

Republic of Lebanon  
National Council for Scientific Research

# Provisional Seismological Bulletin

from the

## NATIONAL SEISMIC NETWORK

December

2016

Prepared by  
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## GENERAL BULLETIN INFORMATION

The National Centre for Geophysical Research is a governmental agency established 1975 in Lebanon by the National Council for Scientific Research (CNRS). The mission of the Centre, among other assignments, is the monitoring of seismic activity within the national territory. Currently, the national seismic network is under deployment; it has been officially registered as GRAL, an acronym for Geophysical Research Arrays of Lebanon. Station coordinates and status are given below.

Since 1993, the Centre has been participating in a regional initiative by the UNESCO and the USGS known as RELEMR, i.e. Reducing Earthquake Losses in the Eastern Mediterranean Region.

Within this framework, the Centre routinely contributes to the database set up for this purpose and maintained by the Euro-Mediterranean Seismological Centre (EMSC). For coherence, the Centre has adopted the recommended seismic analysis system SEISAN developed by Jens Havskov and Lars Ottemoller from the University of Bergen, Norway.

The localization program currently used for locating earthquakes is Hypocenter (Lienert et al., 1986). Plane parallel layers are assumed for local and regional events, while the IASPEI travel time tables are used for distant events.

The velocity model used for all local and regional events is the one currently adopted by the RELEMR initiative.

P-wave velocity (km/sec)	depth to top of layer (km)
6.2	0.0
6.8	14.0
8.05	34.0
8.25	50.0
8.5	80.0

Magnitudes are calculated from the coda duration. The coda wave magnitude is estimated via the formula:

$$M_c = 0.08 + 1.63 * \log_{10}(T) + 0.0009 * D.$$

where T is the coda duration (sec) and D is the epicentral distance (km). The coefficients above were adopted at the outset of our Centre in 1980 and thus are still in use for the sake of continuity.

All available coda values are used for magnitude calculations. No station corrections are used for either travel times or magnitudes calculations. The  $V_p/V_s$  velocity ratio used in both layered models above is 1.74.

As a general policy, neither depths, nor epicenters, are fixed unless stated otherwise since this might restrict later use of the data. Consequently, some event locations might be unrealistic such as zero depth earthquakes or teleseismic locations off by 1000 km. However, the locations are based on the available data and reflect the localization procedure and the models used.

## STATIONS USED

The stations listed below are operated by the National Centre for Geophysical Research. They constitute the basic setup of the National Seismic Network of Lebanon.

However, readings from other cooperating agencies are also used in locating the events and thus more stations may appear in the event lists than in the station list; it is worth mentioning the systematic use of arrival times from the Cypriot seismic network CSS in order to constrain events corresponding to an active zone off the Lebanese shorelines.

STATION	LATITUDE	LONGITUDE	HEIGHT (m)	NAME	COMMENTS
BHL	3354.25N	3539.25E	1000	BHANNES	Opened May 1980
HWQ	3416.68N	3556.78E	1161	HAWQA	Opened Jan 2001
MATL	3329.32N	3519.78E	5	MATARIH	Nov2000-Sep2012
FKH	3414.69N	3624.61E	1152	FAKEHEH	Opened Dec 2004
RCY	3329.79N	3550.14E	1370	RACHAYA	Opened Jun 2006
BEYL	3352.30N	3529.59E	49	BEIRUT	Opened Jul 2006
NAQL	3307.02N	3508.46E	83	NAQOURA	Jul2008-Jan2012
DQRL	3342.34N	3534.21E	963	DEIR QAMAR	Opened Mar 2010
QRWL	3332.86N	3540.93E	875	QARAOUN	Opened Oct 2011
SHBL	3320.90N	3544.63E	1422	CHEBAA	Opened Oct 2011
ZAHL	3351.48N	3553.12E	1211	ZAHLE	Opened Aug 2015

## REGIONAL AND DISTANT EARTHQUAKES

Because regional events and teleseisms are not localized, but simply identified, EMSC determination data are given along with phase arrivals (in general first arrival) at the stations of our network.

## MACROSEISMIC DATA

Macroseismic data, if available, are included in the bulletin.

## MONTHLY EPICENTER MAPS

Maps will be found on the last page.

