

ITSU 1985 - 2005

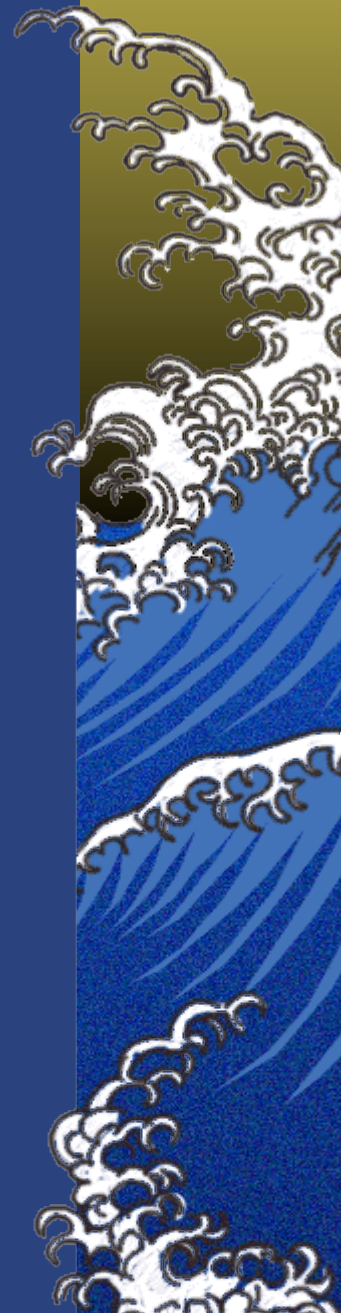
**Maturity of the Pacific
(and still unique...)
international
tsunami warning system**

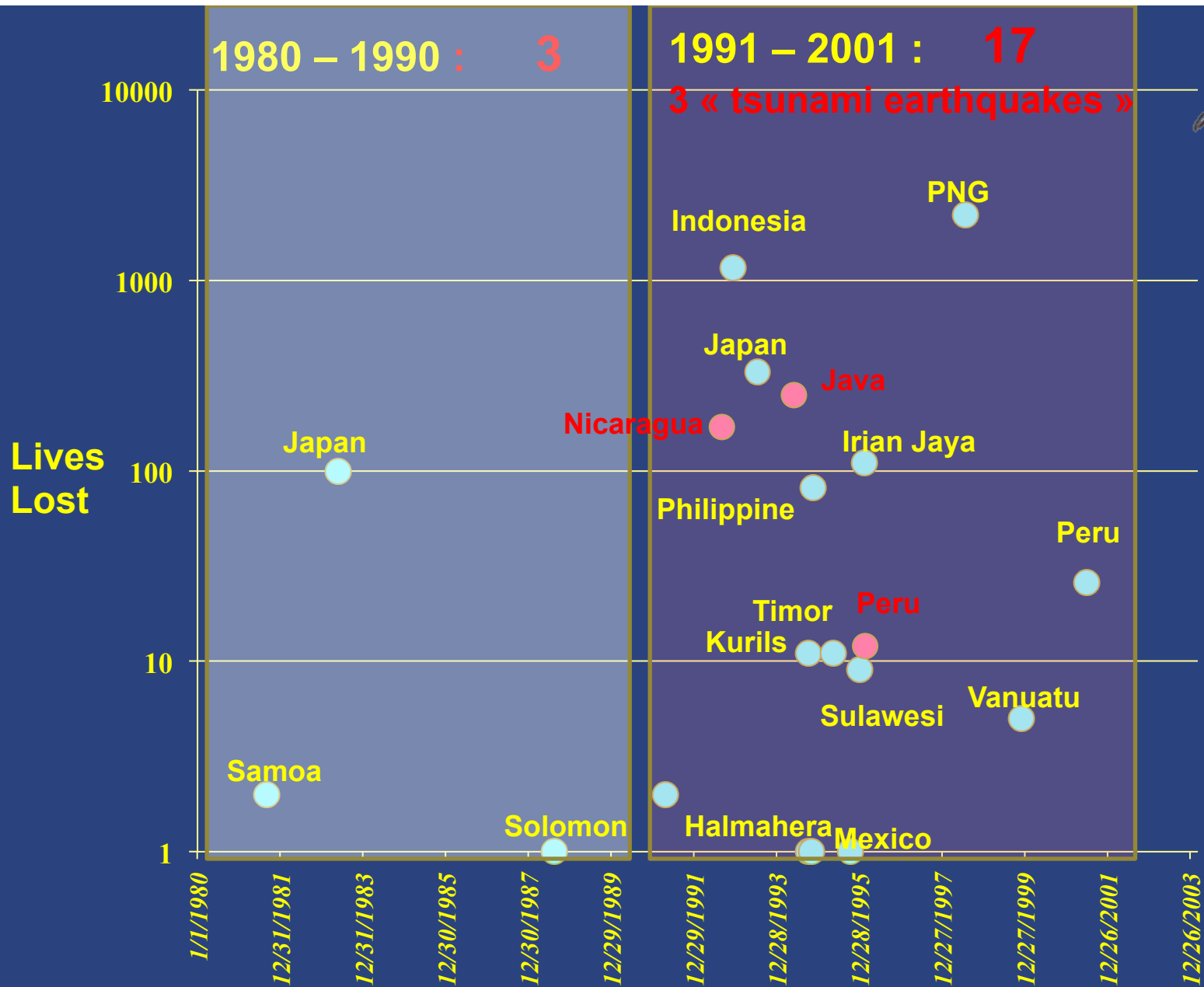
François Schindelé (CEA – France)

