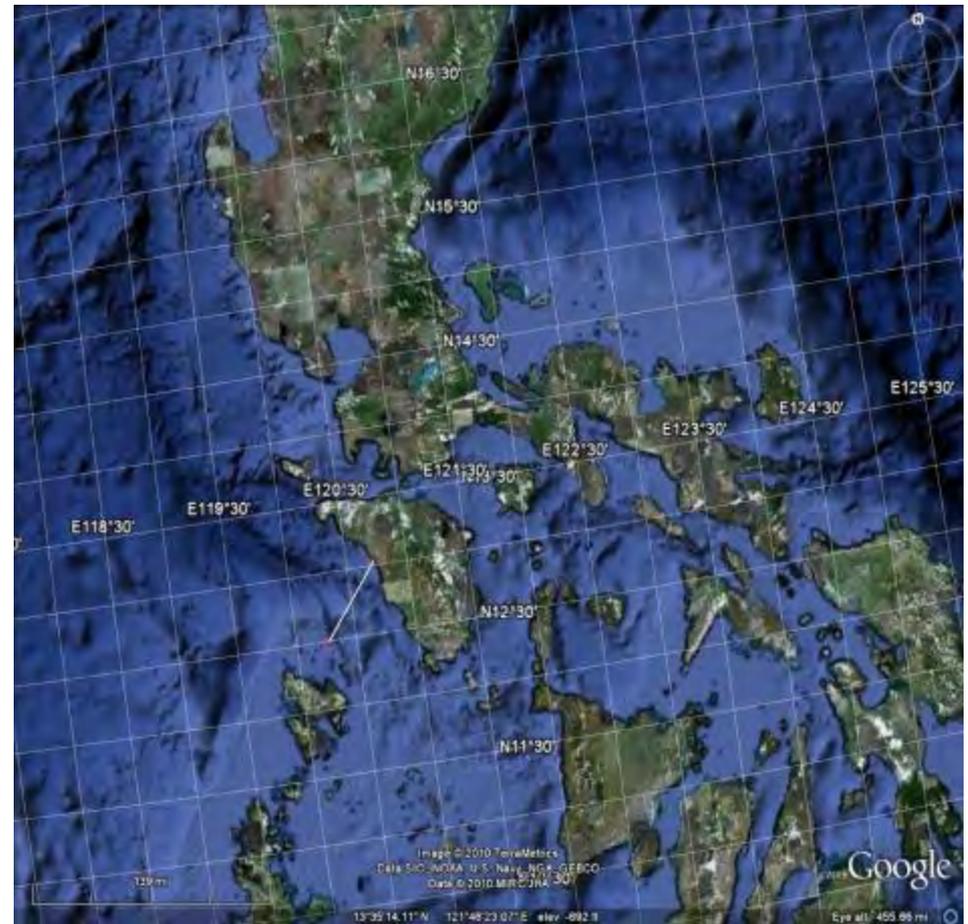
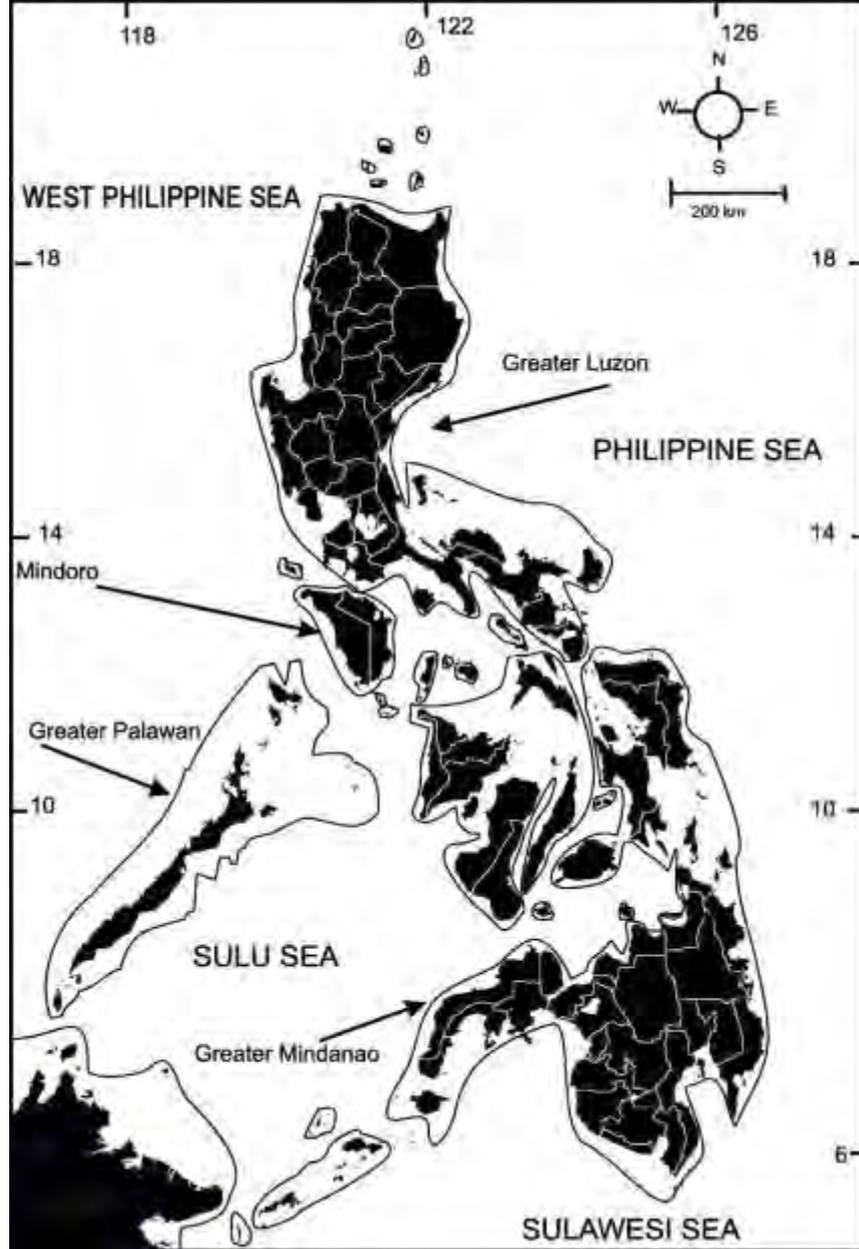


**Sunda Shelf:  
LGM, 21 ka BP**

▲ Lakes



1000      0      1000      2000 Kilometers



I believe that early humans already have the basic knowledge of building a simple sea worthy vessel and crossed the open sea gap. This could be as simple as a raft.

