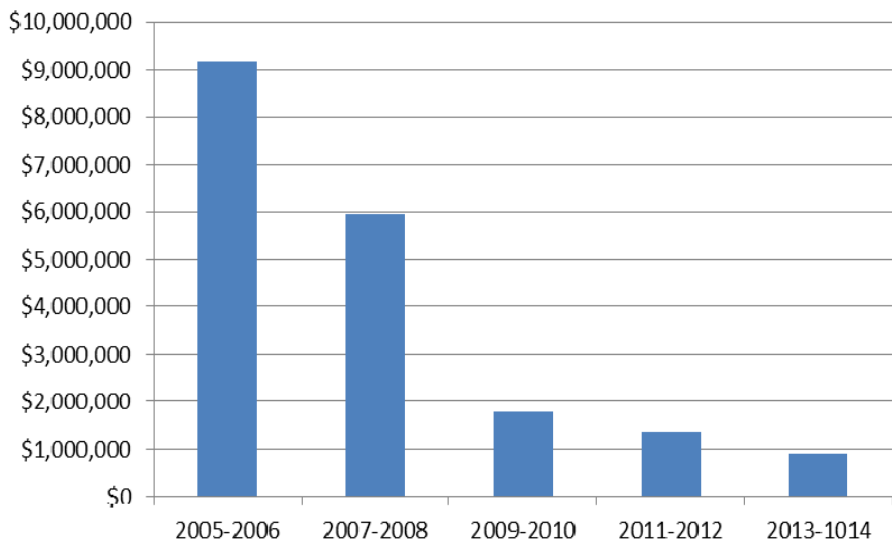


The Indian Ocean Tsunami Warning and Mitigation System (IOTWS), 2005-2014

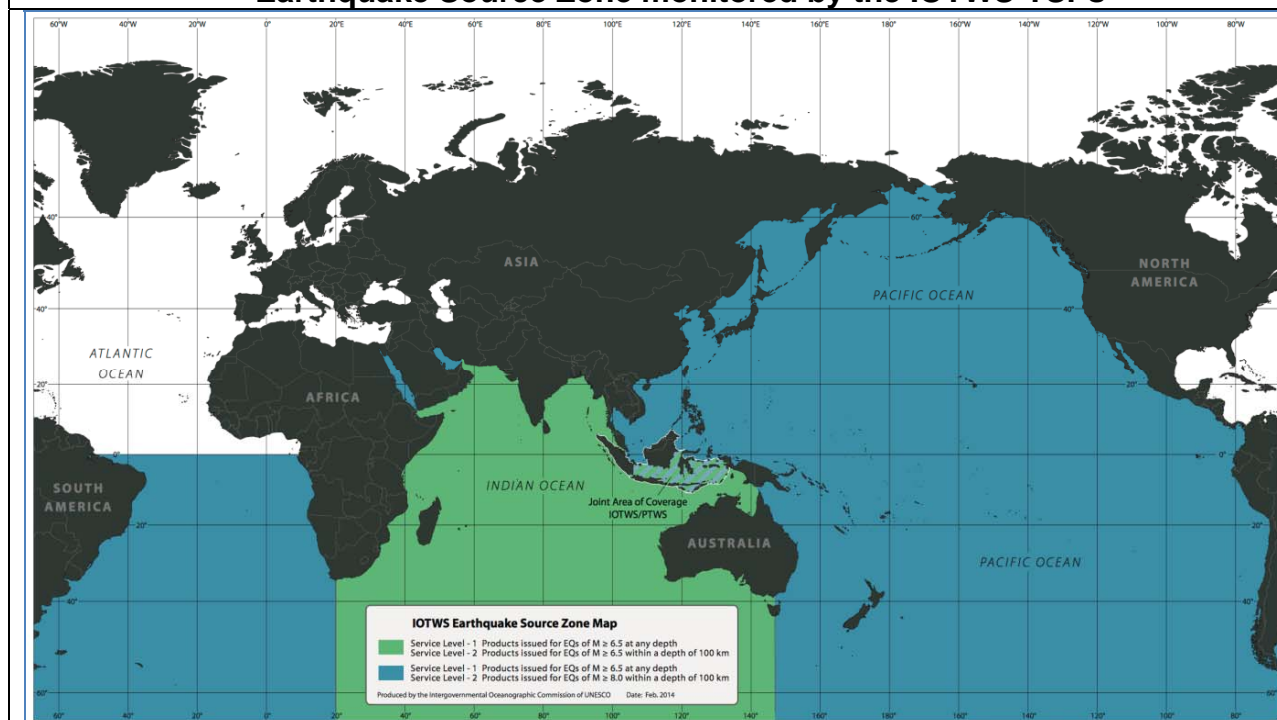
Quick Fact Sheet, November 2014

Background	The Indian Ocean Tsunami on 26 th December 2004 resulted in the loss of over 230,000 and the displacement of over 1.6 million people around the Indian Ocean, with estimated economic losses of \$14 billion. The catastrophe brought renewed focus on the need for a regional tsunami warning system in the Indian Ocean. Following the disaster, the Intergovernmental Oceanographic Commission (IOC) of UNESCO was given the mandate to develop and implement an Indian Ocean Tsunami Warning and Mitigation System (IOTWS). An Intergovernmental Coordination Group (ICG) for the IOTWS was established as a primary subsidiary body of the IOC by the IOC Assembly in July 2005 (Resolution IOC-XXIII-12). Further mandates were given to IOC UNESCO by the UN General Assembly through Resolutions 61/132 and 62/91. After 8 years of international collaboration and development, facilitated and coordinated by IOC UNESCO, the IOTWS became fully operational on 31 st March 2013 with Tsunami Service Providers (TSPs) established by Australia, India and Indonesia.
Governing Bodies of the IOC	Assembly: 147 Member States Executive Council: 40 Member States
Title of IOC Subsidiary Body	The Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS)
Date and resolution of establishment	June 2005, Resolution XXIII-12