International expert

ITSU Vice-Chair 1995-1999

ITSU Chair 1999-2005





=> URGENT task : Addressing Local and Regional tsunamis



International Coordination Group

XII
Russia

XVII
Korea

XIV
Japan

XI
China

XIII
Mexico

XVIII
Colombia

XVI
Peru

XX
Chile

X
Australia

XV
France

XIX
New-Zealand

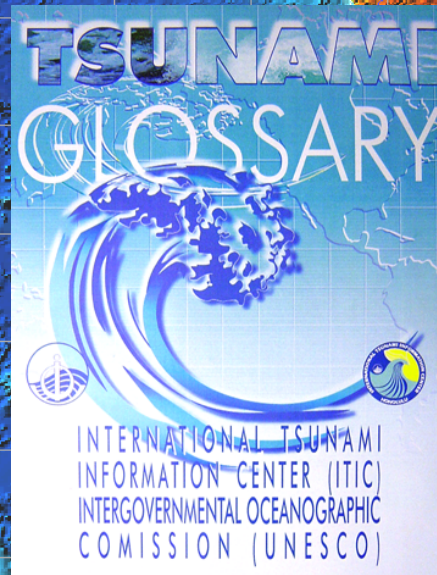


=> Commitment of Government of Member States

Joint workshops ITSU – IUGG Tsunami Commission

2000
Moscow

2002
Kamchatka



2000
Intra-America
Sea project

2001
Cartagena

2003
Wellington

2005
Santiago



=> Strengthening cooperation between scientists, researchers and tsunami warning system and centers

