International Tsunameter Partnership

Report to DBCP-25, Paris 2009

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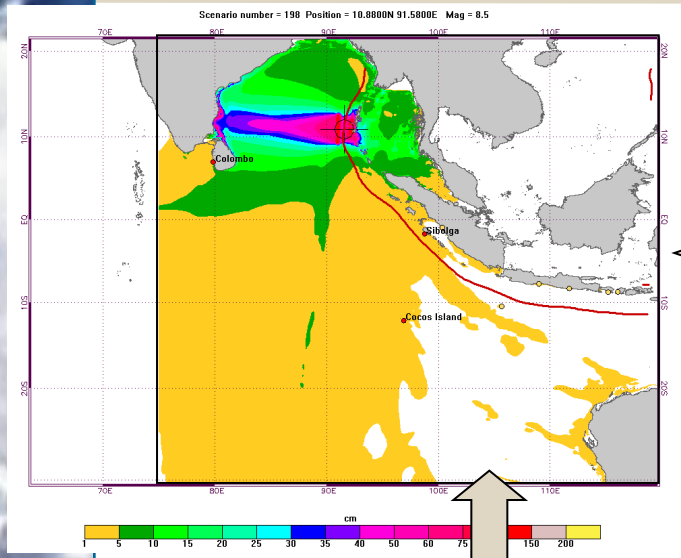
Sea Level Observations – Stages

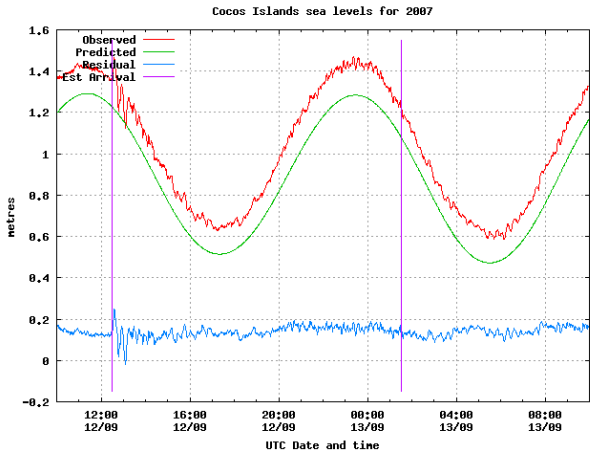


Observation Network Design

Coastal & Deep Ocean Network Establishment

Timely Data Exchange to Agreed or Common Standards

Operating and Sustaining



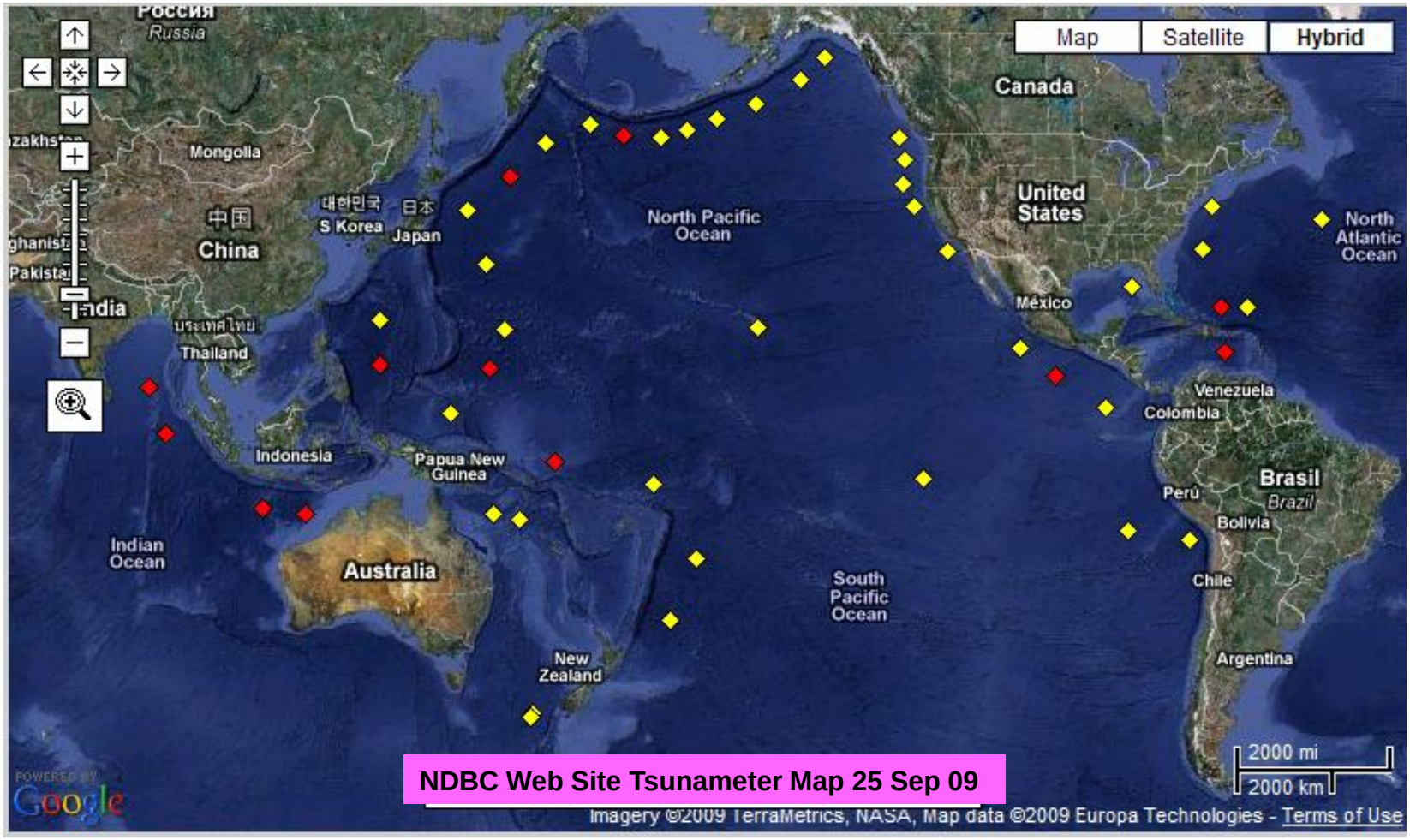
Data Management and Data / Metadata Repositories

The Last Year

- MEETINGS:
  - March – **Global Tsunami Warn Systems Meet** – Paris – global TWS "harmonisation", broader than ITP, but with ramifications – e.g. joint ITP/DBCP tasking on vandalism study, through subsequent IOC-TOWS Meeting
  - April – Hyderabad **informal inter-sessional meeting** in conjunction with ICG/IOTWS
  - Sep – **ITP- 5, Paris – linkage to DBCP** **GREAT TEAM !!!**
  - To come – **IOTWS Steering Committee, Perth, Dec 09** – potential rationalisation of Working Groups in next year

- PROGRESS:
  - **Significant # of Indian Ocean network deployments**, but with attrition.
  - **US-operated networks returned to high availability**.
  - **BUFR data exchange standard** for tsunameters ratified for GTS transmission – AUS tsunameters all transmitting in this format.
  - **Some stations exercised with small tsunami events** – high resolution data sets being exchanged, and performance potential being revealed
  - **Some warning centre / modeller experience with live data during an event**.