Pleistocene islands of the Philippines at lowest sea level (Heaney 1986)

- Project: Palaeoenvironmental and Biodiversity Study of Mindoro Island: An Archaeological Science Initiative

Proponents :

Armand Salvador Mijares-ASP

Victor Paz -ASP

Alfred Pawlik-ASP

Thomas Ingicco-ASP

Carlo Arcilla- NIGS

Benjamin Vallejo-EnvSci

Corazon De Ungria-NSRI

Sabino G Padilla Jr-UP Manila (Rebecca Crozier-ASP)

- Funding OVPAA-EIDR
- Year 2012- 2016



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# Aims of the ASP-EIDR Project

- The general aim of our inter-disciplinary research is to seriously contribute to answering regional questions on the peopling of the Philippine Islands and the Sundaland region.
- Specifically, we aim to draw from the current expertise we have in UP to address a hypothesis about the timing and direction of human introduction to the Philippine archipelago.
- The island of Mindoro is strategically located land formation between Borneo/Palawan (Sundaland) and the main Philippine Archipelago that have great potential to contribute to our understanding of
  - 1. Early human colonization of the Philippines;
  - 2. Human adaptive behaviour in different island environments through time;
  - 3. The history of the flora and fauna of the islands;
  - 4. landscape and ecosystem changes through time related to global climate and sea level variations.

In addressing this Agenda, we are tapping on different current resources

- The Archaeological Studies Program maintains a number of especially equipped research laboratories for Lithic analysis, Zooarchaeology and Archaeogenetics, Geoarchaeology, Archaeobotany and Palaeoanthropology (Human Osteology).
- The National Institute of Geological Sciences (NIGS) of the College of Science currently has the laboratories necessary for identifying and sourcing the stone implements (XRF/XRD) recovered from the archaeological survey and excavation.
- With NSRI DNA Analysis Laboratory, attempts will be made to extract aDNA from the human remains recovered from the site and compare/relate this to the extant groups in Mindoro

# Archaeological Survey: Finding Sites in Mindoro

# Luyang Baga Cave complex, Abra de Ilog

- First identified in 1994 by AnthroWatch and reported by Mijares in the 1996 National Museum Paper
- Contains metal age pottery, adzes, jade adzes, obsidian flakes, animal remains



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Sitio Binabagan, an Iraya community





Tinokod cave





Preformed adzes

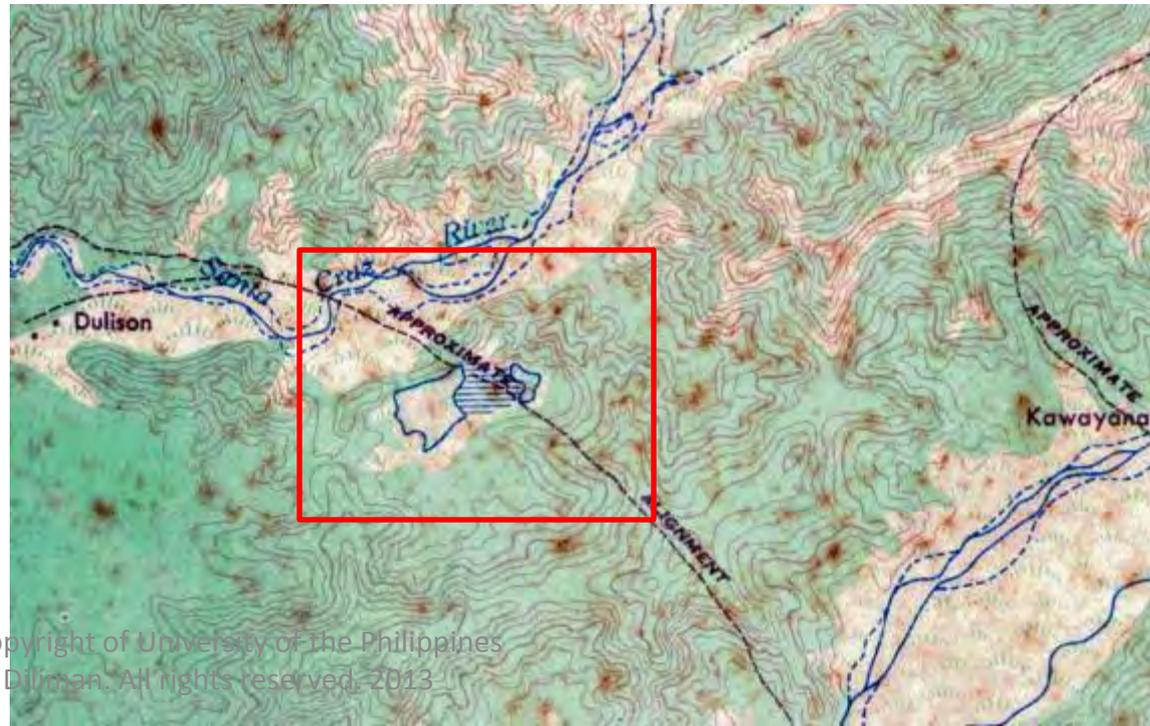
Metal Age pot (lead)



