



Australian Government



How resilient are our shores?

Applications of nuclear techniques to the study of
storm surges, tsunamis and sea-level rise

Catherine Chagué-Goff^{1,2}, Henk Heijnis¹, Patricia Gadd¹, Atun Zawadzki¹ and James Goff²

¹Australian Nuclear Science and Technology Organisation, Australia; ²University of New South Wales, Australia

2011 Tohoku-oki tsunami inundating the Sendai plain (near Sendai airport)

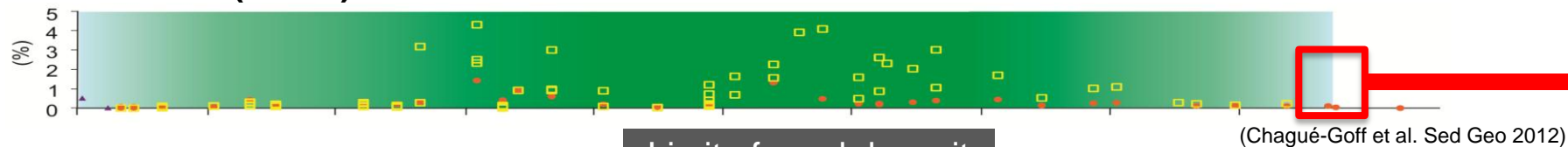


Source: wordpress.api.com

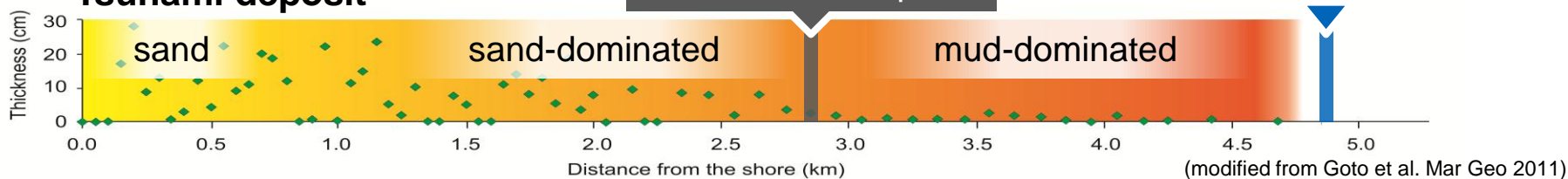
Chemical fingerprinting



Chlorine (= salt)



Tsunami deposit



Extent of sand

Chemical fingerprinting

Magnitude of tsunamis and earthquakes under-estimated

Identify true extent of tsunami inundation, redraw (palaeo) tsunami inundation maps

How big? How often?

2011 Tohoku-oki

1611 Keicho?

915 *Towada-a tephra*

869 Jogan



^{210}Pb

$t_{1/2} \sim 22.3 \text{ yr}$

AMS ^{14}C

$t_{1/2} \sim 5730 \text{ yr}$

A satellite image of Tropical Cyclone Yasi over the eastern coast of Australia. The cyclone is a large, well-defined system with a clear eye and dense, swirling cloud bands. The landmass of Australia is visible in shades of brown and green, with the surrounding ocean in deep blue. A white arrow points from the text box towards the center of the cyclone.

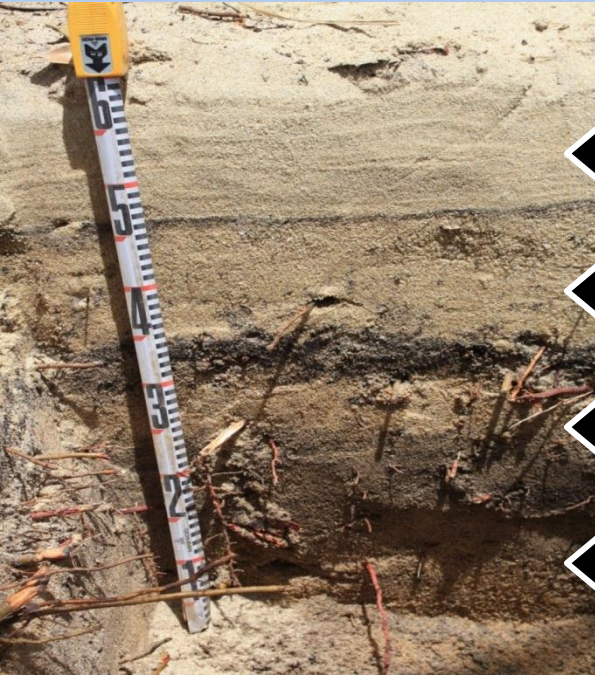
Tropical Cyclone Yasi, Category 5





Tropical Cyclone Yasi- 2011

How big? How often?

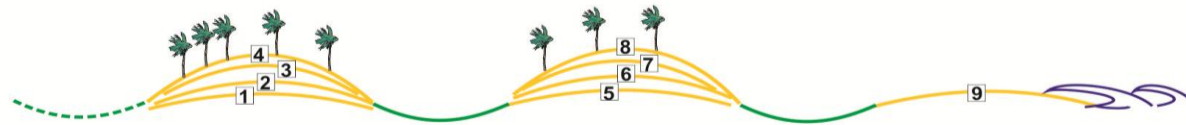


Tropical Cyclone Yasi, 2011

Tropical Cyclone Larry, 2006

Tropical Cyclone Winifred, 1986

Innisfail Tropical Cyclone, 1918



Landward ————— Progradation —————> Seaward

(from Nott et al. JGR 2013)



Australian Government



Thank you