Status of Networks (A) – "DART" *www.ndbc.noaa.gov*



NDBC Web Site Tsunameter Map 25 Sep 09

◇ Stations with recent data
◇ Stations with historical data only
◇ Stations with no data in last 8 hours

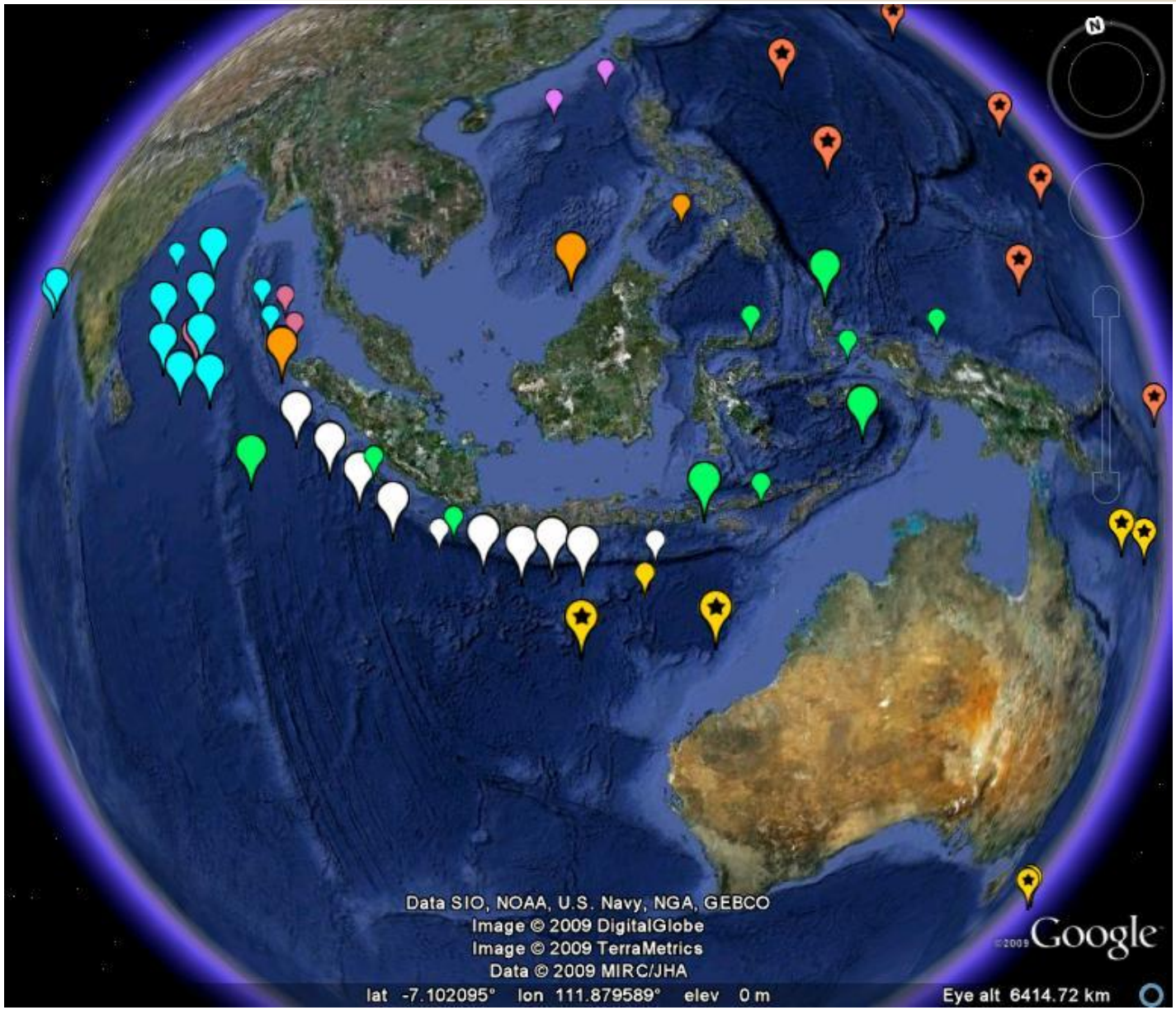
48 Tsunami stations deployed
36 have reported in the past 8 hours

Disclaimer

Global Tsunameter Network Coverage – Exist & Plan*

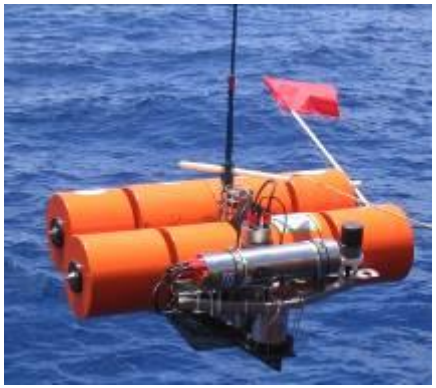
* Excluding European / NEAMTWS Plans
* 2 Rep. of China buoys (South China Sea) illustrative only

