



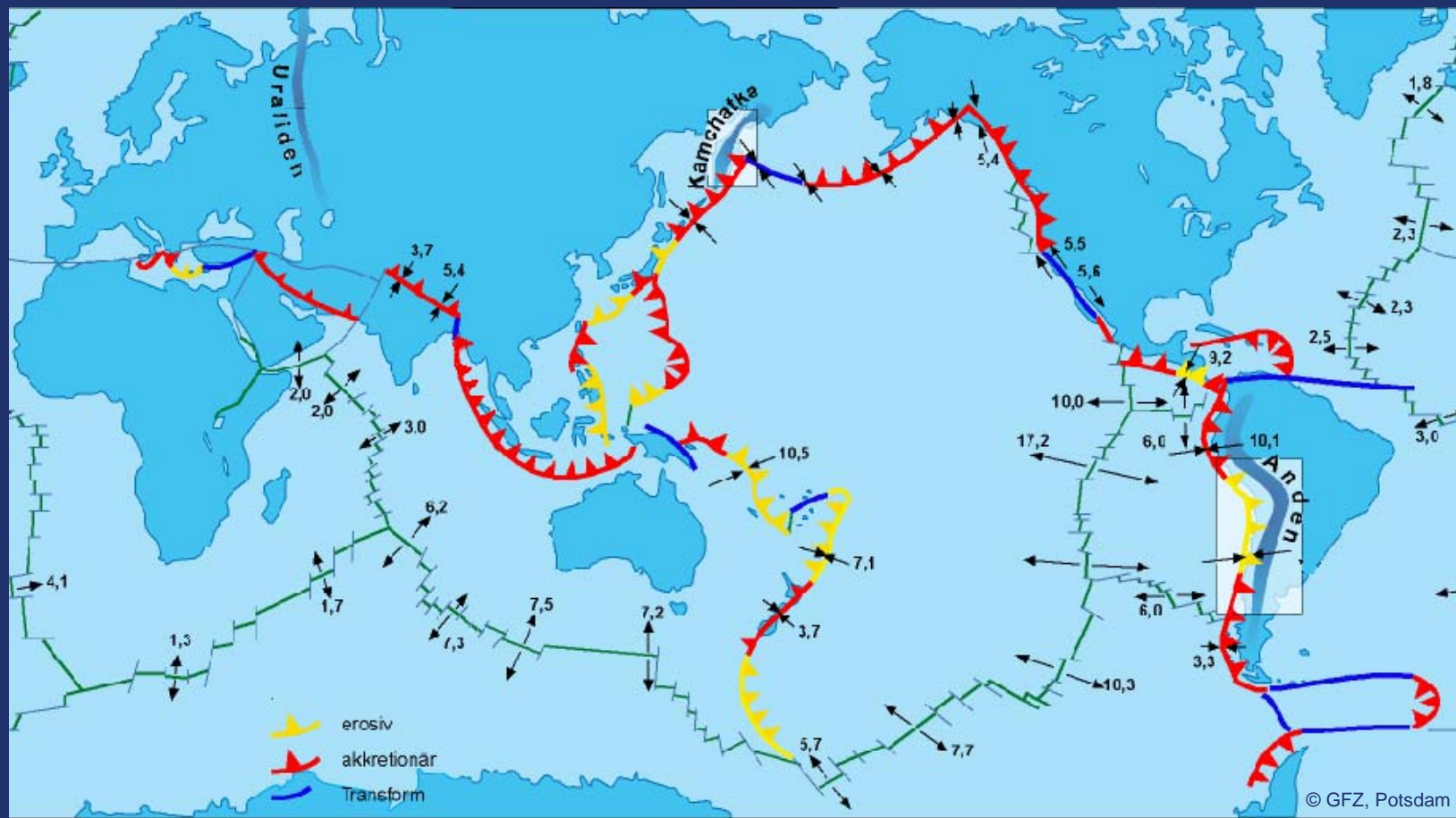
Progress in building an "end-to-end" Tsunami Early Warning and Mitigation System

International Forum on Tsunami and Earthquake
Progress from the Hyogo Framework for Action
15/16 Jan 2007 Kobe, Japan

Dr. Patricio Bernal, Executive Secretary IOC, ADG UNESCO



Geotectonic sources for major destructive tsunamis





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- ▶ *After the big Tsunamis of 1960 (Chile) and 1964 (Alaska), in 1965 the IOC established the ICG/ITSU International Coordination Group for the Tsunami Warning System in the Pacific (PTWC).*
- ▶ *This is a successful experience of an operational Tsunami Warning & Mitigation system, based on proved and robust technologies.*