## ELECTRONIC PUBLICATION

This provisional bulletin is available for download in pdf format on:  
<http://www.cnrs.edu.lb/grdownload.html>

## REFERENCES

- Havskov, J. and Ottemoller, L. (2001). SEISAN: The Earthquake Analysis Software. -version 7.2-  
Institute of Solid Earth Physics, University of Bergen.  
<http://www.ifjf.uib.no/seismo/software/seisan.html>
- Lienert, B.R., Berg, E. and Frazer, L.N. (1986). Hypocenter: An earthquake location method using centered, scaled, and adaptively least squares. Bull. Seism. Soc. Am., 76., pp 771-783.

## Abbreviations:

TIME: Origin time in UTC (hr. min. and sec.) or data file onset time if event is not located.

LAT: Latitude of epicenter

LON: Longitude of epicenter

DEPTH: Focal depth in kilometer (trailing F indicates fixed depth)

AGENCY: REL throughout the bulletin, aka. REsearch Lebanon

MAGNITUDES: Up to 3 different magnitudes can be given followed by type and reporting agency, e.g. 3.1 MC REL - coda magnitude calculated according to above mentioned formula.

EMSC: Euro-Mediterranean Seismological Centre.

OT: Origin Time

RMS: Root mean square value of travel time residuals

STAT: Station code

CO: Component; S:short period, L:long period, B:broadband.

DIST: Epicenter distance (km)

AZI: Azimuth from source to station

PHAS: Phase; The first letter characterizes onset E(mergent) or I(mpulsive)

P: Polarity ( C for compression, D for dilatation )

HR: Hour

MN: Minute

SECON: Seconds

TRES: Residual (seconds)

CODA: Signal duration in seconds

AMPL: Ground Amplitude ( $0.5 * (\text{peak to peak})$ ), (nm) at period PERI

PERI: Period where amplitude is measured

BAZ: Back azimuth (station to event)

ARES: Back azimuth residual

VELO: Apparent phase velocity (km/sec)

WT: Weight of phase in the location

\*: An asterisk before the phase arrival time implies a potential timing error. If an S phase is read, differential S-P times will be used in the hypocenter location.

**December 1 2016 Hour: 14:53 36.2 Lat: 33.27N Lon: 35.38E Depth: 0 Agency: REL Local**  
**Magnitudes: 3.1MC REL Rms: 0.1 secs**

**SOUR REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	49	59	EP		1453	44.17	0.09	66						1.0
RCY	SE	49	59	ES		1453	49.87	-0.06							1.0
DQRL	SZ	52	20	EP		1453	44.37	-0.10							1.0
DQRL	SN	52	20	ES		1453	50.47	-0.15							1.0
BEYL	SZ	68	9	EP		1453	47.16	0.08							1.0
BHL	BZ	75	19	EP		1453	48.15	-0.09							1.0
BHL	BN	75	19	ES		1453	57.32	0.15							1.0
ZAHL	SZ	80	35	EP		1453	49.14	0.03							1.0
HWQ	BZ	123	25	EP		1453	56.08	-0.01							1.0
HWQ	BN	123	25	ES		1454	10.88	0.06							1.0

**December 1 2016 Hour: 22:50 40.2 Agency: REL Regional**

**EMSC OT=22:50:40.2 36.35N 33.86E 14Km M=3.4 CENTRAL TURKEY**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
HWQ	BZ			EP		2251	23.92								
BHL	BZ			EP		2251	25.17								
DQRL	SZ			EP		2251	26.91								
RCY	SZ			EP		2251	31.60								

**December 2 2016 Hour: 4:35 45.8 Lat: 32.95N Lon: 35.66E Depth: 9 Agency: REL Regional**

**Magnitudes: 3.7MC REL**

**SYRIA REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	63	15	EP		435	56.15	0.05							1.0
RCY	SN	63	15	ES		436	3.72	-0.02							1.0
DQRL	SZ	85	354	EP		435	59.42	-0.12							1.0
DQRL	SN	85	354	ES		436	9.80	0.08							1.0
ZAHL	SZ	103	11	EP		436	2.22	-0.07							1.0
BEYL	SZ	104	351	EP		436	2.31	0.00							1.0
BHL	BZ	106	360	EP		436	2.62	-0.10	145						1.0
BHL	BN	106	360	ES		436	15.34	0.09							1.0
HWQ	BZ	150	10	EP		436	9.15	-0.02							1.0
HWQ	BN	150	10	ES		436	26.48	0.01							1.0