Networks Established by Indian Ocean TWS Countries

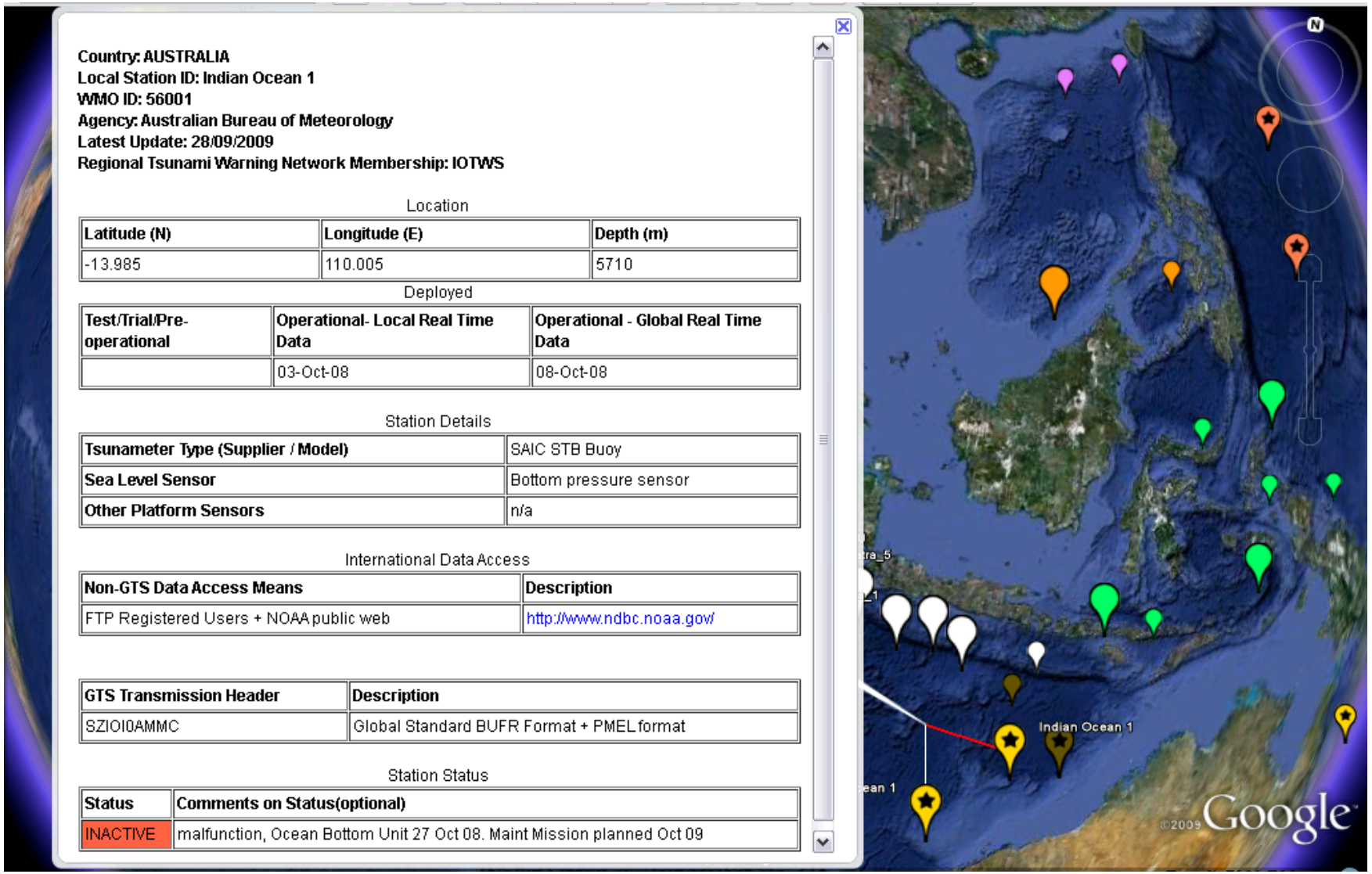


Tsunameter Equipment Types (some)

Excluding Cabled Systems



Behind the Google Earth Projection



Country: AUSTRALIA
Local Station ID: Indian Ocean 1
WMO ID: 56001
Agency: Australian Bureau of Meteorology
Latest Update: 28/09/2009
Regional Tsunami Warning Network Membership: IOTWS

Location

Latitude (N)	Longitude (E)	Depth (m)
-13.985	110.005	5710

Deployed

Test/Trial/Pre-operational	Operational- Local Real Time Data	Operational - Global Real Time Data
	03-Oct-08	08-Oct-08

Station Details

Tsunameter Type (Supplier / Model)	SAIC STB Buoy
Sea Level Sensor	Bottom pressure sensor
Other Platform Sensors	n/a

International Data Access

Non-GTS Data Access Means	Description
FTP Registered Users + NOAA public web	http://www.ndbc.noaa.gov/

GTS Transmission Header	Description
SZIOI0AMMC	Global Standard BUFR Format + PMEL format

Station Status

Status	Comments on Status(optional)
INACTIVE	malfunction, Ocean Bottom Unit 27 Oct 08. Maint Mission planned Oct 09

The Journey – Where Are We?

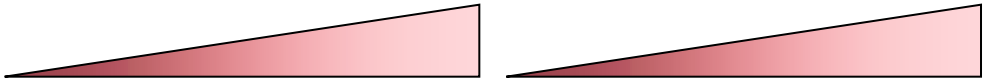
NOW

Delivering on Mission → Realising Potential

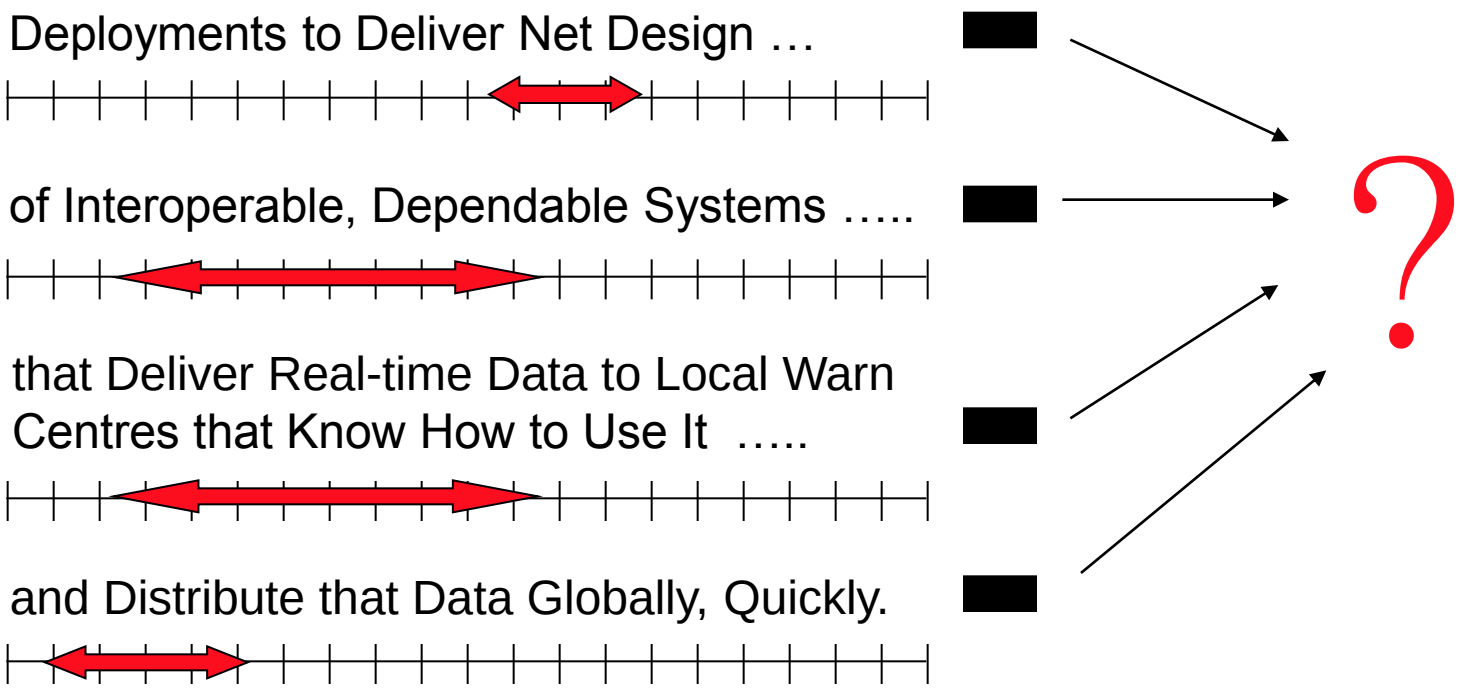
NEXT

Very Soon!!

