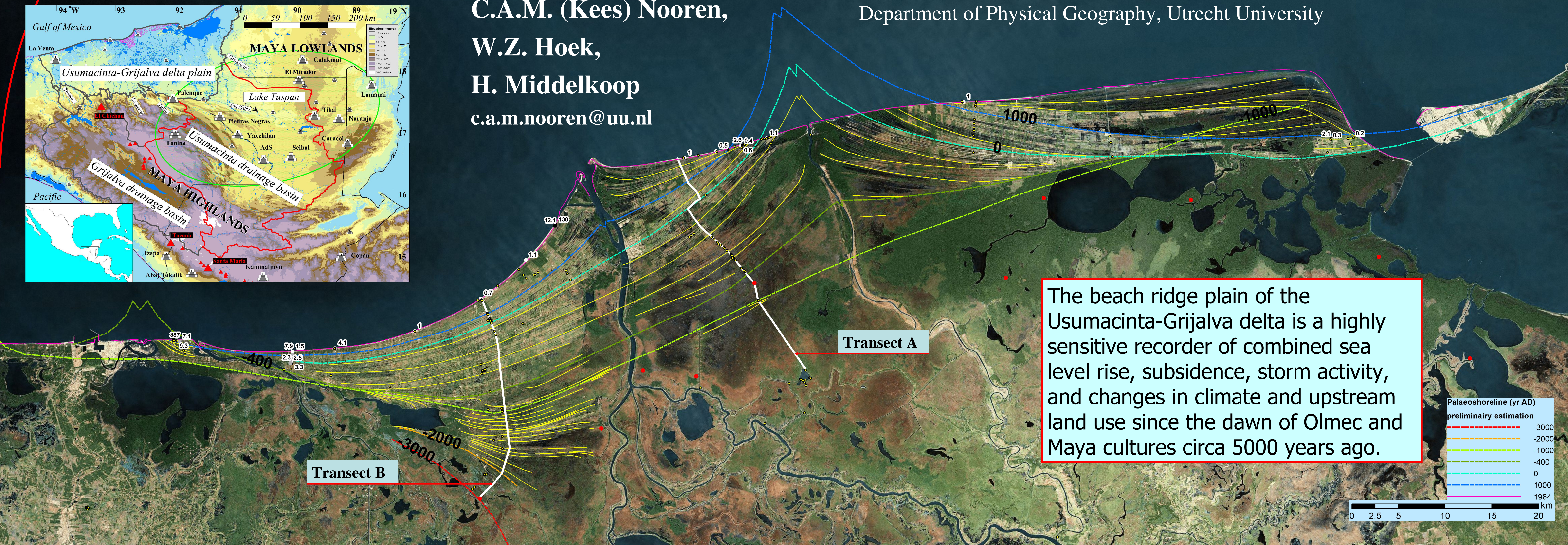
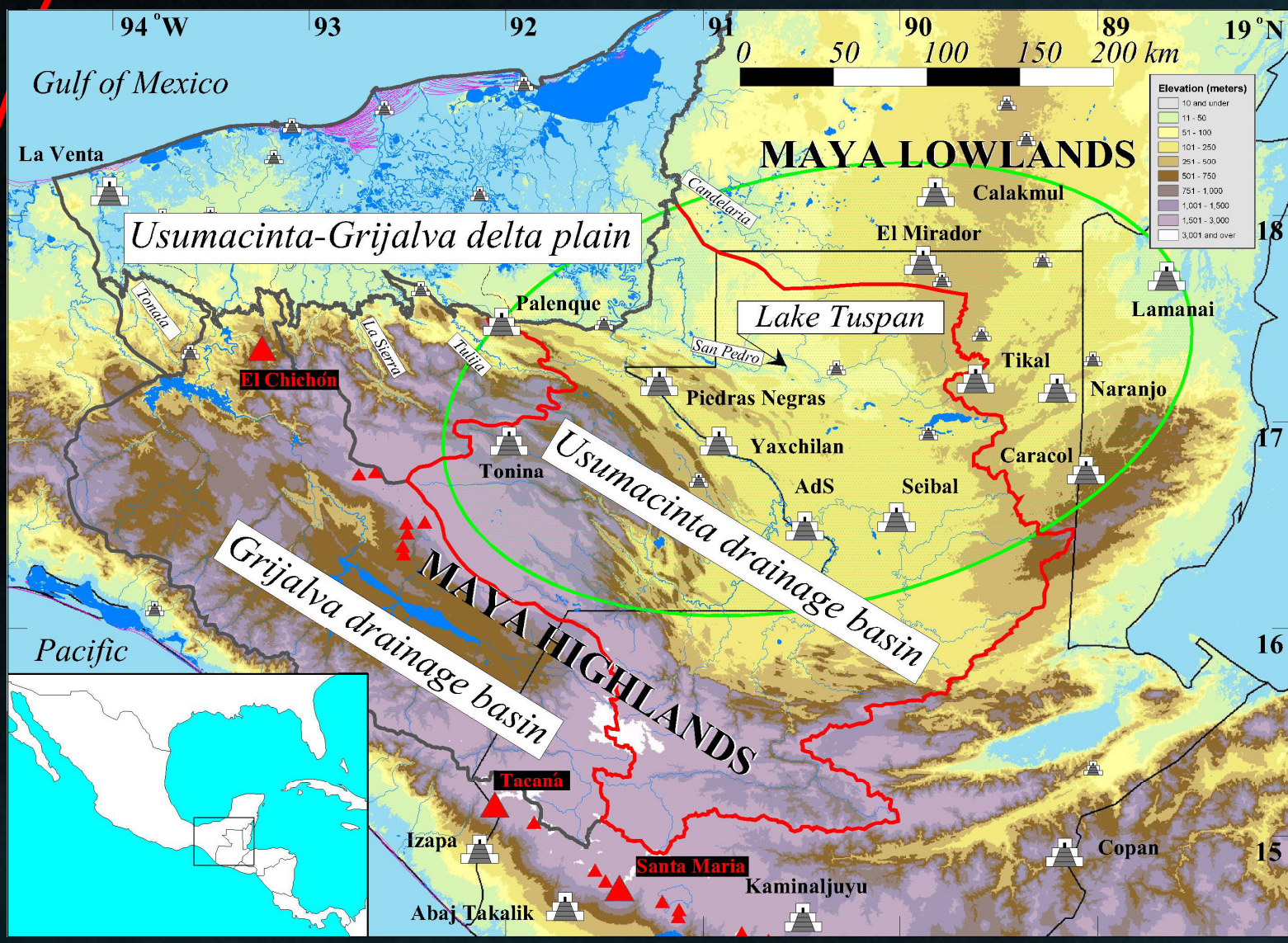