# Lanas, Kurtingalan, Sta Cruz

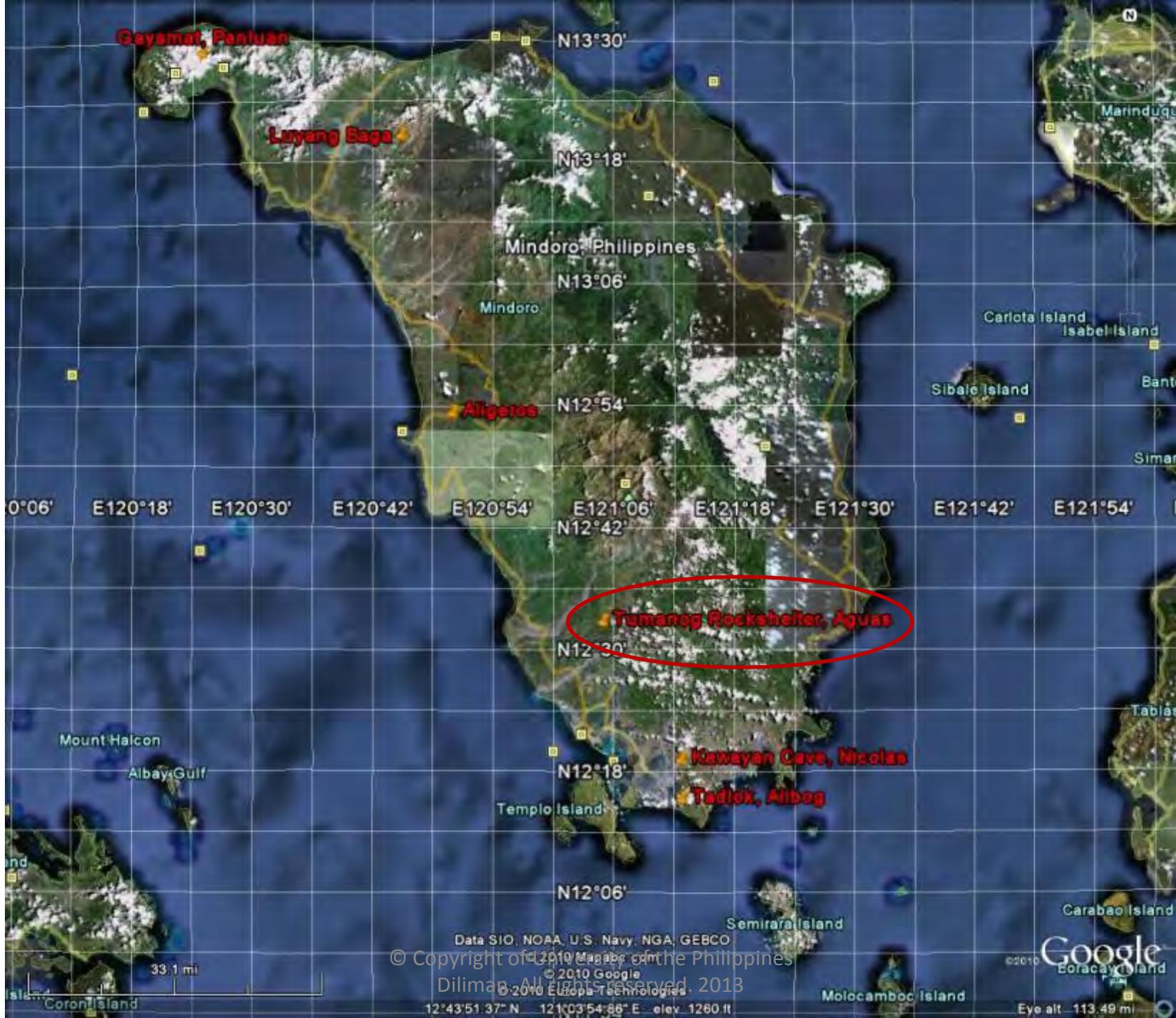


Possible area to conduct coring for palaeobotany/palynology



# Aguas, Rizal





Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
© 2010 Google  
© 2010 Europa Technologies  
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12°43'51.37" N 121°03'54.88" E elev. 1260 ft

