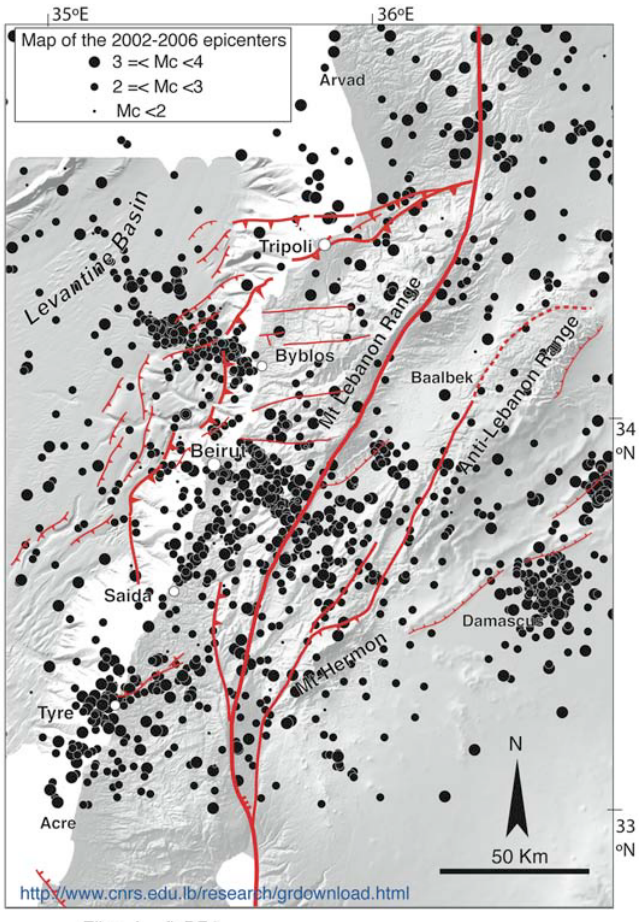
Data Repository

Elias, A. - figDR1

Figure DR1: E-looking aerial view taken in 1936, showing the cumulative Bahsas thrust scarp cutting Tripoli city and region. Uplift of eastern relative to western part of city is about 70 m.



Elias, A. - figDR2

Figure DR2: Instrumental seismicity map of Lebanon and adjacent regions for the 2002-2006 period. From the Geophysical Research Arrays of Lebanon (GRAL) network. Active faults are from Fig. 1. Notice the seismicity offshore central-Lebanon.

DR3: Full descriptions of the effects of the 551 AD earthquake are related in Plassard, (1968) and Guidoboni et al., (1994). The accounts describe the complete ruin of "Berytus, Jewel of Phoenicia", home of the Roman Law school, the collapse of buildings crushing inhabitants and students, the sea first retreating 1-2 roman miles (~ 1500-3000m) from shore, enough to ground mooring ships and uncover sunken ones, then returning on "God's command" to its original level, destroying everything. A large, earthquake-triggered, rockslide fell from the high sea-cliff south of Chekka (Fig.1). All major coastal cities between Tripoli and Tyr suffered heavy damage from the tremor and sea-wave. Tripoli was said to have "drowned". Saida and Tyr probably suffered less, since the law school was later transferred to Saida. Archeological excavations in downtown Beirut have uncovered evidence of considerable destruction in a 6th century AD level, as well as seismites and soil liquefaction in soundings, all most likely due to the 551 AD event (Saghieh, 1996).

Saghieh, M., 1996, Bey 001 & 004 preliminary Report, Bulletin d'Archeologie et d'Architecture Libanaise, v. 1, p. 25-59.