**December 3 2016 Hour: 1:13 39.3 Lat: 33.16N Lon: 35.37E Depth: 0 Agency: REL Local**

**Magnitudes: 2.6MC REL**

**BENT JBEIL REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	57	49	EP		113	48.48	-0.02	32						1.0
RCY	SN	57	49	ES		113	55.30	-0.01							1.0
DQRL	SZ	63	17	EP		113	49.41	-0.10							1.0
DQRL	SN	63	17	ES		113	57.10	0.03							1.0
BHL	BZ	87	17	EP		113	53.29	0.02							1.0
ZAHL	SZ	91	31	EP		113	54.02	0.05							1.0
HWQ	SZ	135	23	EP		114	1.12	0.05							1.0
HWQ	SN	135	23	ES		114	17.16	-0.02							1.0

**December 3 2016 Hour: 8:35 56.5 Agency: REL Regional**

**EMSC OT=08:35:56.5 35.89N 27.26E 10Km M=4.1 DODECANESE ISLANDS, GREECE**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
DQRL	SZ			EP		837	39.94								
HWQ	BZ			EP		837	41.54								
RCY	SZ			EP		837	43.94								

December 4 2016 Hour: 9:10 48.4 Lat: 33.25N Lon: 35.41E Depth: 2 Agency: REL Local  
Magnitudes: 3.0MC REL Rms: 0.1 secs

**BENT JBEIL REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	48	55	EP		910	56.15	-0.03							1.0
RCY	SN	48	55	ES		911	1.93	0.03							1.0
DQRL	SZ	53	16	EP		910	56.88	-0.05	62						1.0
DQRL	SN	53	16	ES		911	3.27	0.06							1.0
BHL	BZ	76	17	EP		911	0.61	-0.08							1.0
ZAHL	SZ	80	33	EP		911	1.45	0.04							1.0
ZAHL	SN	80	33	ES		911	10.87	-0.14							1.0
HWQ	BZ	124	23	EP		911	8.40	-0.08							1.0
HWQ	BN	124	23	ES		911	23.49	0.19							1.0

December 4 2016 Hour: 14:25 48.4 Lat: 33.89N Lon: 36.14E Depth: 16 Agency: REL Local  
Magnitudes: 2.9MC REL Rms: 0.0 secs

**BAALBECK REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
ZAHL	SZ	24	262	EP		1425	53.18	-0.01	50						1.0
ZAHL	SN	24	262	ES		1425	56.72	0.01							1.0
BHL	BZ	45	273	EP		1425	56.03	-0.08							1.0
BHL	BN	45	273	ES		1426	1.80	0.00							1.0
HWQ	BZ	47	337	EP		1425	56.40	0.02							1.0
RCY	SZ	52	213	EP		1425	57.07	-0.03							1.0
RCY	SN	52	213	ES		1426	3.52	0.01							1.0
DQRL	SZ	57	249	EP		1425	57.85	0.07							1.0

December 5 2016 Hour: 14:52 24.1 Lat: 33.79N Lon: 35.79E Depth: 5 Agency: REL Local  
Magnitudes: 2.5MC REL Rms: 0.0 secs

**ALEY REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
BHL	BZ	18	317	EP		1452	27.11	-0.02	31						1.0
BHL	BN	18	317	ES		1452	29.41	0.01							1.0
DQRL	SZ	22	246	EP		1452	27.78	0.01							1.0
DQRL	SN	22	246	ES		1452	30.50	-0.01							1.0
RCY	SZ	33	172	EP		1452	29.44	0.00							1.0
RCY	SN	33	172	ES		1452	33.41	-0.00							1.0
HWQ	BZ	56	15	EP		1452	33.22	0.00							1.0

December 5 2016 Hour: 15:19 9.1 Lat: 33.78N Lon: 35.79E Depth: 2 Agency: REL Local  
Magnitudes: 2.3MC REL Rms: 0.0 secs

**ALEY REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
BHL	BZ	18	318	EP		1519	12.00	-0.08	23						1.0
BHL	BN	18	318	ES		1519	14.32	0.03							1.0
DQRL	SZ	22	247	EP		1519	12.66	0.04							1.0
DQRL	SN	22	247	ES		1519	15.23	-0.01							1.0
RCY	SZ	32	172	EP		1519	14.26	-0.01							1.0
RCY	SN	32	172	ES		1519	18.12	0.00							1.0
HWQ	BZ	57	15	EP		1519	18.32	0.02							1.0

