Technnology Planning and Integration Office (TPIO)

United States Department of Commerce
National Oceanic and Atmospheric Administration

NOAA Program Observation Requirements Document (PORD)

Consolidated Observation Requirements List (CORL)

NOAA Program Observation Requirements Document (PORD)

FINAL with Requirements Validation Version 1.1

FY 2009

Weather and Water Goal

Tsunami Program (WW-TSU)

March 17, 2009[1]

[1] PORD Document Date reflects date for publication of this [FINAL with Requirements Validation]
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Document Changes applied to Requirements Validation

Version	Date	Pages Affected	Description
FY2007 [v1.0]	12/19/2007	Document Finalized [per Above]	FINAL for Program Concurrence
	Verified by	Goal Team Lead Program Manager Program Members	see Observation Requirement Verification Signatures
FY2009 v1.1		CORL Requirememts	Reqmts Updated and Revised during Validation
	03-17-2009 15:35:17	ALL [CORL Download]	New CORL Download & PORD Creation
		Appendix B	Added Requirements Validation data
		Title Page, TOC	Updated to reflect new Version
	3/17/2009	Document Finalized [per Above]	Final with Requirements Validation
	Verified: 3/17/2009	Program Manager Program Members	[see Observation Requirement Verification Signatures]
	Validated by:	Program Manager	[see Observation Requirement Validation Signatures]
	Concurred:	Goal and Line Office	
	Endorsed by:	NOSC Co-chairs	

Signatures

Observation Requirement Validation

NOSC Endorsement

The NOSC has received the Tsunami Program's Observation Requirements with Goal Lead and Line Office concurrence, and is satisfied with the Level-of-Validation provided for the Priority-1 Requirements.

Mary Kicza Co-Chair, NOSC	5/18/09 Date	✓ Endorsed
Jack Hayes Co-Chair, NOSC	05/18/2009 Date	✓ Endorsed

Goal Lead and Line Office Concurrence

The Tsunami Program's Goal Team Lead and Line Office Director concur with the Observation Requirements and are satisfied with the Level-of-Validation provided for the Priority-1 Requirements.

Ed Johnson Goal Lead, Weather and Water Goal	05/08/09 Date	✓ Concurred
David Caldwell Director, Office of Climate, Water, and Weather Svcs	05/07/09 Date	✓ Concurred

Program Manager Validation

The Tsunami Program Manager has validated the Priority-1 Observation Requirements by providing the Documentation listed in Appendix B as evidence of a substantiated basis for each of the 5 Key Attributes of those requirements.

Therese Pierce Program Manager, Tsunami Program	5/7/09 Date	X Validated

Observation Requirement Verification

The Program Manager, with Program Membership concurrence, has verified that the Tsunami Program's Observation Requirements, as documented in the CORL and reproduced in this document, comprise the Tsunami Program's Threshold and Objective level requirements for environmental observations, and are ready for Validation.

Program Manager Verification

Therese Pierce Program Manager, Tsunami Program	5/7/09 Date	X Verified

Program Membership Concurrence

Eddie Bernard	4/9/09 Date	X Concurred
Kathleen O'Neil	4/20/2009 Date	X Concurred
Mark Paese	5/7/09 Date	X Concurred
for Michael Szabados	5/7/09 Date	X Concurred
Susan McLean	4/27/2009 Date	X Concurred

1. Program Summary

The Tsunami Warning and Education Act of 2006 (P.L. 109-424) identifies NOAA as the lead agency responsible for: operating the U.S. Tsunami Warning System; organizing the National Tsunami Hazard Mitigation Program (NTHMP); conducting a tsunami research program; providing technical assistance and training to the global tsunami warning system; and reporting to Congress on the operational status of the U.S. Tsunami Warning System.

The NOAA Tsunami Program mission is to provide reliable and timely tsunami forecast and warnings and to promote community resilience. NOAA accomplishes its tsunami mission by providing timely, accurate, reliable, and effective tsunami forecast and warning products to coastal populations and emergency management organizations within the Tsunami Warning System's (TWS) Area of Responsibility (AOR), as well as by promoting tsunami mitigation activities such as community preparedness and public education. The Tsunami Program's main operational responsibilities are to rapidly characterize potential tsunami sources, forecast arrival time and impact when possible, and disseminate the appropriate guidance to coastal communities. A robust tsunami mitigation system relies on the free and open exchange and long-term management of high quality data, including real-time observational and retrospective data.