Governance ITSU

Pacific tsunami
warning center PTWC

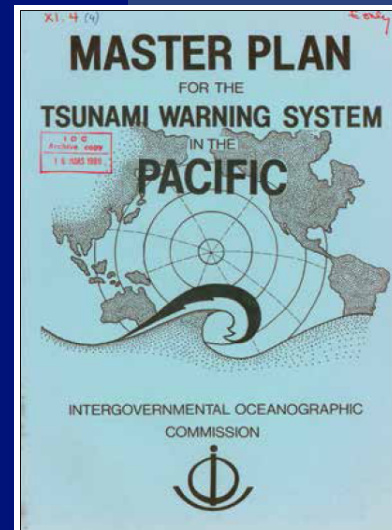
National Tsunami
warning centers NTWC

Tsunami National Contact
TNC

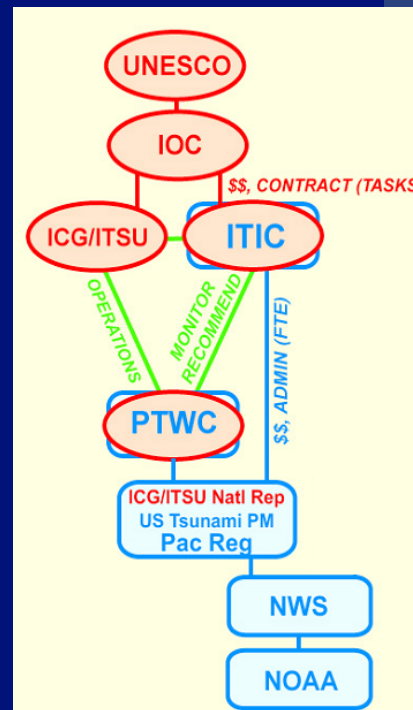
Tsunami Warning
Focal Points TWFP

International Tsunami
Information Center ITIC

1st Version 1989

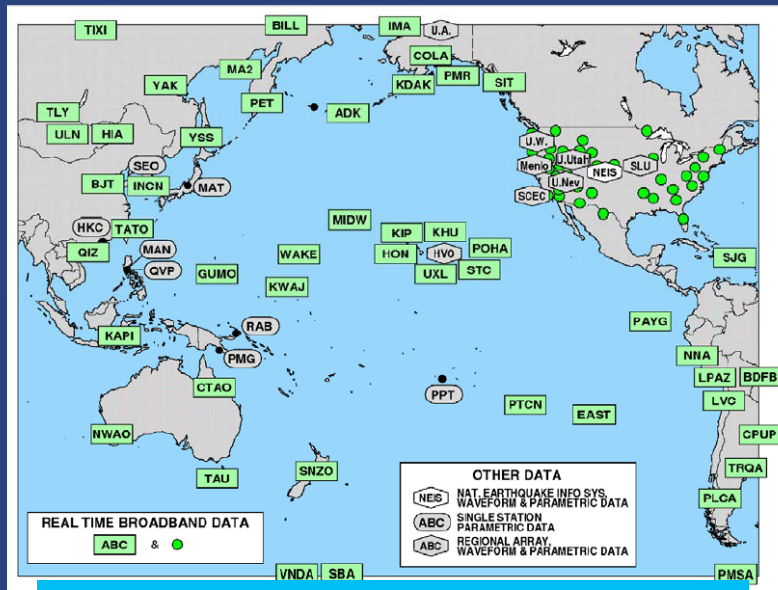


2nd Version 1999
Master Plan

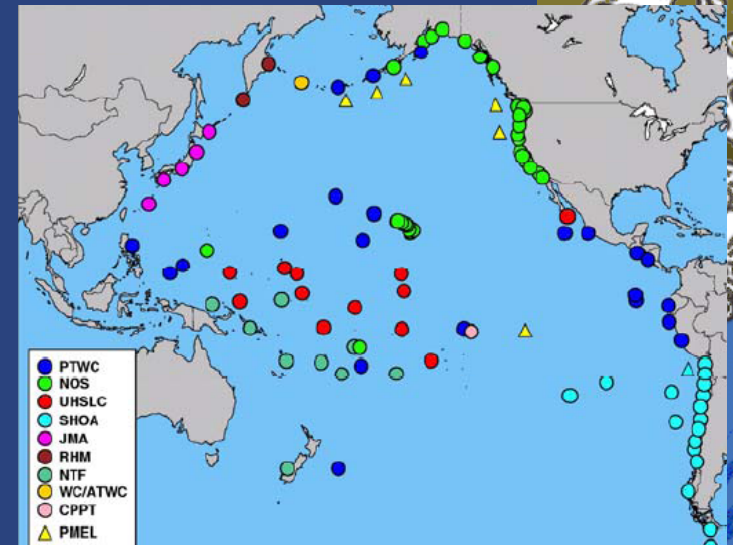


CONTENTS	
ITSU HISTORY AND ORGANIZATIONAL STRUCTURE	1
TSUNAMIS AND THE TSUNAMI HAZARD	3
Local and Regional Tsunamis	3
Pacific-Wide or Distant Tsunamis	4
Characteristics of the Tsunami Phenomena	5
CURRENT STATUS, LIMITATIONS, AND FUTURE DIRECTIONS	7
Hazard Assessment	7
Historical Tsunami Data	7
Paleotsunami Data	9
Post-Tsunami Surveys	9
Numerical Modeling	9
Warning	11
Warning Systems and Centers	11
The Pacific Tsunami Warning Center	11
The West Coast / Alaska Tsunami Warning Center	12
The Japanese Tsunami Warning Centers	13
The Russian Federation Tsunami Warning Centers	14
The Polynesian Tsunami Warning Center	14
The National Tsunami Warning System of Chile	15
Other National Tsunami Warning Systems	15
Data	17
Seismic Data	17
Water Level Data	19
Historical Tsunami and Earthquake Data	22
Numerical Model Data	22
Other Data	22
Communications	23
Real Time Access to Data	23
Dissemination of Messages	23
Preparedness	24
Evacuation	24
Evacuations for Local Tsunamis	24
Evacuations for Distant Tsunamis	25
Education	25
Public Education	25
Education for Warning System Operators, Emergency Managers, and Policy Makers	26
Land Use	27
Engineering	27
Research	28
Structure	28
Areas for Research	28
Recent Research Applications	30
CONCLUSIONS	32
Acknowledgements	33
List of Acronyms	34