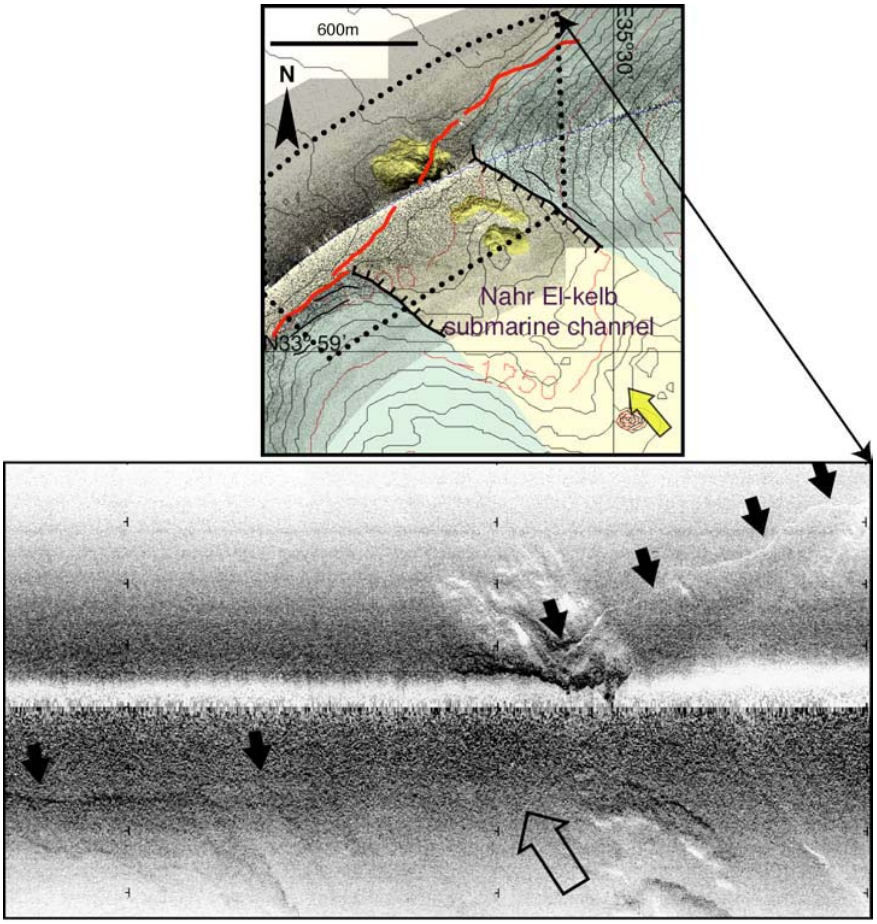


Figure DR4: Bottom: Sidescan sonar image of "fresh" seismic rupture (bold arrows) across outlet of Nahr el Kelb submarine channel (open arrow). **Above**: interpreted seafloor sonar image draped on bathymetric contour map. Dotted line is sonar image outline. Black lines with ticks show edges of channel (pale yellow). Rupture (red line) follows cumulative escarpment base, continuing across channel and slide blocks (yellow).

DR5: The "trottoirs" are surf benches bordered inward by a frequently notched cliff, incrusted by gregarious associations of gastropod species (mainly *Dendropoma petraeum* and *Vermetus triqueter*) and reef-building algae that form a protective cover (Safriel, 1974). In tideless and moderate surf environments the upper surface of the Vermetid benches provides a good, local Mean Sea level (LMSL) proxy, to within ±10cm (Laborel, 1986). This is the case along the East Mediterranean coast where the vertical range of living vermetids rarely

exceeds 25cm (Sanlaville et al., 1997). Slow submersion results in thickening and upward growth of the benches' upper surface. Conversely, slow emersion leads to erosion by surf action. Hence, sudden, large enough uplift allows best for fossil Vermetid bench preservation. The samples elevations relative to LMSL provide only an estimate of local uplift, and since collected under different surf conditions, cannot simply be used to correlate uplifted shorelines along the coast. The death of aragonitic,Vermetid shells is reliably dated with ^{14}C but, due to surf erosion, calibrated calendar ages tend to be older than the actual emersion age.

Laborel, J., 1986, Vermetid gastropods as sea-level indicators, in O. Van de Plassche, ed., Sea-level Research: A manual for the collection an evaluation of data: Norwich, GeoBooks, p. 281-310.
Safriel, U. N., 1974, Vermetid gastropods and intertidal reefs in Israel and Bermuda: Science v. 186, p. 1113-1115.
Sanlaville, P., Dalongeville, R., Bernier, P., and Evin, J., 1997, The Syrian coast: a model of Holocene coastal evolution: Journal of Coastal Research, v. 13, p. 385-396.

Table DR 6:

TABLE DR6. VERMETID SAMPLES FROM BENCH "B1"

Lab reference	Lat (ºN)	Long (ºE)	Site	Biological material *	Elevation (cm)	Radiocarbon age (B.P.)	Calibrated age B.C./A.D.
MC 146	~34°29'	~35°46'	Palmier	V	60	1880 ±50	A.D. 427-651
Ly 10446	34°29.75'	35°46.45'	Palmier	DP	80 ±10	1810 ±35	A.D. 548-676
Ly 10448	~34°18'	~35°40'	Hannouch	DP	35 ±15	2195 ±30	A.D. 96-253
Lyon 2090	34°17.86'	35°40.21'	Hannouch	VG	40 ±15	1930 ±25	A.D. 410-550
Ly 10445	34°17.08'	35°39.62'	Ras Koubba	V	20 ±15	2075 ±35	A.D. 235-414
Ly 10439	34°12.59'	35°38.84'	Ras Madfoun	DP	100 ±10	2485 ±35	270-70 B.C.
Ly 10440	34°12.48'	35°38.60'	Ras Madfoun	DP	110 ±10	2340 ±30	62 B.C.- A.D. 85
Ly 11576	34°12.48'	35°38.60'	Ras Madfoun	DP	110 ±10	2410 ±45	180 B.C. - A.D. 34
Lyon 2092	34°12.12'	35°38.23'	South Ras Madfoun	DP	80 ±10	1995 ±25	A.D. 320-460
Ly 11575	34°03.28'	35°38.24'	Nahr Ibrahim	DP	60 ±10	2065 ±40	A.D. 237-429
Ly 10386	34°02.11'	35°35.51'	Safra	DP	60 ±10	1960 ±35	A.D. 380-548
Ly 10438	~34°02'	~35°35'	Safra/Rabiya	DP	80 ±10	1975 ±45	A.D. 328-550
MC 63	34°02'	35°37'	Tabarja	V	60	2035 ±130	A.D. 65-563
MC 64	34°02'	35°37'	Tabarja	V	60	1960 ±140	A.D. 363-555
Ly 10437	34°01.60'	35°37.36'	Tabarja	DP	60 ±10	1970 ±35	A.D. 364-533
Ly 10387	34°01.74'	35°37.41'	Tabarja	DP	80 ±10	1585 ±35	A.D. 729-906
Ly 11574	34°01.45'	35°37.33'	South of Tabarja	DP	120 ±10	1805 ±30	A.D. 560-676
Lyon 1466	33°27.82'	35°17.59'	Ras Qantara	VT	50 ±20	2230 ±35	A.D. 58-230
Ly 11947	~33°23'	~35°16'	Khaizerane	DP	40 ±10	1095 ±30	A.D. 1259-1341