Tsunamis are low frequency, high-impact natural hazards. When tsunamis of high impact occur in the U.S., they have the potential to cause considerable numbers of fatalities, inflict major damage to infrastructure, and result in significant social upheaval, economic disruption, and environmental degradation to large coastal sections of the country. Since 1900, over 200 tsunami events affected the coasts of the United States and its territories causing more than 500 deaths. According to the NOAA Report *Population Trends Along the Coastal United States 1980 - 2008* (September 2004), in 2003 approximately 53% of the U.S. population live in coastal communities and are at risk for impacts from a destructive tsunami. An additional 7 million people now live on the coasts and 12 million more are expected by 2015. Our coastal communities also contribute to 60% of the U.S. Gross Domestic Product. As coastal economic growth and population density increase, so does the risk of economic damage and harm to people from tsunamis. It is therefore imperative that the tsunami warning centers be at the highest state of readiness and capability to provide necessary warnings.

For additional information see the NOAA Tsunami Program Web Site at
http://www.tsunami.gov

2. Observation Requirements Summary

The **Tsunami** Program of NOAA's Weather and Water Goal requires a total of 35 environmental observation requirements to address its mission. The following graphs provide a breakdown of these requirements by mission Priority, environmental Discipline and Type.

Total Records: 35

2.1 Observation Requirements by Priority

The Tsunami program's observation requirements are distributed among priority levels as follows:

9 = **Priority 1, Mission Critical:** Cannot meet operational mission objectives without this data.
4 = **Priority 2, Mission Optimal:** Data not critical but would provide significant improvement to operational capability.
22 = **Priority 3, Mission Enhancing:** Needed to enhance state of knowledge / assess potential for operational capability.

The following chart provides the distribution of the Tsunami program's requirements by priority.

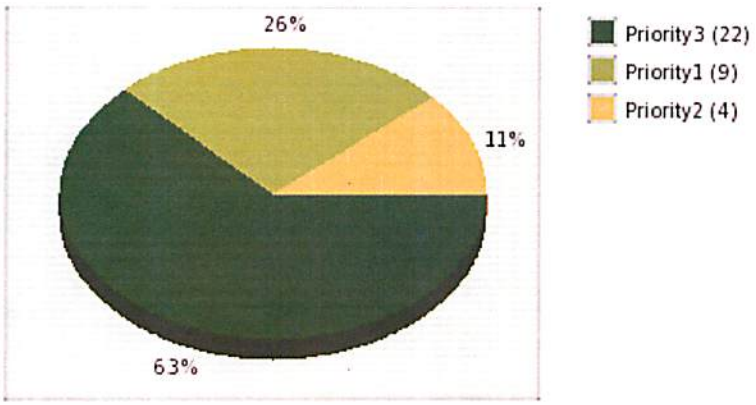

Figure 1: WW-TSU Observation Requirements by Priority (%)

2.2 Observation Requirements by Discipline

The Tsunami program's observation requirements are distributed among environmental disciplines as follows:

3 = Atmosphere
0 = Biosphere
0 = Cryosphere
0 = Human Dimensions
0 = Terrestrial Hydrosphere
1 = Land Surface
27 = Oceans
4 = Solid Earth
0 = Spectral/Engineering
0 = Sun-earth Interactions

The following chart provides the distribution of the Tsunami program's requirements by discipline.

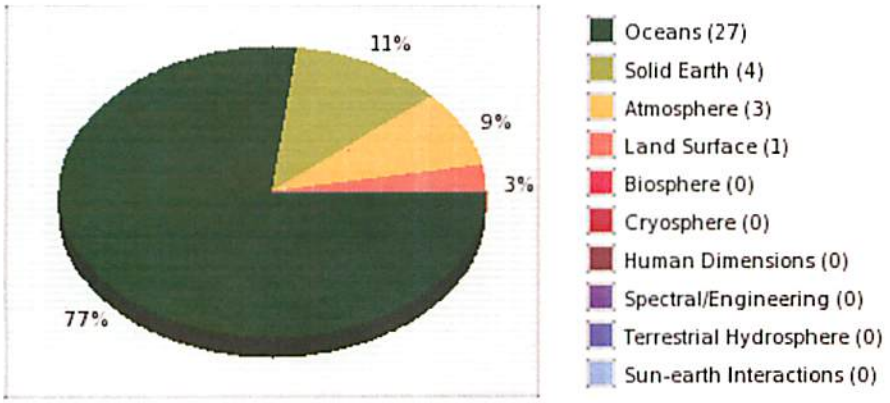

Figure 2: WW-TSU Observation Requirements by Discipline.