Terms of Reference	Annex to Resolution XXIII-12: <ul style="list-style-type: none"> • To coordinate the activities of the IOTWS; • To organize and facilitate as appropriate the exchange of seismic, sea level and other data at or near real-time and information required for the interoperability of the IOTWS; • To promote the sharing of experience and expertise related to tsunami warning and mitigation for the Indian Ocean basin; • To promote tsunami research; • To promote the establishment and further development of national tsunami warning and mitigation capacities in accordance with standard protocols and methods; • To develop, adopt and monitor implementation of work plans of the IOTWS, and to identify required resources; • To promote implementation of relevant capacity-building; • To liaise and coordinate with other tsunami warning systems; • To liaise with other relevant organizations, programmes and projects; • To promote the implementation of the IOTWS within a multi-hazard framework; • To keep under constant scrutiny the status of the system and how it satisfies the needs.
Membership	28 Member States of the IOC within and bordering the Indian Ocean: Australia, Bangladesh, Comoros, Djibouti, France (La Reunion), India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Seychelles, Singapore, Somalia, South Africa, Sri Lanka, United Arab Emirates, Tanzania, Thailand, Timor Leste, United Kingdom, Yemen Observers from other IOC Member States Invited observers from other organizations (including NGOs), programmes and projects, in accordance with the IOC rules and procedures
Governance	Officers composed of Chairman and two Vice-chairmen. The Officers meet on the occasion of sessions of the ICG/IOTWS and also at meetings of the Steering Group. By IOC Rule of Procedure No. 48.3, the ICG/IOTWS reports to each ordinary session of the Assembly.