Operating tsunami warning system



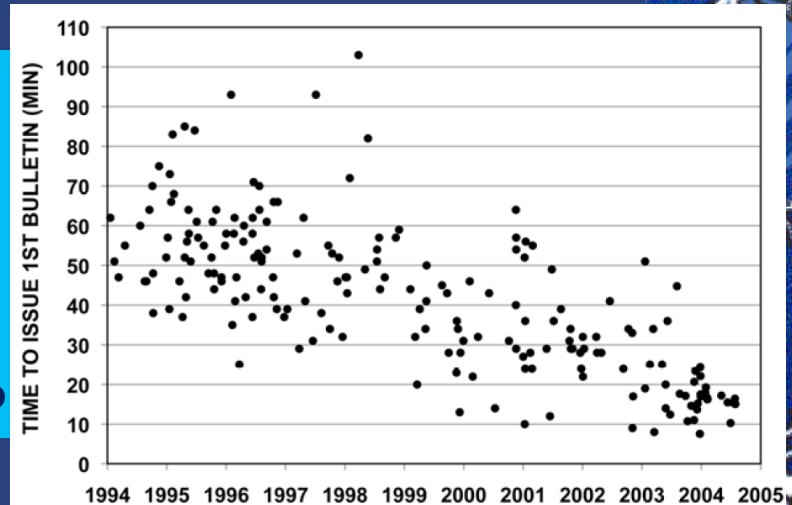
Real-time Seismic networks



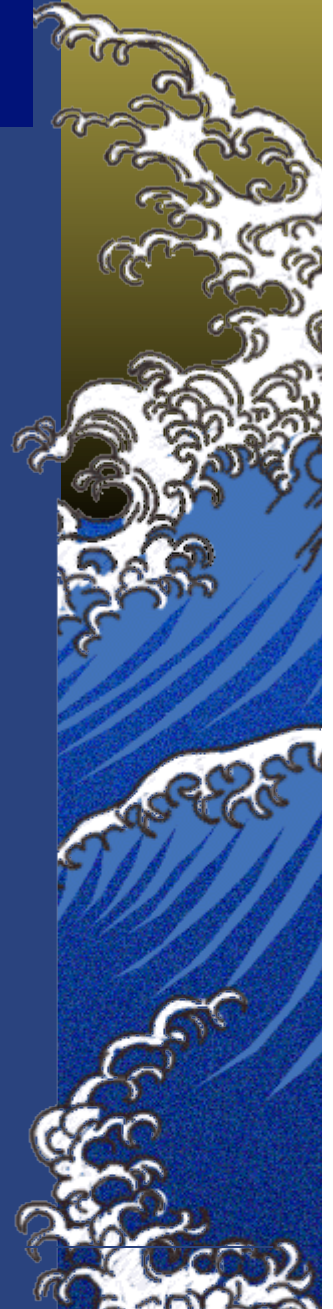
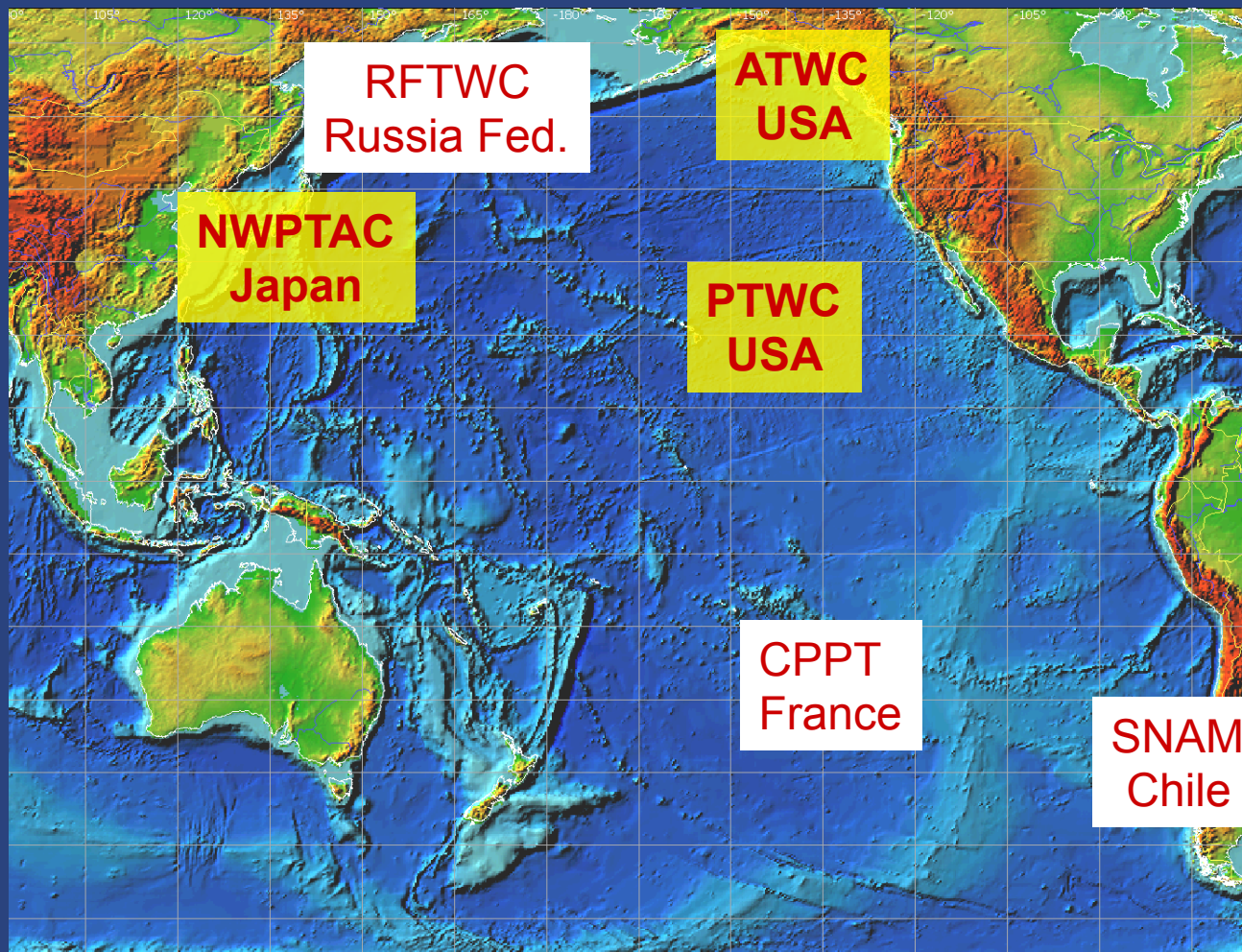
Real-time Sea-level networks

Reduction
dissemination
Latency

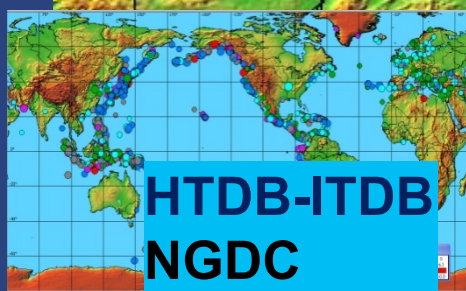
Magnitude
 $M_s \rightarrow M_w$ M_wP



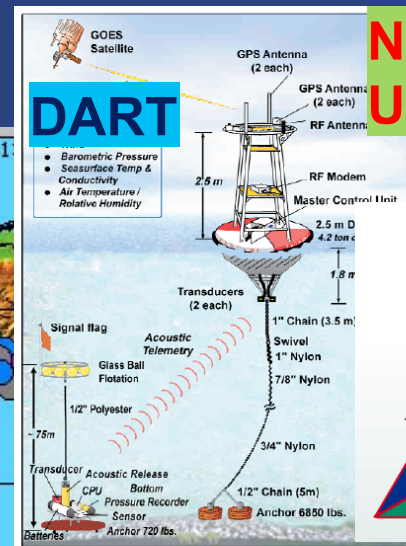
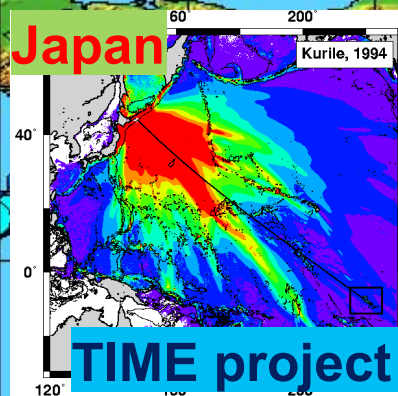
International and National Tsunami warning centers



