



## Group conflict: Does it have a beginning?



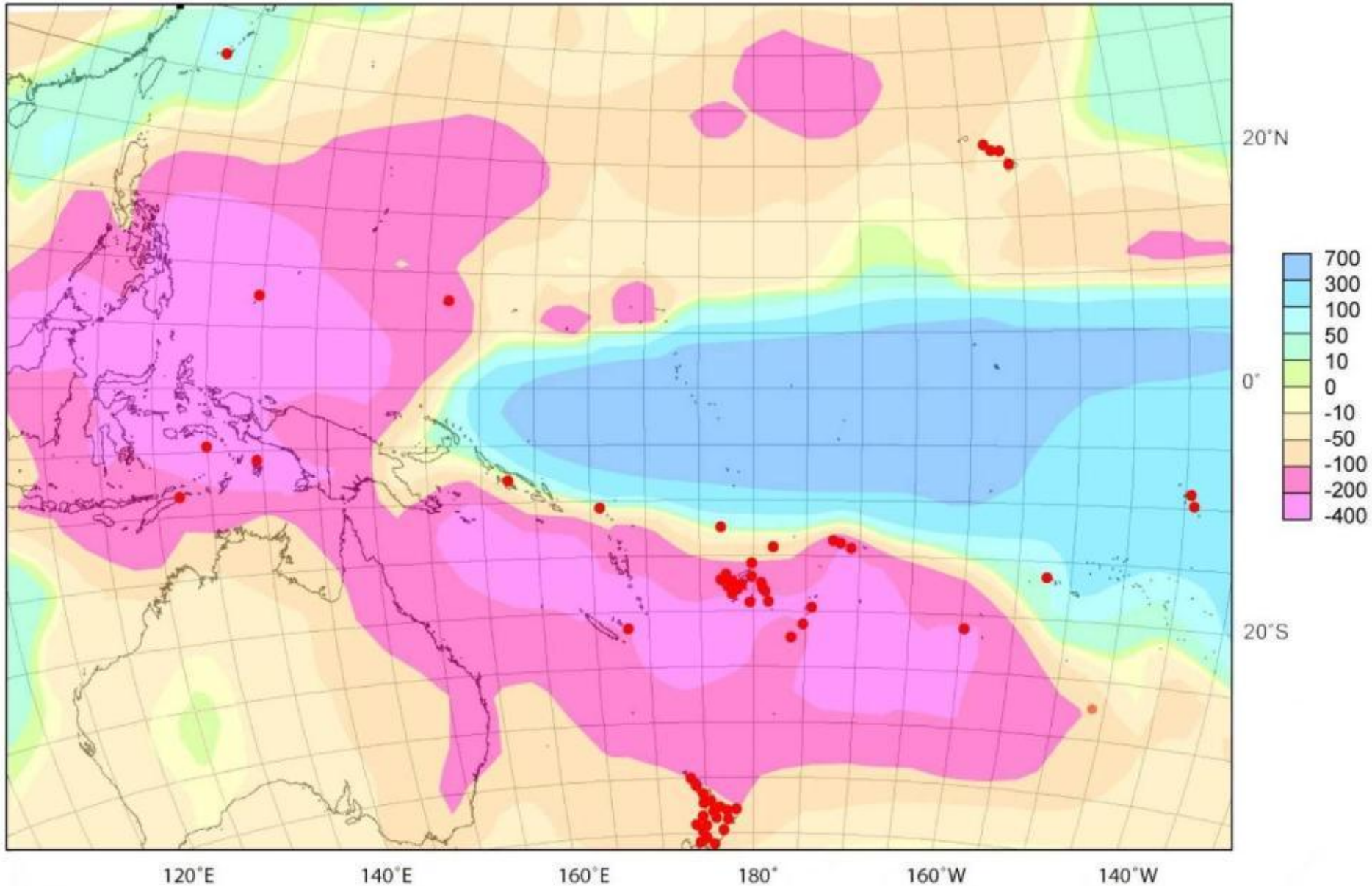


2002



1895

# Spatial correlations: El Nino rainfall anomalies and archaeological