Elected Officers	Chairman: Mr Rick Bailey (Australia) Vice-Chairman: Dr T. Srinivasa Kumar (India) Vice-Chairman: Dr Prih Harjadi (Indonesia) (<i>retired</i>)																												
Structure	<u>Steering Group:</u> Officers (Chair and two Vice-Chairs), Chairs and Vice-Chairs of the Working Groups, representatives from each operational TSP, and two representatives from NTWCs <u>Working Groups:</u> 1. Tsunami Risk Assessment and Reduction (Chair Prof Sam Hettiarachchi, Sri Lanka, Vice-Chair Dr Sultan Al-Yahyai, Oman) 2. Tsunami Detection, Warning and Dissemination (Chair Dr Satheesh Shenoi, India, Vice-Chair Dr Mark Leonard, Australia, Vice-Chair Dr Wahyu Pandoe, Indonesia) 3. Tsunami Awareness and Response (Chair Dr Harkunti Rahayu, Indonesia, Vice Chair vacant)																												
ICG/IOTWS Sessions held	ICG/IOTWS-I, Perth, Australia, August 2005 ICG/IOTWS-II, Hyderabad, India, December 2005 ICG/IOTWS-III, Bali, Indonesia, July 2006 ICG/IOTWS-IV, Mombasa, Kenya, February 2007 ICG/IOTWS-V, Kuala Lumpur, Malaysia, April 2008 ICG/IOTWS-VI, Hyderabad, India, April 2009 ICG/IOTWS-VII, Banda Aceh, Indonesia, April 2010 ICG/IOTWS-VIII, Melbourne, Australia, May 2011 ICG/IOTWS-IX, Jakarta, Indonesia, November 2012																												
Secretariat focal point	Mr Tony Elliott, Head of ICG/IOTWS Secretariat Level 3, 1 Ord Street PO Box 1370 West Perth WA6872 Australia Tel: +61-8-9226 0191 Email: t.elliott@unesco.org																												
Funding	Contributions to the IOC UNESCO Special Account and Funds in Trust, 2005-2014																												
	2005-2006	2007-2008	2009-2010	2011-2012	2013-2014																								
Special Account	2,454,871	1,866,791	700,611	896,871	759,548																								
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Total	9,166,138	5,940,012	1,769,865	1,343,812	904,399																								
 <table><caption>Funding Data (USD)</caption><thead><tr><th>Period</th><th>Special Account</th><th>Funds in Trust</th><th>Total</th></tr></thead><tbody><tr><td>2005-2006</td><td>2,454,871</td><td>6,711,267</td><td>9,166,138</td></tr><tr><td>2007-2008</td><td>1,866,791</td><td>4,073,221</td><td>5,940,012</td></tr><tr><td>2009-2010</td><td>700,611</td><td>1,069,254</td><td>1,769,865</td></tr><tr><td>2011-2012</td><td>896,871</td><td>446,941</td><td>1,343,812</td></tr><tr><td>2013-2014</td><td>759,548</td><td>144,851</td><td>904,399</td></tr></tbody></table>						Period	Special Account	Funds in Trust	Total	2005-2006	2,454,871	6,711,267	9,166,138	2007-2008	1,866,791	4,073,221	5,940,012	2009-2010	700,611	1,069,254	1,769,865	2011-2012	896,871	446,941	1,343,812	2013-2014	759,548	144,851	904,399
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This table only reflects the funding provided directly to the IOC Tsunami Unit. There have been many other indirect contributions to the programme: disaster managers and staff of national agencies in affected countries have participated in Tsunami Unit related activities; scientists have shared their expertise during workshops and training courses; and many countries have hosted Intergovernmental Coordination Group (ICG) meetings and workshops																													

Interim Advisory Service, April 2005 – March 2013	Pacific Tsunami Warning Center (PTWC), Hawaii, USA Japan Meteorological Agency (JMA), Tokyo, Japan
IOTWS Tsunami Service Providers, October 2011 - present	Joint Australian Tsunami Warning Centre (JATWC) operated by Geoscience Australia and the Bureau of Meteorology Indian Tsunami Early Warning Centre (ITEWC) operated by the Indian National Centre for Ocean Information Services (INCOIS) Indonesian Tsunami Early Warning System (InaTEWS) operated by the Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG)
National Tsunami Warning Centres	National Tsunami Warning Centres (NTWCs) have been established in 24 countries, as follows: Australia, Bangladesh, Comoros, France (La Reunion), India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, Myanmar, Oman, Pakistan, Seychelles, Singapore, South Africa, Sri Lanka, Tanzania, Thailand, Timor Leste, Yemen