2.3 Observation Requirements by Type

The Tsunami program's observation requirements are distributed among types as follows:

0 = Biological
1 = Chemical
34 = Physical
0 = Social
0 = Socio-economic

The following Chart gives the distribution of the Tsunami program's requirements by type.

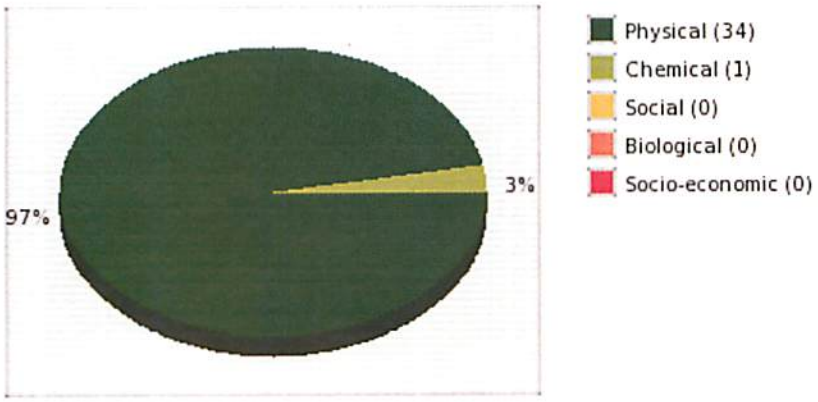

Figure 3: WW-TSU Observation Requirements by Type.

3. Observation Requirements Mapping to Performance Measures

The following table provides the listing of observation requirements for the **Tsunami** Program of NOAA's Weather and Water Goal by GPRA and Corporate (NOAA) Performance Measures, and Regional Collaboration Priorities (RC).

NOAA-1: WW-TSU-02 Reduce elapsed time from earthquake to Tsunami Message Product issuance for distant events from 22 minutes to 16 minutes by 2013
NOAA-2: WW-TSU-03 Reduce elapsed time from earthquake to Tsunami Message Product issuance for regional events from 10 minutes to 5 minutes by 2013
NOAA-3: WW-TSU-12 Maintaining TWCs at a high level of reliability
NOAA-4: WW-TSU-05 Reduce the community cost of tsunami evacuation from $6M in 2007 to $4.3M in 2013
NOAA-5: WW-TSU-06 Accurately estimate AOR earthquake location within 15 km of epicenter (compared to official USGS location and magnitude product) by 2013 so that reliable and appropriate products are issued
NOAA-6: WW-TSU-07 Increase the data available from the observational networks to 90% by 2013
NOAA-7: WW-TSU-01 Maintain Probability of detection for a destructive tsunami within the TWC area of responsibility at 100%
NOAA-8: WW-TSU-04 Reduce the Geographical extent of tsunami warnings from 25% reduction in 2007 to 47% reduction in 2013
NOAA-9: WW-TSU-09 Increase efficiency of archive and distribution of post-event tsunami data
NOAA-10: WW-TSU-10 Increase the number of Inundation Forecast Models developed for specific high-risk areas from 26 to 75 by 2013
NOAA-11: WW-TSU-11 Improve tsunami warning accuracy
NOAA-12: WW-TSU-08 Increase the number of TsunamiReady communities from 46 to 102 by 2013
NOAA-13: WW-TSU-13 Accurately estimate AOR earthquake magnitude within .17 (compared to official USGS location and magnitude product) by 2013 so that reliable and appropriate products are issued

RC-1: Hazard Resilient Coastal Communities
RC-2: Integrated Ecosystem Assessments
RC-3: Integrated Water Resource Services