fortifications in Pacific



# rainfall distribution rich/poor boundaries?

Sources: d'après ARPAPET 1996, in Fox (J.), 2001 et Gertil, 2001

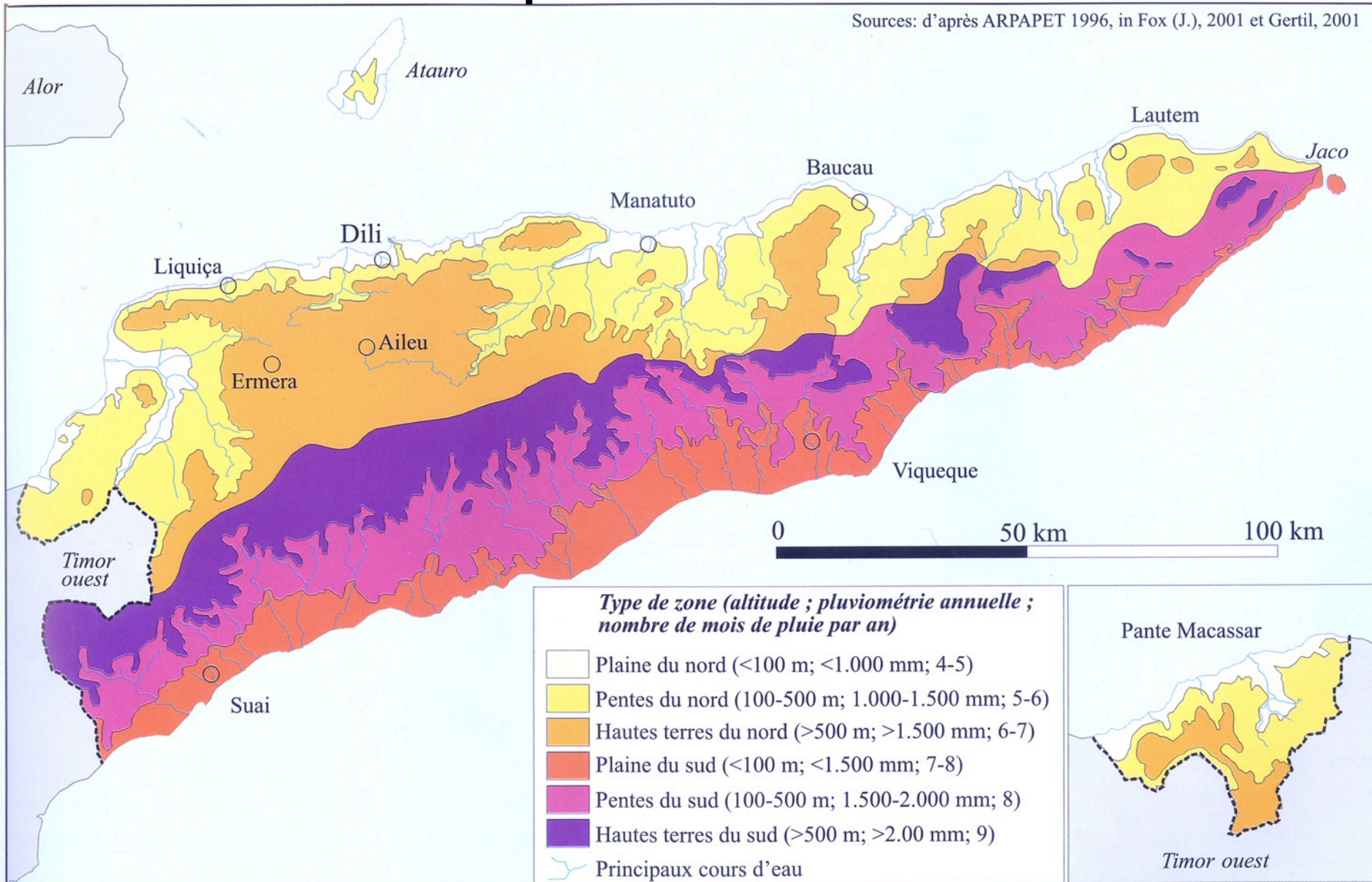