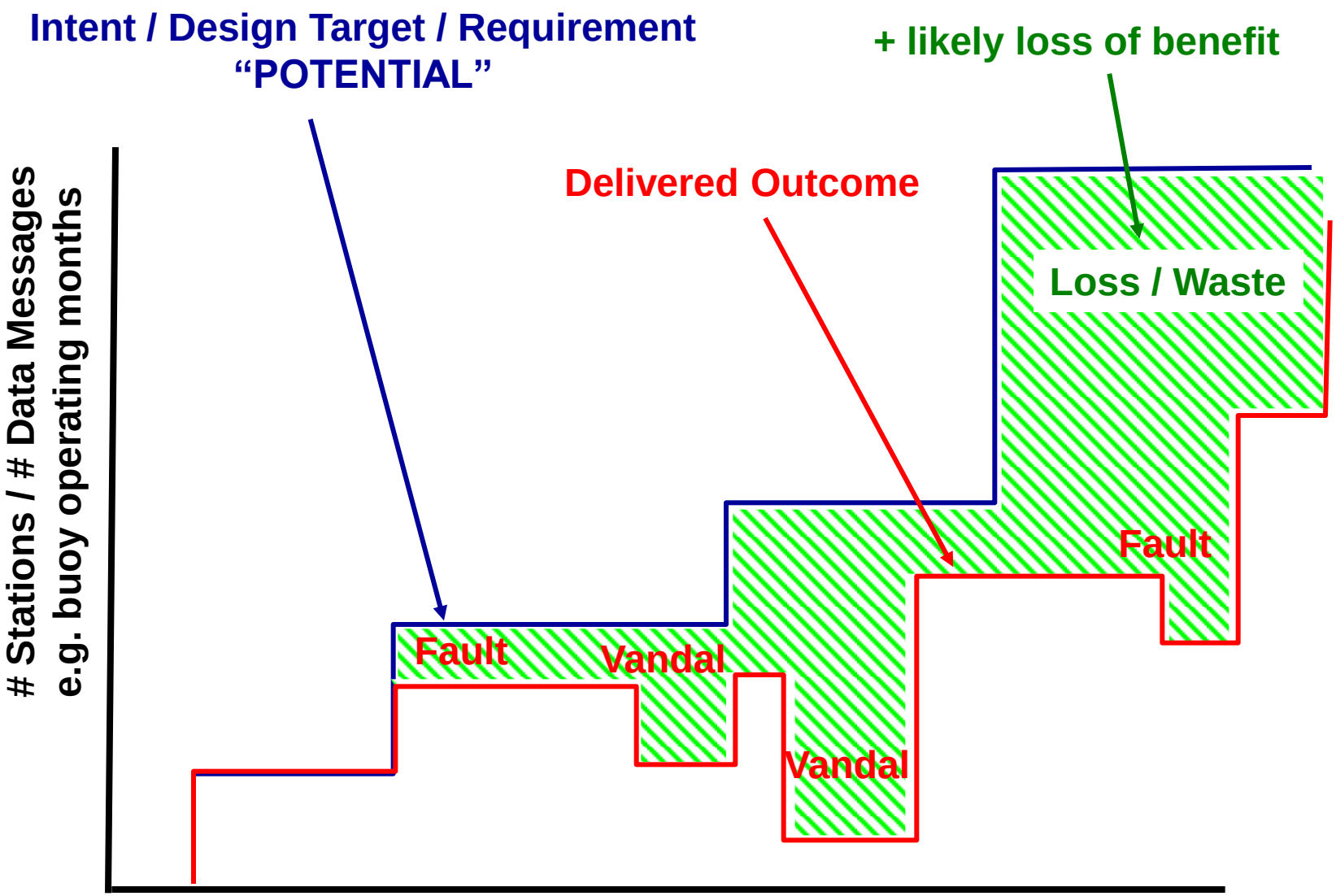
Sustaining the Mission



- Deployments to Deliver Net Design …
- of Interoperable, Dependable Systems …..
- that Deliver Real-time Data to Local Warn Centres that Know How to Use It …..
- and Distribute that Data Globally, Quickly.