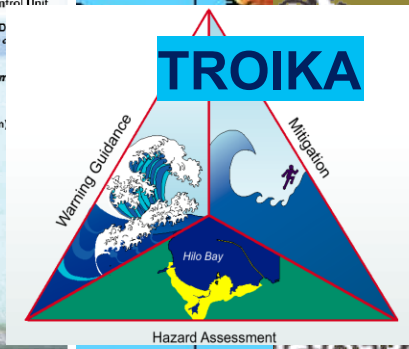
National Contributions



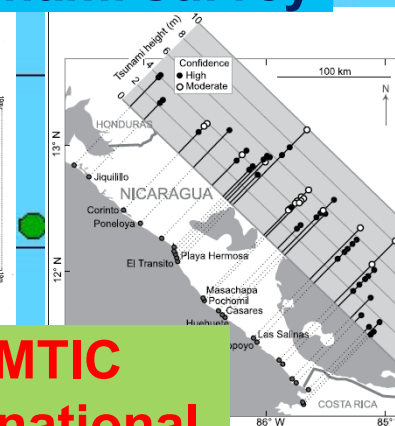
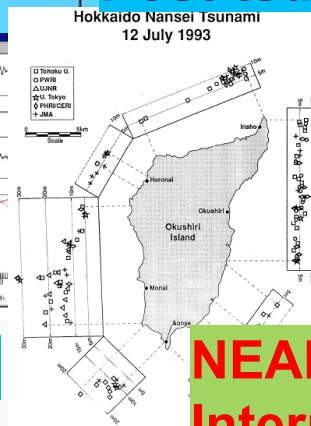
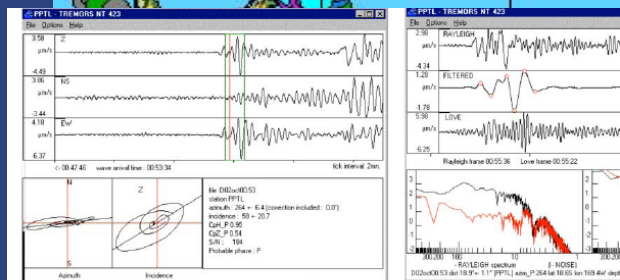
**Russia
USA**