Table 1: WW-TSU Observation Requirements Mapping to Performance Measures

Requirement	Priority	NOAA													RC		
		1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3
Hydrography: Selected Coastal	1			X	X	X							X		X	X	X
Seismicity: Global	1	X	X	X	X	X	X								X		
Seismicity: Local	1		X	X	X	X											
Seismicity: Regional	1	X	X	X	X	X											
Shoreline Mapping: Selected Coastal	1				X	X									X	X	X
Topography: Selected Coastal	1				X	X									X	X	X
Tsunami Offshore: Realtime	1			X	X	X							X				X
Water Level: Global	1			X	X	X							X				X
Water Level: Regional	1			X	X	X							X		X		X
Bathymetry: Deep Water	2			X	X	X							X				
Hydrography: Shallow	2			X	X	X							X		X		
Sea Surface Height: Predicted Topography	2				X	X							X				
Tsunami Offshore: Post-event	2				X	X							X				
Air Temperature - Regional	3																
Barometric Pressure	3																
Barometric Pressure - Regional	3																
Hydroaccoustic: Landslide	3																
Land Deformation: GPS	3																
Ocean Waves: Significant Wave Height (Coastal)	3																
Ocean Waves: Significant Wave Height (Global)	3																
Ocean Waves: Significant Wave Height, Local	3																
Ocean Waves: Significant Wave Height, Regional	3																
Ocean Waves: Swell Height	3																
Ocean Waves: Wind Waves, Height	3																
Post Event survey	3																
Sea Surface Height: Coastal	3																
Sea Surface Temperature	3																
Seawater Conductivity with Depth	3																
Seawater Pressure with Depth	3																
Seawater Temperature with Depth	3																
Water Temperature - Regional	3																
Wind (Direction) - Regional	3																
Wind (Speed) - Regional	3																
Wind Direction at 10m	3																
Wind Speed at 10m	3																

4. Status of Program List

As shown in Appendix A, each NOAA Observation Requirement is further specified by spatial, temporal and accuracy related attributes at both Threshold and Objective levels. The following table provides the attribute completion status of the observation requirements list for the Tsunami Program. All attributes at the Priority-1/Threshold Level must be completed to allow for observation gap analyses to be conducted.

Table 2: WW-TSU Observation Requirement Attributes Remaining [blank] or [tbs]

