

RED-ACT Report

Real-time Earthquake Damage Assessment using City-scale Time-history analysis

Mar. 13, M5.2 Japan Kii-suido Earthquake

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Acknowledgments and Disclaimer

The authors are grateful for the data provided by **K-NET** and **KiK-net**. This analysis is for research only. The actual damage resulting from the earthquake should be determined according to the site investigation.

Scientific background of this report can be found at:

http://www.luxinzheng.net/software/Real-Time_Report.pdf

1. Introduction to the earthquake event

At 13:48 13 Mar 2019 (Local Time, UTC +9), an **M 5.2 (JMA)** earthquake occurred in **Japan Kii-suido**. The epicenter was located at **134.9 33.8**, with a depth of **50.0 km**.

2. Recorded ground motions

30 ground motions near to epicenter of this earthquake were analyzed. The names and locations of the stations can be found Table 1. The maximal recorded peak ground acceleration (PGA) is **158 cm/s/s**. The corresponding response spectra in comparison with the design spectra specified in the Chinese Code for Seismic Design of Buildings are shown in Figure 1.

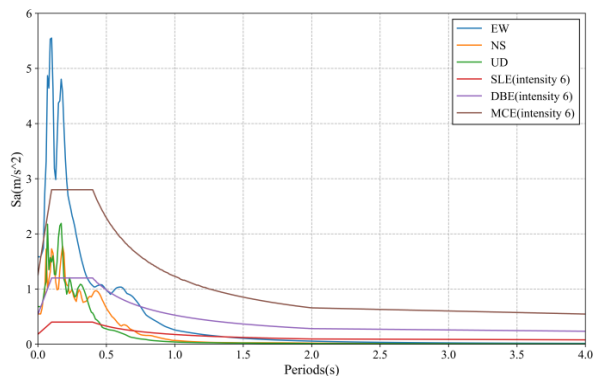


Figure 1 Response spectra of the recorded ground motions with maximal PGA

3. Damage analysis of the target region subjected to the recorded ground motions

Using the real-time ground motions obtained from the strong motion networks and the **city-scale nonlinear time-history analysis (see the Appendix of this report)**, the damage ratios of buildings located in different places can be obtained. The building damage distribution and the human uncomfotableness distribution near to different stations is shown in Figure 2 and Figure 3, respectively. These outcomes can provide a reference for post-earthquake rescue work.