# Reconstructing five millennia of Maya land use variability from a Mexican beach ridge plain.

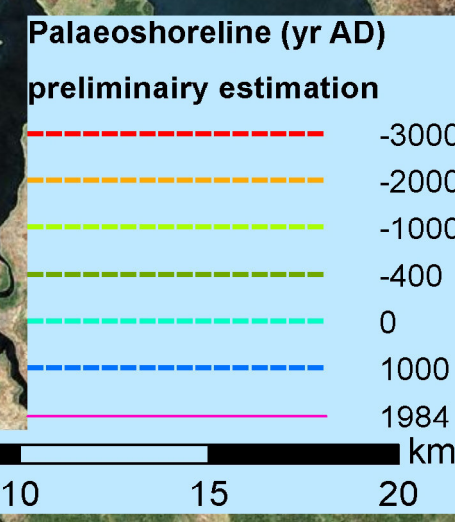
NAC 2012

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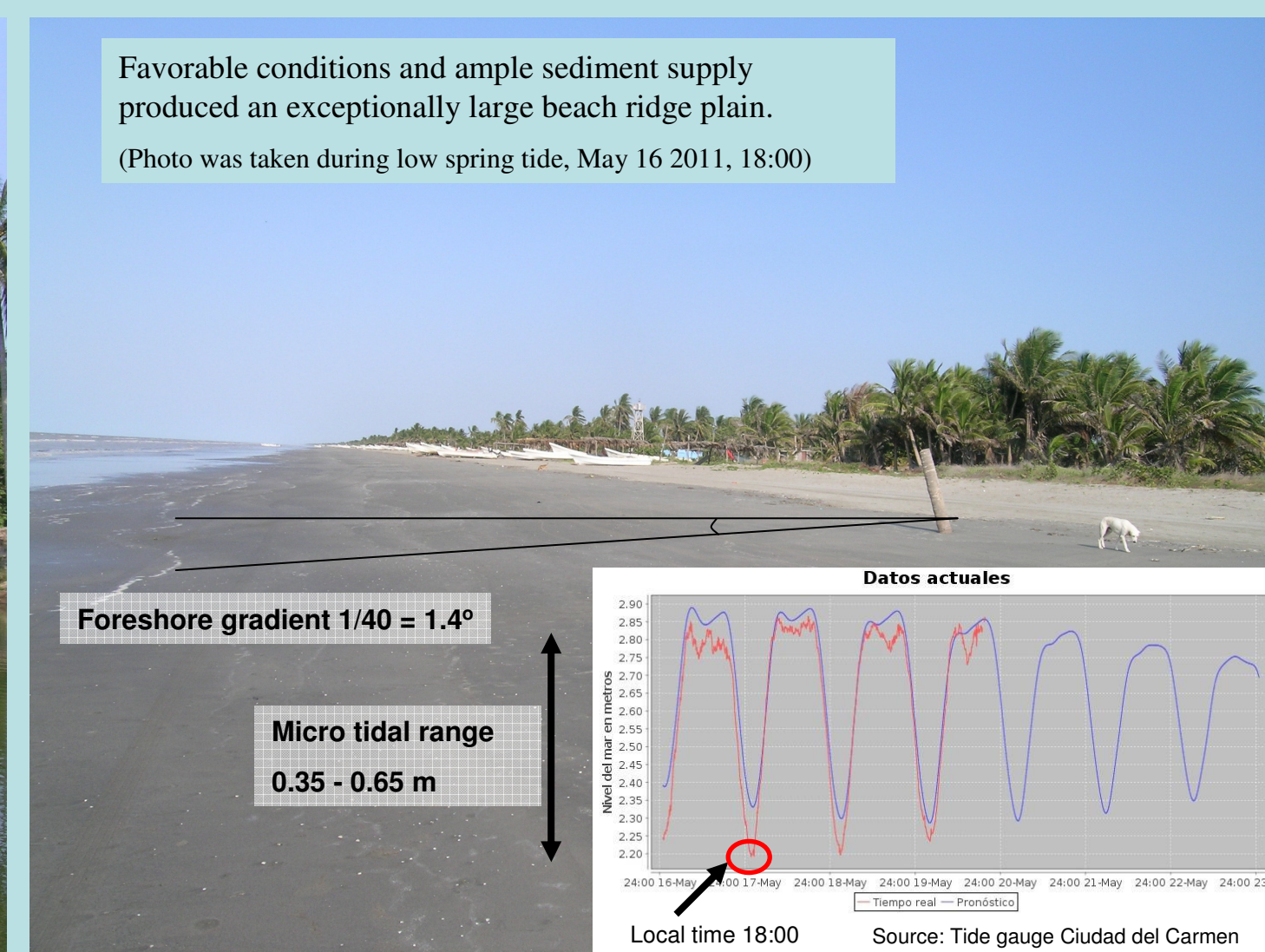