Google  
©2010  
Eye alt: 113.49 mi



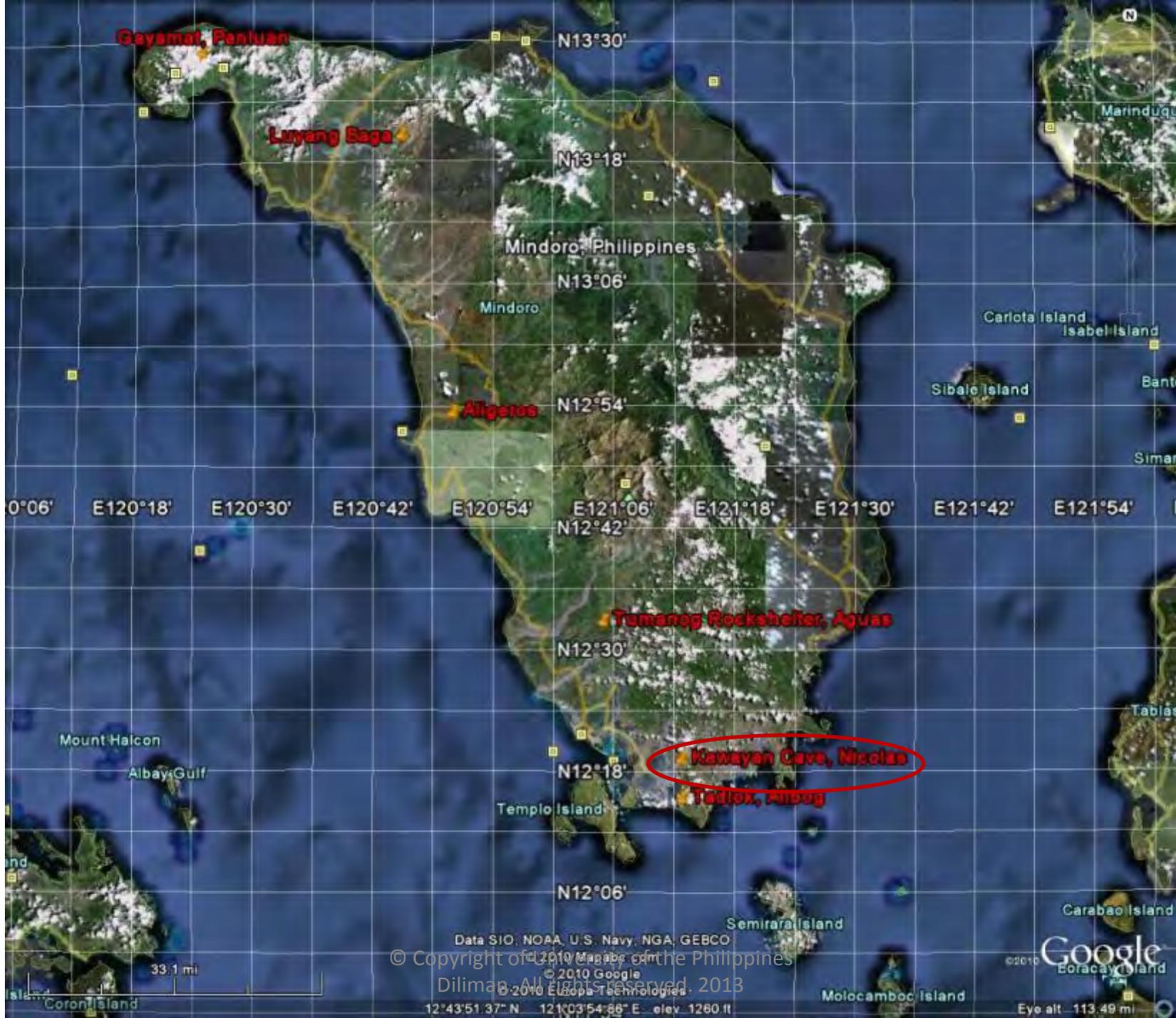
Tumanog rockshelter

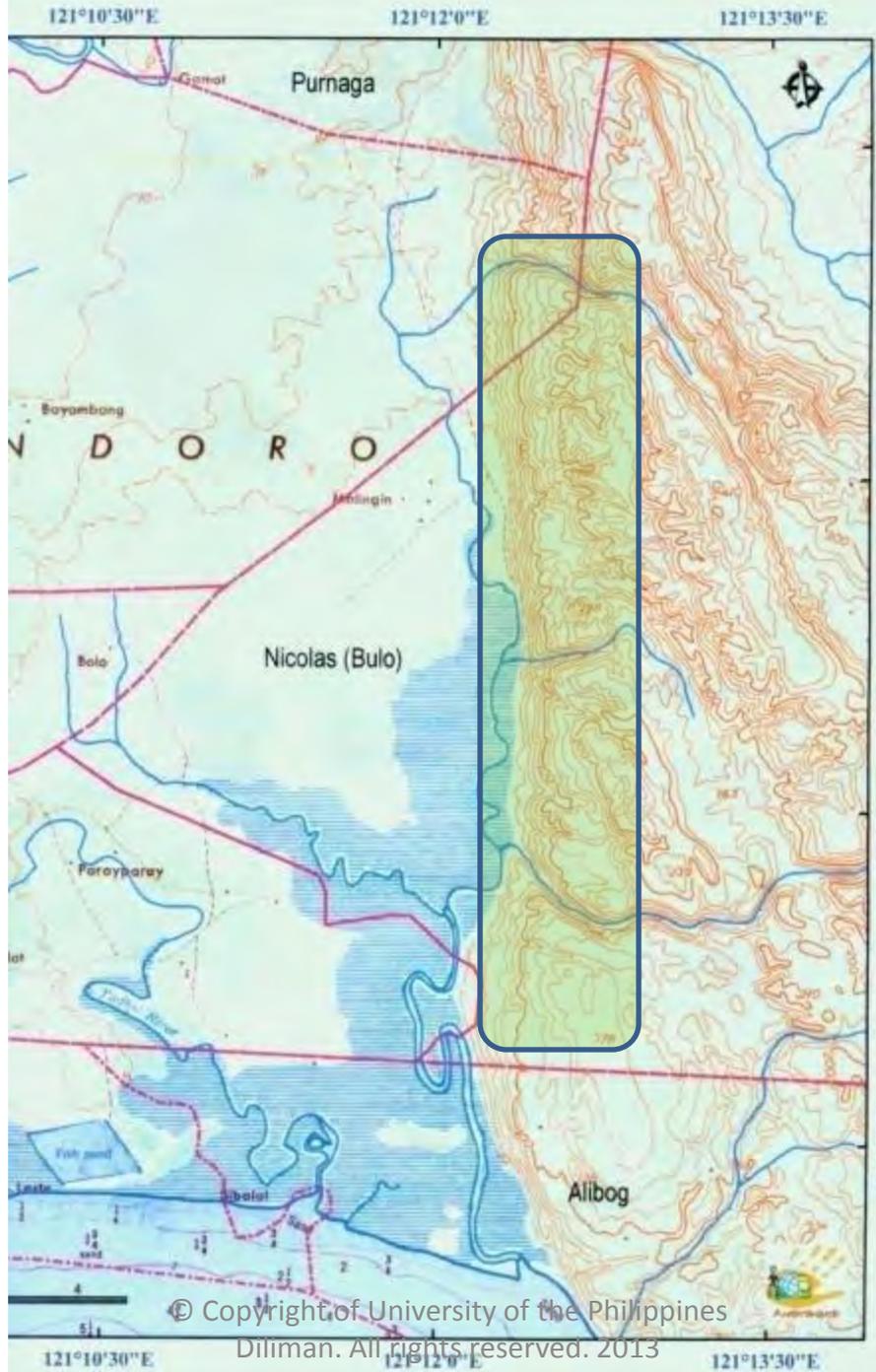
Potsherds and shellmidden  
observed

# Narciso, Magsaysay



Famnoan Formation (Late Pliocene)

