C.1 Past bibliographic studies on specific historical events

Table C1. Past bibliographic studies on specific historical events between 100BC and 1900 around the Dead Sea Transform Fault Zone. In the column on the right, italics font-style indicates events that occurred outside our investigated zone (27N-36N, 31E-39E), while brackets indicate that the event is considered spurious. The parameters of the events with assigned IDs (in bold) can be found in **Error! Reference source not found.**; the rest are listed in Appendices B and D. All dates are AD, except where specified.

Study	Event ID or date of investigated event
Traina 1995; Karcz 2004	[92BC], [69BC]
Karcz 2004; Williams et al. 2012	**H31BC**
Ambraseys 2005b; Williams et al. 2012	[33]
Russell 1980	**H363a**, **H363b**
Yelin 1927	**H502**
Darawcheh et al. 2000	**H551**
Tsafrir & Foerster 1992; Karcz 2004; Ambraseys 2005a	**H747**
Karcz 2004; Ambraseys 2005a	*750*
Ambraseys 2005a	*757*
Guidoboni et al. 2004a	1139, **H1156**, *1156 Dec,* **H1157a**, **H1157b**, **H1157c**
Guidoboni et al. 2004b; Hough & Avni 2009	**H1170**
Ambraseys & Melville 1988; Hough & Avni 2009	**H1202**
Guidoboni and Comastri 1997; El-Sayed et al. 2000	*1303*
Braslavski 1956; Ambraseys & Karcz 1992; Ambraseys 2005b	**H1546**
Yaari 1951; Ambraseys & Barazangi 1989; Albini & Stucchi 1992	**H1759a**, **H1759b**
Ambraseys 1997	**H1837**

C.2 Dating soft-sediment deformation structures

The radiocarbon dating process primarily involves dating a charcoal sample that was burned and had its initial C14/C12 fixed before the charcoal was deposited in a specific layer. Hence, the layers in the section and the identified seismic events from the disturbed layers will mostly produce younger radiocarbon dates than when the layers were deposited and the earthquakes occurred, i.e there is a systemic bias towards younger dates that must be accounted for in developing a seismic chronology from any given section. Unfortunately, the time elapsed has not thus far been estimated with great accuracy; it may vary from years to even centuries depending on the local site conditions (Ken01). Ken01 and Kag11 argued that in their sites this time-span was negligible in comparison to the overall uncertainty of their dating process. On the other hand, Mig04 claim that, due to the particular soil conditions in their site, this time-lag can be up to 350 years. This issue requires further research in our opinion.

The relatively straightforward process of directly comparing modeled radiocarbon ages of seismites with the historical records to check possible correlations was followed by Ken01 and Kag11. Mig04, on the other hand, followed a different approach. They first focused on the part of their core sample with depth 0.8-3.0m. Within these layers, they identified ~1550 deposition cycles and assumed that each cycle represents one year of sedimentation (varves, i.e. a rainy season followed by a dry season) and 22 SSDS. They combined the two and developed a chronological model. They also radiocarbon-dated 6 wood fragments within the first 3 meters of their core sample; the oldest of which was from around 300BC. Then, they matched their chronological model (for the 0.8-3.0m section) within the 2σ ranges of the 6 radiocarbon dates. Next, the top of each disturbed sequence in the curve was matched to one of the historical earthquake dates (which they assumed accurate) by shifting the curve on the time-axis (Mig04, their fig. 4). This process was iterated looking for the best fit for the entire section, i.e. minimize the number of SSDS for which no historical earthquake is known. Finally, they found only one model that matched 20 out of the 22 structures within the 0.8-3.0m section, with historical earthquakes between 140BC and 1408 BC.