Priority	Threshold	Objective
1	0	50
2	30	41
3	72	110
Total	**102**	**201**

Appendix A Tsunami Program, Observation Requirements

Key: V=value, U=units, W=weight

Observation Requirement	Obs Req Prty	T/O	Geo Cov		Vert Range				Vert Res			Horiz Res			Meas Range				Msmnt Accy			Smplng Intvl			Data Ltncy			Long Stab		
			V	W	Low	High	U	W	V	U	W	V	U	W	Low	High	U	W	V	U	W	V	U	W	V	U	W	V	U	W
Hydrography: Selected Coastal	1	T	Coastal US	50	na	na	na	0	na	na	0	10	m	15	-10	0	m	10	0.1	m	15	10	yr	5	3	mon	5	5	yr	0
		O	Coastal US	tbs	na	na	na		na	na		2	m	tbs	-10	0	m	tbs	0.05	m	tbs	1	yr	tbs	1	mon	tbs	tbs	tbs	tbs
Seismicity: Global	1	T	Coastal Global	25	na	na	na	0	na	na	0	2000	km	20	6	9	Magnitude	15	0.2	Magnitude	15	0.05	sec	10	30	sec	10	5	yr	5
		O	Coastal Global	tbs	na	na	na		na	na		1500	km	25	5	10	Magnitude	25	0	Magnitude	25	0.02	sec	10	10	sec	10	100	yr	5
Seismicity: Local	1	T	Coastal Global	25	na	na	na	0	na	na	0	40	km	20	2	7	Magnitude	15	0.2	Magnitude	15	0.05	sec	10	10	sec	10	5	yr	5
		O	Coastal Global	tbs	na	na	na		na	na		20	km	25	1	10	Magnitude	25	0	Magnitude	25	0.02	sec	10	5	sec	10	100	yr	5
Seismicity: Regional	1	T	Coastal Global	25	na	na	na	0	na	na	0	600	km	20	3	8	Magnitude	10	0.2	Magnitude	15	0.05	sec	15	30	sec	10	5	yr	5
		O	Coastal Global	tbs	na	na	na		na	na		400	km	25	2	10	Magnitude	25	0	Magnitude	25	0.02	sec	10	5	sec	10	100	yr	5
Shoreline Mapping: Selected Coastal	1	T	Coastal US	50	na	na	na	0	na	na	0	10	m	15	-1	1	m	10	0.1	m	10	5	yr	5	3	mon	10	5	yr	0
		O	Coastal US	tbs	na	na	na		na	na		2	m	tbs	-1	1	m	tbs	0.05	m	tbs	3	yr	tbs	1	mon	tbs	tbs	tbs	tbs
Topography: Selected Coastal	1	T	Coastal US	50	na	na	na	0	na	na	0	10	m	15	0	2500	m	10	0.1	m	10	5	yr	5	3	mon	10	5	yr	0
		O	Coastal US	tbs	na	na	na		na	na		2	m	tbs	0	2500	m	tbs	0.05	m	tbs	5	yr	tbs	1	mon	tbs	tbs	tbs	tbs
Tsunami Offshore: Realtime	1	T	Global Ocean	10	na	na	na	0	na	na	0	450	km	10	0	10	m	5	0.5	mm	15	1	min	20	5	min	25	2	yr	15
		O	Global Ocean	tbs	na	na	na		na	na		450	km	15	0	10	m	10	0.25	mm	10	15	sec	20	1	min	25	5	yr	10
Water Level: Global	1	T	Global Ocean	10	na	na	na	0	na	na	0	1000	km	15	0	15	m	10	3	mm	10	1	min	20	15	min	20	5	mm	15
		O	Global Ocean	tbs	na	na	na		na	na		tbs	na	15	0	30	m	10	tbs	tbs	10	15	sec	20	1	min	25	tbs	tbs	15
Water Level: Regional	1	T	Coastal Global	5	na	na	na	0	na	na	0	100	km	15	0	30	m	10	3	mm	15	1	min	20	6	min	20	1	yr	15
		O	Coastal Global	tbs	na	na	na	0	na	na	0	20	km	15	0	30	m	10	tbs	tbs	10	15	sec	20	15	sec	25	10	yr	15
Bathymetry: Deep Water	2	T	Global Ocean	tbs	<-5000	-1000	m	tbs	10	m	tbs	150	m	tbs	<-5000	-1000	m	tbs	10	m	tbs	100	yr	tbs	3	mon	tbs	tbs	tbs	tbs
		O	Global Ocean	tbs	tbs	tbs	tbs	tbs	5	m	tbs	100	m	tbs	tbs	tbs	tbs	tbs	5	m	tbs	100	yr	tbs	1	mon	tbs	tbs	tbs	tbs
Hydrography: Shallow	2	T	Coastal Global	tbs	-1000	-10	m	tbs	1	m	tbs	25	m	tbs	-1000	-10	m	tbs	5	m	tbs	25	yr	tbs	3	mon	tbs	tbs	tbs	tbs
		O	Coastal Global	tbs	tbs	tbs	tbs	tbs	tbs	tbs	tbs	10	m	tbs	tbs	tbs	tbs	tbs	2	m	tbs	25	yr	tbs	1	mon	tbs	tbs	tbs	tbs
Sea Surface Height: Predicted Topography	2	T	Global Ocean	tbs	-3	3	m	tbs	1	micro-rad of slope	tbs	6	km	tbs	-3	3	m	tbs	1	micro-rad of slope	tbs	1.2	yr	tbs	6	yr	tbs	tbs	tbs	tbs
		O	Global Ocean	tbs	-8000	0	m	tbs	100	m	tbs	6	km	tbs	-8000	0	m	tbs	100	m	tbs	tbs	tbs	tbs	tbs	tbs	tbs	tbs	tbs	tbs
Tsunami Offshore: Post-event	2	T	Global Ocean	15	0	6000	m	10	0.5	mm	10	450	km	10	0	10	m	10	1	mm	10	15	sec	15	6	yr	10	2	yr	10
		O	Global Ocean	15	0	6000	m	10	0.5	mm	10	450	km	10	0	10	m	10	1	mm	10	15	sec	15	2	yr	10	5	yr	10