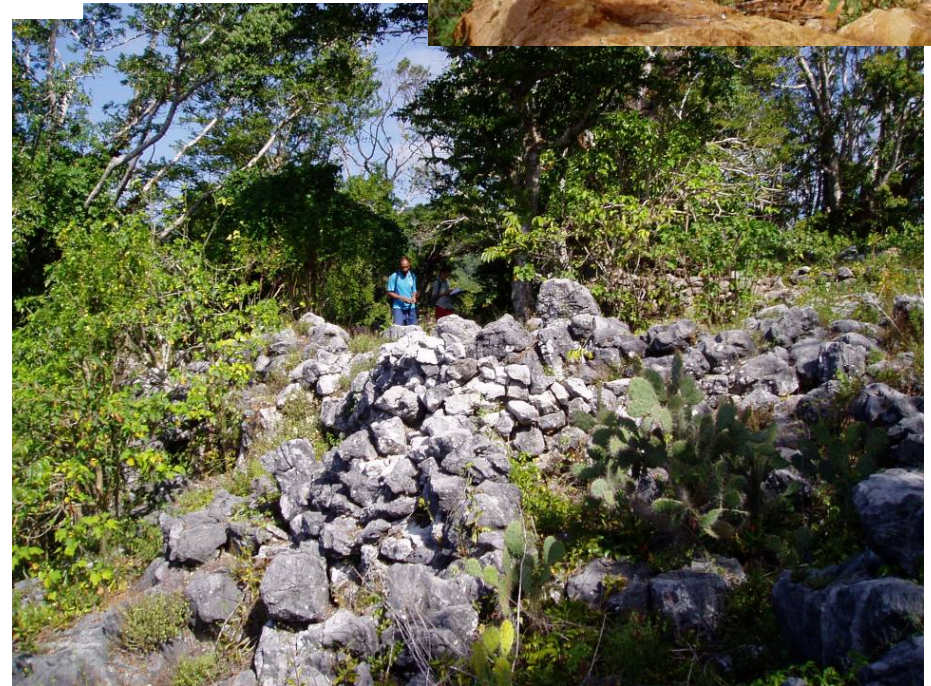
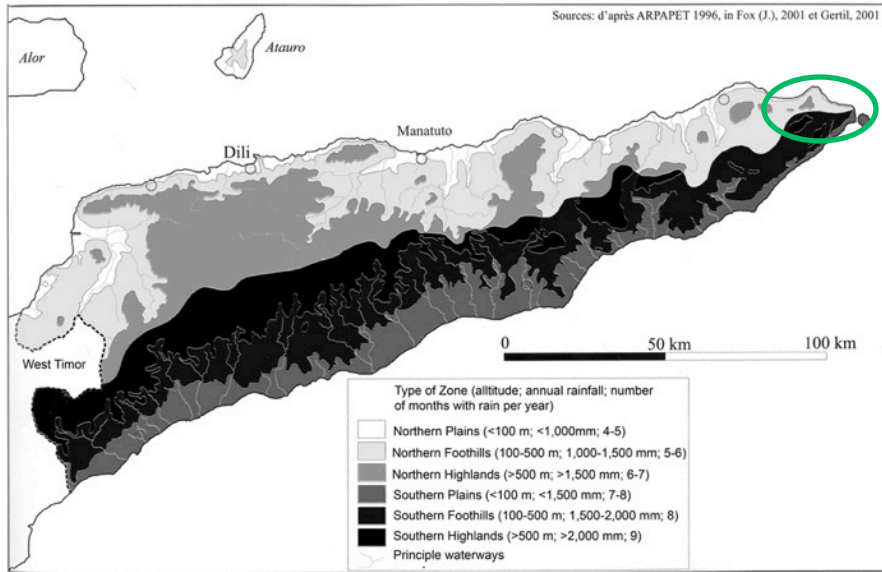
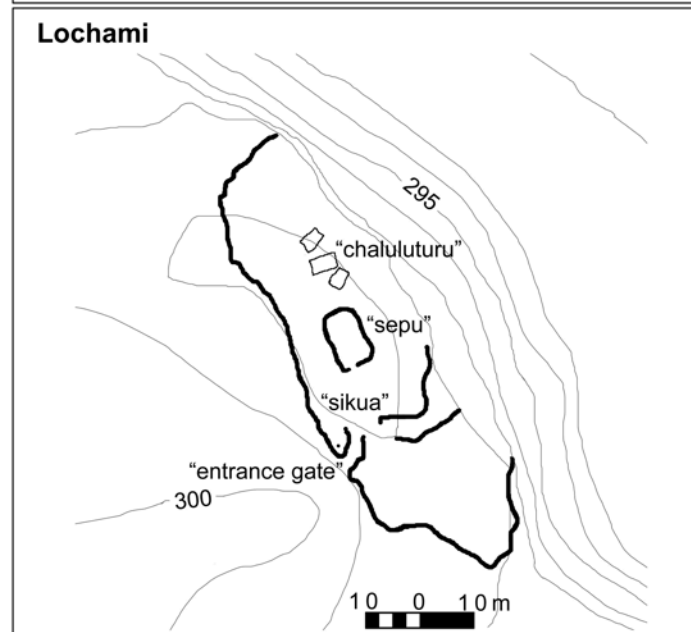
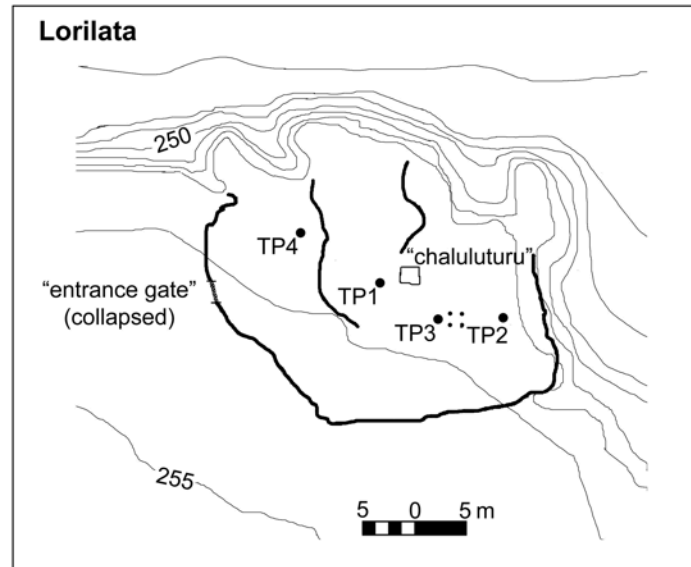