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Establishment of an Indian Ocean Tsunami Warning System

- ▶ *In the aftermath of the greatest tsunami recorded in history on Dec 26th 2004, IOC organized two International Coordination meetings: March (Paris) and April (Mauritius), to define the terms for the development of an Indian Ocean Tsunami Warning and Mitigation System (IOTWS)*





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▲ In June 21-30, 2005: the 23rd **IOC** General Assembly approved resolutions for the establishment of **a global program and three additional regional** Intergovernmental Coordination Groups on TEWS (XXIII-12 to XXXIII-15) for

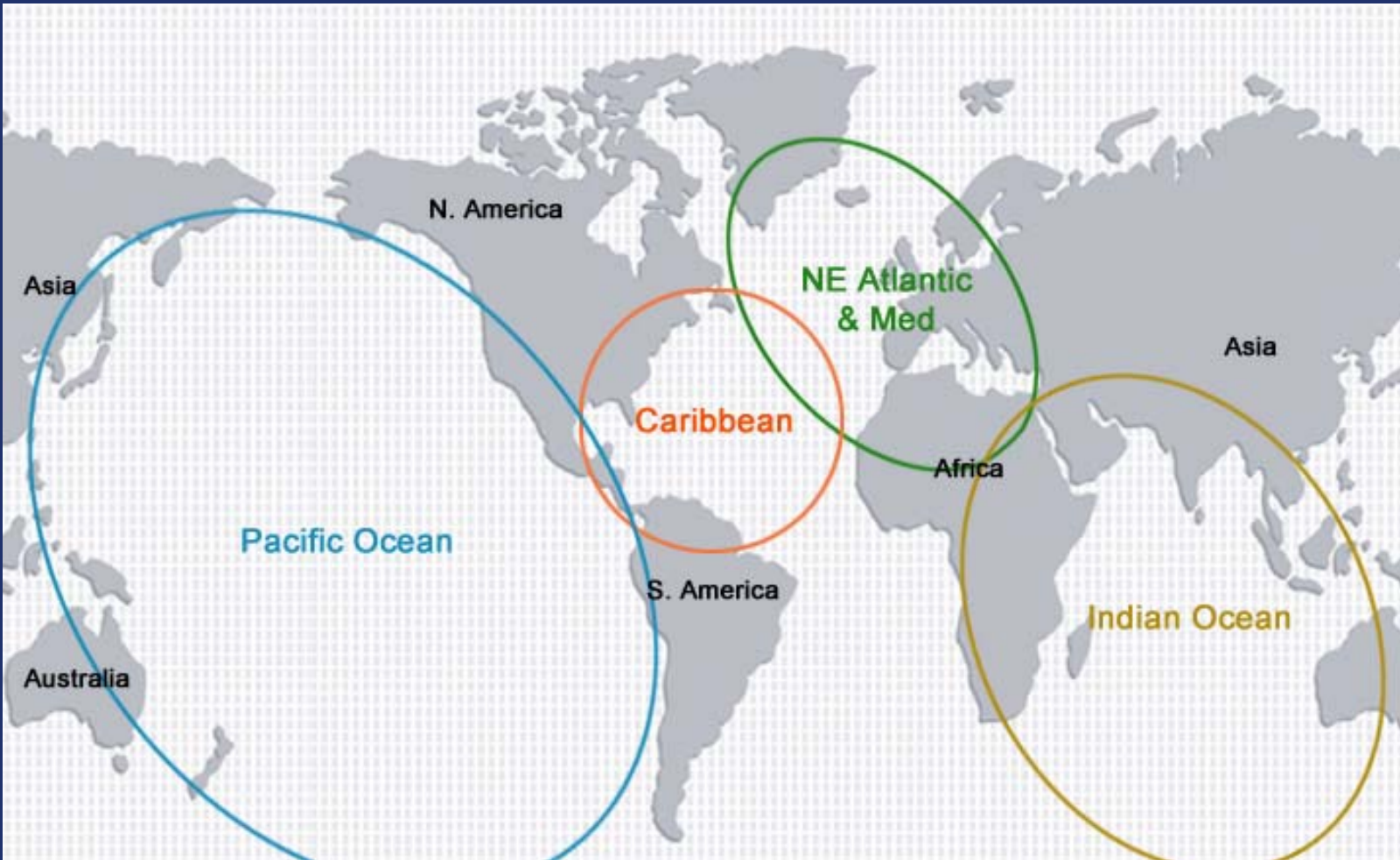
- *Global multi-hazard system (GOHWMS)*
- ***the Indian Ocean (ICG/IOTWS)***
- *the Caribbean (ICG/CARTWS)*
- *the NE Atlantic and Med (ICG/NEAMTWS)*