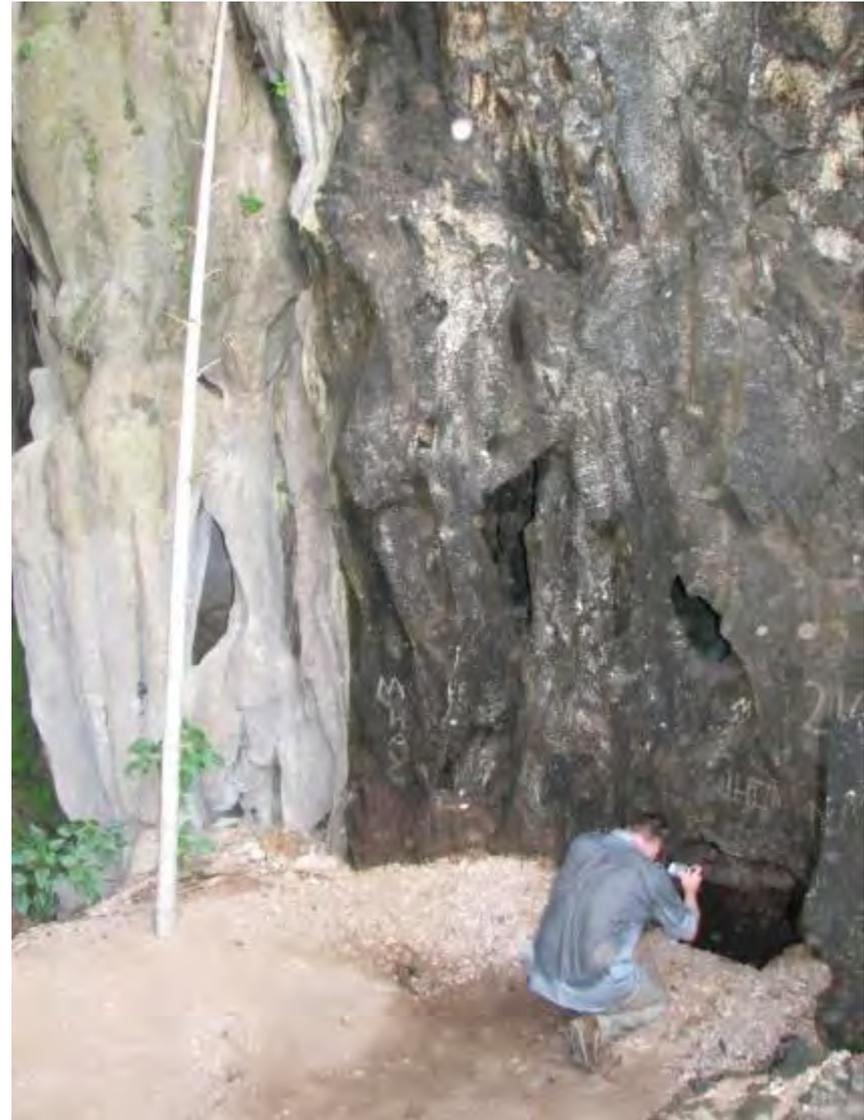


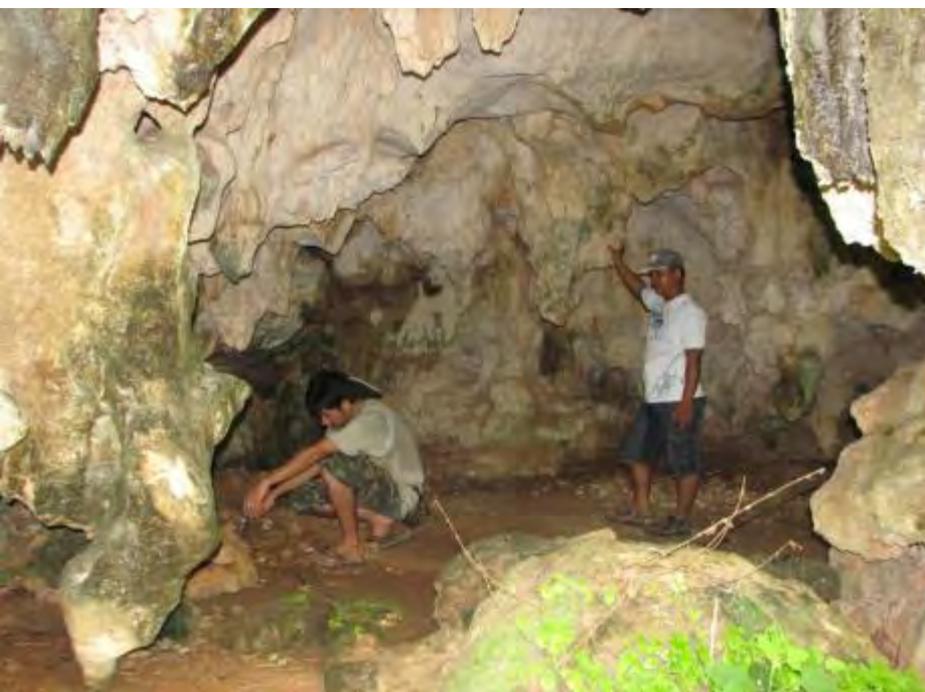


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Cueva Uno- shell midden and pottery





Kawayan Cave composed of 2 chambers and rockshelters on both ends



Shell midden of mostly marine origin



The SE rockshelter with  
Treasure hunter's pit

Dr. Porr cleaning the wall  
Two layers of shell midden  
were observed



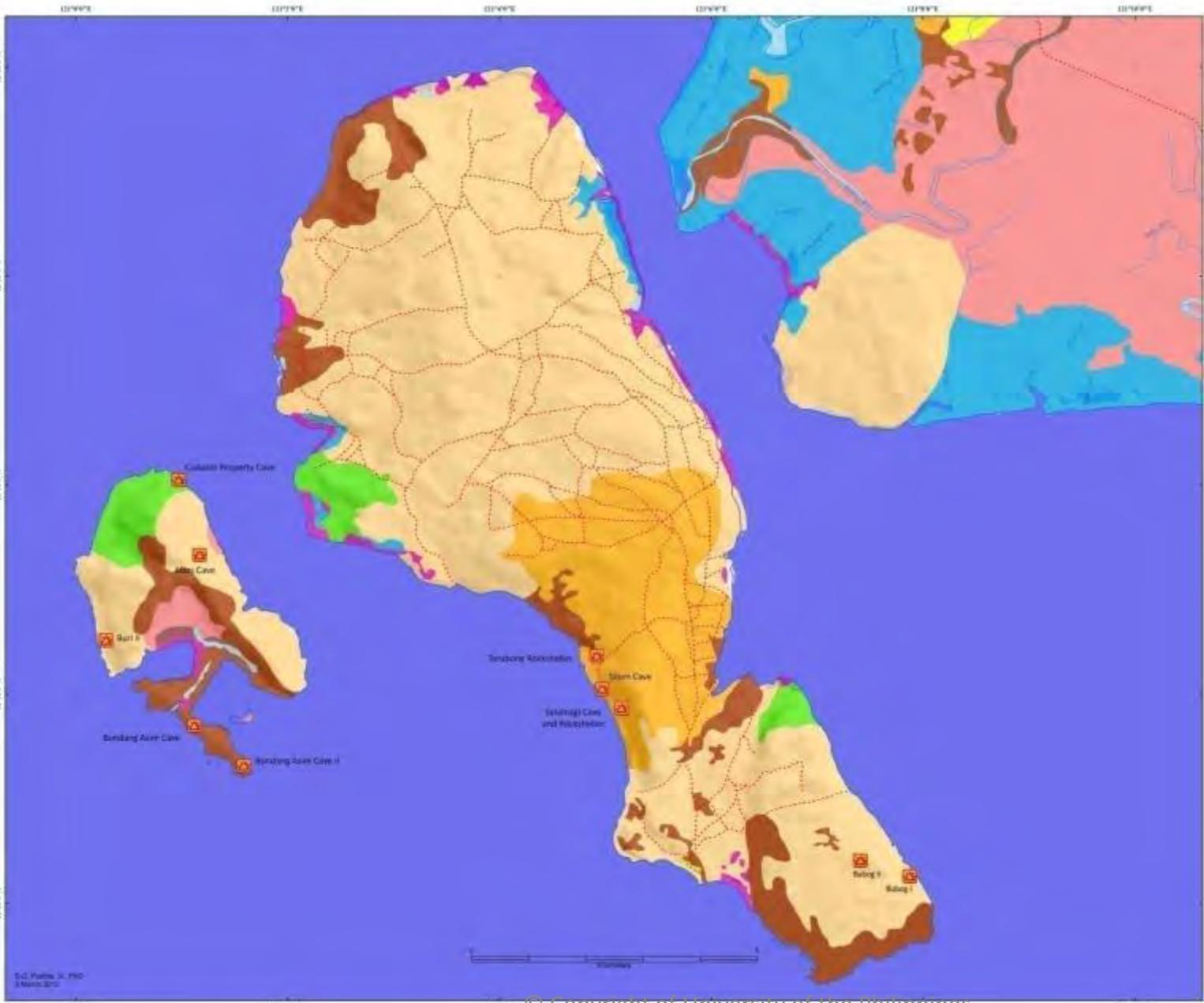
  
**Ilin Island**



Projection: Geographic  
Datum: PMS 92

**LEGEND**

-  Archaeology site
-  Trail
-  River
-  Provincial boundary
-  Coastline
- NAMRIA Land Cover Data (2004)
-  Brushland
-  Built-up
-  Closed canopy
-  Cultivated area
-  Fishpond
-  Grassland
-  Inland water
-  Mangrove
-  Marshland
-  Open areas
-  Open canopy forest
-  Tree Plantation and Perennial