Figure 23 : Les zones agro-climatiques de Timor Lorosa'e

# fortifications in Lautem



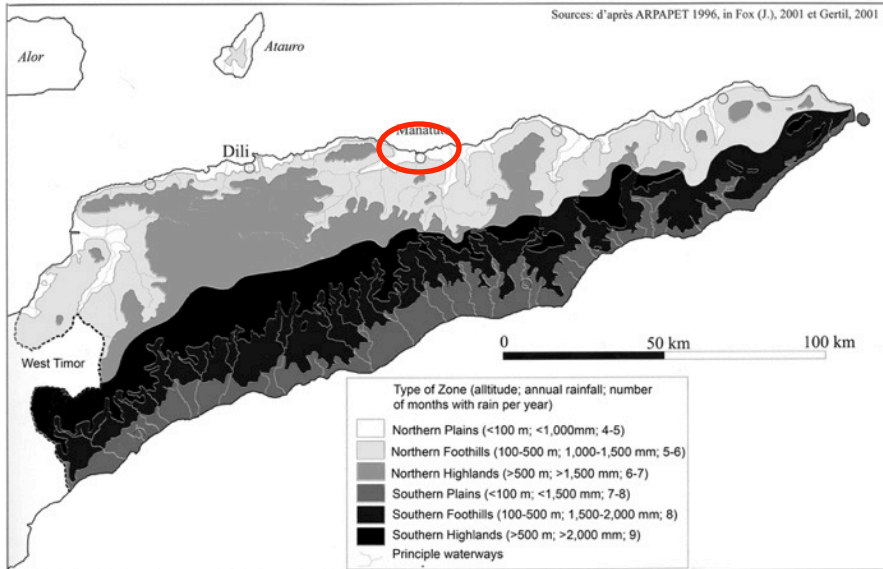
# Typical fortifications, Lautem



contour interval 1m

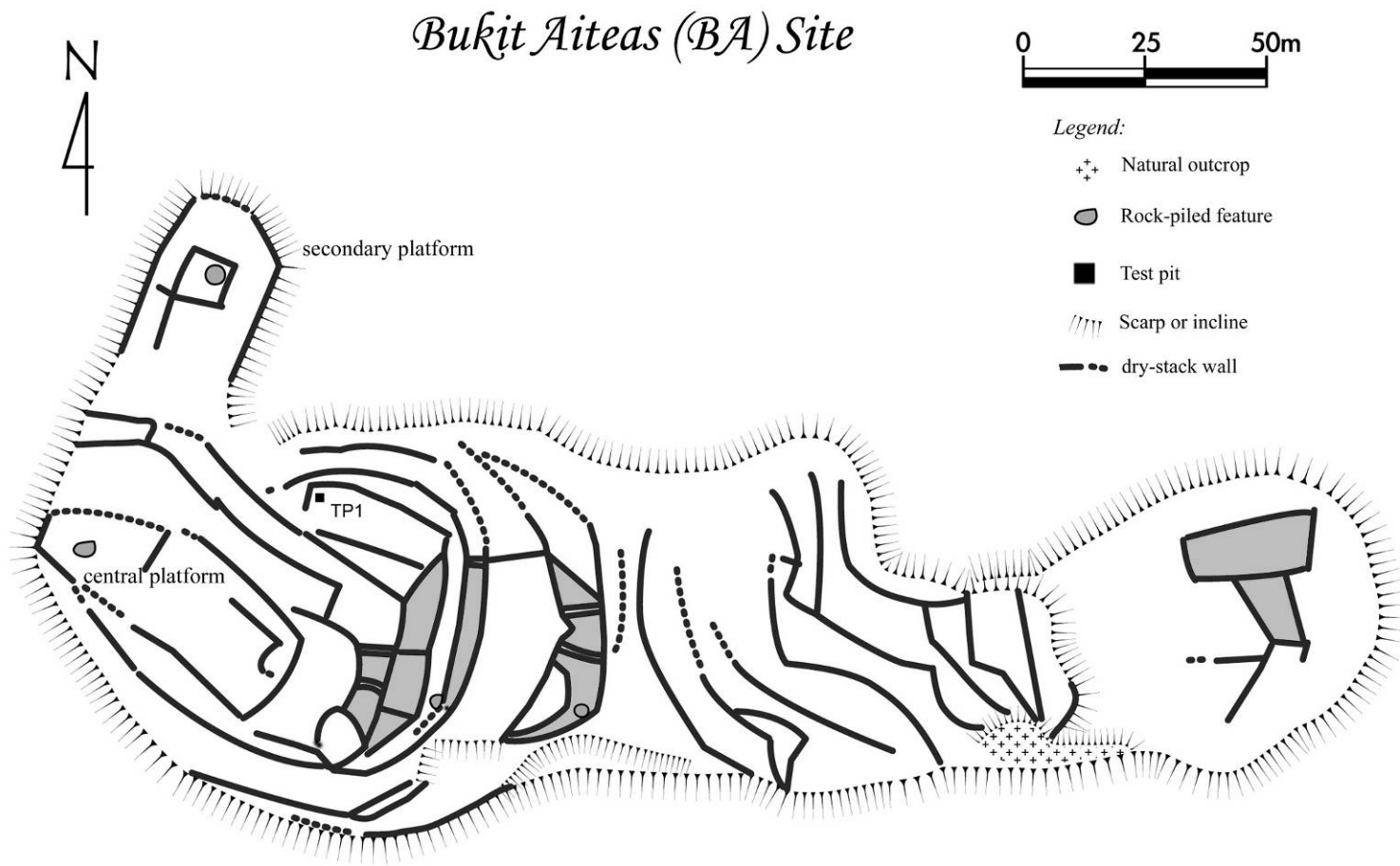
rock wall

# fortifications in Manatuto





# Typical fortification, Manatuto



# Oral history consultation



# UW Field School 2005



# rainfall-dependent resource sensitivity model

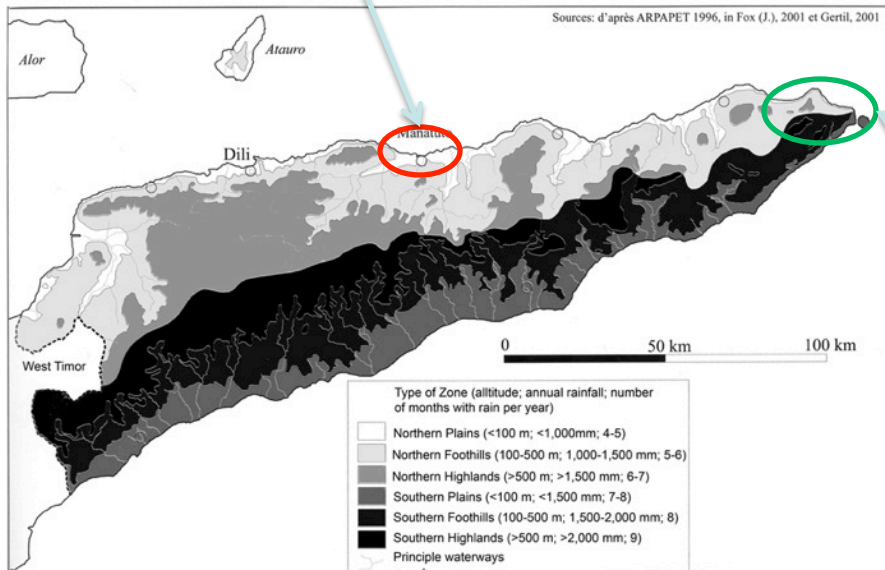
1. Conflict over resources most likely at resource **rich/poor boundaries**
2. In mixed foraging/farming economy in Timor, **rainfall is key variable** affecting food resources
3. **Unprecedented or unpredictable drought** is most likely to initiate conflict, as hedging strategies (e.g. food storage, trade) fail
4. **El Nino** consistently causes drought in Timor (for 20<sup>th</sup> century, at least)
5. Model applies to **incipient fortification building only**. Once fortification-related conflict begins, rainfall dependent resources