**NOAA-PMEL
USA**

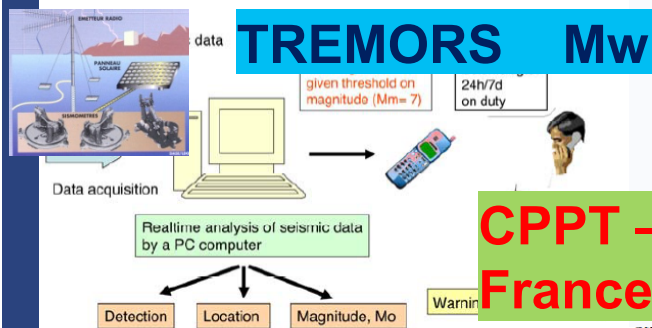


Post-tsunami survey



**SHOA – Chile
NEAMTIC USA
LDG - France**

**NEAMTIC
International
Survey teams**

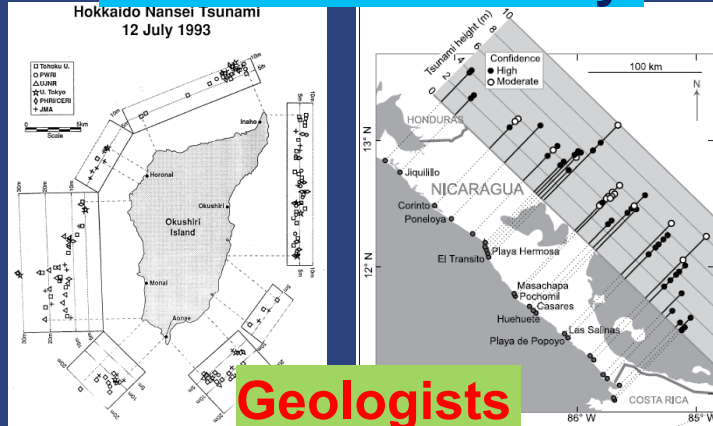


**CPPT – LDG
France**

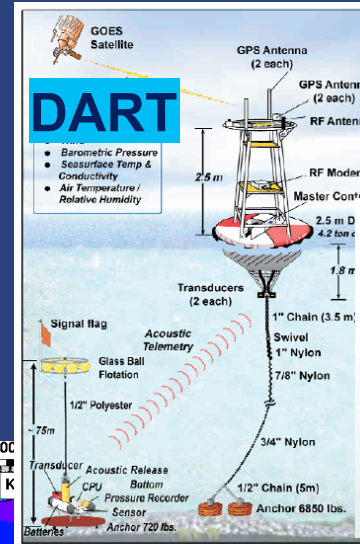


Multidisciplinary

Post-tsunami survey



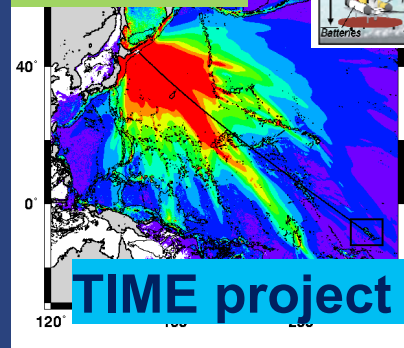
**Geologists
Geographers**



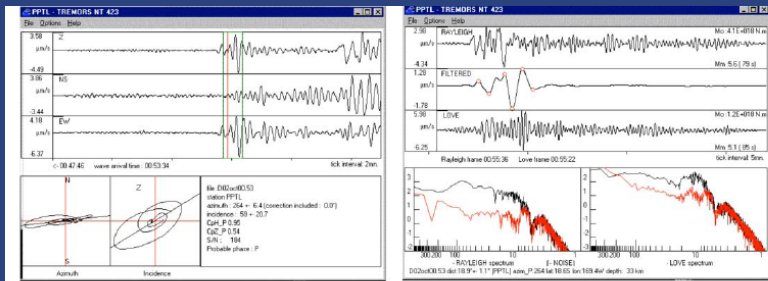
**Oceanographers
Engineers
Managers**



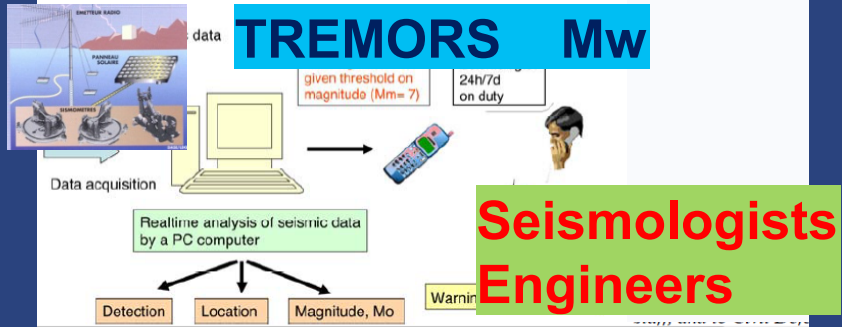
Modelers



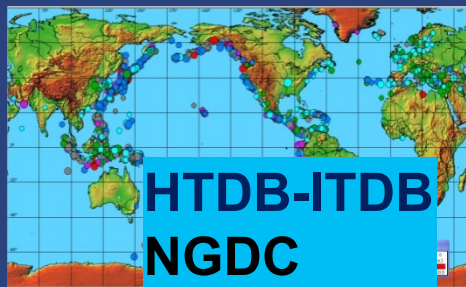
TIME project



TREMORS Mw



**Seismologists
Engineers**



**HTDB-ITDB
NGDC**

**Geophysicists
Tsunamiologists**

**Warning Centers
Information Center
Managers**

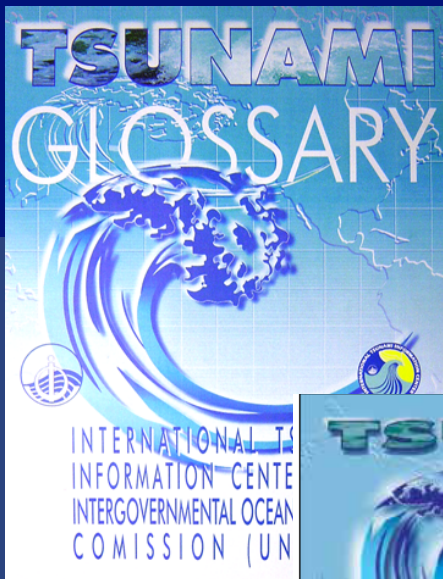
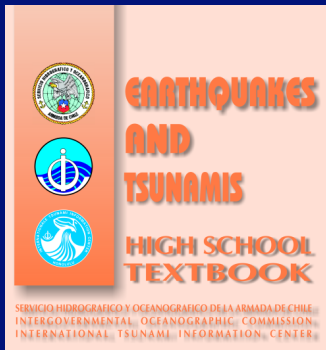
ITIC