Three more regions to coordinate



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Global coordination

GOHWMS provides the necessary oversight function for the regional EWS, ensuring commonalities and good practice to define a common

- ✦ ***Structure***
- ✦ ***Strategy***
- ✦ ***Standards***
- ✦ ***Resources***





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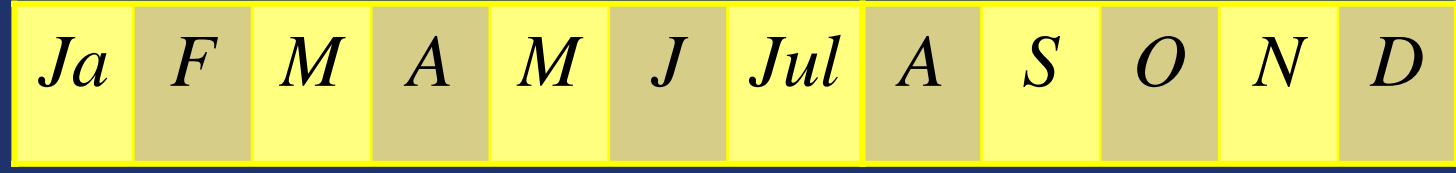
IOTWS time line and milestones in 2005/2006



Implementation Interim System IOC-JMA-PTWC

18 National Assessment Missions IOC/ISDR/WMO

Sea level stations being deployed



Initial IOTWS established

Core Regional System build up

IOTWS Implementation Plan

Focus on National Plans



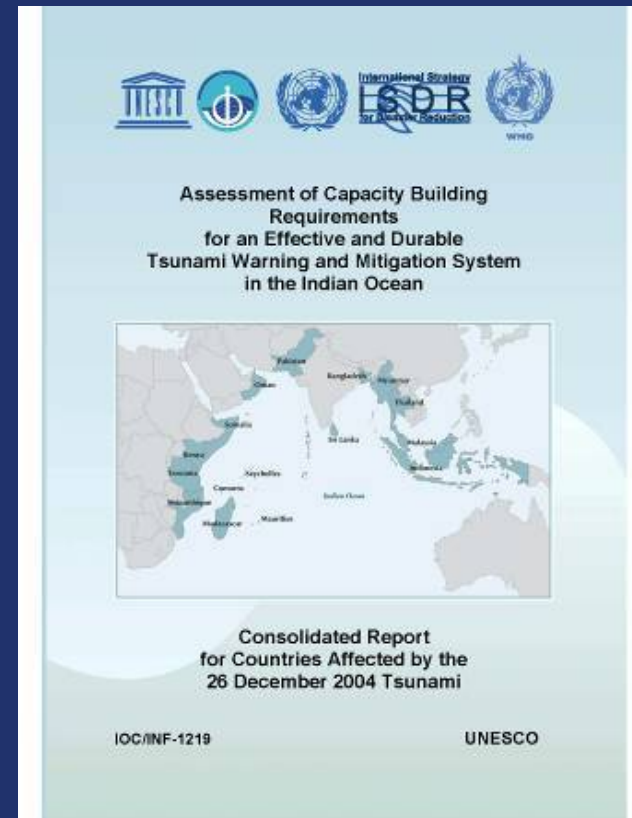


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19 out of 22 requested **assessment missions** by IOC/ISDR/WMO on tsunami warning and mitigation capacity to Indian Ocean member states, have been finalised.

These reports, by identifying deficits, provide clear guidelines for the design of national plans.

The 3 final missions to Timor Leste, South Africa and Djibouti are scheduled for the first half of 2007



Since July 2006 an Initial System is in place

Based on Existing:

- 26(28) National 24x7 Information Centres slowly evolving into a
- Network of Tsunami Warning Centres in charge of National Plans

Need to improve Regional Instrumental Networks:

- Improved Seismographic network (faster and more accurate) detection of earthquakes
- Real-time (1-5min transmission interval) network of sea-level stations near tsunami source zones



