



Australian Government
Geoscience Australia

A national assessment of the impact of climate related hazards on the coast

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Climate Change Adaptation Information Sharing Forum
Canberra, 22 September 2009

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Outline

- Understanding risk
 - Definitions
 - Influences
- NCVA case study
 - Overview / aims
 - Methodology
 - Limitations
- Next phase
 - Detailed studies

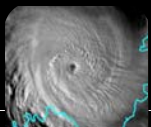


South Narrabeen Beach

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Assessing Risk



Hazard



Exposure



Vulnerability



Impact

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National Coastal Vulnerability Assessment

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National Coastal Vulnerability Assessment (NCVA)

- Funded by Dept. Climate Change
 - an initial assessment of a range of simple, indicative (but quantitative) estimates of climate change impacts at a national scale
 - aims to identify national priorities in supporting effective adaptation/emergency management policy responses in the coastal zone
 - complementary to detailed studies by States/Territories

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National Coastal Vulnerability Assessment (NCVA)

- National assessment includes affects of:
 - sea level rise
 - coastal instability
 - tides and storm surge
 - tropical cyclones
- Number of case studies:
 - Rock lobster fisheries (TAS)
 - Pimpama catchment (QLD)
 - Hunter/Central coast (NSW)
 - Yorke Peninsula (VIC)
 - Pilbara Region (WA)
 - Kakadu (NT)



Glenelg, Adelaide

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Determine impacts of climate change on coastal infrastructure

- Determined hazard in the coastal zone
 - SMARTLINE geomorphic and shoreline stability maps
 - national Digital Elevation Model (DEM) – SPOT
 - SLR scenarios for 2030 and 2100
 - storm tide inundation modelling
 - tropical cyclone wind hazard for 2030 and 2070
- Integrated with GA's National Exposure Information System (NEXIS)
 - residential and commercial buildings
 - major roads, local roads and railways
 - airports, ports, harbours
 - social vulnerability indicators



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Storm Tides + SLR

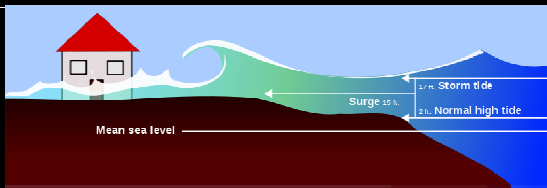


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Storm Tide Modelling (CSIRO)

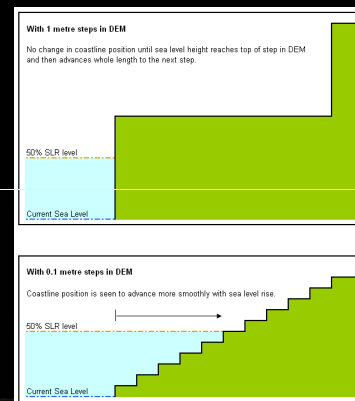
- 1 in 100 year storm surge + max. spring HW tide + SLR (TAS, NSW, VIC)
- 'bathtub' approach
- areas of inundation based on SPOT DEM



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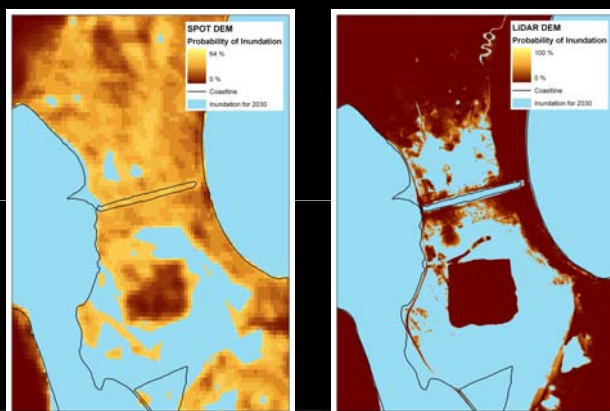
"Step" problem with DEM vertical resolution



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Comparison between corrected SPOT and LiDAR DEMs



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SMARTLINE (UTAS)