**Text books
Newsletters**

Preparedness

Education



Capacity building

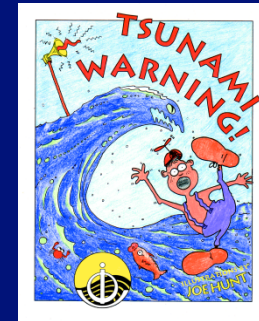
TRAINING

ITIC Visiting
Expert Program

Time project

TREMORS

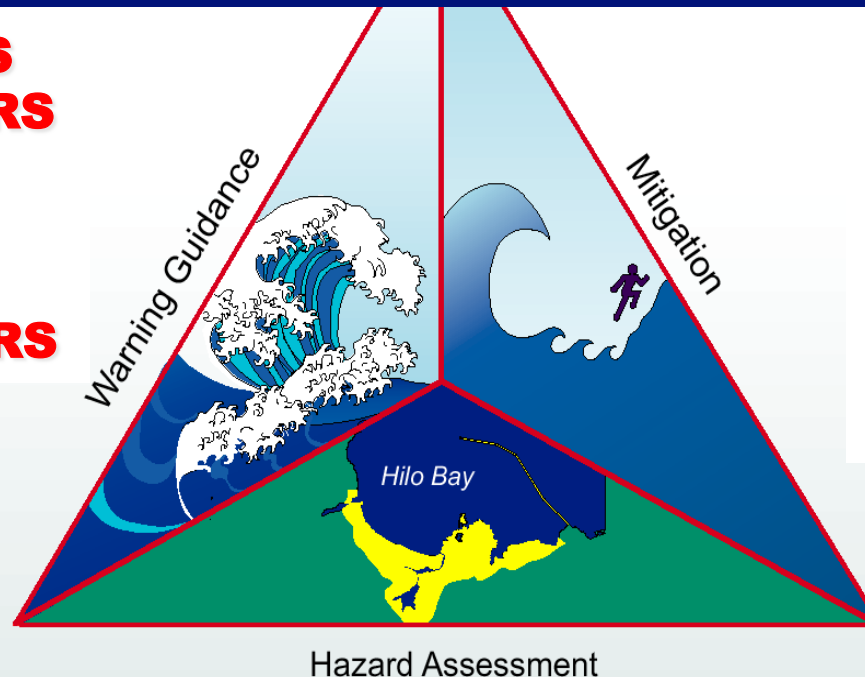
Awareness



3 Pillars : Warning operation Hazard assessment Preparedness

Many different stakeholders

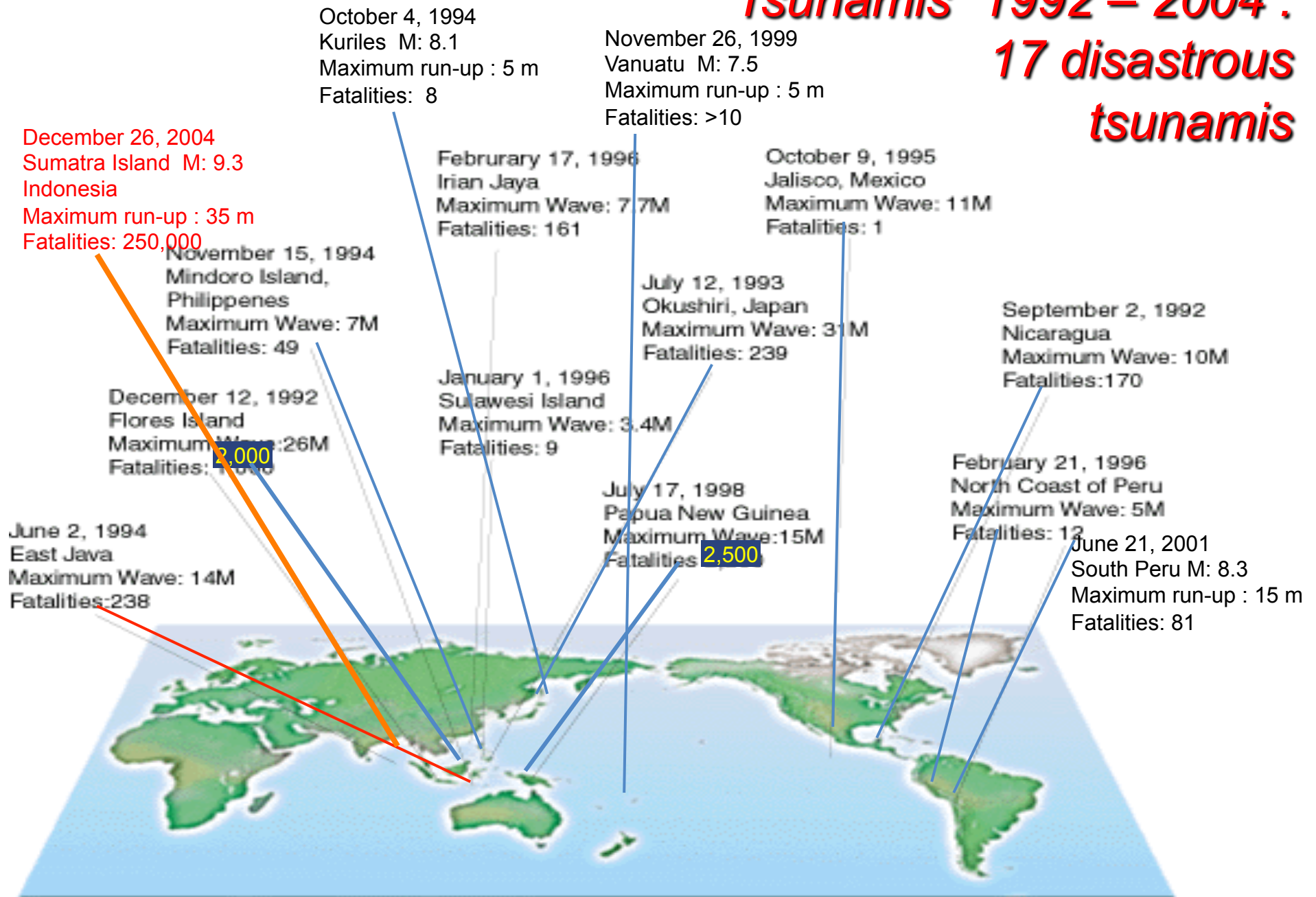
**SEISMOLOGISTS
OCEANOGRAPHERS
ENGINEERS
TECHNICIANS
OPERATORS OF
WARNING CENTERS**



**CIVIL
PROTECTION
AUTHORITIES
TEACHERS
SCIENTISTS**

**RESEARCHERS
MATHEMATICIANS
GEOGRAPHS
HISTORIANS**

Tsunamis 1992 – 2004 : 17 disastrous tsunamis



Keys of Maturity Pacific tsunami warning system 1985 -2005

- International coordination, cooperation and governance**

- Commitment of Member States**

- clear strategy of tsunami warning system**

 - increase the preparedness, awareness, education, capacity building, trainings..