December 5 2016 Hour: 19:0 41.5 Lat: 33.27N Lon: 35.63E Depth: 8 Agency: REL Local  
Magnitudes: 2.4MC REL Rms: 0.0 secs

**HASBAYA REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	32	38	EP		19 0	46.88	0.02	24						1.0
RCY	SN	32	38	ES		19 0	50.80	-0.01							1.0
DQRL	SZ	48	354	EP		19 0	49.42	-0.03							1.0
DQRL	SN	48	354	ES		19 0	55.32	0.01							1.0
ZAHL	SZ	69	20	EP		19 0	52.77	-0.02							1.0
BHL	BZ	70	2	EP		19 0	52.95	0.03							1.0

December 6 2016 Hour: 5:52 18.4 Lat: 33.87N Lon: 35.84E Depth: 0 Agency: REL Local  
Magnitudes: 2.5MC REL Rms: 0.1 secs

ZAHLE REGION

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
ZAHL	SZ	4	105	EP		552	19.06	-0.03							1.0
BHL	BZ	18	283	EP		552	21.28	0.04	29						1.0
BHL	BN	18	283	ES		552	23.28	-0.09							1.0
DQRL	SZ	31	234	EP		552	23.47	0.11							1.0
RCY	SZ	41	181	EP		552	24.98	-0.04							1.0
RCY	SN	41	181	ES		552	29.93	-0.01							1.0
HWQ	SZ	47	12	EP		552	25.90	0.02							1.0

December 6 2016 Hour: 22: 3 33.4 Agency: REL Distant

EMSC OT=22:03:33.4 5.29N 96.11E 10Km M=6.5 NORTHERN SUMATRA, INDONESIA

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ			EP		2213	56.89								
HWQ	BZ			EP		2213	58.12								
BHL	BZ			EP		2213	58.69								
DQRL	SZ			EP		2213	58.98								

December 7 2016 Hour: 0:36 41.7 Lat: 34.28N Lon: 36.41E Depth: 29 Agency: REL Local  
Magnitudes: 2.6MC REL Rms: 0.0 secs

BAALBECK REGION

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
HWQ	BZ	43	269	EP		036	49.79	-0.02	31						1.0
HWQ	BN	43	269	ES		036	55.82	0.01							1.0
ZAHL	SZ	68	226	EP		036	53.11	0.01							1.0
ZAHL	SN	68	226	ES		037	1.54	-0.01							1.0
BHL	BZ	82	239	EP		036	55.04	0.01							1.0
DQRL	SZ	101	231	EP		036	57.67	-0.00							1.0

December 8 2016 Hour: 5:15 3.6 Agency: REL Distant

EMSC OT=05:15:03.6 43.85N 86.35E 10Km M=6.0 NORTHERN XINJIANG, CHINA

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
HWQ	BZ			EP		522	36.25								
BHL	BZ			EP		522	39.61								
RCY	SZ			EP		522	40.87								
DQRL	SZ			EP		522	41.10								

December 8 2016 Hour: 17:38 46.9 Agency: REL Distant

EMSC OT=17:38:46.9 10.71S 161.36E 40Km M=7.8 SOLOMON ISLANDS

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
HWQ	BZ			EP		1757	43.96								
BHL	BZ			EP		1757	43.46								

December 9 2016 Hour: 15:45 7.9 Lat: 33.80N Lon: 35.77E Depth: 16 Agency: REL Local  
Magnitudes: 2.8MC REL Rms: 0.0 secs

ALEY REGION

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
BHL	BZ	15	317	EP		1545	11.52	-0.01							1.0
DQRL	SZ	21	240	EP		1545	12.12	-0.07	43						1.0
DQRL	SN	21	240	ES		1545	15.45	0.05							1.0
RCY	SZ	35	169	EP		1545	14.07	0.05							1.0
RCY	SN	35	169	ES		1545	18.54	-0.03							1.0
HWQ	BZ	55	17	EP		1545	17.03	0.01							1.0

December 10 2016 Hour: 20:15 22.9 Lat: 33.68N Lon: 35.77E Depth: 0 Agency: REL Local  
Magnitudes: 2.6MC REL Rms: 0.0 secs

WEST BEKAA REGION

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
DQRL	SZ	18	278	EP		2015	25.90	0.04	33						1.0
DQRL	SE	18	278	ES		2015	28.05	-0.01							1.0
RCY	SZ	22	163	EP		2015	26.31	-0.06							1.0

