

Category of literatures

Category	Examples	Using for the Database
Scientific papers	Hatori(1975-), Tsuji et al.(2002) etc. (Such papers that the author(s) mention old documents, their bibliographical consideration, identification of place names on today's map, induced damage, measurement of tsunami heights, and so on.)	Each paper should be judged whether it is good(○) to refer for the database, or not(△).
Old documents and their collection	Collection books of material for historical earthquakes.	Each document should be classified by its reliability.
Catalogues	“Rika Nenpyo(Chronological Scientific Tables)” “Comprehensive list of Tsunamis to Hit the Japanese Islands(H. Watanabe, 1998)”	Catalogues are not used for making the database.

(defined by prof. Tsuji, ERI of Tokyo Univ.)

Version: 2011/3/8

Classification for individual document categorized in [B] by reliability

Document Reliability Category	(Notation on the database)	Basis for Judgment
◎	I	A1 : A document recorded by a direct eyewitness just after the event. A2 : A document recorded by a person on official post, for example, a village headman or a local governor. For example a document for exemption considering with the damage of a tsunami. A3 : A necrology of a temple. B3 : A legend of run up limit of seawater on a stone step of a temple.
○	II	B1 : A local chronology edited by an official editor in the 18 th to 19 th centuries. An essay written by an intellectual of those years. B2 : Description of an event written after at a long time elapse in an auto biography. C1 : A chronology edited by an office of municipality in the modern ages.
△	III	C2 : Description written on the basis of a rumor by an traveler. C3 : Description written at a place apart from the scene of the event on the basis of rumor. D : A record with less reliability than those in the category C. Description on the basis of guess given by a person in the modern ages.
×	X	E : Description in a forged book.

(defined by prof. Tsuji, ERI of Tokyo Univ.)

Version: 2011/12/01

Document Reliability Category	(Notation on the database)	Basis for Judgment
◎	I	<ul style="list-style-type: none"> (a) A document recorded by a direct eyewitness just after the event. (b) An old document recognized as a reliable one by authorized experts of Japanese history, even if its bibliography is not always clearly known. Such as “Todaiki (The chronicle of the first Shogun, Tokugawa Ieyasu)” and “Gyokuro-so” which are considered as the original documents in the beginning period of the Edo Era(1602-1868). (c) Description on an old document on agricultural or fishery admission villages in the Edo era. (d) A stone monument or a grave stone for victims of a tsunami which is founded within 100 years after the tsunami event. (e) A document whose bibliography is not clear, but its grammatical style is that of historical ages and it is difficult to be forged by a present person. (f) A text translated (a) into that of the present style. (g) A legend of run up limit of seawater on a stone step of a temple.
○	II	<ul style="list-style-type: none"> (a) Description on an old document written after at a long time elapse from the event. (b) Records written at a place apart from the scene of the event. Even if it was written in the same days, but it can not be considered high reliable. (c) Descriptions on a stone monument founded more than 100 years after a tsunami event. (d) Articles in books published in the Meiji(1868-1912) and the Edo(1603-1868) eras. (e) Results of researches on legends obtained by an expert of local history. (f) Descriptions of a local legend written by an editor of a chronicle of municipality.
△	III	<ul style="list-style-type: none"> (a) Descriptions written on the basis of a rumor or guess given by a writer including in the beginning of the Meiji(1868~) through the early years of the Showa eras(1868-1940). (b) Articles on the basis of guess made by an editor of a chronicle of a municipality. (c) Estimated tsunami height data on the basis of only a circumstantial evidence without any reliable documents.
◇	IV	<ul style="list-style-type: none"> (a) Results obtained through geological researches: surveys of archaeological sites, tsunami stones and so on.
×	X	<ul style="list-style-type: none"> (a) Description in a forged book. (b) Description in a low reliable document which is denied by that of another more reliable text. (c) Articles written through a misunderstanding by a writer of a chronicle of municipality. (For example, an author of a paper misunderstood that an articles of a tsunami as an event broke out in that town, but the fact is, that article had been written on the viewpoint of the whole the Japan.) (d) Such an event that had been once recognized by an author of a paper as a tsunami, but the fact is, that it is an another phenomenon, such as storm surges. (e) Misreading of the original text by an author of a scientific paper.
Blank(no reliable judgment is given)	Blank(no reliable judgment is given)	<ul style="list-style-type: none"> (a) Events listed in a catalogue. (b) Such a document that our retrospective search is still not made yet. (c) Such a document that an author of a paper on tsunami(s) did not state clearly the bibliographical information. (d) The case that the original material is unknown.
Further examination is required.	Further examination is required.	Pending of judgment of reliability

(defined by Dr. Y.Tsuji, the expert of geophysics, Fukada Geological Institute.)