We should note that their best-fit curve does not match the results of the 6 radiocarbon date ranges. The curve is shifted mostly by 50 – 200 years, with one exception of 350 years (Mig04, their fig. 4). As we already mentioned before, they attribute this significant discrepancy to reworking of the washed-in organic matter before it settled in the bottom of the dense saline lake. It is evident that their approach is based mostly on historical records and much less on radiocarbon dating. As a result, the aforementioned problem of circular reasoning is evident. Their results rely heavily on the rather strong assumption that the available catalogs in 2004 were complete, did not include spurious events and had accurate dating. Nevertheless, they note that the chance for a random fit of a series of 20 intervals with a combined error of 20 years and a mean recurrence of 100 years is of the order 10^{-10}. However, we argue that at least 12 of these 20 correlations are questionable (Table 3), because the historical data they used are now outdated.

Another pitfall of the fitted model of Mig04 is that it did not identify any event in year 363, even though two large events next to Ein Gedi site and a seiche in the Dead Sea lake are reported in that year. No sedimentary hiatuses that could explain this lack of seismites is found in Ein Gedi (Mig04, their fig. 2). Unfortunately, the complex iterative method of Mig04 does not provide modeled age ranges and thus further interpretation of their results in light of new evidence is not feasible.

C.3 Extended version of Table 2

Table C2. Multisite comparison of Holocene seismites from four lacustrine sediment samples along the Dead Sea lake (DSL). Curly braces indicate confidence intervals,"σ" is the standard deviation (normal distribution) and bold deformation values indicate correlation within the 1σ range. In the column on the left, italics font-style indicates events that occurred outside our investigated zone (27N-36N, 31E-39E), while square brackets indicate that the event is considered spurious. MSK_{DSL} is the expected MSK intensity at DSL, given magnitude and distance from the epicenter R_{DSL}. The study-sites are shown in **Error! Reference source not found.**. The parameters of the events with assigned IDs (in bold) can be found in **Error! Reference source not found.**. For more information about the events and the missing abbreviations, see Appendices A, B and D. All dates are AD, except where specified.

Event ID or year of correlated event	**Event parameters**	**Study / Site**				**Remarks**	**References**	
		Ken01 Ze'elim	Mig04 Ein Gedi	Kag11 Ze'elim	Kag11 Ein Feshkha (EF)		Location	Magnitude
-				8cm 140BC-66BC {1σ} 178BC-28BC {2σ}	1cm 146BC-96BC {1σ} 177BC-61BC {2σ}	This event is either absent from catalogs or is [139BC]		
[92BC]			1cm		**1cm** 126BC-76BC {1σ} 160BC-39BC{2σ}	Am09 & Kar04: spurious event		
-					1cm 101BC-42BC{1σ} 133BC-6BC {2σ}	H31BC already correlated in EF, so this event is absent from catalogs		
69BC	R_{DSL}=500km	**14.5cm[1]** 200-60BC {1σ} 200-40BC {2σ}	masked [2]		**<1cm** 96BC-41BC {1σ} 131BC-2BC {2σ}	[1]Agn06: relates to [139BC] [2]Masked by subsequent deformation	Sb05	
H31BC	R_{DSL}=56km M=6.0-6.5 MSK_{DSL}=VI	**20.5cm** 40BC-130AD {1σ}	9cm	**6cm** 40BC- 35AD {1σ}	**1cm** 57BC-7AD {1σ}		BM79	Kar04
[33]		4.5cm[3] 64BC-311[4]	0.2cm	**4cm** 12-91 {1σ} 20BC-131 {2σ}	**1cm** 25-100 {1σ} 20BC-142{2σ}	Am09: spurious event [3]Alternative match: **H112** [4]dated based on sedimentary rate		
H76	R_{DSL}=500km M_L=7 MSK_{DSL}=III		0.4cm			Very low MSK_{DSL}	BM91	BM79
[90]			0.5cm			No historical record		
H112	R_{DSL}=80km M_s=6.2	[3]	0.5cm	[5]		Am09: only archaeological evidence	Am94	Am94

