

NEAR-REAL-TIME LOSS ESTIMATES FOR THE L'AQUILA EARTHQUAKE (M6.3) 6 APRIL 2009

WAPMERR Report

An earthquake of magnitude 6.3 struck at night in the Abruzzi mountains in central Italy. This is a brief summary of the near-real-time loss estimates for this earthquake by WAPMERR. The source parameters ultimately given by INGV is shown in Table 1.

Year	Month	Day	Hour	Min	Lat	Lon	Dep	M
2009	4	6	1	33	42.334	13.334	8.9	5.7

Table 1: Revised source properties of the L'Aquila earthquake given by INGV.

WAPMERR focuses on assisting developing countries dealing with earthquake risk. However, its near-real-time loss assessments can also help international rescue teams to reach the scene of a disaster with minimum delay in industrialized countries. The delay with which the number of fatalities became known is shown in Figure 1. For the first few hours, the reports of the earthquake did not mention any fatalities or injured people. Six hours after the earthquake, 27 fatalities were reported, and this number climbed to 50 after nine hours. Half a day after the earthquake 92 fatalities were reported, and after a full day the number was 150, about half of the final count. It took almost three days to come up to 272, nearly the final count. The mean of the range given by WAPMERR 21 minutes after the event was 275.

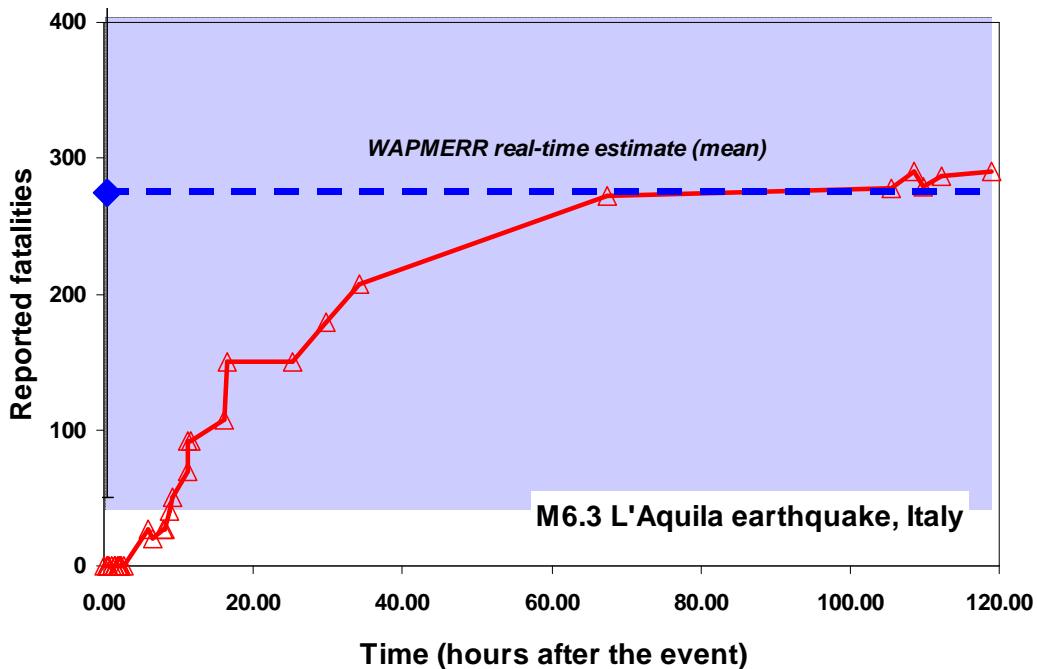


Figure 1: Number of fatalities reported by news organizations (triangles) as a function of time after the L'Aquila earthquake. Only first time reports of a given level are shown, and all news agencies are considered. The loss estimate distributed by WAPMERR 21 minutes after the earthquake is shown by the blue diamond with error bars.

The delay times with which source parameters became available is shown in Table 2. WAPMERR distributes only loss estimates based on reviewed source parameters, however, automatically calculated ones may serve as basis for preliminary loss estimates for internal purposes. By far the earliest solution was that by GFZ. The WAPMERR duty person immediately calculated losses and then waited for 10 minutes for the first reviewed location to arrive, which was the one by the USGS. Three minutes after this information arrived, WAPMERR's customers received the message displayed in Table 3.

Hour	Min	Delay	Institution	Lat	Lon	Depth	M	Fatal	Injured	Action
1	33		Earthquake							
1	35	2	GFZ	42.38	13.38	5	5.6			Automatic
1	51	18	USGS	42.42	13.40	10	6.3			Reviewed
1	53	20	EMSC	42.34	13.32	2	5.7			Reviewed
1	54	21	WAPMERR					50-500	100-1300	Email/Telephone
2	9	36	GFZ	42.45	13.39	10	6.2			Reviewed
2	28	55	EMSC	42.38	13.32	2	6.2			Revised
3	23	110	GSR	42.50	13.40	10	6.4			Reviewed
			INGV	42.33	13.33	8.8	5.8			Final

Table 2: Delay times in minutes of email messages with source parameters for the L'Aquila earthquake as received by WAPMERR.

Immediately after dispatching this email alert, the WAPMERR duty person telephoned the duty person of the Swiss rescue team for international disasters, waking him up and alerting him of the serious situation in central Italy. The greatest contribution to the error bars (± 225) came from the uncertainty in the teleseismic location, which is about 9 km for the USGS results in Italy. This type of uncertainty is typical for medium magnitude earthquakes. If an epicenter with about 2 km location error, based on records by the local Italian seismograph network, had been available, the error bar of the loss estimation would have been reduced by a factor of two. For this reason, WAPMERR is eager to receive fast and accurate source parameters based on local networks around the world.

WAPMERR did not calculate additional loss estimates because there was no evidence to believe that any of the later, revised source parameters were more accurate than the first reviewed solution. A comparison with the final epicenter by INGV (Table 2) shows that the first reviewed epicenter by the EMSC was the best, and the automatic solution by GFZ was quite good.

The conclusion is that even for a well prepared industrialized country with frequent earthquakes news media and authorities can underestimate the extent of earthquake disasters for two days. In such cases the near-real-time loss estimating service of WAPMERR can significantly accelerate the response of rescuers.

The Following Earthquake has been Reported:

Date: 2009/04/04 01:31:57.6

Region: Italy

Magnitude: M 6.3

Latitude: 42.42 N

Longitude: 13.39 E

Depth (km): 5.0

Source: GHZ

Injured Exp. min/max: 100 / 1300

Fatalities Exp. min/max: 50 / 500

L'Aquila is the nearest town at 5 km distance

DISCLAIMER:

There is no guarantee that this loss estimate is correct.

Although we try to take error sources into account, the true losses may be outside our estimated errors.

WAPMERR is not responsible for any damage or loss resulting from the use of the information presented in this email and on its website.

More Information can be found here:

http://www.wapmerr.org/user_quake.htm

Login Info for this Website: Username: 'wapmerr' Password: 'quakewap'

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Table 3: Text of Email message estimating losses in the L'Aquila earthquake of April 6, 2009 distributed by WAPMERR 21 minutes after the event.