 - improvement of fast large earthquakes and tsunamis detection and characterization

- Close cooperation with scientists and researchers :**

 - the tsunamis science is multidisciplinary**

=> ITSU was fully ready guiding and warning the Indian Ocean TWS in the first quarter of 2005



**26 December 2004
Indian Ocean
tsunami**



Unexpected TSUNAMIS in far field

Chile July 1995

M: 8.1

3 m at Hiva Oa,
Marquesas

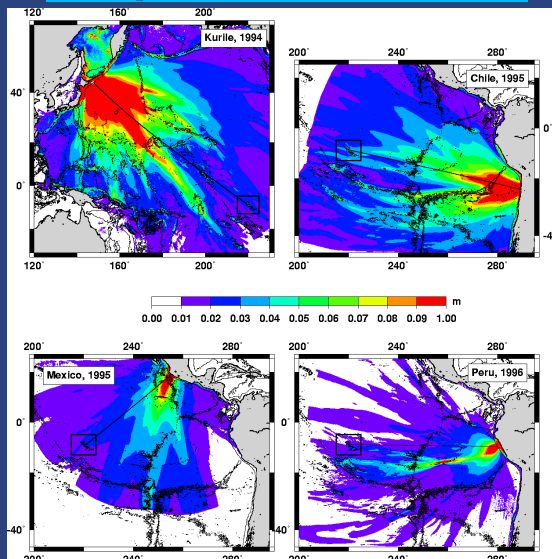
6 months later

Peru Feb 1996 M: 7.5

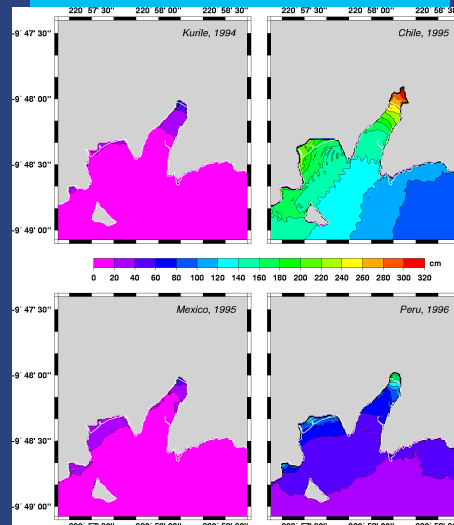
2 m at Hiva Oa,



(1) Offshore distant Amplification



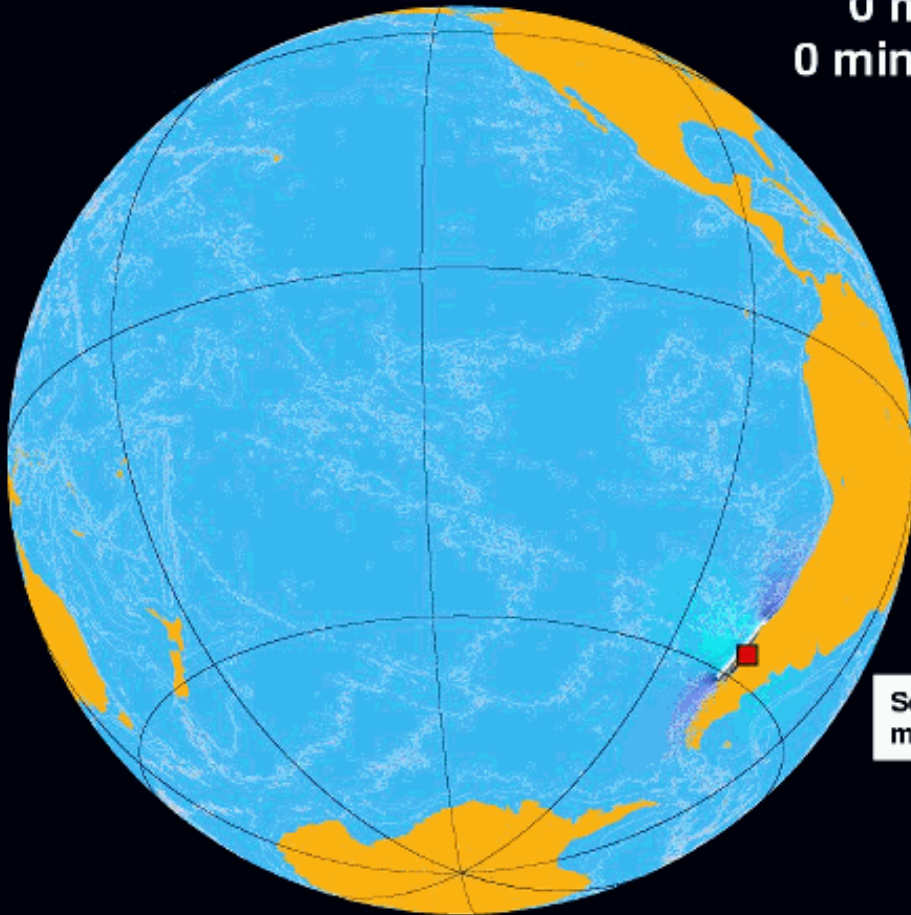
(2) Near coast Amplification



=> Tsunami modeling is the tool that explains tsunami records (Amplitude, run-up) and local and distant amplifications

Human adventure Friendship Follow-up !

0 h
0 min



Séisme de
magnitude 9.5

max 25 m

Chip Dick
Hugo Iouri
Laura Yves
Dominique
Bernard Emile
Hélène Eddie
Dennis Mike
Emilio Rodrigo
Peter Masa
Filomena
Salvador Ken
David Mike
Slava Sasha
Fred Patricio
Rick Kenji
Fumihiko
Takeshi Vasily
Raul Patricio

THANKS