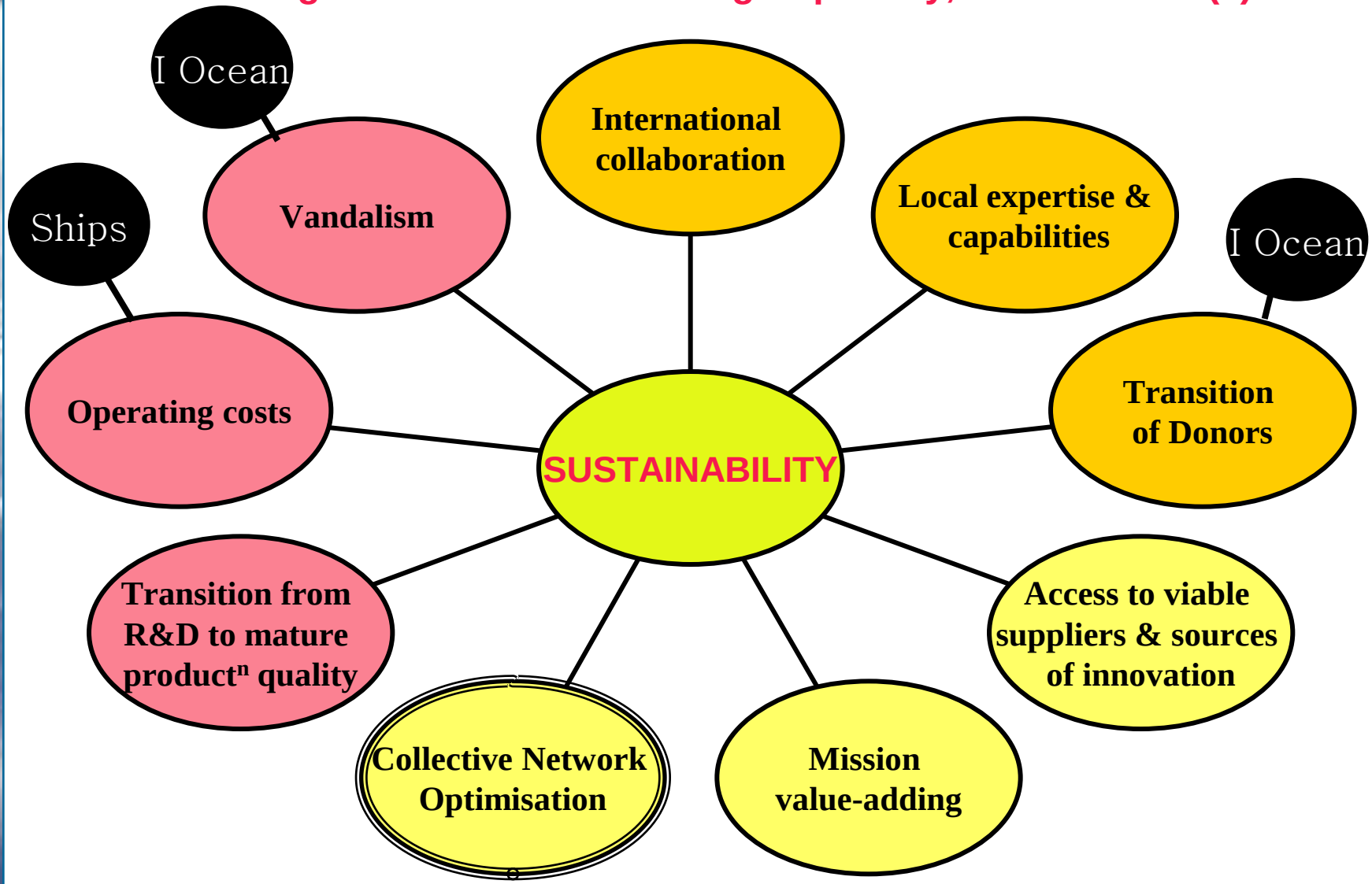


Reaching “POTENTIAL”



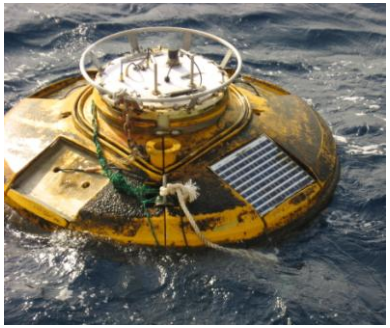
Challenges

Sustaining the Communal Warning Capability, NOT Network(s)



Vandalism

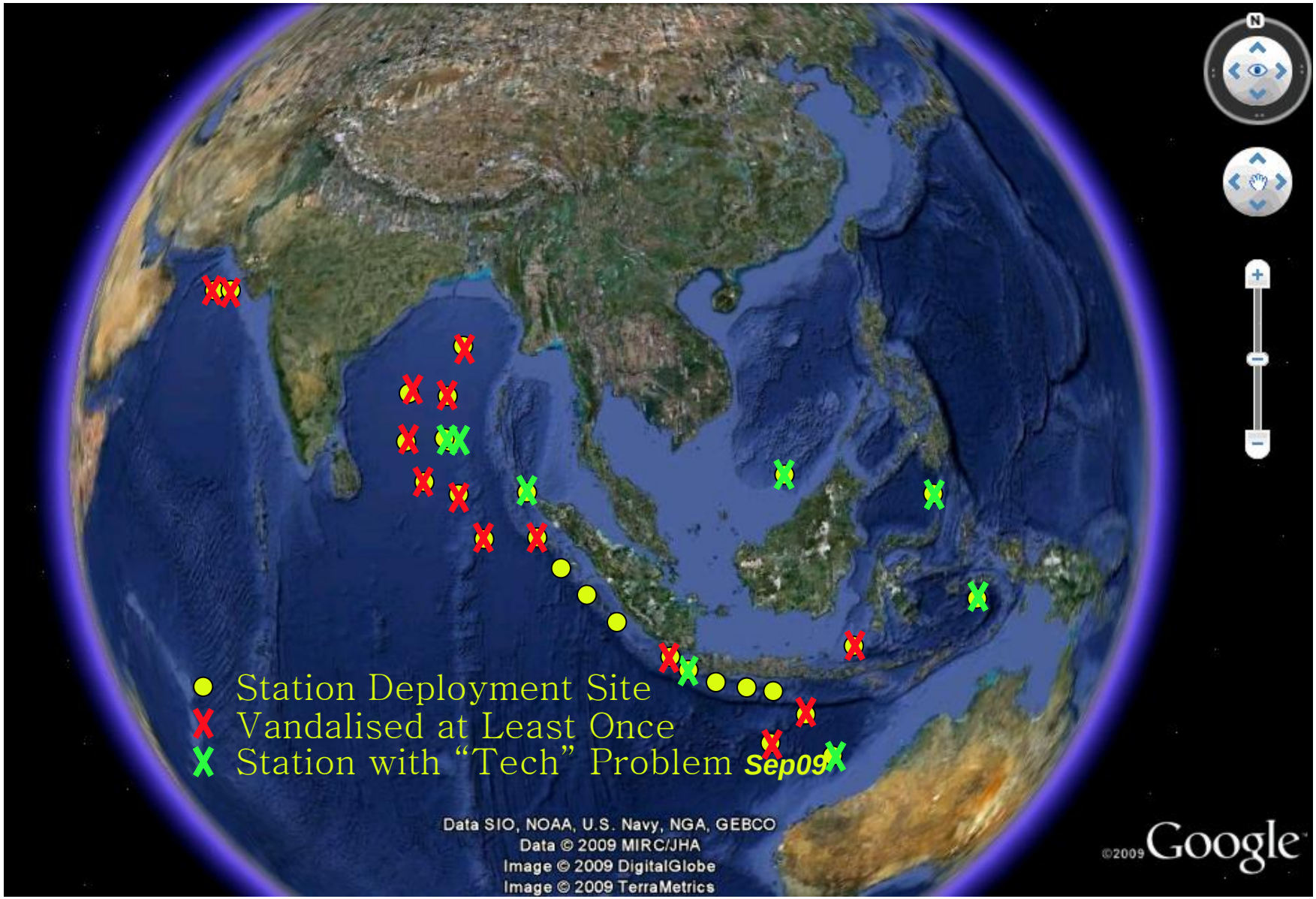
- **Since first steps to establish national tsunameter networks in the Indian Ocean, over 25 vandalism events have been recorded.**
- **Incidental and malicious interactions** :
  - Fishing line / net fouling of moorings and damage to underwater modem cables
  - Satellite antenna damage, theft of solar cells
  - Stations being pulled off station and consequential damage to mooring line
  - Theft of entire electronics payloads from surface buoys (several incidents)



COSTS:

