Supplemental File S9. Turbidite Classification and Correlation Standard Spreadsheet.

Supplemental File S9. Turbidite Classification and Correlation Standard Summary. The Turbidite Class is presented for each numbered (T-) turbidite in each core displayed in Supplemental File S 3. The counts of each class 1 and class 2 turbidites are presented. The age model results (Supplemental File 2 and 5 A) are presented for each turbidite number. The accounting of these turbidite classes, strike-length of correlation, the thickness for the majority of each core, and notes are presented. The summary of recurrence interval (RI) estimates for each time period is displayed. See footnotes for notation. See footnotes for notation. Please visit http://dx.doi.org/10.1130/GES01066.S9 or the full-text article on www.gsapubs.org to view Supplemental File S9.

	Turbidite Class						Cores											
	Core Number						108		107		105		104		102/103		96		all	
T #	108	107	105	104	102/ 103	96	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1	1			1	1	1	1	0	0	0	0	0	1	0	1	0	1	0	1	0
2			1	2	3	2	0	0	0	0	1	0	0	2	0	0	0	2	1	0
3	2	3	1	1	3	2	0	2	0	0	1	0	1	0	0	0	0	2	1	0
4		2	1	1	2	2	0	0	0	2	1	0	1	0	0	2	0	2	1	0
5	3	1	2	2	2	2	0	0	1	0	0	2	0	2	0	2	0	2	1	0
6		2	1	2	3	1	0	0	0	2	1	0	0	2	0	0	1	0	1	0
7		1	3	1	1	1	0	0	1	0	0	0	1	0	1	0	1	0	1	0
8		2	2	2	1	2	0	0	0	2	0	2	0	2	1	0	0	2	1	0
9			3	2	2	1	0	0	0	0	0	0	0	2	0	2	1	0	1	0
10	1	2	1	2	1	1	1	0	0	2	1	0	0	2	1	0	1	0	1	0
11		1	2	3	3	1	0	0	1	0	0	2	0	0	0	0	1	0	1	0
12		3	1	3	3	2	0	0	0	0	1	0	0	0	0	0	0	2	1	0
13		3	1	3	2	3	0	0	0	0	1	0	0	0	0	2	0	0	1	0
14	2	1	1	2	2	1	0	2	1	0	1	0	0	2	0	2	1	0	1	0
15		1	1	1	1	1	0	0	1	0	1	0	1	0	1	0	1	0	1	0
16			2	3	3	3	0	0	0	0	0	0	0	2	0	0	0	0	0	2
17		3	3	3	3	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0
18		2	1	1	1	3	0	0	0	2	1	0	1	0	1	0	0	0	1	0
19			3	1	3		0	0	0	0	0	0	1	0	0	0			1	0
20		3	2	3	3		0	0	0	0	0	2	0	0	0	0			0	2
21	1	2	1	1	1		1	0	0	2	1	0	1	0	1	0			1	0
22	3		3	2	2		0	0			0	0	0	2	0	2			0	2
23	3		3	2	3		0	0			0	0	0	2	0	0			0	2
24	3		2	2	3		0	0			0	2	0	2	0	0			0	2
25	3		2	2	3		0	0			0	2	0	2	0	0			0	2
26	2		2	3	3		0	2			0	2	0	0	0	0			0	2
27	2		1	1	1		0	2			1	0	1	0	1	0			1	0
28	2		1	2	3		0	2			1	0	0	2	0	0			1	0
29	1		1	1	3		1	0			1	0	1	0	0	0			1	0
30	1		1	3	2		1	0			1	0	0	0	0	2			1	0
31	2		1	3	2		0	2			1	0	0	0	0	2			1	0
32	2		1	3	2		0	2			1	0	0	0	0	2			1	0
33	1		1	3	1		1	0			1	0	0	0	1	0			1	0
34	3		3	1	2		0	0			0	0	1	0	0	2			1	0
35	3		1	2	2		0	0			1	0	0	2	0	2			1	0
36	1		2	3	1		1	0			0	2	0	0	1	0			1	0
37	3		2	3	2		0	0			0	2			0	2			0	2
38	2		1		1		0	2			1	0			1	0			1	0
39	1		2		2		1	0			0	2			0	2			1	0
40	2				1		0	2							1	0			1	0
41	1				1		1	0							1	0			1	0
42	1				1		1	0							1	0			1	0
43	1				2		1	0							0	2			1	0
T# Count >>	28	16	37	37	43	18	11	9	5	6	20	10	11	14	14	14	9	6	35	8
oldest T# >>	43	21	39	36	43	18	1	2	1	2	1	2	1	2	1	2	1	2	1	2
							turb counts for each class													