Version: 2013/10/12

Classification of Confidence Levels of Tsunami Traces (After 1960 Chilean Tsunami)

	Judgment criteria	
Confidence Level A	High confidence level	Clear traces with minor survey errors.
Confidence Level B	Moderate confidence level	Traces are obscure, but the surrounding conditions and witnesses indicate a reliable water level. Survey errors are insignificant.
Confidence Level C	Low confidence level	Traces indicating waves having abnormally landed a sand beach, etc. or traces with significant survey errors due to survey points located away from the seashore.
Confidence Level D	Extremely low confidence level	Obscure traces overlapped by the effect of high water or typhoons etc. or folklore or other ungrounded information.

Reference: [1], [2], [3], [4]*, [5]

Classification of Confidence Levels of Tsunami Traces (Before the 1960 Chilean

	Judgment criteria	
Confidence Level A	High confidence level	Trace Information is described in ancient texts and local historical documents, etc., as well as site can be confirmed at present. Furthermore, trace height is surveyed and determined in recent years.
Confidence Level B	Moderate confidence level	Trace Information is described in ancient texts and local historical documents, etc., as well as site can be confirmed at present. However, trace height is not re-surveyed in recent years.
Confidence Level C	Low confidence level	Trace Information is described in ancient texts or told from mouth to mouth. However, the information is only limited to the name of regions and villages. Location of trace cannot be tacked.
Confidence Level D	Only as reference	Information speculated from relevant phenomena and descriptions on damage described in ancient texts.

Reference: [5]

■ Method of excluding erroneous data

X	Traces with least confidence	<ul style="list-style-type: none"> - Traces with obvious errors in quotation and description - Traces that shall not be used, or shall be excluded
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Reference: [6]

■ Classification of catalogues and qualitative information

Z	Traces that shall be judged based on the original literature used for catalog creation	<ul style="list-style-type: none"> - Traces classified as catalogues - Traces with values that summarized over relatively wide areas
	Duplication	<ul style="list-style-type: none"> - Re-quotation from other literature
	Qualitative information	<ul style="list-style-type: none"> - Qualitative information does not provide tsunami trace height but can be used to check the presence or absence of inundation

Reference: [6]

- [1] Hatori(1961):3.On the standard of measurements and observation times, REPORT ON THE CHILEAN TSUNAMI OF MAY 24, 1960, AS OBSERVED ALONG, THE COMMITTEE FOR FIELD INVESTIGATION OF THE CHILEAN TSUNAMI OF 1960, p.165 (in Japanese)
- [2] Earthquake Research Institute, The University of Tokyo (1983): Handbook for a field survey in areas damaged by a large earthquake (in Japanese)
- [3] Shuto&Unohana (1984): Field Surveys of Tsunami Heights from the 1983 Nihonkai-Chubu Earthquake Tsunami, Research report of Experimental Station for Tsunami Disaster Prevention, Tohoku University (in Japanese)
- [4] Shuto&Unohana (1995): Field Surveys of Tsunami Heights from the 1994 Hokkaido Toho-oki Earthquake Tsunami, Research report of Tsunami Engineering, Tohoku University (in Japanese)
- [5] Japan Society of Civil Engineers (2002): Tsunami Assessment Method for Nuclear Power Plants in Japan Annex 1,(in Japanese), URL: <http://committees.jsce.or.jp/ceofnp/node/5>
- [6]Iwabuchi et al. (2012): Development of Tsunami Trace Database with Reliability Evaluation on Japan Coasts, B2, Vol.68, No.2, Journal of JSCE. (in Japanese with English abstract)

* “Confidence Level D” was added by Shuto & Unohana (1995).