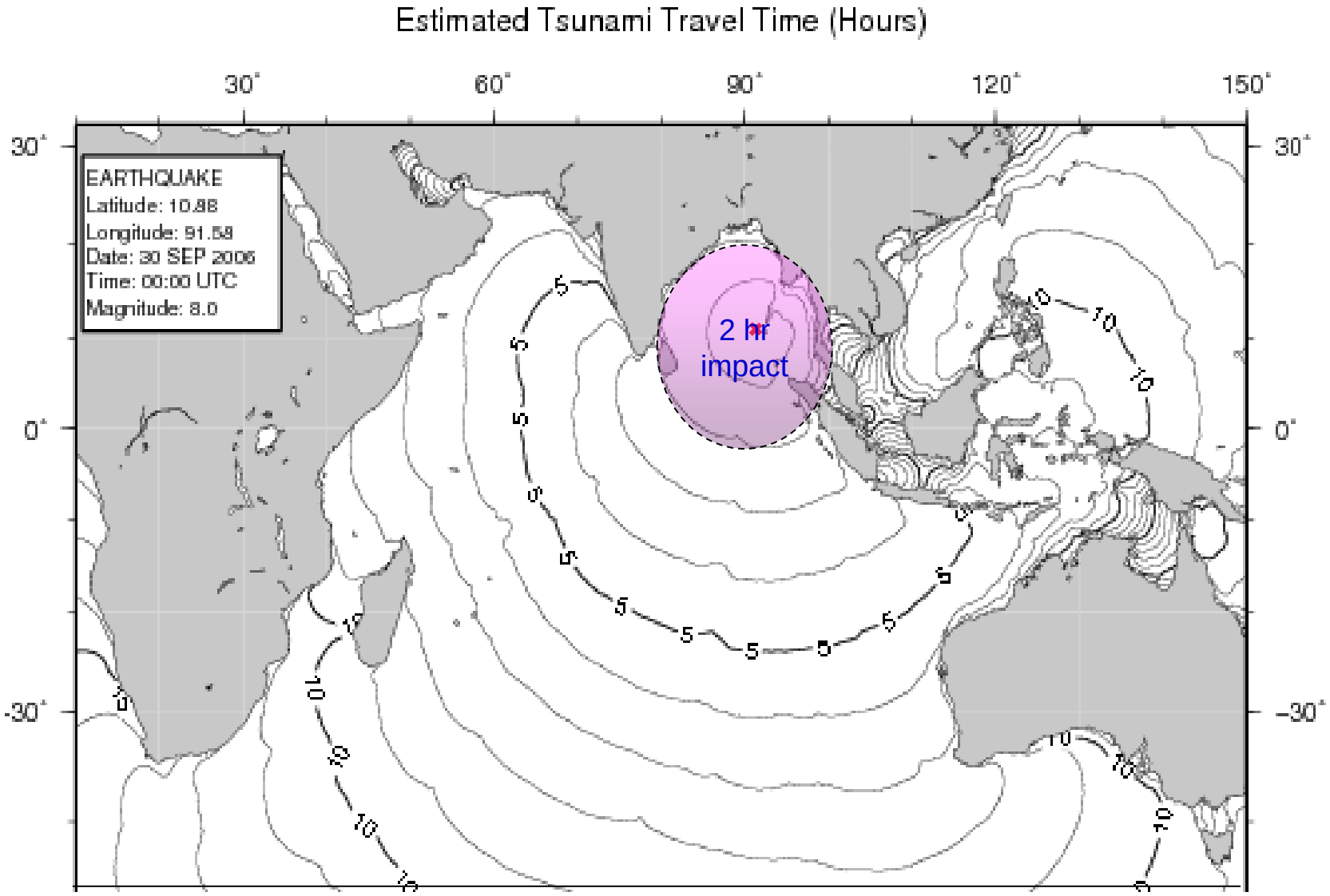
- **$$$$$**
- **Warning capability**
- **Distraction of resources** from important developments
- **Confidence**

IO Tsunameter Vandalism Incidents (excluding most recent)



Consequence of Network Degradation

Australian BOM “Scenario 198” – Travel Time Model Estimates



Wave Arrival Times – Sea Level Stations

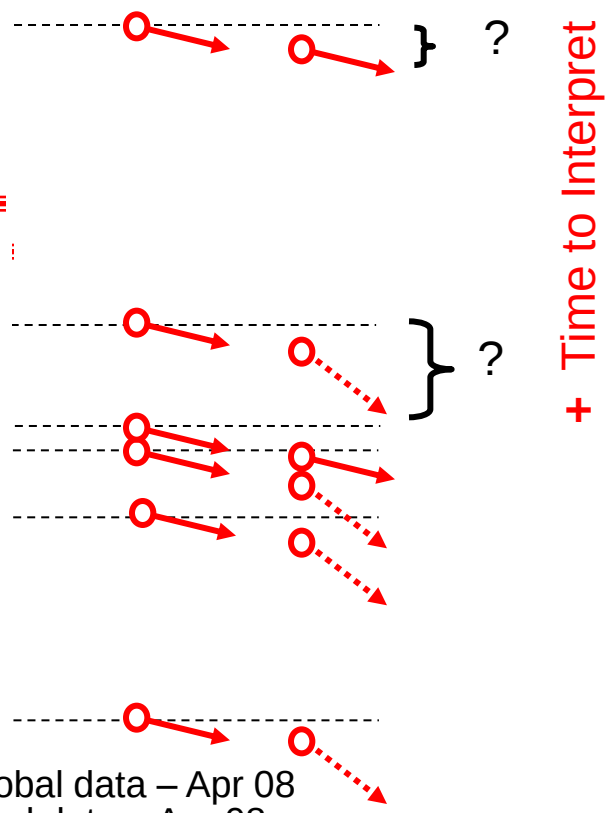
NOTE: ***travel times indicative, subject to model grid alignments, and fidelity of bathymetry*

With Available (Deployed) Stations (NOT ALL)

Type	Name	Wave Arrival (Model)
Coastal	Rangath Bay	0.33
Tsunameter	DART (Thai)	0:36
Tsunameter	TB6 (India)	0:47
Tsunameter	TB3 (India)	0.54
Coastal	Nicobar	1:00
Tsunameter	Rondo (Malaysia)	1:19
Coastal	Sabang	1:27
Tsunameter	DART (Indon)	1:42
Coastal	Trinconmalee	1:43
Coastal	Nirinda	1:53
Coastal	Nias Island	1:57
Coastal	Ko Miang	1:58
Coastal	Chennai	2:07
Coastal	Sittwe	2:12

+ Time to reach host Warn Centre: Local comms.