Observation Requirement	Obs Req Prty	T/O	Geo Cov		Vert Range				Vert Res			Horiz Res			Meas Range				Msmnt Accy			Smplng Intvl			Data Ltncy			Long Stab		
			V	W	Low	High	U	W	V	U	W	V	U	W	Low	High	U	W	V	U	W	V	U	W	V	U	W	V	U	W
Air Temperature - Regional	3	T	Coastal Global	15	var	var	m	10	0.1	C	10	tbs	tbs		-30	55	C	15	0.2	K	10	6	min	10	8	min	10	2	yr	10
		O	Coastal Global	15	var	var	m	10	0.1	C	10	tbs	tbs		-30	55	C	15	0.2	K	10	6	min	10	6	min	10	2	yr	10
Barometric Pressure	3	T	Global	15	-1	1	cm	10	1	cm	10	450	km	15	800	1100	hPa	15	0.1	hPa	15	15	min	10	1	hr	10	2	yr	5
		O	Global	15	-1	1	cm	10	1	cm	10	450	km	15	800	1100	hPa	15	0.1	hPa	15	2	min	10	10	min	10	2	yr	10
Barometric Pressure - Regional	3	T	Coastal Global	15	var	var	m	10	0.1	hPa	10	tbs	tbs		800	1100	hPa	15	0.5	hPa	15	6	min	10	8	min	10	2	yr	10
		O	Coastal Global	15	var	var	m	10	0.1	mb	10	tbs	tbs		800	1100	hPa	15	tbs	tbs	15	6	min	10	6	min	10	2	yr	10
Hydroaccoustic: Landslide	3	T	Global	tbs	na	na	na	tbs	na	na		5	km		2	4	Magnitude		0.2	Magnitude		256	Hz		10	sec		5	yr	
		O	Global	tbs			na	tbs		na										Magnitude		50	Hz		5	sec			yr	
Land Deformation: GPS	3	T	Coastal Global	tbs	-10	10	m	tbs	10	cm		50	km		-10	10	m		10	cm		15	sec		1	min				
		O	Coastal Global	tbs	tbs	tbs	tbs	tbs	1	cm		50	km		tbs	tbs			1	cm		1	sec		5	sec			tbs	
Ocean Waves: Significant Wave Height (Coastal)	3	T	Coastal Global	15	30	0	m	10	5	cm	10	1	km	10	0.1	35	m	15	10	cm	15	20	min	10	5	min	10	tbs	tbs	5
		O	Coastal Global	15	30	0	m	10	1	cm	10	300	km	10	0	35	m	15	10	cm	10	tbs	tbs	10	tbs	tbs	10	tbs	tbs	10
Ocean Waves: Significant Wave Height (Global)	3	T	Global Ocean	tbs	0	tbs	tbs	tbs	na	na		2.5	km		0	30	m		0.2	m		4	hr		1.5	hr		tbs	tbs	
		O	Global Ocean	tbs	0	tbs	tbs	tbs	tbs	tbs		10	km		0	30	m		0.1	m		1	min		tbs	tbs		tbs	tbs	
Ocean Waves: Significant Wave Height, Local	3	T	CONUS+AK+HI+US EEZ	15	0	5	cm	10	na	na	10	0.5	km	10	0.1	30	m	15	10	%	15	tbs	tbs	10	tbs	tbs	10	tbs	tbs	5
		O	CONUS+AK+HI+US EEZ	15	0	5	cm	10	tbs	tbs	10	0.3	km	10	0.1	30	m	15	5	%	10	tbs	tbs	10	tbs	tbs	10	tbs	tbs	10
Ocean Waves: Significant Wave Height, Regional	3	T	Coastal Global	15	0	5	cm	10	na	na	10	1	km	10	0.1	30	m	15	10	%	15	tbs	tbs	10	tbs	tbs	10	tbs	tbs	5
		O	Coastal Global	15	0	5	cm	10	tbs	tbs	10	0.5	km	10	0.1	30	m	15	5	%	10	tbs	tbs	10	tbs	tbs	10	tbs	tbs	10
Ocean Waves: Swell Height	3	T	Coastal Global	15	0	0	m	10	tbs	tbs	10	10	km	10	0	35	m	15	0.2	m	15	20	min	10	5	min	10	tbs	tbs	5
		O	Coastal Global	15	tbs	tbs	tbs	10	tbs	tbs	10	tbs	km	10	tbs	tbs	tbs	15	tbs	tbs	10	tbs	tbs	10	tbs	tbs	10	tbs	tbs	10
Ocean Waves: Wind Waves, Height	3	T	Coastal Global	15	0	0	m	10	tbs	tbs	10	10	km	10	0	35	m	15	0.2	m	15	20	min	10	5	min	10	tbs	tbs	5
		O	Coastal Global	15	tbs	tbs	tbs	10	tbs	tbs	10	tbs	km	10	tbs	tbs	tbs	15	tbs	tbs	10	tbs	tbs	10	tbs	tbs	10	tbs	tbs	10
Post Event survey	3	T	Coastal Global		0.1	600	m		10	cm		10	m		0.1	600	m		10	cm		event	day		6	mon		na	na	
		O	Coastal Global		0.01	600	m		1	cm		1	m		0.01	600	m		1	cm		event	day		2	yr		na	na	
Sea Surface Height: Coastal	3	T	Global Ocean	tbs	0	tbs	tbs	tbs	na	na		0.3	km		tbs	tbs	tbs		4	cm		2	day		1	day		1	mm/yr	
		O	Global Ocean	tbs	0	tbs	tbs	tbs	tbs	tbs		0.2	km		tbs	tbs	tbs		2	cm		tbs	tbs		30	min		tbs	tbs	
Sea Surface Temperature	3	T	Global Ocean	15	0	-1	m	10	1	cm	10	450	km	10	-5	35	C	15	0.1	K	15	1	hr	10	1	hr	10	2	yr	5
		O	Global Ocean	15	0	-1	m	10	1	cm	10	450	km	10	-5	35	C	15	0.1	K	10	10	min	10	1	hr	10	2	yr	10