# Predictions

**First forts in a region should be built in rich/poor boundary areas during increasing El Nino centuries**

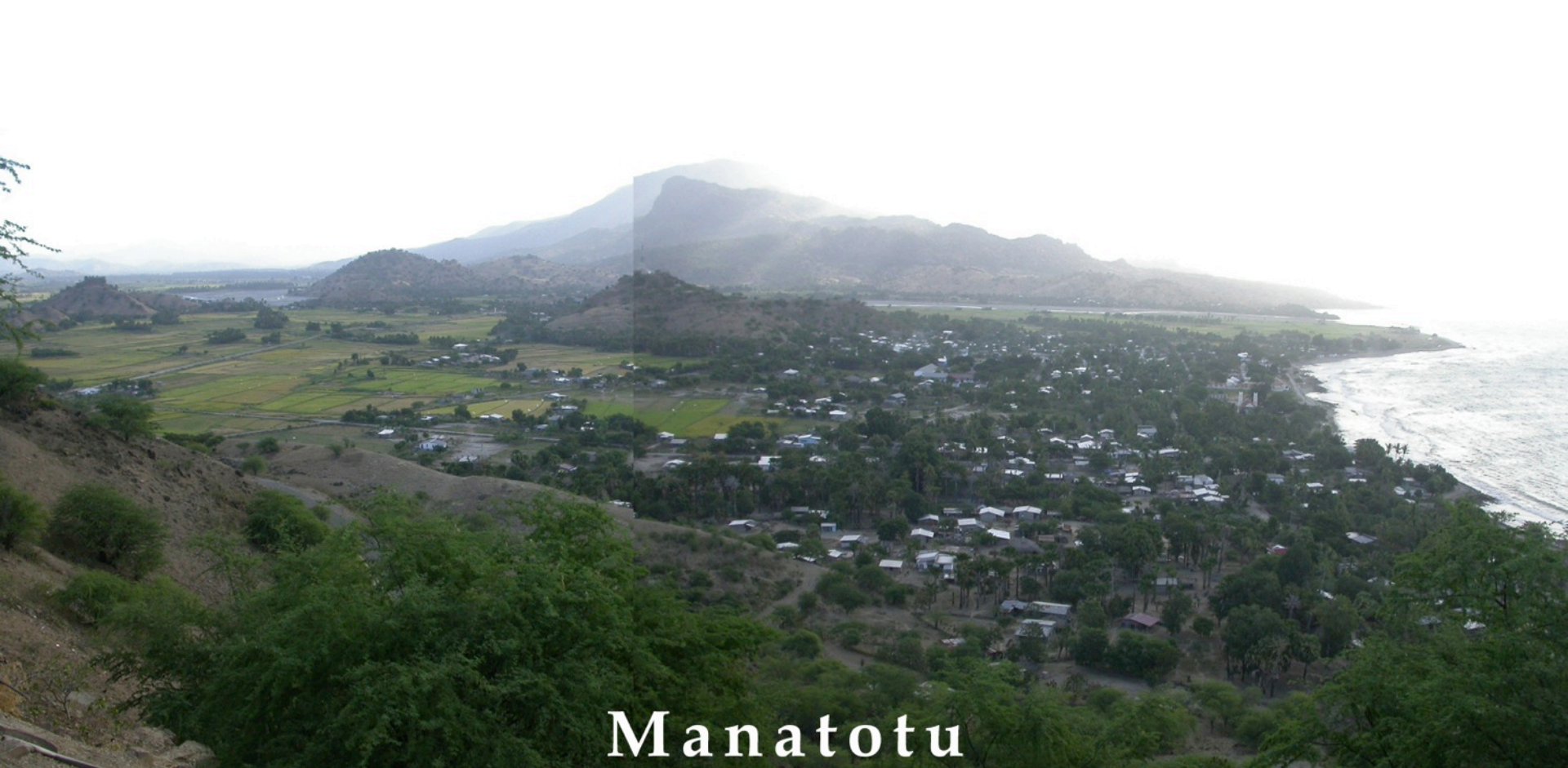


**Manatuto:**  
rich-poor  
boundaries  
at edges of  
rivers



**Lautem:**  
rich-poor  
boundaries  
in areas  
closely  
spaces  
rainfall  
clines

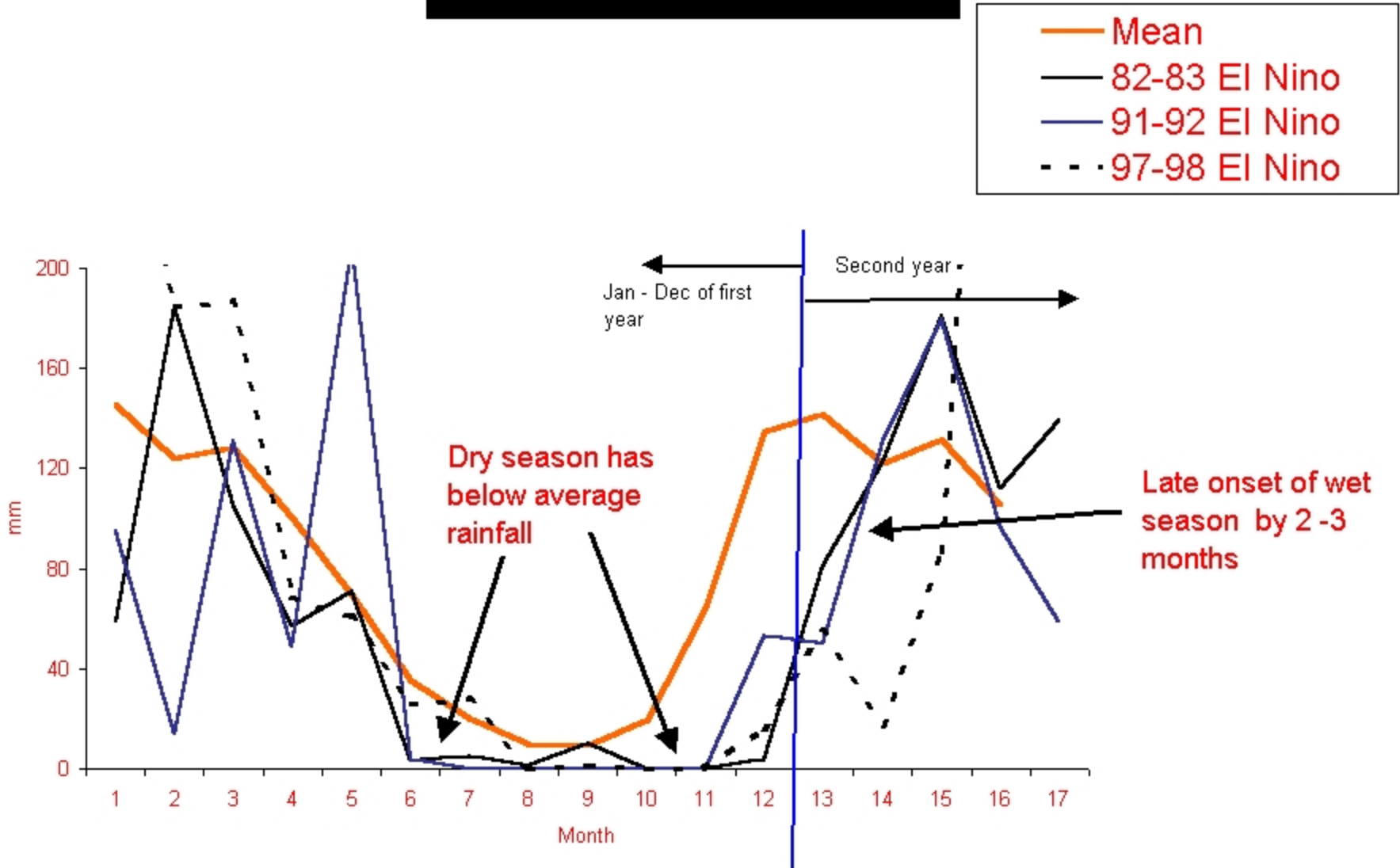
**rich/poor boundaries--rivers, irrigation**