Note: Location, nature, elevation, and death-ages of Vermetid shells sampled on uplifted "B1" bench along Lebanese shoreline are from Morhange et al., (2006).

* Dated species: V = Vermetus sp., DP = Dendropoma petraeum, VG = Vermetus gigas, VT = Vermetus triqueter.

Location, nature, elevation, and ages of 19 Vermetid shells from Morhange et al. (2006) on uplifted "B1" bench along Lebanese shoreline. Of the 24, 2σ -calibrated ages originally listed by the authors, a few show locally inconsistent chronological stratigraphic order. Of the 19 remaining "B1" samples listed here, collected 20±15 to 120±10cm above present LMSL (also Fig.2), most (15) come from between Beirut and Enfeh, particularly near Tabarja. 4 samples are older than the 3rd century AD, 2 are younger than the 6th century AD, and most (9) have ages in between. Two samples on Palmier island offshore Tripoli have ages of 427-651 AD and 548-676AD, slightly younger than the bulk of the ages near Batroun or Tabarjah. Samples south of Beirut yield ages of 58-230AD (Saida), and 1259-1341AD (Sarafand).

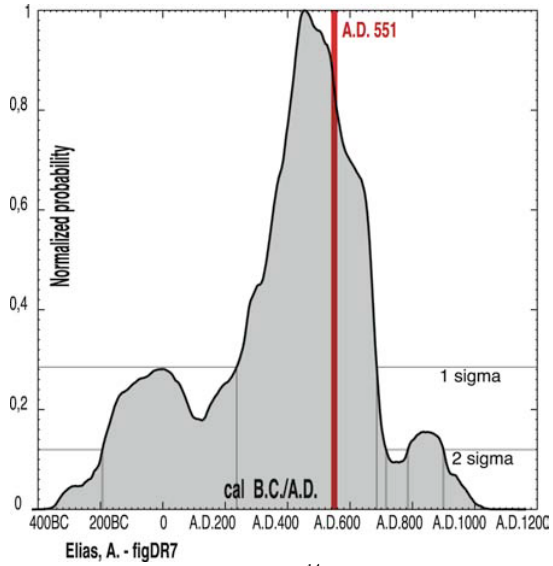


Figure DR7: Death age probability distribution of 17, ^{14}C calibrated Vermetid death ages on "B1" bench between Beirut and Palmier Island (sum probability, normalized to unit height).

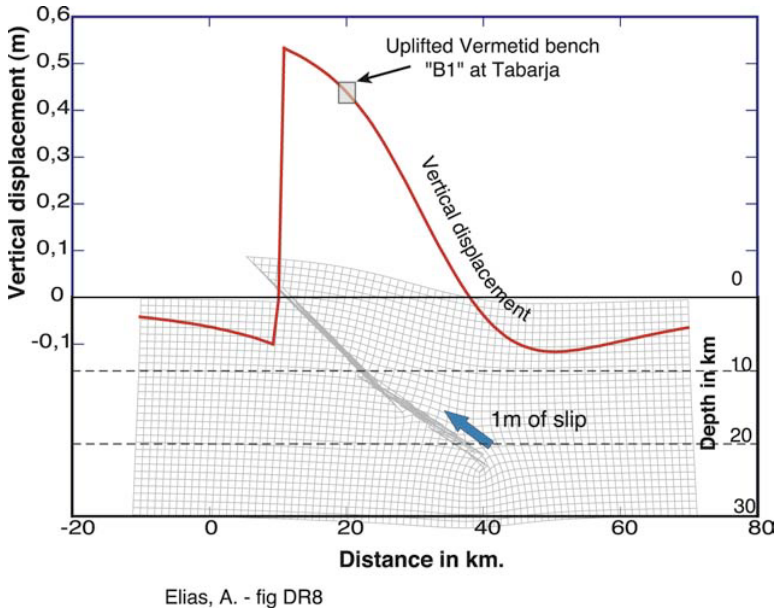


Figure DR8: Elastic half-space model of deformation produced by 1 m of slip on thrust fault dipping ~45º on average, down to ~ 20 km. Bold curve shows corresponding vertical displacement of surface, in meters. Small box indicates location of uplifted B1 bench at Tabarja relative to seafloor fault trace. Linear elasticity implies that the measured mean value of 80 cm of uplift for B1 in Tabarja, should correspond to ~ 2 m of slip at depth.