S.C. Palina, Jr. PhD  
2 March 2010



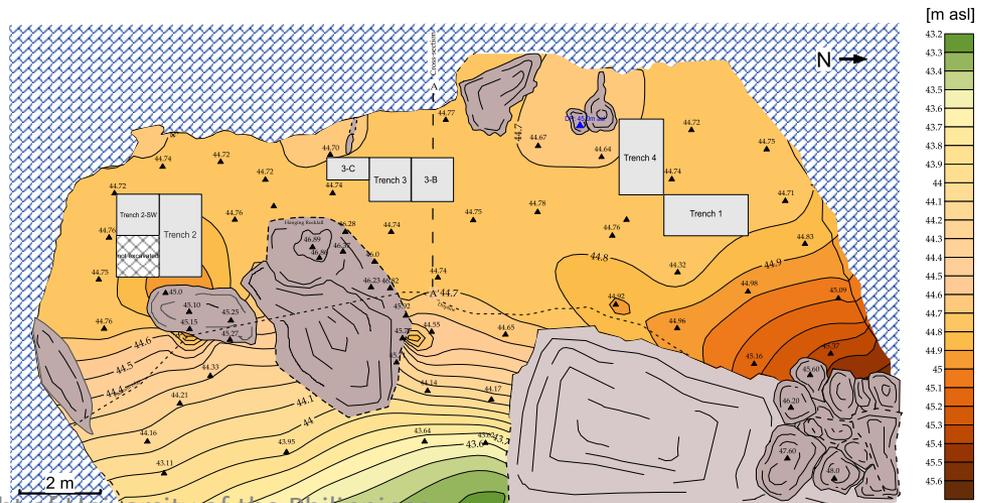
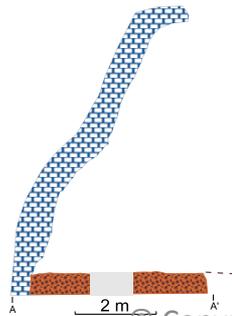


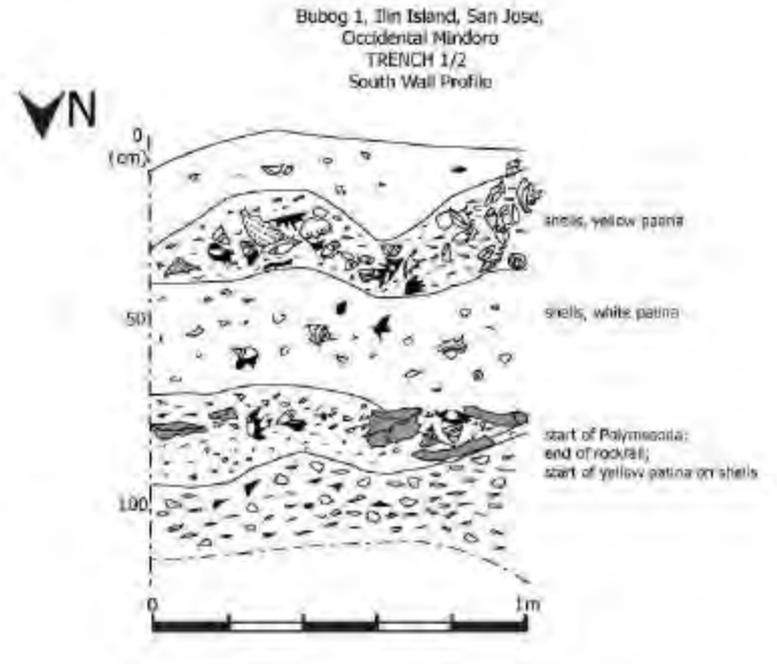
Salamagi Cave





Bubog 2 Rockshelter  
 NM No. IV-2011-M3  
 Sitio Bubog, Ilin Island  
 Lat 12°10'25"N, Lon 121°07'42"E  
 LDP: 45.0m asl  
 Mindoro, Philippines





Bubog 1 excavation, Ilin Island



Bubog 2: Stratigraphy in trench 2 showing shell midden deposits and rock fall

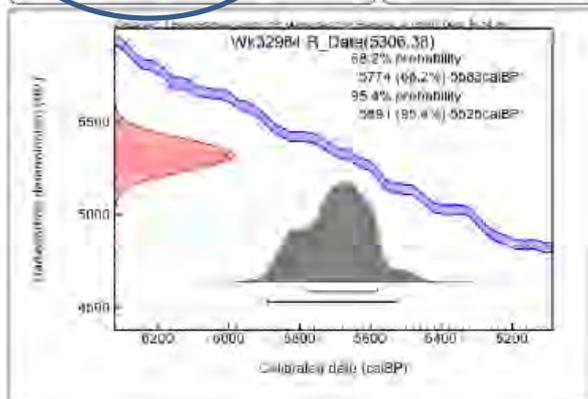


Report on Radiocarbon Age Determination for Wk- 32984

|                       |                                                                                          |
|-----------------------|------------------------------------------------------------------------------------------|
| Submitter             | P Piper                                                                                  |
| Submitter's Code      | IV-2011-CS-573                                                                           |
| Site & Location       | Bubog Island, Philippines                                                                |
| Sample Material       | Conus sp.                                                                                |
| Physical Pretreatment | Surfaces cleaned. Washed in an ultrasonic bath. Tested for recrystallization: aragonite. |
| Chemical Pretreatment | Sample acid washed using 2 M dil. HCl for 120 seconds, rinsed and dried.                 |

|                |                     |
|----------------|---------------------|
| $\delta^{13}C$ | $0.2 \pm 0.2\%$     |
| $\delta^{14}C$ | $-483.4 \pm 25\%$   |
| $\pm^{14}C\%$  | $51.7 \pm 0.2\%$    |
| <b>Result</b>  | <b>5306 ± 30 BP</b> |

Comments



Alan Hogg  
21/02/12

- Result is *Conventional Age of Percent Modern Carbon (pMC)* following Stuiver and Polach, 1977, Radiocarbon 19, 310-313. This is based on the Libby half life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications as it does not include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier.
- The isotopic fractionation,  $\delta^{13}C$ , is expressed as ‰ vs PDB.
- $\delta^{14}C$  is also known as *Percent Modern Carbon (pMC)*.

Large marine shells (open lagoon)  
(5kya)

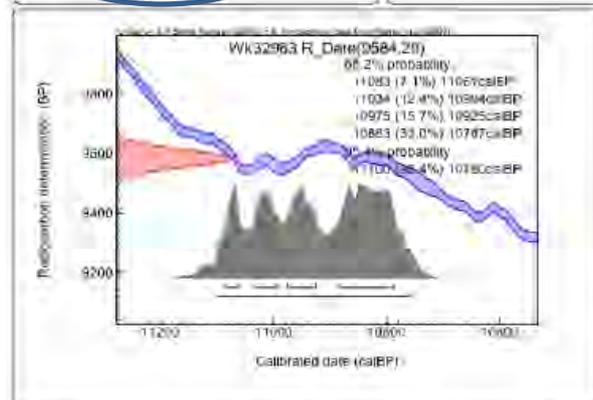


Report on Radiocarbon Age Determination for Wk- 32983

|                       |                                                                                                                                                               |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Submitter             | P Piper                                                                                                                                                       |
| Submitter's Code      | IV-2011-CS-574                                                                                                                                                |
| Site & Location       | Bubog Island, Philippines                                                                                                                                     |
| Sample Material       | Canarium sp. frag                                                                                                                                             |
| Physical Pretreatment | Sample cleaned                                                                                                                                                |
| Chemical Pretreatment | Sample washed in hot HCl, rinsed and treated with multiple hot NaOH washes. The NaOH insoluble fraction was treated with hot HCl, filtered, rinsed and dried. |

|                |                     |
|----------------|---------------------|
| $\delta^{13}C$ | $-24.2 \pm 0.2\%$   |
| $\delta^{14}C$ | $-596.7 \pm 1.1\%$  |
| $\pm^{14}C\%$  | $30.3 \pm 0.1\%$    |
| <b>Result</b>  | <b>9584 ± 29 BP</b> |
|                | (AMS measurement)   |