Information of Tsunami Trace Data and Newly-Proposed Confidence Levels*

Information item	Described information	Details of information	System display	Judgment	Notation on the database
Positional information	Address, lot number information	Detailed information such as latitude/longitude, block number, etc. is included.	Reliable latitude/longitude information provided	⊙	I
		Information is detailed, but specific to a region or locality (such as Mr. ○○'s residence).	Latitude/longitude information provided if estimated at the moment.	⊙	I
			With the latitude/longitude unestimated at the moment, the location is set at a representative point (town office, station, port, etc.).	○	II
	Maps, photos, sketches	No detailed information included.	Under review	○	II
		Information serving to identify the point is included.	Reliable latitude/longitude information provided	⊙	I
		No information serving to identify the point is included.	Under review	○	II
Height information	Information concerning the height measurement standard	Such information as the sea surface during the tsunami assault, the mean sea surface, and T.P. is included.	(To be put down with the standard)	⊙	I
		No		△	III
	Information concerning the definition of tsunami height	Definitions of run-up height, inundation height, wave height, and so on are included.	(To be put down with the height)	⊙	I
		No		△	III
	Influence of ground displacement	Described	(To be entered in the remarks column)		
		No			

(Reliability: ⊙Reliable, ○Confirmation required, △To be used for reference only)

*(Version)

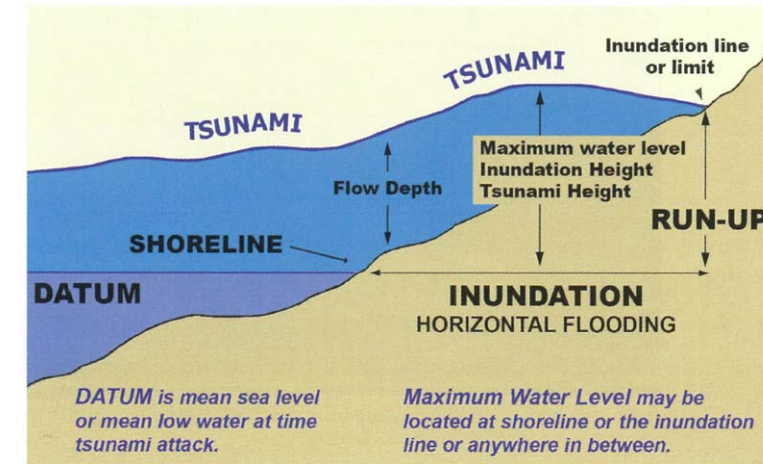
Y. Iwabuchi, H. Sugino, K. Ebisawa and F. Imamura (2008) : Reviewed database of the tsunami run-up data on the documentation in Japan, The 14th World Conference on Earthquake Engineering, Beijing, China.