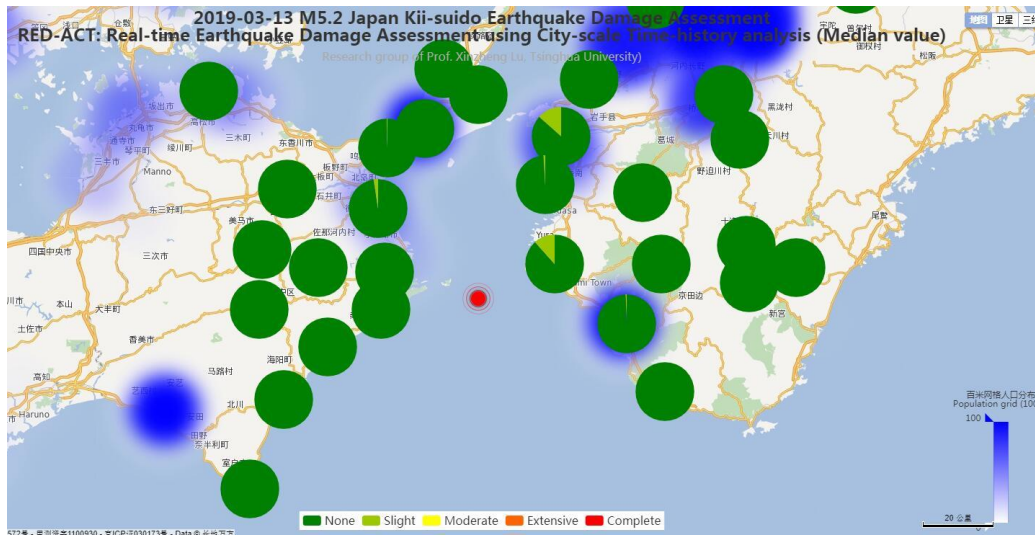


Figure 2 Damage ratio distribution of the buildings near to different stations

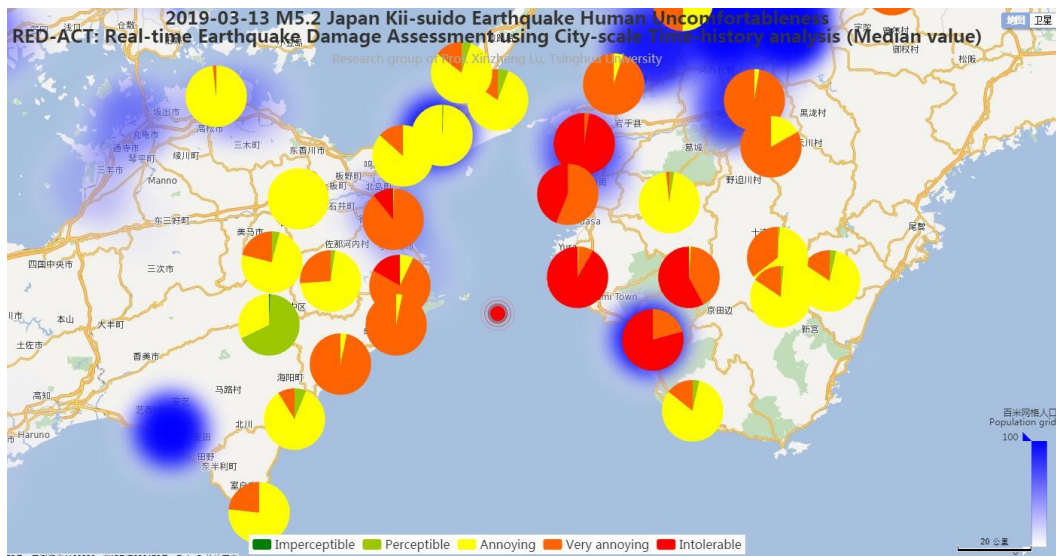


Figure 3 Human uncomfortableness distribution near to different stations

The details can be accessed at

<http://www.luxinzheng.net/software/2019-03-13-Japan-5.2.html>

<http://www.luxinzheng.net/software/2019-03-13-Japan-5.2-Acc.html>

Scientific background of this report can be found at: http://www.luxinzheng.net/software/Real-Time_Report.pdf

Table 1 Names and locations of the strong motion stations

No.	Station Name	Longitude	Latitude
1	HYG025	134.901	34.3405
2	HYG026	134.792	34.4149
3	HYG027	134.729	34.2499
4	KGW004	134.037	34.3473

5	KOC001	134.281	33.5275
6	KOC002	134.168	33.2903
7	MIE008	136.107	34.6285
8	MIE016	135.919	33.8764
9	NAR005	135.688	34.3408
10	NAR007	135.737	34.2213
11	NAR009	135.755	33.938
12	OSK006	135.471	34.5894
13	OSK010	135.255	34.3755
14	TKS001	134.61	34.203
15	TKS002	134.582	34.0438
16	TKS003	134.604	33.8716
17	TKS004	134.591	33.7749
18	TKS005	134.389	33.8788
19	TKS006	134.419	33.6692
20	TKS007	134.285	34.0905
21	TKS008	134.212	33.9344
22	TKS009	134.2	33.7719
23	WKY001	135.169	34.2288
24	WKY003	135.116	34.0996
25	WKY004	135.431	34.0841
26	WKY005	135.488	33.8938
27	WKY006	135.152	33.8908
28	WKY007	135.774	33.8375
29	WKY008	135.377	33.7289
30	WKY010	135.497	33.5503