Comments



Alan Hogg  
21/02/12

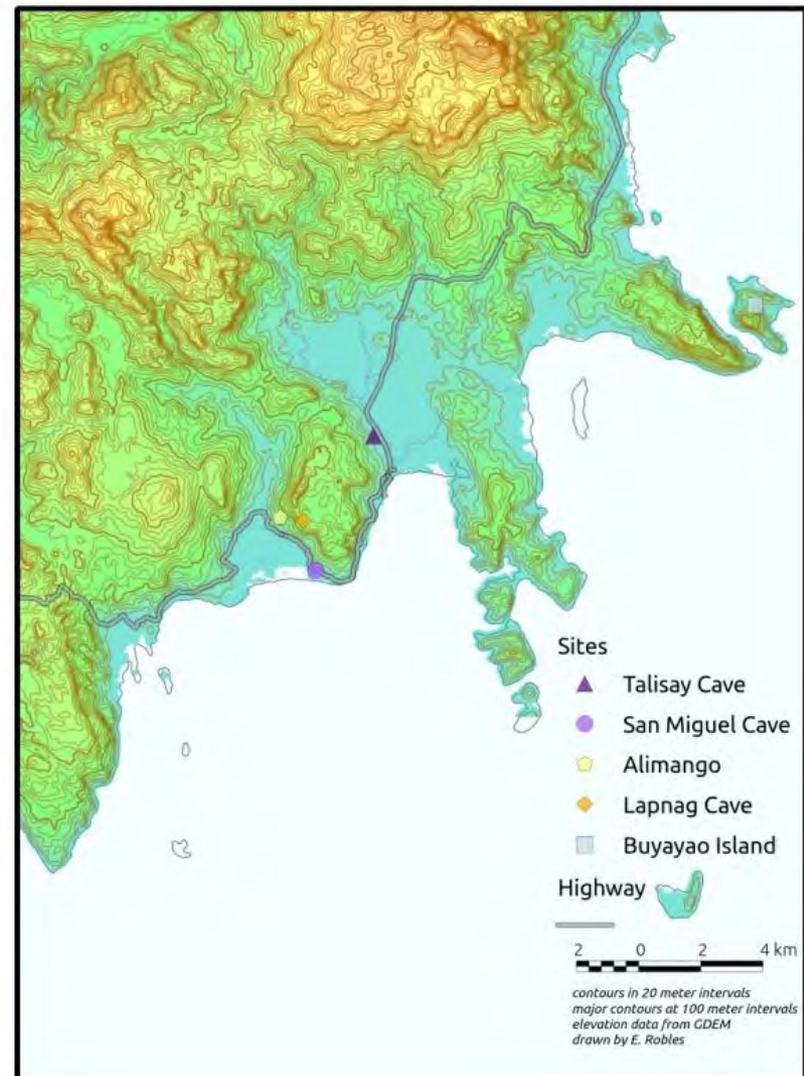
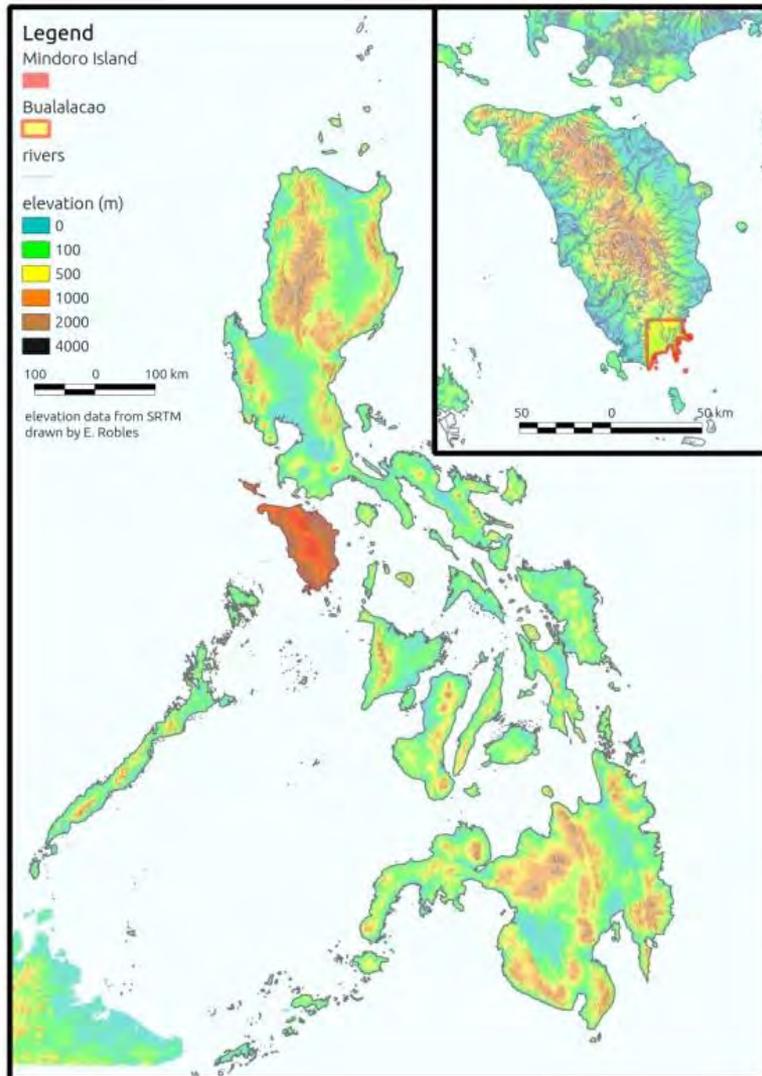
- Result is *Conventional Age of Percent Modern Carbon (pMC)* following Stuiver and Polach, 1977, Radiocarbon 19, 310-313. This is based on the Libby half life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications as it does not include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier.
- The isotopic fractionation,  $\delta^{13}C$ , is expressed as ‰ vs PDB.
- $\delta^{14}C$  is also known as *Percent Modern Carbon (pMC)*.