**Manatotu**

# Typical annual rainfall pattern vs. El Nino

## Dili Rainfall 1952-97



# How did the predictions work out?

- Earliest forts in Manatuto will be located adjacent to Lacleo River
  - YES
- Earliest forts in Lautem will be in areas of highest rainfall diversity
  - YES
- Earliest forts in both areas will appear just after an El Nino frequency peak
  - NOT QUITE—Lautem forts 200 years after 1150 AD peak



# Spatial distribution re. rich/poor boundaries

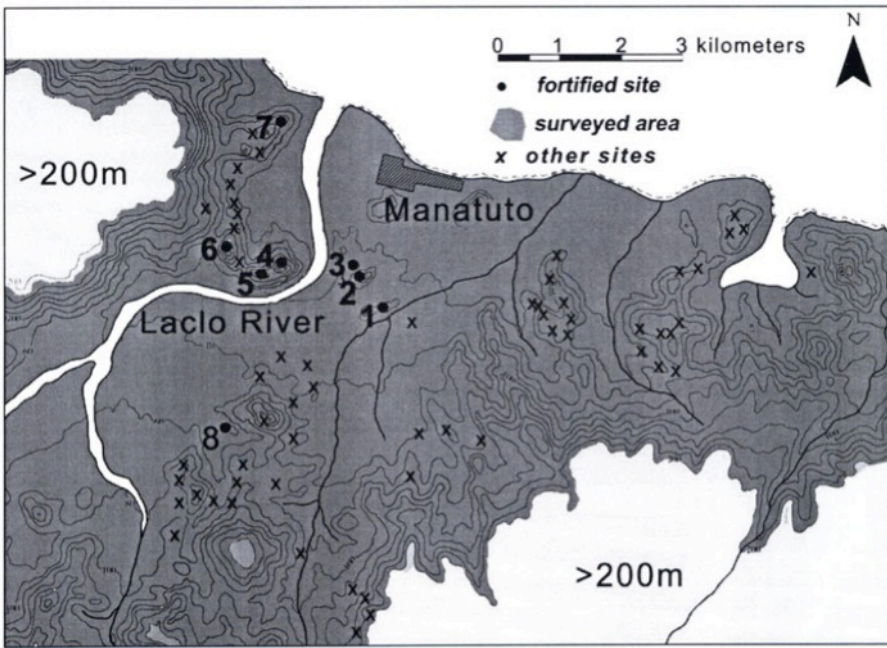


Figure 5. Manatuto area sites. Fortified sites include: 1) Lekpaturen, 2) Soraha, 3) Soraha Barat, 4) Bukit Aiteas, 5) Malarahun Lama #1, 6) Malarahun Lama #4, 7) Hataro #5, 8) LURI.