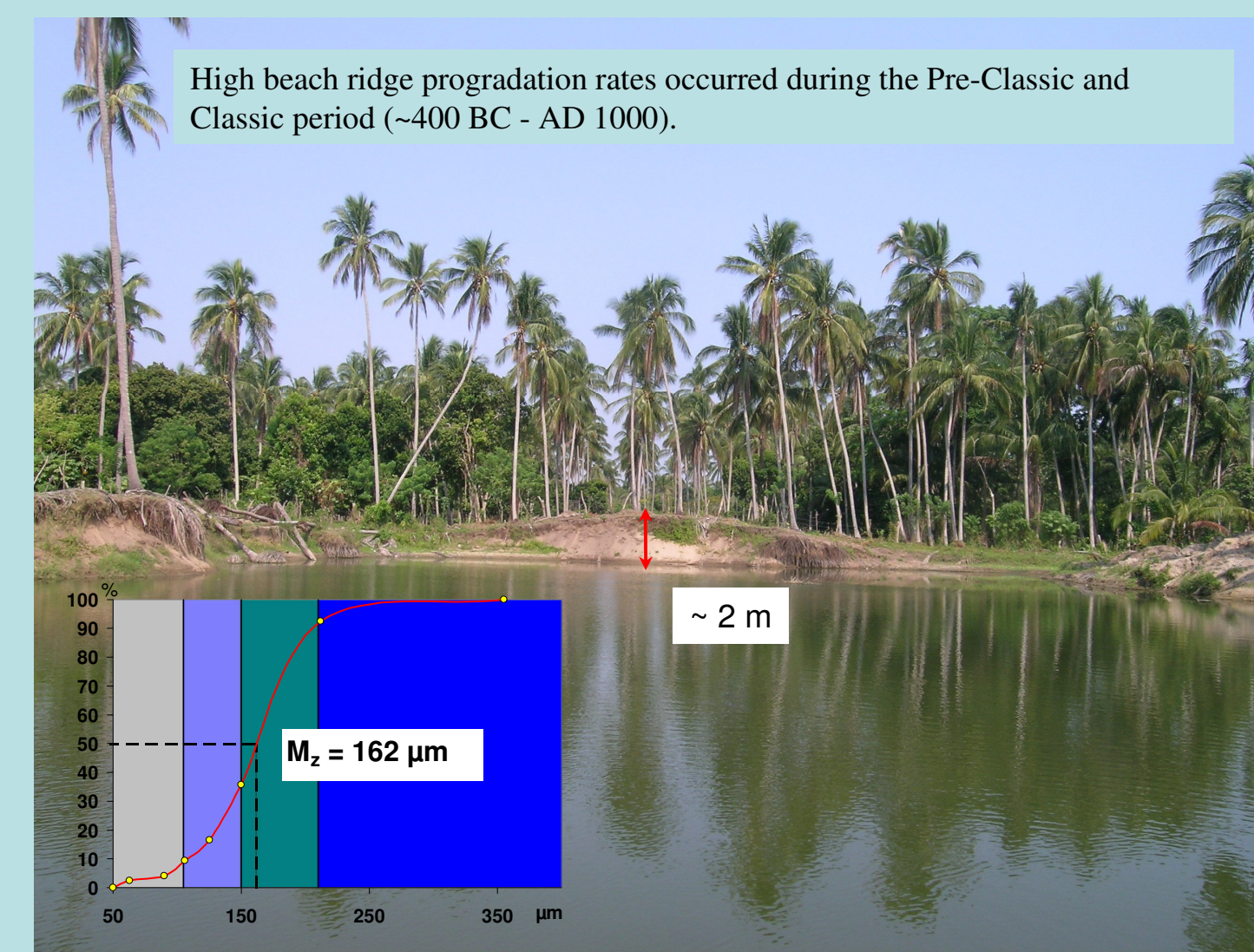
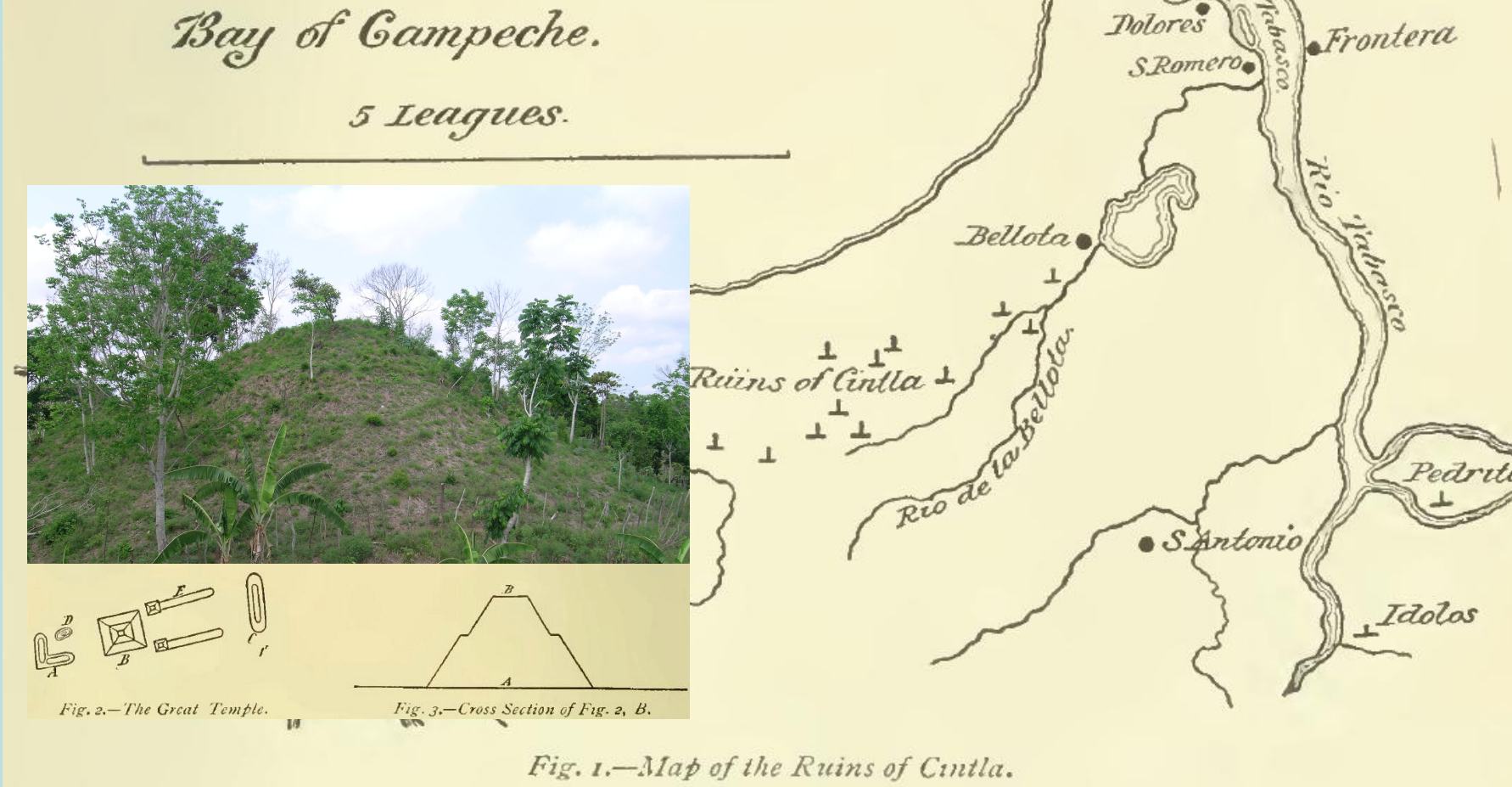
Department of Physical Geography, Utrecht University