Observation Requirement	Obs Req Prty	T/O	Geo Cov		Vert Range				Vert Res			Horiz Res			Meas Range				Msmnt Accy			Smplng Intvl			Data Ltncy			Long Stab		
			V	W	Low	High	U	W	V	U	W	V	U	W	Low	High	U	W	V	U	W	V	U	W	V	U	W	V	U	W
Seawater Conductivity with Depth	3	T	Global Ocean	15	0	6000	m	10	10	m	10	450	km	10	0	7	Sm/m	15	0.003	Sm/m	15	1	yr	10	30	day	10	1	day	10
		O	Global Ocean	15	0	6000	m	10	10	m	10	450	km	10	0	7	Sm/m	15	0.003	Sm/m	15	1	yr	10	30	day	10	1	day	10
Seawater Pressure with Depth	3	T	Global Ocean	15	0	6000	m	10	10	m	10	450	km	10	0	10000	psi	15	0.1	%	15	2	yr	10	30	day	10	1	day	10
		O	Global Ocean	15	0	6000	m	10	10	m	10	450	km	10	0	10000	psi	15	0.1	%	15	1	yr	10	30	day	10	1	day	10
Seawater Temperature with Depth	3	T	Global Ocean	15	0	6000	m	10	10	m	10	450	km	10	-5	35	C	15	0.01	K	15	2	yr	10	30	day	10	1	day	10
		O	Global Ocean	15	0	6000	m	10	10	m	10	450	km	10	-5	35	C	15	0.01	K	15	1	yr	10	30	day	10	1	day	10
Water Temperature - Regional	3	T	Coastal Global	15	var	var	m	10	0.1	C	10	tbs	tbs		-30	55	C	15	0.2	K	10	6	min	10	8	min	10	2	yr	10
		O	Coastal Global	15	var	var	m	10	0.1	C	10	tbs	tbs		-30	55	C	15	0.2	K	10	6	min	10	6	min	10	2	yr	10
Wind (Direction) - Regional	3	T	Coastal Global	15	10	10	m	10	0.1	deg	10	tbs	tbs		0	360	deg	15	3	deg	10	6	min	10	8	min	10	2	yr	10
		O	Coastal Global	15	10	10	m above MSL	10	0.1	deg	10	tbs	tbs		0	360	deg	15	3	deg	10	6	min	10	6	min	10	2	yr	10
Wind (Speed) - Regional	3	T	Coastal Global	15	10	10	m	10	0.1	m/sec	10	tbs	tbs		0	60	m/sec	15	0.3	m/sec	10	6	min	10	8	min	10	2	yr	10
		O	Coastal Global	15	10	10	m above MSL	10	0.1	m/sec	10	tbs	tbs		0	60	m/sec	15	0.3	m/sec	10	6	min	10	6	min	10	2	yr	10
Wind Direction at 10m	3	T	Global	15	10	10	m	10	1	cm	10	450	km	10	0	360	deg True	15	1	deg	15	10	min	10	1	hr	10	2	yr	5
		O	Global	15	10	10	m	10	1	cm	10	450	km	10	0	360	deg True	15	1	deg	10	2	min	10	5	min	10	2	yr	10
Wind Speed at 10m	3	T	Global	15	10	10	m	10	1	cm	10	450	km	10	0	62	m/sec	15	0.1	m/sec	15	10	min	10	1	hr	10	2	yr	5
		O	Global	15	10	10	m	10	1	cm	10	450	km	10	0	62	m/sec	15	0.1	m/sec	10	2	min	10	5	min	10	2	yr	10

Appendix B WW-TSU, Priority-1 Requirements Validation

Appendix B.1 Validation Documents Submitted

The following Validation Documents have been submitted in support of the Tsunami Program's Priority-1 Observation Requirements.