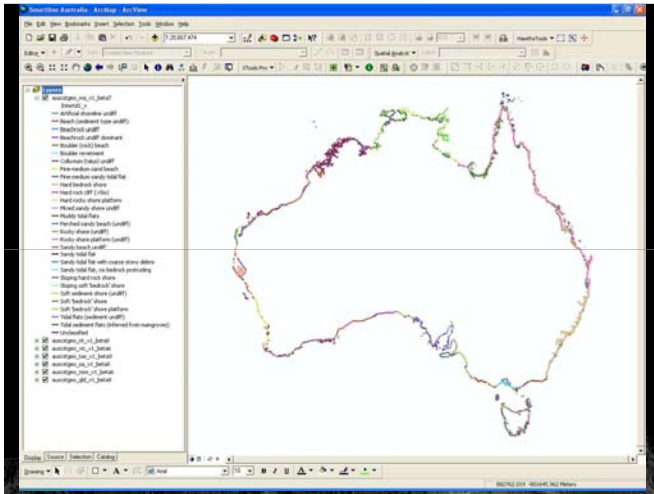
- Nationally consistent geomorphic line map of Australia's coastal zone
 - using existing geomorphic and geology data.
- SMARTLINE is a polyline - segmented into various attributes
 - landform type, exposure, geology etc. of the coast.
- Resulting map used to identify shores that are potentially susceptible to physical instability
 - erosion, slumping etc.



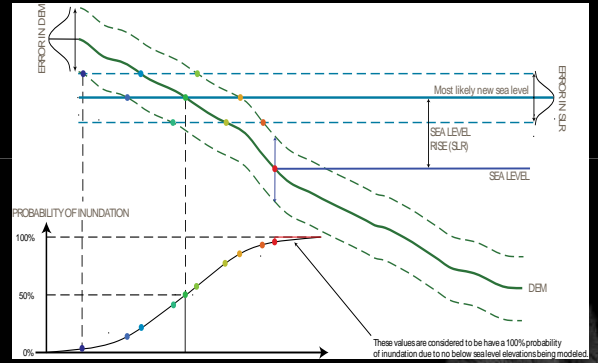
www.ozcoasts.org.au

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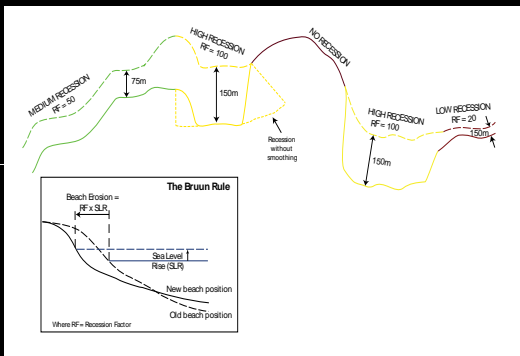
Areas of potential inundation



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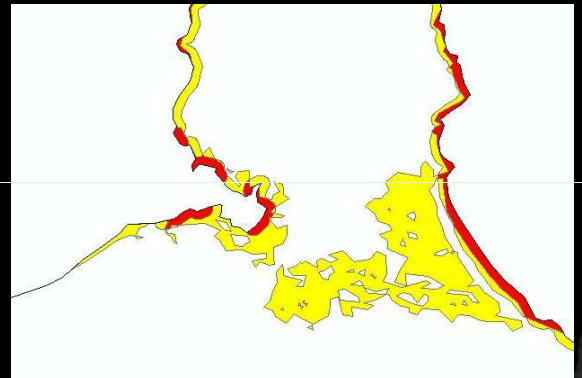
Coastal instability - the Bruun Rule



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Combined Potential Inundation & Instability



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Hazard footprint integrated with NEXIS