RCY	SN	22	163	ES		2015	28.94	-0.00									1.0
ZAHL	SZ	22	29	EP		2015	26.56	0.05									1.0
BHL	BZ	27	337	EP		2015	27.11	-0.10									1.0
BHL	BN	27	337	ES		2015	30.43	0.02									1.0
HWQ	BZ	68	14	EP		2015	33.91	0.02									1.0

**December 11 2016 Hour: 18:29 26.4 Lat: 33.79N Lon: 35.57E Depth: 5 Agency: REL Local**  
**Magnitudes: 3.2MC REL Rms: 0.2 secs**

**Earthquake was felt**  
**ALEY REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
DQRL	SZ	9	178	EP		1829	28.21	0.01	84						1.0
DQRL	SN	9	178	ES		1829	29.49	-0.02							1.0
BEYL	SZ	12	324	EP		1829	28.59	0.09							1.0
BHL	BZ	15	32	EP		1829	28.93	-0.17							1.0
BHL	BN	15	32	ES		1829	31.10	0.02							1.0
ZAHL	SZ	31	75	EP		1829	31.48	0.02							1.0
RCY	SZ	41	142	EP		1829	33.04	-0.05							1.0
RCY	SN	41	142	ES		1829	38.09	0.08							1.0
HWQ	BZ	65	33	EP		1829	37.84	0.91							0.2

**December 12 2016 Hour: 15:51 12.3 Lat: 33.80N Lon: 35.75E Depth: 19 Agency: REL Local**  
**Magnitudes: 2.7MC REL Rms: 0.0 secs**

**BAABDA REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
BHL	BZ	14	321	EP		1551	16.25	-0.05							1.0
BHL	BN	14	321	ES		1551	19.24	0.00							1.0
DQRL	SZ	20	237	EP		1551	16.88	0.01	37						1.0
DQRL	SN	20	237	ES		1551	20.24	0.02							1.0
RCY	SZ	35	167	EP		1551	18.77	-0.00							1.0
HWQ	BZ	56	19	EP		1551	21.65	0.03							1.0

**December 15 2016 Hour: 16:43 58.3 Agency: REL Regional**

**EMSC OT=16:43:58.3 37.09N 28.64E 5Km M=4.3 WESTERN TURKEY**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
BHL	BZ			EP		1645	34.77								
DQRL	SZ			EP		1645	34.82								
HWQ	BZ			EP		1645	36.12								
RCY	SZ			EP		1645	39.24								

**December 15 2016 Hour: 23:29 36.4 Lat: 33.20N Lon: 35.35E Depth: 1 Agency: REL Local**  
**Magnitudes: 2.6MC REL Rms: 0.0 secs**

**SOUR REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	56	54	EP		2329	45.37	-0.02	31						1.0
RCY	SN	56	54	ES		2329	52.03	0.01							1.0
DQRL	SZ	59	20	EP		2329	46.03	0.02							1.0
BHL	BZ	83	20	EP		2329	49.74	-0.03							1.0
ZAHL	SZ	88	34	EP		2329	50.62	0.01							1.0
HWQ	BZ	131	25	EP		2329	57.56	0.02							1.0
HWQ	BE	131	25	ES		2330	13.16	-0.01							1.0

**December 16 2016 Hour: 13:23 41.0 Lat: 33.26N Lon: 35.44E Depth: 3 Agency: REL Local**  
**Magnitudes: 3.0MC REL Rms: 0.1 secs**

**MARJAAYOUN REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
SHBL	BZ	30	71	EP		1323	45.90	0.09	56						1.0
RCY	SZ	45	55	EP		1323	48.21	-0.04							1.0
RCY	SN	45	55	ES		1323	53.56	-0.04							1.0
DQRL	SZ	50	13	EP		1323	49.13	-0.03							1.0
DQRL	SN	50	13	ES		1323	55.26	0.06							1.0
BHL	BZ	74	15	EP		1323	52.85	-0.06							1.0
HWQ	SZ	122	22	EP		1324	0.65	0.01							1.0



**December 16 2016 Hour: 17:12 43.2 Lat: 33.26N Lon: 35.41E Depth: 3 Agency: REL Local**  
**Magnitudes: 3.1MC REL Rms: 0.1 secs**