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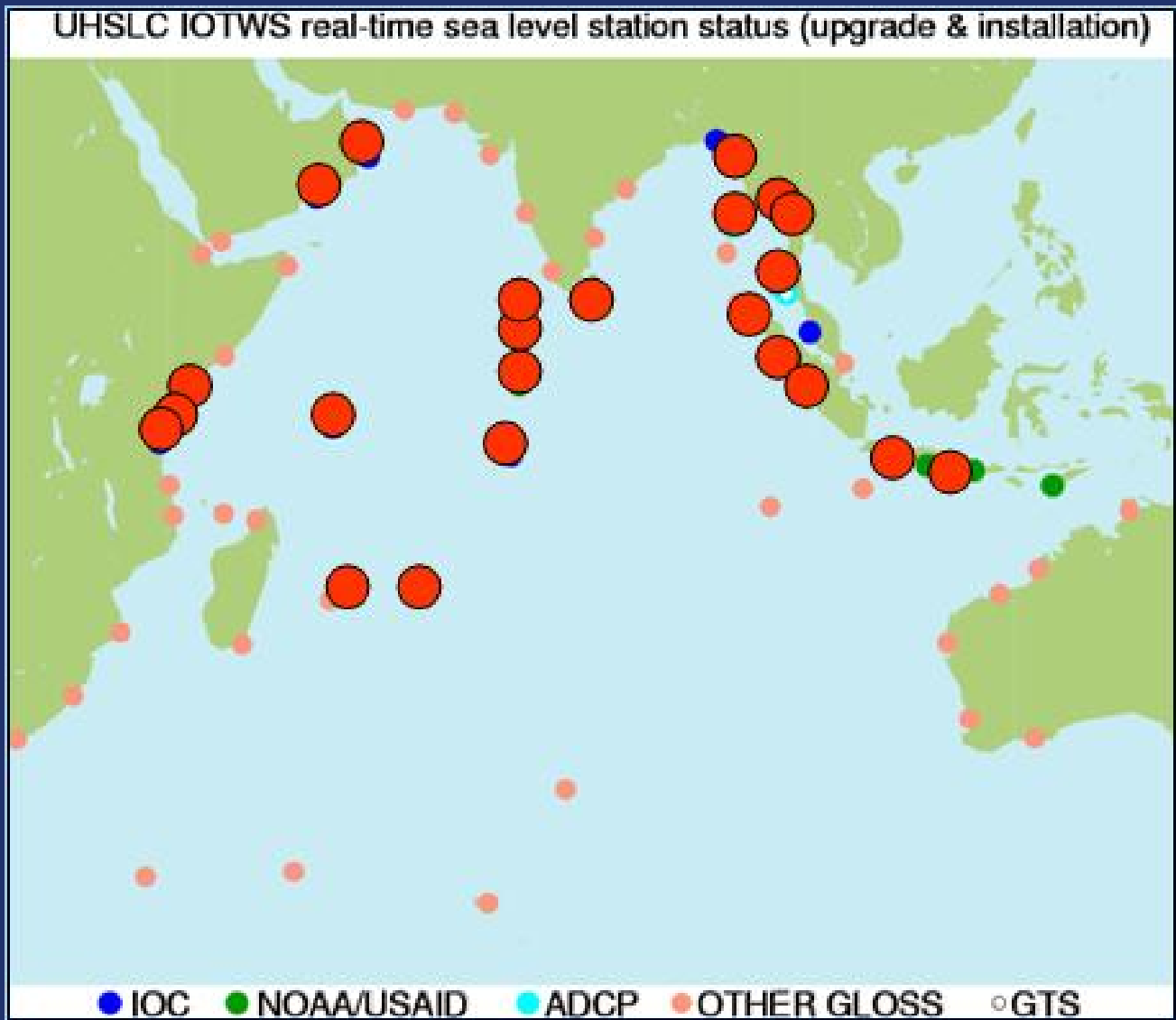




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28 new real time sea level stations