Table B-1: Validation Documents provided to support Priority- Requirements

#	Validation Document Title	Document Type
1	MOST Tsunami Forecast Model – Digital Elevation Models Requirements; SME B. Eakins	Unpublished Paper
2	Implementation and Testing of the Method of Splitting Tsunami (MOST) Model. Titov & Gonzales	NOAA Report
3	Real-Time Tsunami Forecasting: Challenges & Solutions. Titov et. al.	Technical Paper
4	Real-time experimental forecast of the Peruvian tsunami of August 2007 for U.S. coastlines. Wei et. al.	Journal Article
5	Digital Elevation Model for Monterey, CA: Procedures, Data Sources and Analysis, Taylor, et. al.	NOAA Report
6	Digital Elevation Model for Nantucket, MA: Procedures, Data Sources and Analysis, Taylor, et. al.	NOAA Report
7	Tsunami Warning Center Reference Guide – USIOTWS Document No 26-IOTWS-07	USAID Report
8	ANSS Performance Standards – ANSS Technical Implementation Committee	Committee Report
9	Seismic Data Monitoring at Tsunami Warning Centers (TWC). Whitmore et. al.	NOAA Briefing
10	Tsunami Data Management – Initial Report Jan 2008 – NOAA Data Management Committee Special Report	NOAA Special Report
11	Public Law 109-424 – Dec 20, 2006 TSUNAMI WARNING AND EDUCATION ACT, U.S. Congress	Act of Congress
12	NOAA's Tsunami Program 2008-2017 Strategic Plan – July 2008. Bernard et. al	NOAA Strategic Plan
13	Intergovernmental Co-ordination Group for the Pacific Tsunami Warning and Mitigation System Report to GLOSS-X, June 6-8, 2007	Technical Report
14	Memo from Subject Matter Experts	SME Statement

Appendix B.2 Validation Documents Mapping to Observation Requirements

Tsunami Program and TPIO representatives worked jointly to identify references to validate both the need for an observation requirement and it's specific measurement attributes. These validation documents support one or more of the Priority-1 Requirements as shown in Table B-2 below. For occurrences where validation documents could not be identified, Program Subject Matter Experts (SME) justifications are provided.

Table B-2: Validation Document Mapping to Observation Requirement

Observation Requirement	Priority	Document[s] Submitted
Hydrography: Selected Coastal	1	1,2,3,4,5,6,10,SME
Seismicity: Global	1	7,8,9,10,11
Seismicity: Local	1	7,8,9,10,11, SME
Seismicity: Regional	1	7,8,9,10,11
Shoreline Mapping: Selected Coastal	1	1,2,3,4,5,6,10,SME
Topography: Selected Coastal	1	1,2,3,4,5,6,10,SME
Tsunami Offshore: Realtime	1	3,4,10,11,12
Water Level: Global	1	3,4,10,11,13
Water Level: Regional	1	3,4,10,11,13

Appendix B.3 Validation Assessment for Priority-1 Requirements

Tsunami Program and TPIO representatives worked jointly to review the submitted documentation, and identify the "level of validation" for the Threshold value of each of the five key attributes of each Priority-1 Observation Requirement.

Table B-3: Level of Validation for each Priority 1 Requirement Attribute

Parameters	Attribute Validated				
	Geo Cov	Vert Res	Horiz Res	MeaAcc	Samp Int
Hydrography: Selected Coastal	Coastal US	na	10 m	0.1 m	10 yr
Seismicity: Global	Coastal Global	na	2000 km	0.2 Magnitude	0.05 sec
Seismicity: Local	Coastal Global	na	40 km	0.2 Magnitude	0.05 sec
Seismicity: Regional	Coastal Global	na	600 km	0.2 Magnitude	0.05 sec
Shoreline Mapping: Selected Coastal	Coastal US	na	10m	0.1 m	5 yr
Topography: Selected Coastal	Coastal US	na	10 m	0.1 m	5 yr
Tsunami Offshore: Realtime	Global Ocean	na	450 km	0.5 mm	1 min
Water Level: Global	Global Ocean	na	1000 km	3 mm	1 min
Water Level: Regional	Coastal Global	na	100 km	3 mm	1min

Legend: Level of Validation

Direct Validation Documentation Submitted	
Associated Validation Documentation Submitted	
SME Consensus Validation Documentation Submitted	
Not Validated	
Attribute not applicable	