**SOUR REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	48	57	EP		1712	50.84	-0.09							1.0
RCY	SN	48	57	ES		1712	56.72	0.05							1.0
DQRL	SZ	52	17	EP		1712	51.56	0.01	71						1.0
DQRL	SN	52	17	ES		1712	57.77	0.01							1.0
BHL	BZ	75	18	EP		1712	55.39	0.08							1.0
BHL	BN	75	18	ES		1713	4.23	-0.06							1.0
HWQ	SZ	124	24	EP		1713	3.02	0.00							1.0

**December 20 2016 Hour: 6:3 43.6 Agency: REL Regional**

**EMSC OT=06:03:43.6 36.54N 26.96E 133Km M=5.5 DODECANESE ISLANDS, GREECE**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
BEYL	SZ			EP		6 5	27.71								
BHL	BZ			EP		6 5	28.91								
DQRL	SZ			EP		6 5	29.27								
HWQ	BZ			EP		6 5	31.25								
ZAHL	SZ			EP		6 5	32.09								
RCY	SZ			EP		6 5	34.33								
SHBL	BZ			EP		6 5	34.12								

**December 22 2016 Hour: 7:49 5.9 Lat: 34.11N Lon: 35.77E Depth: 19 Agency: REL Local**  
**Magnitudes: 2.3MC REL Rms: 0.0 secs**

**JBEIL REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
HWQ	BZ	25	42	EP		749	10.89	-0.02	23						1.0
HWQ	BN	25	42	ES		749	14.63	0.02							1.0
BHL	BZ	26	204	EP		749	10.96	-0.04							1.0
DQRL	SZ	49	202	EP		749	14.20	0.04							1.0
DQRL	SN	49	202	ES		749	20.29	0.01							1.0
RCY	SZ	69	175	EP		749	17.06	-0.01							1.0

**December 23 2016 Hour: 15:27 6.6 Lat: 33.79N Lon: 35.77E Depth: 3 Agency: REL Local**  
**Magnitudes: 2.4MC REL Rms: 0.1 secs**

**ALEY REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
ZAHL	SZ	13	54	EP		1527	8.85	0.03							1.0
BHL	BZ	17	320	EP		1527	9.23	-0.13	25						1.0
BHL	BN	17	320	ES		1527	11.37	-0.05							1.0
DQRL	SZ	21	244	EP		1527	10.04	0.06							1.0
DQRL	SN	21	244	ES		1527	12.59	0.09							1.0
RCY	SZ	33	169	EP		1527	11.66	-0.28							1.0
RCY	SE	33	169	ES		1527	16.03	0.11							1.0
HWQ	BZ	57	17	EP		1527	15.91	0.17							1.0

**December 24 2016 Hour: 16:26 58.0 Lat: 33.30N Lon: 35.43E Depth: 4 Agency: REL Local**  
**Magnitudes: 2.8MC REL Rms: 0.1 secs**

**BENT JBEIL REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	44	60	EP		1627	5.09	0.00	47						1.0
RCY	SN	44	60	ES		1627	10.30	-0.04							1.0
DQRL	SZ	47	16	EP		1627	5.60	0.00							1.0
DQRL	SN	47	16	ES		1627	11.24	0.02							1.0
BHL	BZ	70	17	EP		1627	9.21	-0.13							1.0
ZAHL	SZ	75	34	EP		1627	10.26	0.15							1.0
HWQ	BZ	118	24	EP		1627	17.02	-0.01							1.0

**December 24 2016 Hour: 21:1 51.6 Lat: 33.33N Lon: 35.45E Depth: 5 Agency: REL Local**  
**Magnitudes: 2.9MC REL Rms: 0.1 secs**

**NABATIYE REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SN	40	63	ES		21	2	3.02-0.03							1.0
DQRL	SZ	43	15	EP		*21	2	1.69 3.06							0.0
BEYL	SZ	60	4	EP		21	2	1.38 0.03							1.0
BHL	BZ	66	16	EP		21	2	2.21-0.15	50						1.0
BHL	BN	66	16	ES		21	2	10.33 0.01							1.0
ZAHL	SZ	71	34	EP		21	2	3.25 0.14							1.0
HWQ	BZ	115	23	EP		21	2	10.00-0.01							1.0

**December 25 2016 Hour: 1:52 58.1 Lat: 33.33N Lon: 35.44E Depth: 8 Agency: REL Local**  
**Magnitudes: 3.1MC REL Rms: 0.1 secs**