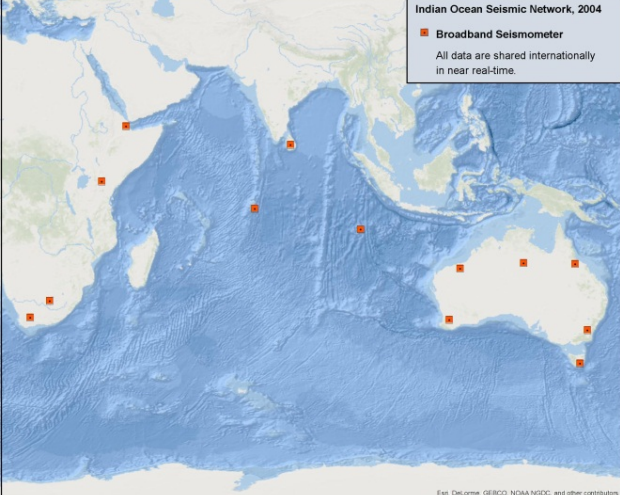
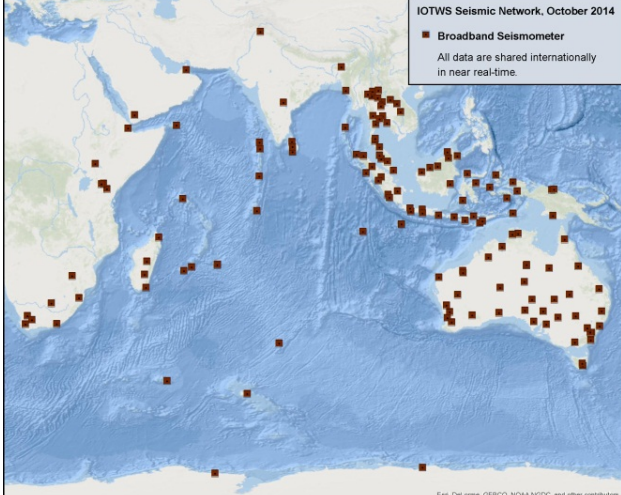
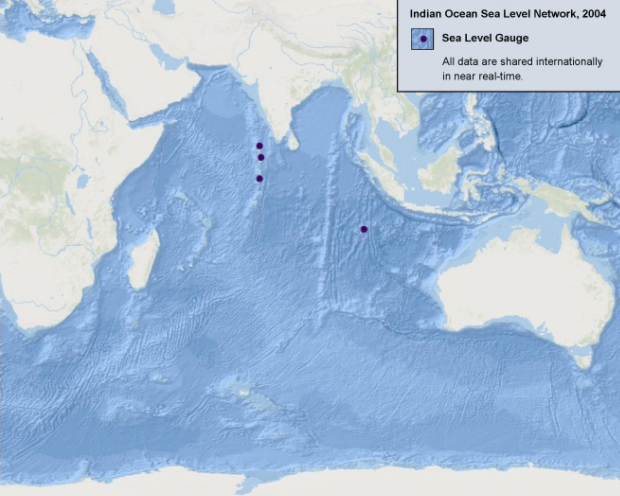
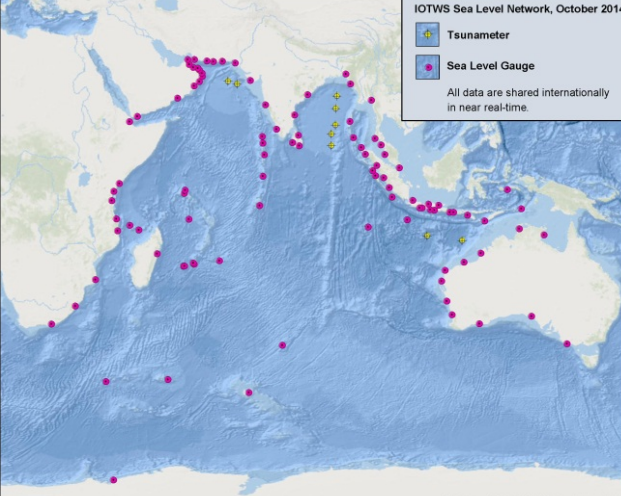
Earthquake Source Zone monitored by the IOTWS-TSPs