NEXIS

SPATIAL

- Latitude
- Longitude
- Address
- Block Size
- Floor Area

STRUCTURAL

- Building Type
- Roof Type
- Wall Type
- Floor Type
- Age
- Storeys/Height

OTHERS

- People
- Income Group
- Replacement Value
- Contents Value

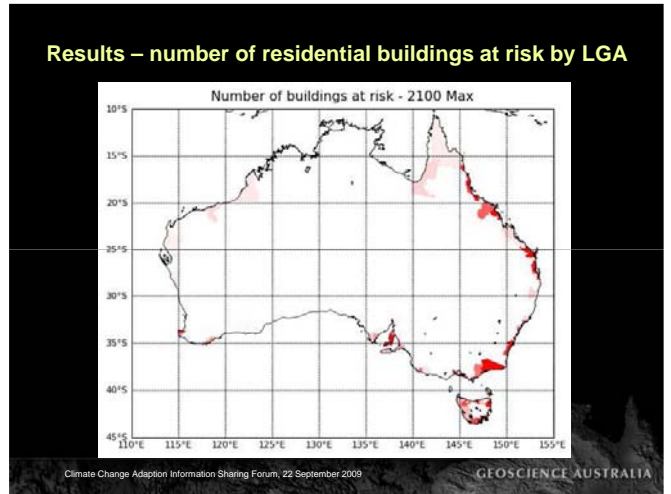
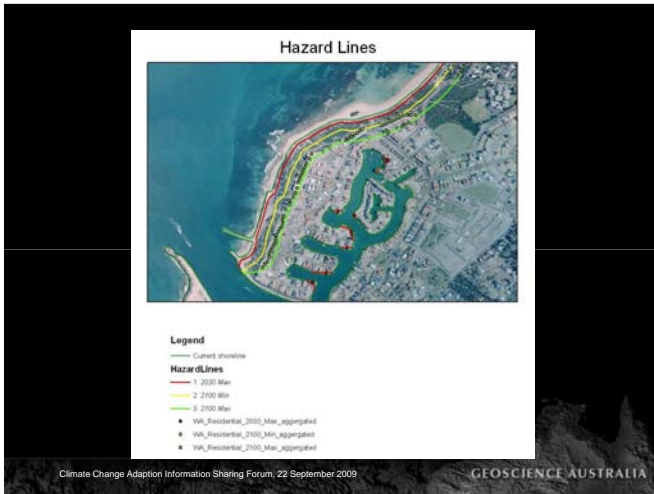


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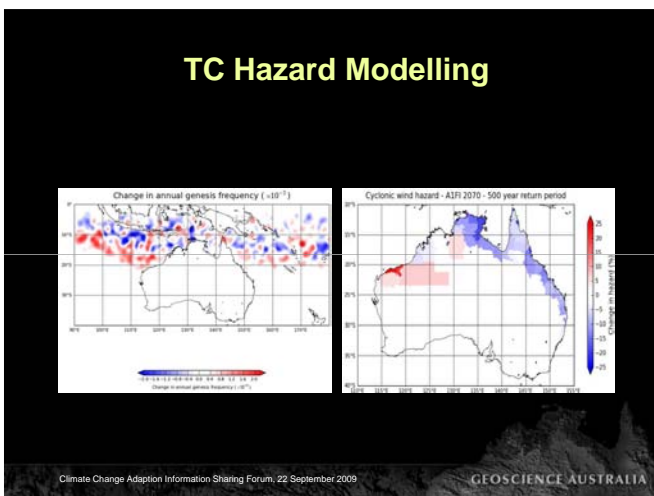
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- ### TC Hazard Modelling
- Cyclonic wind hazard estimated for northern Australia
 - GA's Tropical Cyclone Risk Model (TCRM)
 - Synthetic TC event sets (~50000 yrs)
 - Derived from a Global Climate Model
 - Wind hazard levels modified at local level for:
 - Terrain
 - Topography
 - Sheilding effects
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- ### Limitations/Assumptions
- Mid-resolution DEM – SPOT
 - Vertical resolution = 1m (steps)
 - Absolute planimetric accuracy = 15m
 - Not 'bare earth'
 - 'Bathtub' approach to inundation modelling
 - Storm surge modelling used for NSW, Vic & Tas only – HAT used elsewhere
 - Bruun Rule for coastal recession
 - Estuaries not mapped in all States
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NCVA – next phase: Regional Studies

- More detailed hazard modelling
 - Fine resolution DEM (Urban LiDAR project)
 - Dynamic inundation modelling at the coast
 - Better estimate of coastal recession using Shoreface Translation Model (USyd)

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Future Needs

- Updating Australian height datum
- Storm surge modelling for all States/Territories
- Filling additional gaps in high resolution DEM
- Improved shallow water bathymetry
- National repository of data and models
- Continued improvement of exposure and vulnerability data

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Thank You

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