Smaller gastropods shells (Mangrove)  
(10kya)

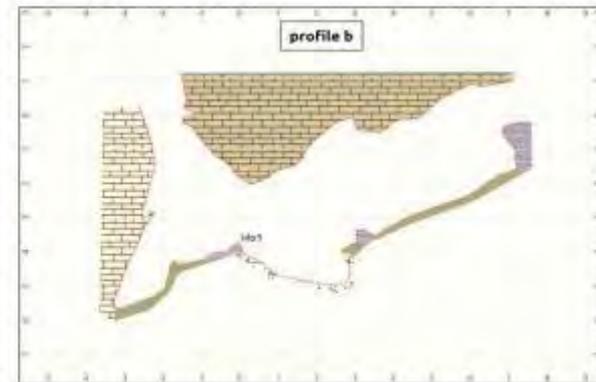
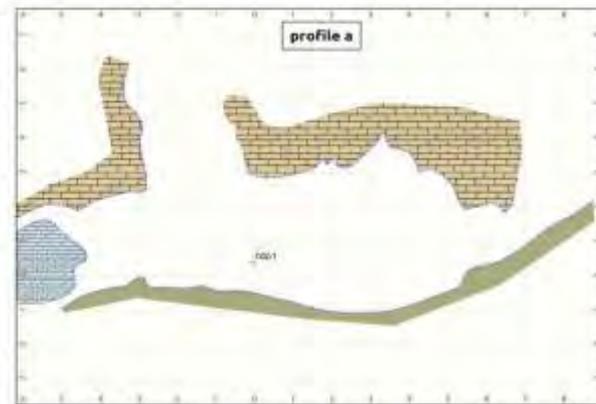
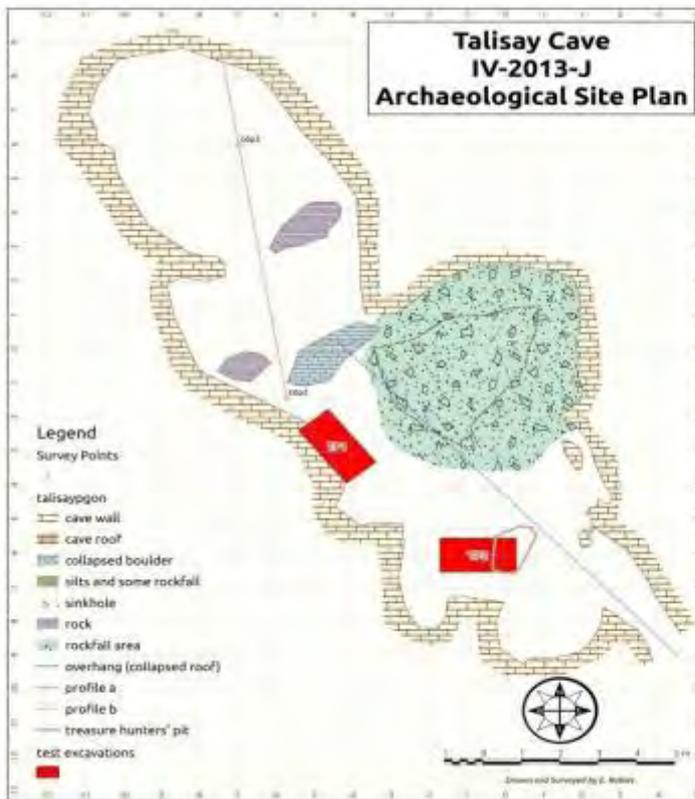
## North of the Southern Arc – The Mindoro Archaeological Research Program: A summary of the 2010 and 2011 fieldwork activities

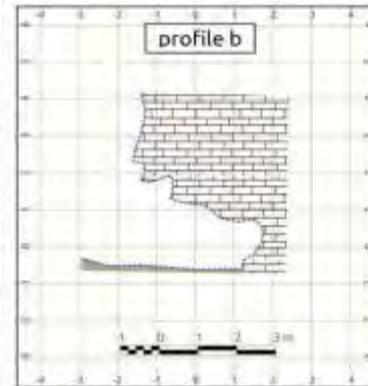
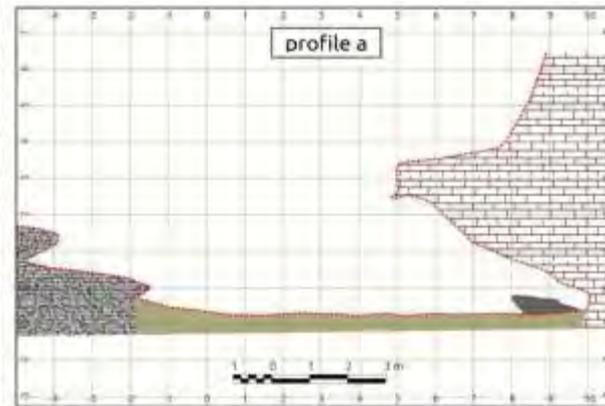
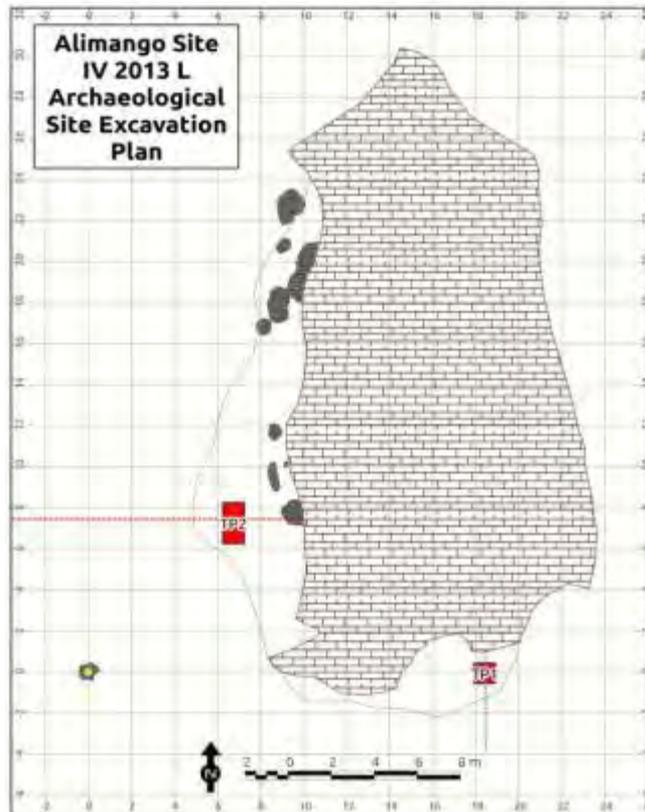
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Martin Porr<sup>1</sup>, Armand Salvador B. Mijares<sup>2</sup>, Alfred F. Pawlik<sup>3</sup>, Philip J. Piper<sup>4\*</sup> and Sabino Padilla Jr<sup>5\*</sup>



## Newly discovered sites (2012-2013) in Bualalacao, Oriental Mindoro





Surveyed and drawn by E. Shiller and N. Adams



- UP Archaeological research has dramatically changed in recent times.
- We are now in the forefront of understanding not only our past, but also engaged in regional and global debates and discoveries.
- Three important components in this change are
  - 1. Well trained Archaeological personnel
  - 2. Development of different laboratories and analytical facilities
  - 3. Access to research grants

# THANK YOU.....



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