Service Level – 1 Products issued for Eqs of $M \geq 6.5$ at any depth
 Service Level – 2 Products issued for Eqs of $M \geq 6.5$ within a depth of 100km

Service Level – 1 Products issued for Eqs of $M \geq 6.5$ at any depth
 Service Level – 2 Products issued for Eqs of $M \geq 8.0$ within a depth of 100km

IOTWS Communications Tests	<ul style="list-style-type: none"> 15 June 2011 14 September 2011 14 December 2011 13 June 2012 12 December 2012 12 June 2013 11 December 2013 11 June 2014 	<u>Participating NTWCs</u> 21 23 23 19 21 17 20 21 23
Indian Ocean Wave Exercises	<ul style="list-style-type: none"> IOWave09 IOWave11 IOWave14 	<u>Participating Member States</u> 20 22 24

IOTWS Core Seismic Network	<p>Number of broadband seismometers sharing data in near real time:</p> <ul style="list-style-type: none"> • 2004: = 13 broadband seismometers • 2014: >140 broadband seismometers
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Indian Ocean Seismic Network, 2004</p> <p>■ Broadband Seismometer</p> <p>All data are shared internationally in near real-time.</p> </div> <div style="text-align: center;">  <p>IOTWS Seismic Network, October 2014</p> <p>■ Broadband Seismometer</p> <p>All data are shared internationally in near real-time.</p> </div> </div>
IOTWS Core Coastal Sea Level Station and Deep Ocean Tsunamieter Networks	<p>Number of coastal sea level gauges and deep ocean tsunameters sharing data in near real time and available for tsunami warning purposes:</p> <ul style="list-style-type: none"> • 2004: coastal sea level gauges = 4 • 2014: coastal sea level gauges > 100 • 2004: deep ocean tsunameters = 0 • 2014: deep ocean tsunameters = 9
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Indian Ocean Sea Level Network, 2004</p> <p>● Sea Level Gauge</p> <p>All data are shared internationally in near real-time.</p> </div> <div style="text-align: center;">  <p>IOTWS Sea Level Network, October 2014</p> <p>★ Tsunamieter</p> <p>● Sea Level Gauge</p> <p>All data are shared internationally in near real-time.</p> </div> </div>