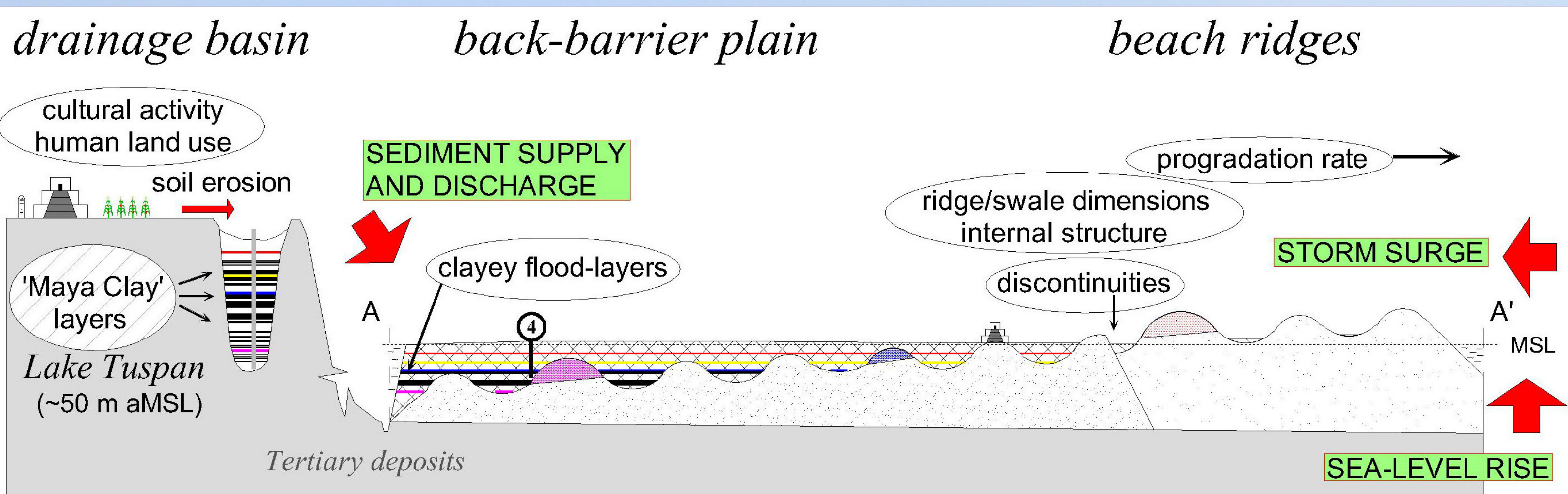
The beach ridge plain of the Usumacinta-Grijalva delta is a highly sensitive recorder of combined sea level rise, subsidence, storm activity, and changes in climate and upstream land use since the dawn of Olmec and Maya cultures circa 5000 years ago.