= oldest turbidite in each core
= count of T-# turbidites in each core
= count of turbidites in classes 1 and 2 *for each core*

Analysis Type #	Median Age*	95.4% Uncertainty	
P_Sequence	60	150	
R_date	390	260	
Combine	630	110	
Combine	740	120	
103PC	820	130	
Synthetic	940	180	
Combine	1,080	140	Microatoll Limit
Synthetic	1,220	220	
Synthetic	1,370	210	
Combine	1,500	110	Tsunami Limit
Combine	1,620	140	
Synthetic	1,730	200	
Synthetic	1,840	220	
R_date	1,950	210	
Synthetic	2,040	190	
R_date	2,120	150	
Synthetic	2,210	200	
Synthetic	2,310	230	96PC Limit
Synthetic	2,410	230	
R_date	2,520	200	
Combine	2,750	100	
Synthetic	2,920	300	
Synthetic	3,120	380	
Synthetic	3,320	410	
Synthetic	3,530	400	
Synthetic	3,720	340	
Combine	3,900	190	
Synthetic	4,220	330	
R_date	4,500	160	
Synthetic	4,600	190	
Synthetic	4,690	200	
Synthetic	4,780	180	
R_date	4,850	130	
Synthetic	4,920	150	
Synthetic	4,980	170	
Synthetic	5,040	180	
Synthetic	5,100	180	
Synthetic	5,160	180	
R_date	5,230	150	
R_date	5,790	140	
R_date	6,030	150	
R_date	6,470	130	
R_date	6,600	140	

Footnotes:
gray ages = model age

(1) R_date ages are the result of using the Sequence command in OxCal. (2) Combine ages are based on the "Combine" function in OxCal. (3) Synthetic ages are based on the "Date" command in our OxCal age model. Synthetic ages are not attributed to any "source" core. (4) P_Sequence ages are based on a P_Sequence age model for a single core.

Minimum Class	big ones majority 1's		
	strike > 200 km	Majority Thicker Turbidites	Notes on the 7 criteria
1	yes	yes	Ok. Goes from 108-96, All class 1.
1	no	no	Ok. Poorly defined T2, correlation quality very low. Only has class one criteria at one site.
1	no**	yes	Ok, link to 96 very tenuous
1	no**	yes	Ok, link to 96 very tenuous
1	no	no	Ok, link to 96 very tenuous. One change
1	no**	yes	Ok, link to 96 very tenuous
1	no**	no	Ok, link to 96 very tenuous
1	no	no	Ok, link to 96 very tenuous. One change
1	no	no	Ok, link to 96 very tenuous. One change
1	yes	yes	Ok, link to 96 very tenuous
1	no	no	Ok, link to 96 very tenuous. One change
1	no	no	Ok, link to 96 very tenuous
1	no	no	Ok, link to 96 very tenuous
1	yes	yes	Ok, link to 96 very tenuous. One change
1	no**	no	Ok
2	no	no	Ok
1	no	no	Ok
1	yes	yes	Ok. model age 2310
1	no^	no	Ok.
2	no^	no	Ok
1	no**	yes	Ok
2	no^	no	Ok
2	no^	no	Ok
2	no^	no	Ok
2	no*	no	Ok
2	no^**	yes	only criteria missing is strike length due to short length of 96 small correlation change, and downgrade of class for 108
1	no^**	yes	Ok
1	no^	no	Ok
1	no^	yes	Ok
1	no^	no	Ok
1	no^	no	Ok
1	no^	no	Ok
1	no^**	yes	only criteria missing is strike length due to short length of 96
1	no^	yes	Ok
1	no^	yes	Ok
1	no^**	no	Ok
2	no^	no	Ok
1	no^**	yes	only criteria missing is strike length due to short length of 96
1	no^	no	Ok
1	no^	no	Ok
1	no^**	no	Ok
1	no^**	yes	only criteria missing is strike length due to short length of 96
1	no^**	no	Ok

Footnotes:
^^ = incomplete bed
^ = full (>200 km) strike length not available
** majority class 1 criteria
green = 150 km strike length, long bars have thickness also
yellow = >200 km strike length and thickness

Supplemental File S9: Turbidite Classification and Criteria

We distinguish between individual single-pulse or individual multiple-pulse turbidites from a series of stacked single-pulse or multiple-pulse turbidites using sedimentologic characteristics. We consider characteristics of deposits within a single core, as well as these characteristics from adjacent cores where they are likely correlated. Local variability is inherent in these and all geologic records, thus the determination of single versus multipulse turbidites may not be apparent in all examples, but is taken from the best example of each bed in a correlated series. A detailed example of this was given in Goldfinger et al. (2012a). All correlated turbidites therefore inherit the classification from the best example of turbidite beds that are correlated along strike. We list the characteristics used to constrain turbidite deposition timing and sedimentation characters, and classify turbidites into three categories based on the following criteria.