Summary of IOTWS-TSP Bulletins issued: 12 October 2011 – 29 October 2014

No.	Time/Date (UTC)	Region	USGS Final Mag Mw	TSP India ITEWC		TSP Australia JATWC		TSP Indonesia InaTEWS	
				No. EQ Bulletins Issued (and Final Mag)	No. Threat Bulletins Issued	No. EQ Bulletins Issued (and Final Mag)	No. Threat Bulletins Issued	No. EQ Bulletins Issued (and Final Mag)	Threat Bulletins Issued
1	3:16:32 13 Oct 2011	South of Bali, Indonesia	6.0	1 (6.6)	1 (No Threat)	1 (6.3)	1 (No Threat)	1 (6.8)	1 (No Threat)
2	4:05:13 14 Nov 2011	Southern Molucca Sea	6.3			1 (6.6)	1 (No Threat)	1 (6.7)	1 (No Threat)
3	18:36:59 10 Jan 2012	Off West Coast of Northern Sumatra	7.2	1 (7.1)	2 (THREAT)	1 (7.2)	1 (No Threat)	1 (7.1)	3 (THREAT)
4	8:38:36 11 Apr 2012	Off West Coast of Northern Sumatra	8.6	1 (8.5)	5 (THREAT)	1 (8.5)	8 (THREAT)	1 (8.3)	3 (THREAT)
5	10:43:10 11 Apr 2012	Off West Coast of Northern Sumatra	8.2	2 (8.2)	3 (THREAT)	1 (8.2)	3 (THREAT)	1 (8.1)	1 (THREAT)
6	0:27:45 25 Jul 2012	Off West Coast of Northern Sumatra	6.4			1 (6.6)	3 (THREAT)		
7	9:41:54 18 Aug 2012	Sulawesi, Indonesia	6.3			1 (6.5)	1 (No Threat)		
8	15:05:41 26 Aug 2012	Northern Molucca Sea	6.6	2 (6.8)		1 (6.6)	1 (No Threat)	1 (6.8)	1 (No Threat)
9	18:23:00 3 Sep 2012	South of Java, Indonesia	6.4	1 (6.6)	1 (No Threat)	1 (6.6)	1 (No Threat)	1 (6.5)	1 (No Threat)
10	11:43:35 8 Oct 2012	Banda Sea	6.3			1 (6.5)	1 (No Threat)		
11	00:31:00 12 Oct 2012	Irian Jaya, Indonesia	6.7	1 (7.0)		1 (6.8)	3 (THREAT)	1 (7.0)	
12	16:53:08 10 Dec 2012	Banda Sea	7.1	1 (7.1)	1 (No Threat)	1 (7.1)	1 (No Threat)	1 (7.4)	
13	01:12:27 06 Feb 2013	Santa Cruz Islands	8.0	1 (7.8)		1 (7.9)	1 (No Threat)	1 (7.4)	
14	10:44:20 16 Apr 2013	Southwestern Pakistan	7.7			1 (7.7)	1 (No Threat)	1 (7.6)	
15	05:44:49 24 May 2013	Sea of Okhotsk	8.3	1 (8.1)	1 (No Threat)	1 (8.2)	1 (No Threat)	1 (8.0)	
16	16:47:23 13 Jun 2013	Christmas Island, Indian Ocean	6.7	1 (6.7)	1 (No Threat)	1 (6.7)	1 (No Threat)	1 (6.5)	
17	07:34:06 28 Sep 2013	Pakistan, Baluchistan	6.8	1 (6.8)		1 (7.0)	1 (No Threat)	1 (6.7)	
18	17:10:19 25 Oct 2013	Off East coast of Honshu, Japan	7.1	1 (7.4)		1 (7.6)	1 (No Threat)	1 (7.2)	

No.	Time/Date (UTC)	Region	USGS Final Mag Mw	TSP India ITEWC		TSP Australia JATWC		TSP Indonesia InaTEWS	
				No. EQ Bulletins Issued (and Final Mag)	No. Threat Bulletins Issued	No. EQ Bulletins Issued (and Final Mag)	No. Threat Bulletins Issued	No. EQ Bulletins Issued (and Final Mag)	Threat Bulletins Issued
19	01:24:13 01 Dec 2013	Banda Sea	6.4	1 (6.7)		1 (6.9)	3 (THREAT)	1 (6.7)	
20	13:41:09 21 Mar 2014	Nicobar Islands, India Region	6.4	1 (6.5)	1 (No Threat)	1 (6.6)	1 (No Threat)		
21	23:46:47 01 Apr 2014	Off coast of Northern Chile	8.2	1 (7.8)		1 (8.0)	1 (No Threat)	1 (8.0)	
22	11:10:59 14 Jun 2014	South Indian Ocean	6.5	2 (6.4)		1 (6.6)	2 (THREAT)	1 (6.5)	
23	20:53:09 23 Jun 2014	Rat Islands, Aleutian Islands	7.9	2 (7.9)		1 (8.0)	1 (No Threat)	1 (8.1)	