Numerous archaeological sites are situated on the beach ridges.  
(Map and figures after an archaeological survey by Brinton in 1869 (Brinton, 1896).)



**Hypothesis:** Deforestation and periods of intensive land use in the watershed accelerated soil erosion and increased sediment supply to inland lakes and depressions. In the hinterland eroded soil forms marked beds of so called 'Maya Clay' in many lake records. We hypothesise that human induced soil erosion also resulted in large supply of sandy sediment ('Maya Sand') to the rivers and contributed to the development of the extensive beach ridge plain.



Schematic cross section of transect A with the main forcing factors (red arrows) and related parameters (encircled) controlled by changes in climate and land use. Core 4 has been studied in detail by Nooren et al. (2009).

**Strategy (hinterland)**  
2011 - 2014

-High resolution multiproxy study of a sediment core from lake Tuzán.  
-Archaeological/historical reconstruction of human cultural activity for the last 3000 yrs.  
In collaboration with the Universities of Campeche (Mexico), Toulouse, and Bordeaux.

**Strategy (beach ridge plain)**  
2012 - 2015

-Transect survey and coring (dGPS, GPR, and palynology).  
-Geochronology (<sup>14</sup>C, OSL, tephrostratigraphy and archaeology).  
In collaboration with the University of Campeche, ECOSUR (Mexico), and Michigan State University.  
We use the beach ridge progradation rate as a proxy-measure of received sediment fluxes. These rates are transformed to fluxes using the 3D geometry of the beach ridges to account for the effects of changes in accommodation space and palaeostorm activity.

Beach ridge volume changes will be compared to upstream land-use changes to verify correlations.