+ Time to reach NEIGHBOUR Warn Centre or RTWP: GTS reporting & Tx



Stations in place, transmitting real time global data – Apr 08

Stations in place, but not transmitting global data – Apr 08

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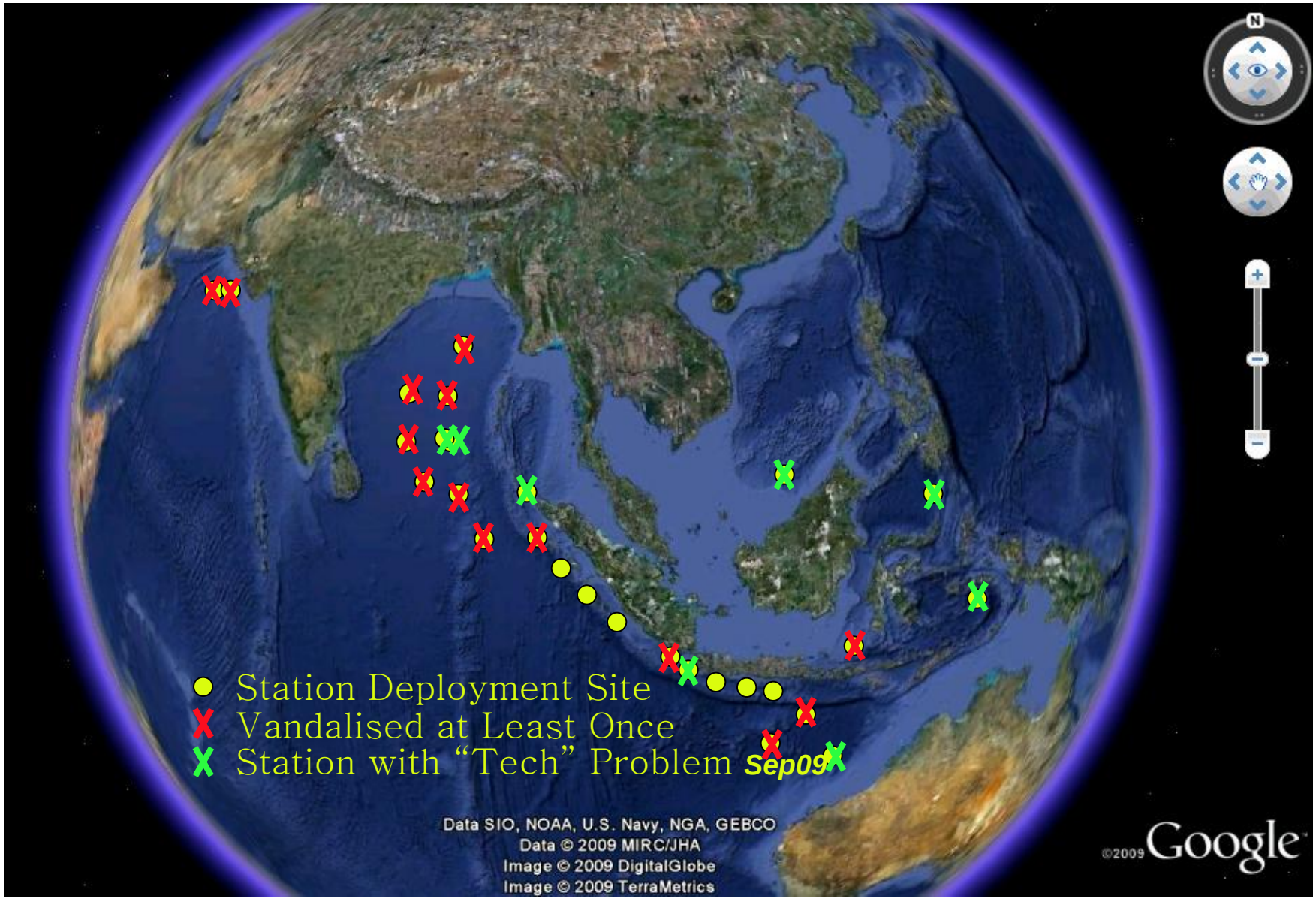

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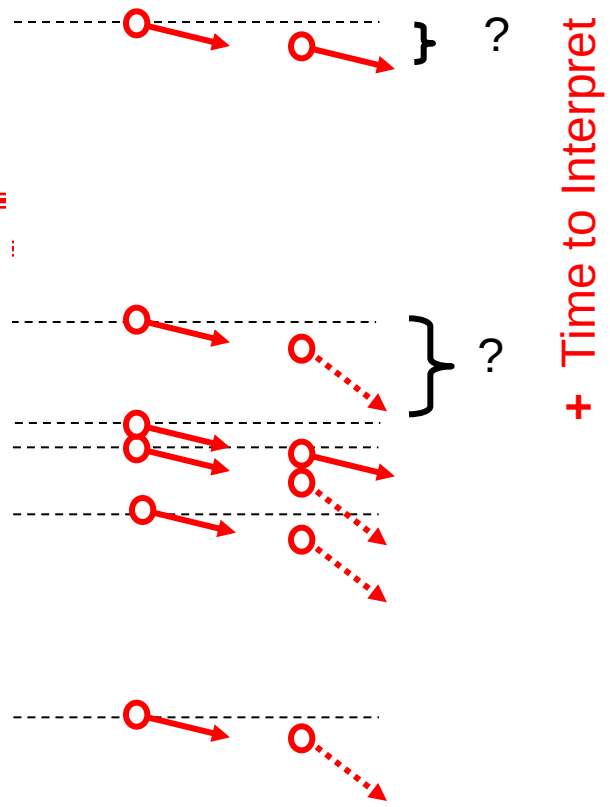
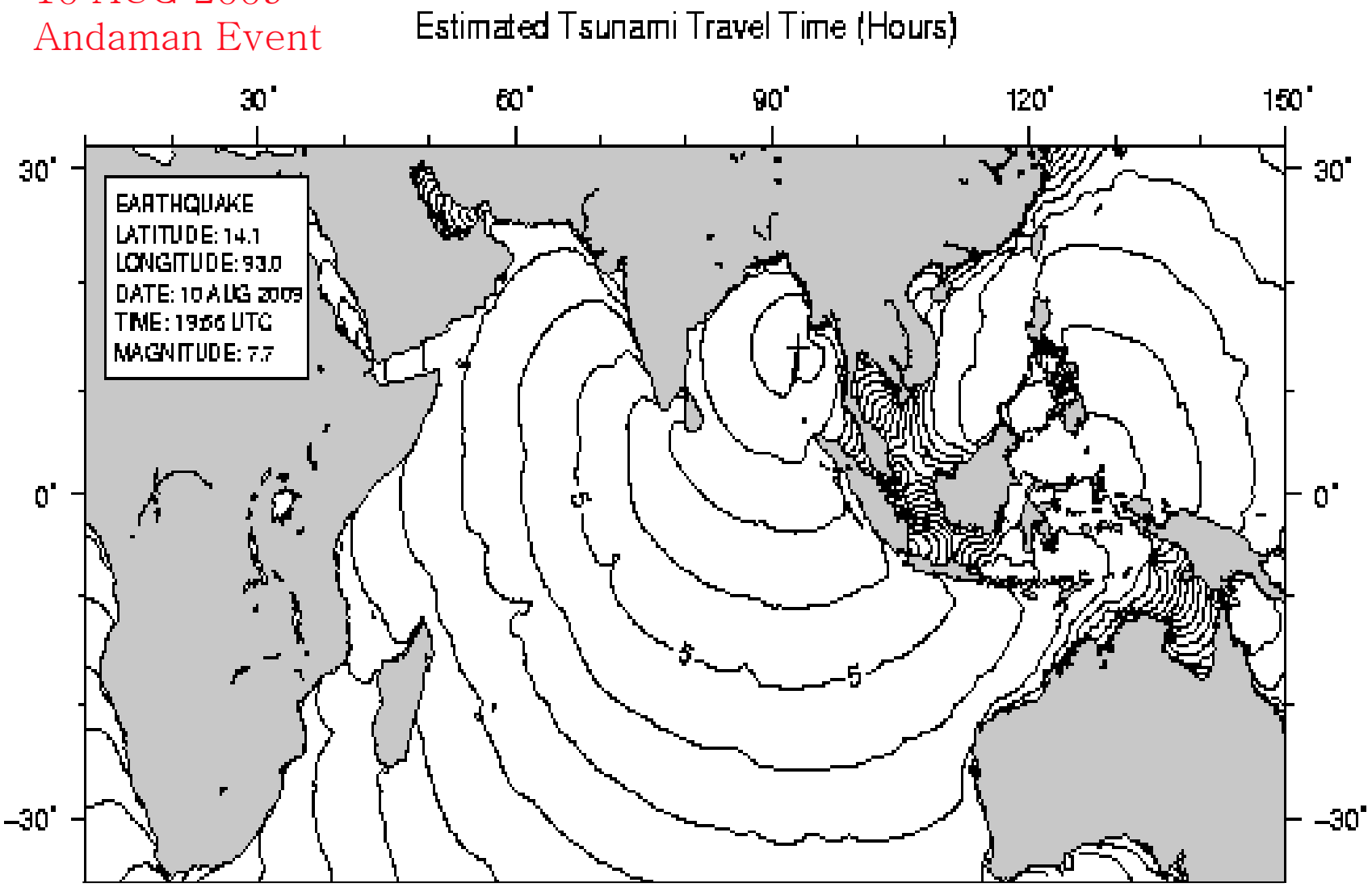