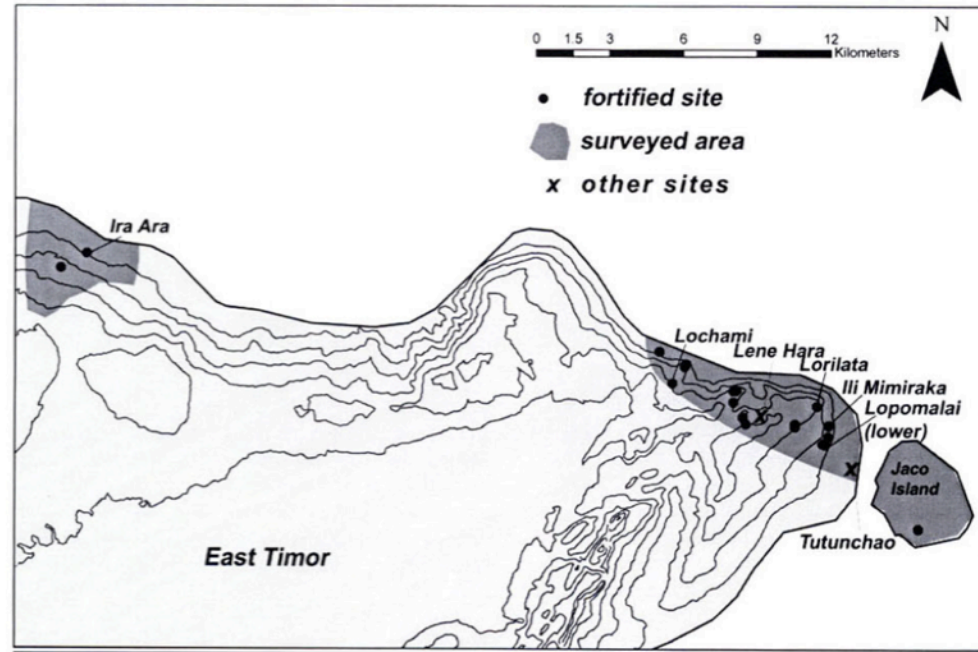
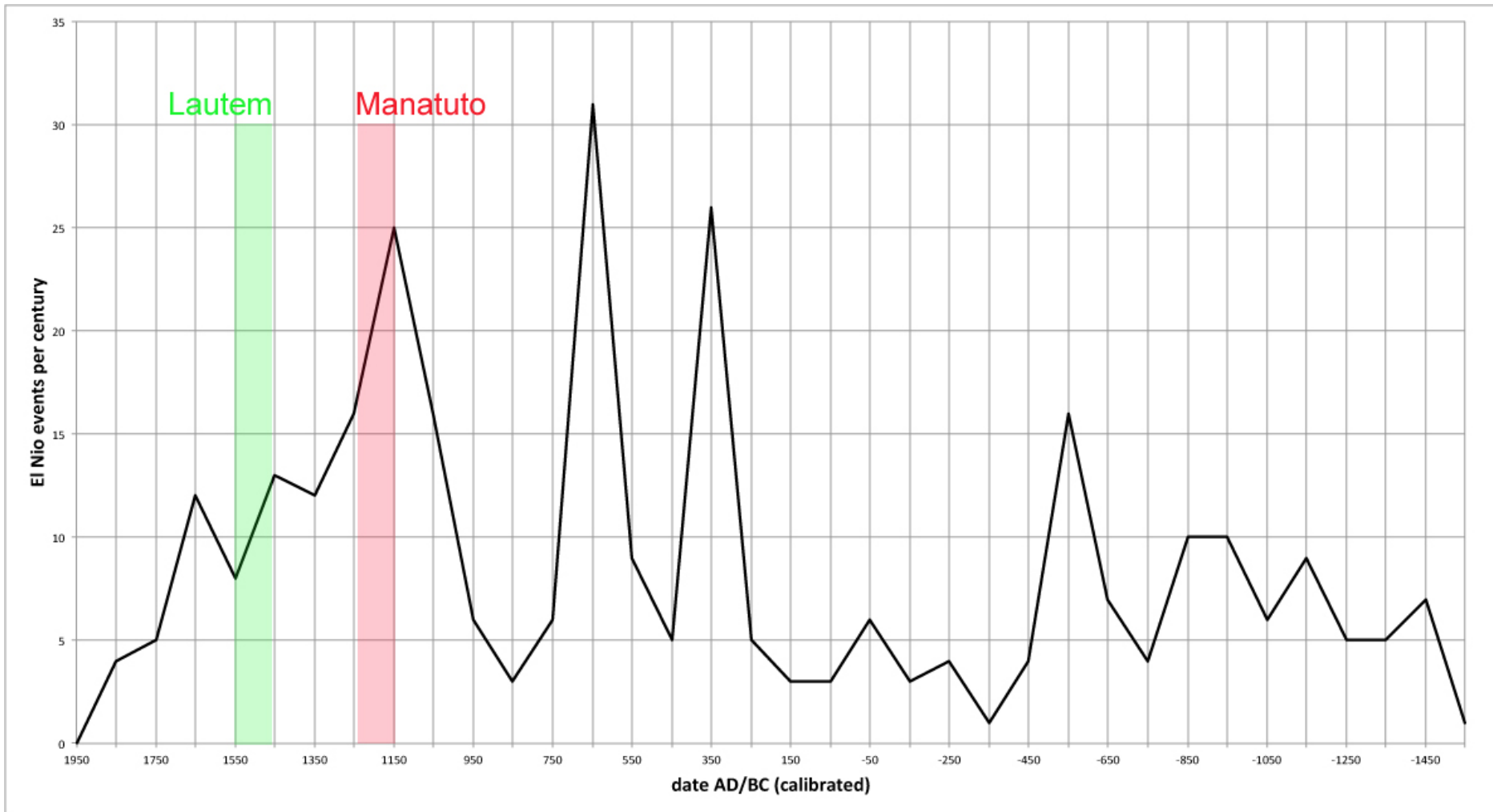


Figure 4. Lautem area sites.