	MSK_{DSL}=VI							
H115	R_{DSL}=450km M_w=7.3-7.5 MSK_{DSL}=III		0.2cm	**5cm[5]** 55-210 {1σ}		[5]Alternative match: **H112** {1σ}	AmJa98	Meg03
[175]			0.66cm			No historical record		
H347	R_{DSL}=250km				1cm[6] 372-487 {1σ} 296-548 {2σ}	[6] Alternative match: **H363a** or **H363b** {~1σ}	Kh00	
H363a or H363b	R_{DSL}<50km M=6.5 MSK_{DSL}>VI	3cm[7] 358-580[8]			[6] 2cm[9] 408-515 {1σ} 334-570 {2σ}	Am09: seiche in DSL [7]Agn06: relates to **H418** [9] Alternative match: **H418** {1σ} [8]dated based on sedimentary rates	Am06	Kag11
-					1cm[10] 439-542 {1σ} 365-595 {2σ}	[10]Alternative match: **H502** {1σ}		
H418	R_{DSL}=50km	[7]	0.5cm	**5cm** 386-519 {1σ}	[9] 2cm {2σ}[11] 448-551 {1σ} 376-605 {2σ}	[11]Alternative match: **H551** {1σ}	INGVweb	
[500]			masked			Amalgamation of 4 events (Am09)		
H502	R_{DSL}=180km M_s=7.2 MSK_{DSL}=VI		0.7cm	[12]	[10]		Sb05	Sb05
H551	250km M_w=7.4-7.6 MSK_{DSL}=V		0.3cm	**17cm [12]** 467-606 {1σ}	[11] **1cm**[13] 543-638 {1σ}	[12]Alternative match: **H502** [13]Alternative match: **H634** {1σ}	Eli07	Eli07
H634	R_{DSL}=50km M_w=6.8 MSK_{DSL}=VII-VIII				[13] **1cm** [14] 603-692 {1σ}	[14]Alternative match: **H659a** or **H659b** {1σ}	INGVweb	EMEC
H659a or H659b	R_{DSL}=50-100km M_e=6.0-6.2 MSK_{DSL}=V-VI		0.5cm		[14] **3cm**[15] 666-747 {1σ}	Event outside the dating range **[15]**Preffered match: **H747** {1σ}	INGVweb	INGVweb
H747	R_{DSL}=150km M_s=7 MSK_{DSL}=VI		0.2cm	**[17]2cm**	**[15]** 2.5cm **[16]** 795-856 {1σ} 729-865 {2σ}	Michael: Tsunami in Med., seiche in DSL **[16]**Correlated rupture in Wadi Araba (Kli15, Table 2) **[17]**Kag11: **H747** or *757.* More likely the former.	Am06	Am06
757				699-848 {1σ}	1cm[18] 801-861 {1σ} 733-870 {2σ}	*757* event perhaps in NE Syria (INGV94) **[18]**Alternative match: **H854** {1σ}		