**NABATIYE REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	41	64	EP		153		4.95-0.00	69						1.0
RCY	SN	41	64	ES		153		10.00 0.01							1.0
BEYL	SZ	60	5	EP		153		8.04 0.15							0.2
BHL	BZ	66	18	EP		153		8.83-0.12							1.0
BHL	BN	66	18	ES		153		17.00 0.06							1.0
ZAHL	SZ	71	35	EP		153		9.75-0.01							1.0
HWQ	BZ	115	24	EP		153		16.42-0.01							1.0
HWQ	BN	115	24	ES		153		29.99 0.03							1.0

**December 26 2016 Hour: 5:53 32.3 Agency: REL Regional**

**EMSC OT=05:53:32.3 32.34N 30.97E 20Km M=4.6 EASTERN MEDITERRANEAN SEA**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
DQRL	SZ			EP		554		34.01							
RCY	SZ			EP		554		36.21							
ZAHL	SZ			EP		554		37.99							
HWQ	SZ			EP		554		40.24							

**December 26 2016 Hour: 9:28 24.8 Agency: REL Regional**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ			EP		928		28.03							
DQRL	SZ			EP		928		32.17							
HWQ	BZ			EP		928		40.36							

**December 27 2016 Hour: 10:59 16.1 Lat: 33.86N Lon: 35.84E Depth: 0 Agency: REL Local**  
**Magnitudes: 2.7MC REL Rms: 0.0 secs**

**ZAHLE REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
ZAHL	SZ	5	98	EP		1059		16.82-0.04							1.0
BHL	BZ	17	285	EP		1059		18.86-0.03	39						1.0
BHL	BN	17	285	ES		1059		20.93-0.04							1.0
DQRL	SZ	30	235	EP		1059		20.94-0.01							1.0
DQRL	SN	30	235	ES		1059		24.61 0.05							1.0
RCY	SZ	41	180	EP		1059		22.62-0.03							1.0
RCY	SN	41	180	ES		1059		27.53 0.02							1.0
HWQ	BZ	47	13	EP		1059		23.75 0.07							1.0

**December 27 2016 Hour: 23:20 55.8 Agency: REL Distant**

**EMSC OT=23:20:55.8 45.71N 26.61E 98Km M=5.6 ROMANIA**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
HWQ	SZ			EP		2324		10.94							
BHL	BZ			EP		2324		12.50							
RCY	SZ			EP		2324		18.16							

**December 29 2016 Hour: 10:12 11.3 Lat: 33.51N Lon: 35.87E Depth: 3 Agency: REL Local**  
**Magnitudes: 2.7MC REL Rms: 0.1 secs**

**RACHAYA REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	4	245	EP		1012	12.28	-0.08	41						1.0
RCY	SN	4	245	ES		1012	13.16	0.04							1.0
DQRL	SZ	35	308	EP		1012	17.19	0.10							1.0
DQRL	SN	35	308	ES		1012	21.31	-0.03							1.0
BHL	BZ	48	335	EP		1012	19.05	-0.08							1.0
HWQ	BZ	85	5	EP		1012	25.18	0.04							1.0

**December 29 2016 Hour: 18:32 55.9 Lat: 33.70N Lon: 36.66E Depth: 5 Agency: REL Local**  
**Magnitudes: 3.1MC REL Rms: 0.0 secs**

**SYRIA REGION**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
RCY	SZ	80	253	EP		1833	8.77	-0.02							1.0
HWQ	BZ	92	314	EP		1833	10.72	0.04	66						1.0
HWQ	BN	92	314	ES		1833	21.60	-0.03							1.0
BHL	BZ	96	284	EP		1833	11.37	0.04							1.0
BHL	BN	96	284	ES		1833	22.74	-0.03							1.0
DQRL	SZ	101	270	EP		1833	12.12	-0.06							1.0
DQRL	SE	101	270	ES		1833	24.30	0.05							1.0

**December 29 2016 Hour: 22:30 19.5 Agency: REL Distant**

**EMSC OT=22:30:19.5 9.22S 118.66E 90Km M=6.2 SUMBAWA REGION, INDONESIA**

STAT	CO	DIST	AZI	PHASE	P	HRMN	SECON	TRES	CODA	AMPL	PERI	BAZ	ARES	VELO	WT
HWQ	BZ			EP		2243	5.39								
RCY	SZ			EP		2243	5.92								
BHL	BZ			EP		2243	6.45								



# Epicentral Map of Lebanon

## DECEMBER 2016