Potential Warning Service Consequence

10 AUG 2009
Andaman Event



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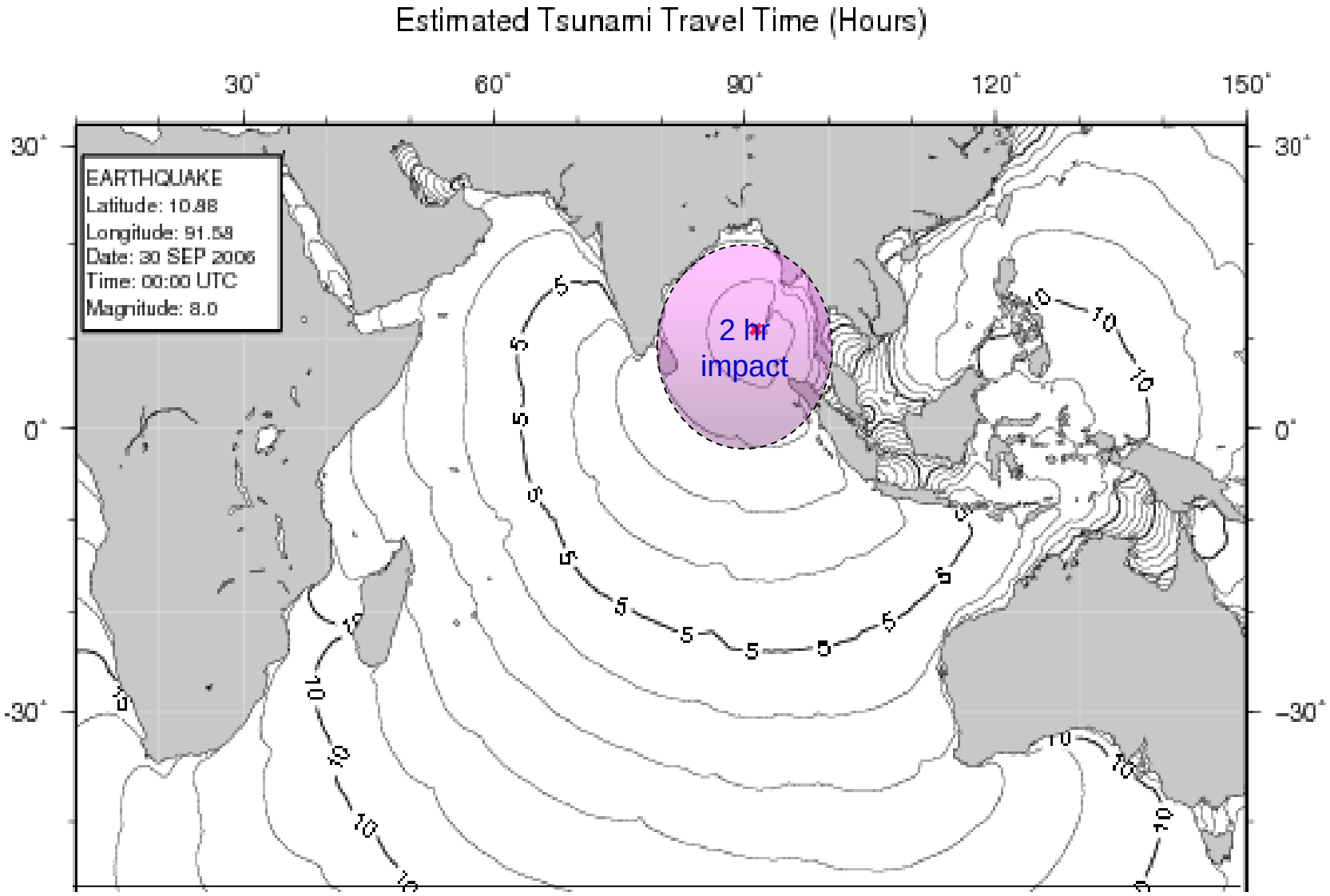

Where to From Here?

- Getting ALL technology & products to mature state – best practice exchanges to reveal improvement & innovation targets; inter-comparison possibilities. Establish best practice framework.
- Data Exchange – Data Exchange – Data Exchange
- Data and metadata repositories
- Vandalism and sustainability studies / propositions
- Communal collaboration facilities
- Near-field tsunami detection – ocean wave signal in seismic noise + , challenge of warning results for immediately threatened communities. Platform and processing technology; modelling science; warning interpretation; neighbourhood data streams. Workshop planned in 2010.
- Relationships and governance transitions – IOC, ICG/IOTWS; other regional tsunami warning "users" or stakeholders; DBCP; GLOSS (coastal stations).
- Life AFTER network establishment.