H847	R_{DSL}=300km M_L=6.2 MSK_{DSL}=III				**3cm** 849-905 {1σ} 788-915 {2σ}	Very low MSK_{DSL} Perhaps event absent from catalogs or **H854**	Sb05	BM79
H860	R_{DSL}=450km M_s=7 MSK_{DSL}=III		0.8cm		**1.5cm** 859-915 {1σ} 801-926 {2σ}	Very low MSK_{DSL} Perhaps event absent from catalogs	INGVweb	Am06
873	R_{DSL}=600km				6cm 885-939 {1σ} 833-954 {2σ}	Very large R_{DSL} Perhaps event absent from catalogs	Am94	
H956	R_{DSL}=450km M_e=6.2 MSK_{DSL}=I				4cm[19] 963-1005 {1σ} 929–1023 {2σ}	[19]Alternative match: **H991** {1σ}	Am94	INGVweb
H991	R_{DSL}=250km M_L=6.7 MSK_{DSL}=IV		0.2cm		[19] **1.5cm**[20] 991-1026 {1σ}	[20]Alternative match: **H1033** {~1σ}	Sb05	BM91
1033 Mar 6	Am09: Istanbul		masked					
H1033	R_{DSL}=100km M_e=7.3 MSK_{DSL}=VII		7.4cm		[20] **1.5cm**[21] 1013-1051	Tsunami in Acre (Am09) [21]Alternative match: **H1047** {1σ}	AmJa98	INGVweb
H1042	R_{DSL}=460km		0.8cm				INGV05	
H1063	R_{DSL}=320km M_s=6.9 MSK_{DSL}=III		masked		**1cm** 1028-1067 {1σ}		INGV05	Sb05
H1068a	R_{DSL}=200km M_e=7.2 MSK_{DSL}=V		0.4cm		**1cm**[22] 1044-1084 {1σ}	Tsunami in Mediterranean (Am09) [22]Alternative match: **H1068b** {1σ}	Zilb05	INGVweb
1114 Nov 29	R_{DSL}=700km M_s=7.4 MSK_{DSL}=I		0.8cm			Very low MSK_{DSL}	Am09	Sb05
1138	R_{DSL}=550km M_e=7.5 MSK_{DSL}=II				**2cm**[23] 1118-1155 {1σ}	[23]Alternative match: **H1113** {~1σ}	INGV05	INGVweb
H1170	R_{DSL}=400km M_e=7.7 MSK_{DSL}=IV-V				**6cm** 1150-1190 {1σ}		Guid04b	Guid04b
H1202	R_{DSL}=300km M_e=7.7	[24]	masked [25]		[26]**2cm**	Tsunami in Mediterranean (Am09) Agn06: [24]masked, [25]apparent not masked	Am06	INGVweb

	MSK_{DSL}=V							
H1212	R_{DSL}=150km M_s=7.0 MSK_{DSL}=V-VI	10.5cm[27] 1244-1385{1σ} 1220-1390 {2σ}	4.2cm		1199-1240 {1σ}	[26]Kag11: **H1202** or **H1212** [27]**H1212** outside modelled age range. Perhaps event absent from catalogs	Am06	Am06
H1293	R_{DSL}=50km M_s=6.6 MSK_{DSL}=VII	**16cm** 1280-1390 {1σ}	1cm		**7cm** 1260-1293{1σ}		INGV05	Am94
H1313	R_{DSL}=500km M_L=5.8 MSK_{DSL}<I				**10cm** 1300-1343 {1σ} 1279–1421 {2σ}	Very low MSK_{DSL} Perhaps event absent from catalogs	Am94	BM79
H1408	R_{DSL}=450km M_s=7.4 MSK_{DSL}=III		masked				Sb05	Sb05
H1458	R_{DSL}=60km M_s=7.1 MSK_{DSL}=VIII		13cm	10cm 1400-1650[28]		[28]Extrapolation from age-depth deposition model	Am06	Am06
H1546	R_{DSL}=70km M_s=6.0 MSK_{DSL}=VI		3cm			Tsunami in Gaza? (Am09)	Am94	Am09
H1588a	R_{DSL}=250km M_s=7.2 MSK_{DSL}=VI		1cm				Am06	Am06
1656	R_{DSL}=2000km		4.8cm			Event too far away	Am09	
[1712]			12cm			Ami94: Epicenter in Jerusalem		
H1759a or H1759b	R_{DSL}=200-250km M_s=6.6-7.4 MSK_{DSL}=V-VI		2cm				Sb05	Sb05
1822	R_{DSL}=550km M_s=7.4 MSK_{DSL}=II		3cm			Very low MSK_{DSL}	Am06	Am06
H1834	R_{DSL}=20km M_L=6.3 MSK_{DSL}=VIII	**25cm** 1670-1950 {1σ}	masked				BM79	BM79
H1837	R_{DSL}=200km M_s=7.0 MSK_{DSL}=V		3cm			Seiche in Sea of Galilee? (Am09)	Am06	Am97