【Definition of tsunami height and example of input tsunami trace pattern】

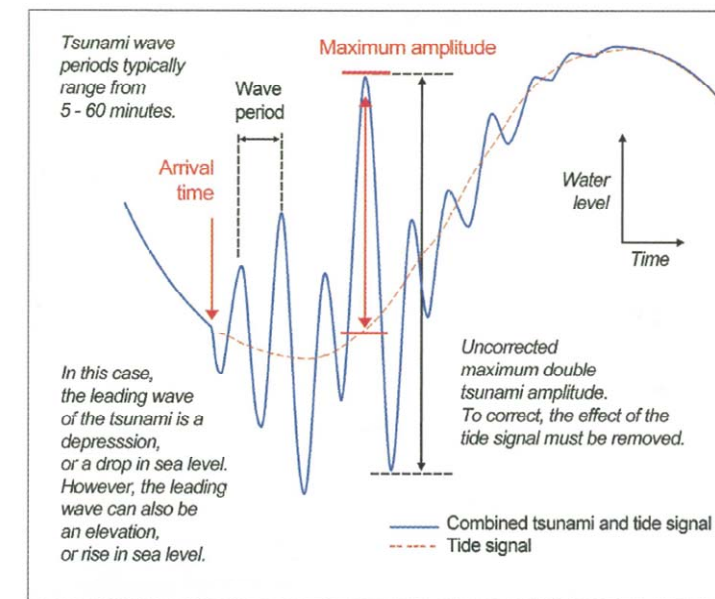
Trace height pattern in document	A mentioning example in document	Remarks
Inundation height	Inundation height Maximum water level Tsunami height	• Tsunami height, which is obtained by measurement of height level of water mark on side surface of a wharf, wall of a building, or a retaining wall, is categorized as a case of inundation height. ⁵⁾ • Tsunami height is measured height above the mean sea level or the astronomical tide level at the measurement time.
Run-up amount	Run-up amount Run-up height	• Tsunami height of sea water reached level climbing along a slope is categorized as "run-up height". ⁵⁾
Inundation depth	Inundation depth Flow depth	• Water layer thickness measured from the ground to water surface.
Total amplitude	Total amplitude Double amplitude Maximum double tsunami amplitude Wave height	• Difference of heights between the peak and the trough of a wave. ⁶⁾
Half amplitude	Half amplitude Maximum amplitude Wave amplitude	• An amplitude is defined as wave top height above mean level, and is a half of a wave height which is defined as level difference between the top and the trough of a wave. ⁶⁾
Difference b/w peak and trough	Difference between peak and trough levels	
Tsunami height in port	Tsunami height in port	• Tsunami height in port is defined by Tsuji(2010) ⁴⁾ for the case that sea water did not rise up to the top of a wharf, but wave height is clearly measurable.
Slight tsunami	Slight tsunami Weak tsunami	• "Weak tsunami" is defined by Tsuji(2010) ⁴⁾ for such a case that the evidence of a tsunami is recognized, but is hardly to be measure the height.
Examining	—	• It is expected to make clear the reliability in future.
Unknown	—	• In the case that tsunami height amount is mentioned in a document, but we have no way to judge its reliability. • For the case that tsunami height amount is mentioned in a document but we still have not enough materials to judge its reliability.
No data	—	For the case that the name of tsunami attacked point is described but the height is described neither in the text nor in the table, including the case that only inundation limit or distance from the shoreline is described.

(Notice)

※The word "Tsunami height" is used in various meaning, according to speakers. We should notice that the speaker use in what meaning by using it.³⁾



TSUNAMI GLOSSARY 2013(UNESCO)⁷⁾



Mareogram (sea level) record of a tsunami (TSUNAMI GLOSSARY 2013(UNESCO)⁷⁾

(References) Definition of tsunami height

1).The 2011 Tohoku Earthquake Tsunami Joint Survey (TTJS) Group	Definition of tsunami height http://www.coastal.jp/ttjt/index.php?%E6%B4%A5%E6%B3%A2%E3%81%AE%E9%AB%98%E3%81%95%E3%81%AE%E5%AE%9A%E7%BE%A9 (in Japanese)
2).Japan Meteorological Agency	Relation of Inundation depth, Tsunami trace, Run-up and Tsunami height at tidal station. http://www.jma.go.jp/ima/kishou/known/faq/faq26.html (in Japanese)
3).Shuto et al.(2007)	Encyclopedia of Tsunamis, p.79-81(in Japanese)
4).Tsuji et al.(2010)	Field Investigation on the 2010 Chilean Earthquake Tsunami along the Comprehensive Coastal Region in Japan, B2, Vol. 66, No.1, 1346-1350, Journal of JSCE. (in Japanese with English abstract) http://library.jsce.or.jp/jsce/open/00008/2010/57-1346.pdf
5).Tsuji et al.(2012)	Field Surveys of Tsunami Heights from the 2011 off the Pacific Coast of Tohoku, Japan Earthquake, Bull. Earthq. Res. Inst. Univ. Toky, Vol. 86, pp. 29-279(in Japanese with English abstract) http://ci.nii.ac.jp/els/110008915040.pdf?id=ART0009873607&type=pdf&lang=jp&host=cinii&order_no=&ppv_type=0&lang_sw=&no=1423111829&cp=
6).Japan Weather Association(2011)	Fundamental Knowledges of Tsunamis(in Japanese) http://www.jwa.or.jp/news/docs/%E6%B4%A5%E6%B3%A2%E3%81%AE%E5%9F%BA%E7%A4%8E%E7%9F%A5%E8%AD%98.pdf http://www.jwa.or.jp/news/2011/04/post-000209.html
7).UNESCO(2013)	TSUNAMI GLOSSARY 2013(in English) http://itic.ioc-unesco.org/index.php?option=com_content&view=article&id=1328:tsunami-glossary&catid=1142:about-tsunamis-tsunami-glossary&Itemid=2434