# El Nino chronology vs. earliest fort dates

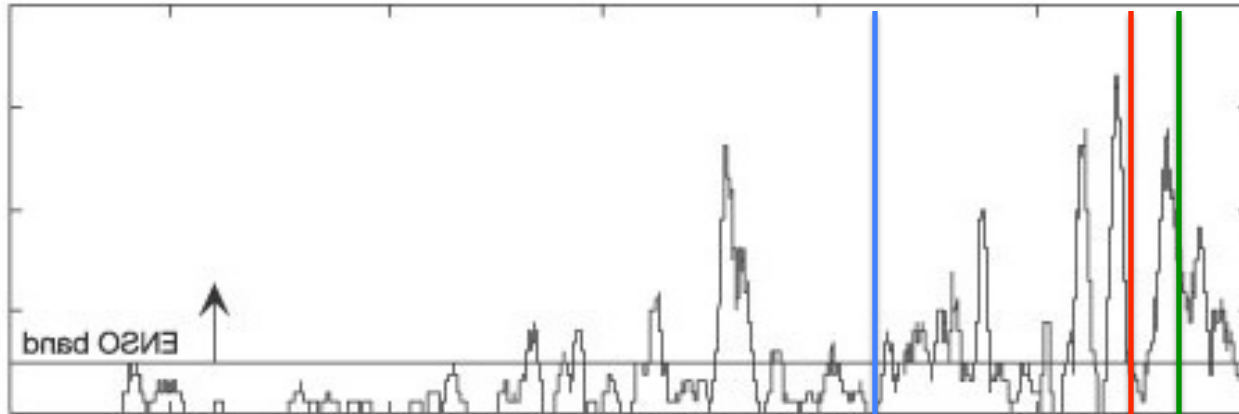


# El Nino vs. fort chronology

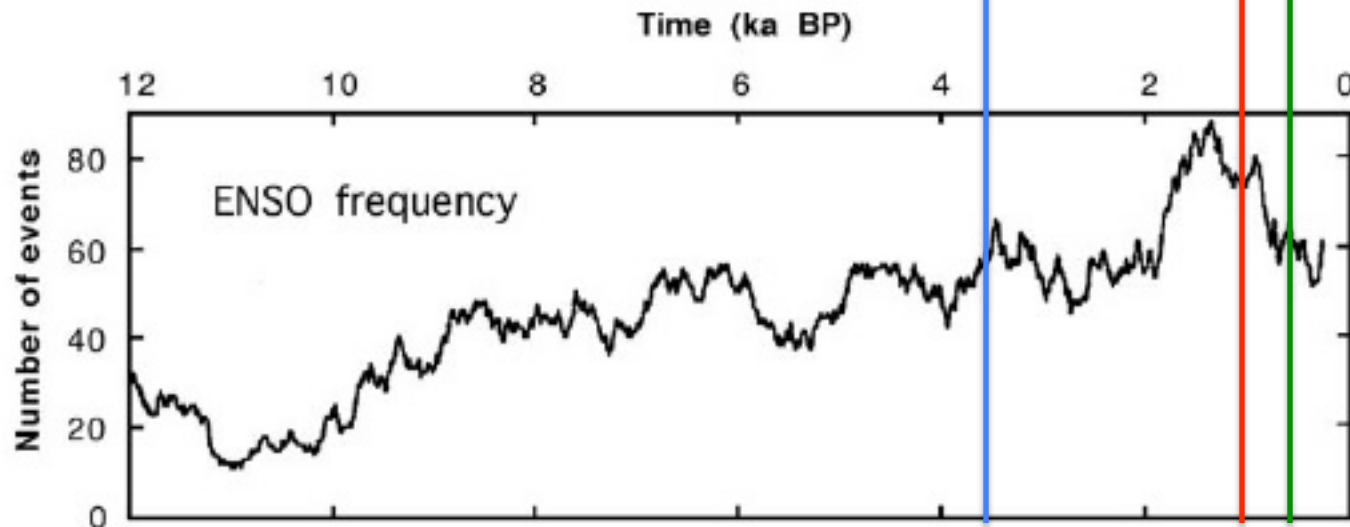
farming

Manat.

Laut.

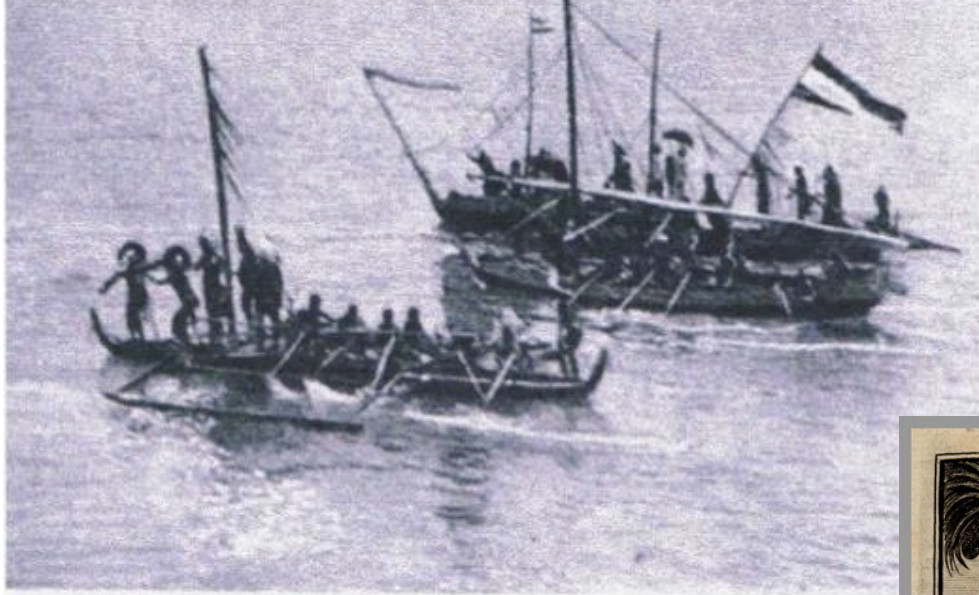


Moy et al. (2002) events per 100 years



Gagan et al. (2004) events per 500 years

# alternative: Colonial disruption as causal factor



- Chronology (forts later)
- Incipient vs. ongoing warfare

# Alternative hypotheses?



- **colonial disruption (slave trade)**
- **unemployed young men (crime, warrior labor)**
- **migration (land tenure stress)**
- **collapse of foodway social network/structure**
- **bet-hedging activities (long distance trade)**
- **Changing baselines/climate memory**

## Next steps

- Local rainfall curves for SE Asia
- Better dates for initial fortification building in other areas
- Testable models for alternate causes