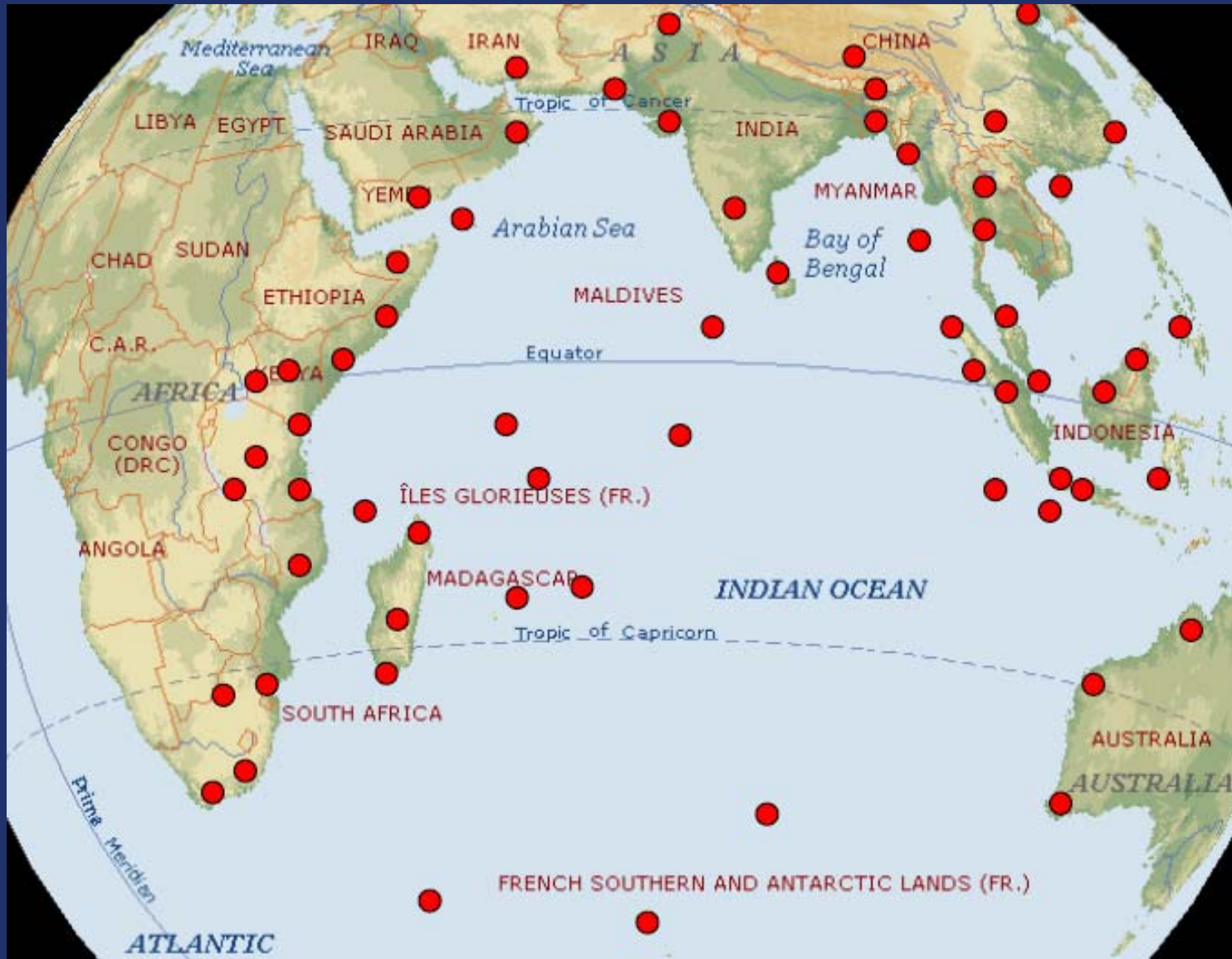
UHSLC IOTWS real-time sea level station status (upgrade & installation)



Agreed upgrade of the Seismographic network



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4 DART-like systems
deployed

Status and achievements in the ICG/IOTWS process

(mainly funded through the ISDR flash appeal project)

- 28 real-time sea level stations
- 25 new broadband seismometers
- more than 12 technical training courses on tsunami modelling and seismic analysis
- 19 TW capacity assessment missions
- Emergency Standard Operations Procedures for Indonesia (January 2007)
- *TsunamiTeacher*: multi-purpose educational toolkit in English and Bahasa Indonesia (5 more languages under way)
- various educational material on tsunamis massively reproduced and disseminated



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A perfect warning will be useless if people do not know what to do in case of an emergency



Awareness and preparedness at the country level is essential





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The Challenge

- ▶ *Governments and donors already know what is needed at the country level in 18 countries*
- ▶ *Indian Ocean countries, through the ICG, requested and endorsed (July 2006) a comprehensive Implementation Plan.*
- ▶ *Plan is a “living document”, to be harmonized and constantly updated with national and regional commitments and contributions*
- ▶ *IOC directly assists with the development of National Plans*





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Beyond immediate response: **Multi-Hazard Platforms for Ocean generated Hazards**

- ▶ *Storm – surges (IOC, WMO)*
- ▶ *Tropical storms (WMO, IOC)*
- ▶ *Improving Storm and cyclones track forecasts (IOC, WMO)*
- ▶ *Ice Hazard (IOC, WMO)*
- ▶ *Oil Spills (IOC, WMO, UNEP, IMO)*





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For further information :

<http://ioc3.unesco.org/ptws>

<http://ioc3.unesco.org/icg-iii>

<http://ioc3.unesco.org/neamtws>

<http://ioc3.unesco.org/cartws>