Turbidite Classification Criteria

- **Impulsive Base (IB)**: coarser sediment overlying finer sediment with a sharp (<1mm) lithologic contact with fine-grained underlying sediment.
- **Erosive Base (EB)**: evidence for an unconformity at the base of the turbidite, due to erosion during turbidite emplacement. May be evident as an angular, and or irregular base.
- **Underlying Hemipelagic Sediment (UHS-RGB)**: hemipelagic sediment is lighter in color than turbiditic sediment and this can be seen visually and in the RGB imagery.
- **Underlying Hemipelagic Sediment (UHS-CT)**: hemipelagic sediment is massive (lacks laminae) and low in density and this can be seen visually in the CT imagery.
- **Underlying Brown Oxidation Laminae (UBOL)**: Oxidation of sediment at the seafloor is not instantaneous and represents a time period much longer than the time required for the deposition of a turbidite. If there is oxidation between two turbidite beds, they are possibly (but not necessarily) the result of separate turbidity currents. Such contacts must be distinguished from oxidation fronts which move through the core with time.
- **Geophysical Property Relation (GPR)**: At least one of the core geophysical properties match the typical vertical profile of a typical turbidite – hemipelagite pair. The profile of a typical turbidite shows at least one maxima associated with a density or particle size increase at the base of the turbidite, with an upwards decrease in value associated with the turbidite tail, and a further diminishing value to a background value associated with the hemipelagite.
- **Sediment Loading Structures (SLS):** Evidence for sediment loading structures.

We define three classes of beds based on these criteria:

1. More certainly a single-pulse or a multi-pulse turbidite
2. Less certainly a single-pulse or a multi-pulse turbidite
3. Indeterminately a single-pulse or multi-pulse turbidite (or possibly not a turbidite).

Turbidite Class

1	More Certainly a Single-Pulse or a Multi-Pulse Turbidite
2	Less Certainly a Single-Pulse or a Multi-Pulse Turbidite
3	Indeterminately a Single-Pulse or a Multi-Pulse Turbidite

Category 1 includes turbidites that satisfy four of the seven criteria we list. Based on these multiple criteria, we find that there is a highest likelihood of the bed being a single turbidite. If three of the seven criteria we list above are met, then we are less certain with our interpretation and place the turbidite into category 2. If fewer than two criteria are met, we place the sedimentary deposit into category 3. Our preferred correlations are composed of category 1 and category 2 turbidites, but not category 3 turbidites. Some beds may be included in category 3 if they are incomplete, particularly at the base.

Comparison Group	Standards Met	Recurrence Interval	Standard Notation Above	Notes
microatoll comparison	> 200 km + thick	1080	yellow	less than 1070 years, best overlap with microatoll record
	> 150 km + thick	540	yellow + green with heavy box	less than 1070 years, best overlap with microatoll record
	overall RI	180	all events	younger than T7
tsunami comparison	> 200 km + thick	1500	yellow	less than 1510 years, best overlap with tsunami record
	> 150 km + thick	500	yellow + green with heavy box	less than 1510 years, best overlap with tsunami record
	overall RI	170	all events	younger than T10
96 PC comparison	> 200 km + thick	770	yellow	less than 2370 years, best overlap with 96 PC record
	> 150 km + thick	460	yellow + green with heavy box	less than 2370 years, best overlap with 96 PC record
	overall RI	140	all events	younger than T18
overall comparison	> 200 km + thick	2200	yellow	less than 6450 years, all seismoturbidites
	> 150 km + thick	550	yellow + green with heavy box	less than 6450 years, all seismoturbidites
	overall RI	160	all events	younger than T37

Citation: Patton, J.R., Goldfinger, C., Morey, A.E., Ikehara, K., Romsos, C., Stoner, J., Djadjadihardja, Y., Udrekh, Ardhyastuti, S., Gaffar, E.Z., and Viscaino, A., 2015, A 6500 year earthquake history in the region of the 2004 Sumatra-Andaman subduction zone earthquake: Geosphere, v. 11, doi:10.1130/GES01066.1.

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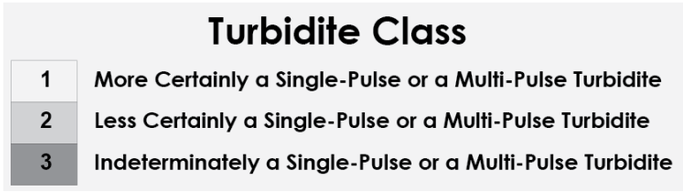

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