

Development of an open-access  
server-based tool capable of providing  
standardized risk assessment services  
worldwide

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**WORLD CONFERENCE ON DROWNING PREVENTION 2011** VIETNAM  
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## Presentation Outline

- Risk Assessment for everyone?
- Elements of Risk Assessment
- A framework for simpler data acquisition
- 4 steps
- Advantages and disadvantages
- Future work



## Risk Assessment for everyone?

- Assessment of beach hazards is a key element in water safety
- **But, Risk Assessment:**
  - is not straightforward
  - can be expensive
- Question: **How to promote the assessment of beach hazards and risks worldwide?**



## Elements of Risk Assessment

- Risk Assessment (R)
- Hazards (H)
- Usage (U)
- $R = f(H \times U)$



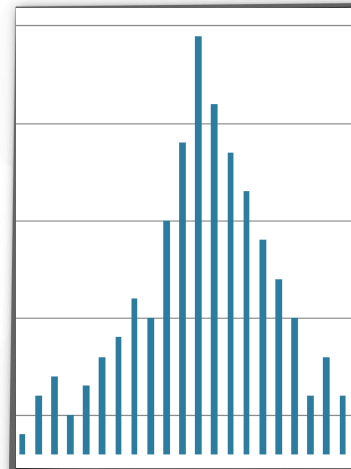
## A framework for simpler data acquisition

1. Rely on users to assess U (usage data) through a guided interface
2. Use state-of-the-art technologies to automatically retrieve the necessary data to (approximately) estimate H while requiring minimal user input
3. Merge U and H using a weighted formula
4. Integrate all in a step-by-step open-access web tool



## Step 1 – Usage data

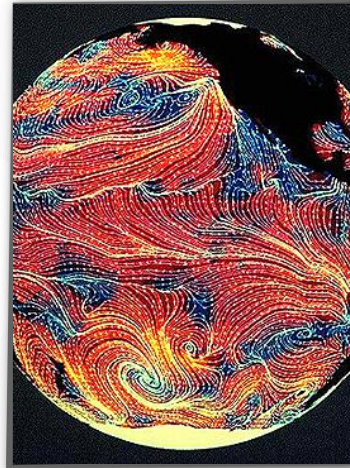
- Hierarchical form
  - Most relevant fields first
  - Estimate of number of users mandatory
  - Remaining fields not mandatory
  - Level of “accuracy” increases with more data
- Gender
- Age
- Beach experience
- ...



## Step 2 - Hazards

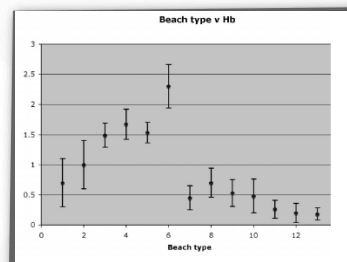
- Solid theoretical background allows for the estimation of “likelihood of presence” of beach hazards
- a) Most beach hazards are strongly related to beach types
  - If the beach type is known a list of the beach hazards most likely present can be drawn (sandy beaches)

(see for example the works of Andrew Short)



## Step 2 - Hazards

- b) Beach types can be characterized based on:
  - spring tide range
  - average breaker wave height
  - sediment size
  - average wave period

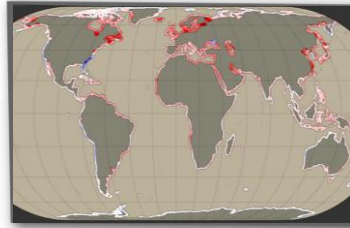
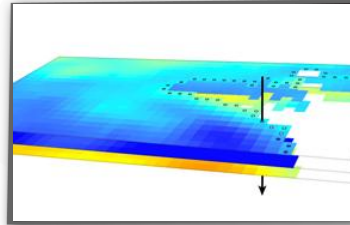


Short (2006) Australian Beach Systems—  
Nature and Distribution. *Journal of Coastal  
Research*. 22(1)



## Step 2 - Hazards

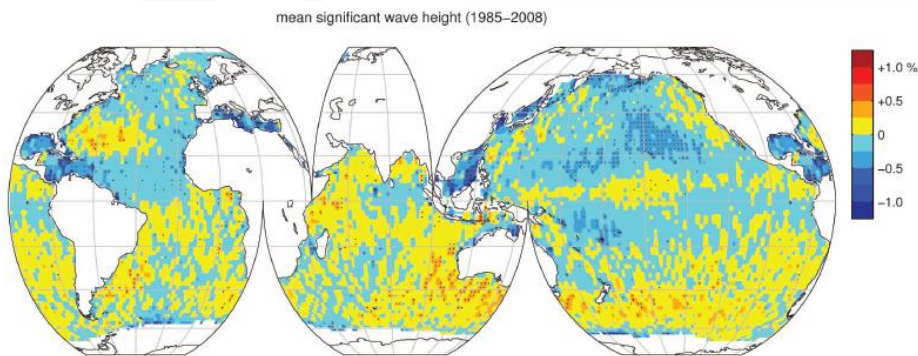
- In recent years data sets containing years of global oceanographic data have been made available (e.g. from NOAA)
  - GEOSAT
  - ENVISAT
  - TOPEX
  - JASON1
  - GFO
  - ...
- Using appropriate tools, parameters can be automatically downloaded from these databases for any shore in the world
  - User only needs to provide the geographical location and be assisted to calculate sediment size



[www.coastalwarming.com](http://www.coastalwarming.com)



## Step 2 - Hazards



Young et al. (2011) Global trends in wind speed and wave height. Science. 332



### Step 3 – Merging U and H

- Parameters composing **U** and **H** can then be merged automatically if a weighted formula is designed

$$X = 3a + (2b \times 0,5c)$$

Example of a hypothetical weighted formula.  
For illustrative purpose only.



### Step 4 – Step-by-step GUI

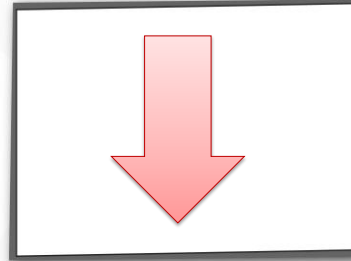
- All data collection can be integrated into an open-access web-based Guided User Interface
  - Guidance
  - Supervision
  - Expert support
  - ...

<http://WWW.>



## Disadvantages

- More Risk Assessment at the cost of quality
- Weighted merging formula – will there ever be a good one?
- Relying on users to collect sensible data
- Internet access required – *far-reaching* but not *all-reaching*



## Advantages

- More Risk Assessment
- Expert risk assessment services can be proposed within the same platform
- Opportunity for standardization of Risk Assessment
- Open-access interface reaches out to developing communities worldwide



## Advantages

- Reduced cost (cost-benefit ratio likely very rewarding)
- Opportunity to spread ILS and water safety policies and advices
- Opportunity for worldwide collection of relevant water safety data
- Educational tool – introduction to the thematic of Risk Assessment



## Future work

- We will engage into and/or need assistance in:
  - Defining the appropriate parameter values for the estimation of beach type for all coastal areas in the world
  - Designing a user-friendly form for the collection of beach usage data
  - Establishing one (or more) weighted formula(s) to merge collected data
  - Designing and implementing a web-based tool for data collection and processing
  - Testing the reliability of the proposed tool



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