

Caravan Earthquake Scenario Report



A

preliminary assessment of expected loss is provided in the following.

Earthquake scenario

The event occurred at $42.70 \pm 0.00^\circ$ latitude and $74.00 \pm 0.00^\circ$ longitude, at a depth of 15.00 ± 0.00 km. The assigned magnitude is $M_w 6.8 \pm 0.0$. The largest affected settlement is geocell_id 13078 with about 45000 inhabitants. The median ground motion in macroseismic intensity (EMS-98) has been estimated using the global_wa_hyp IPE as shown in Fig.1.

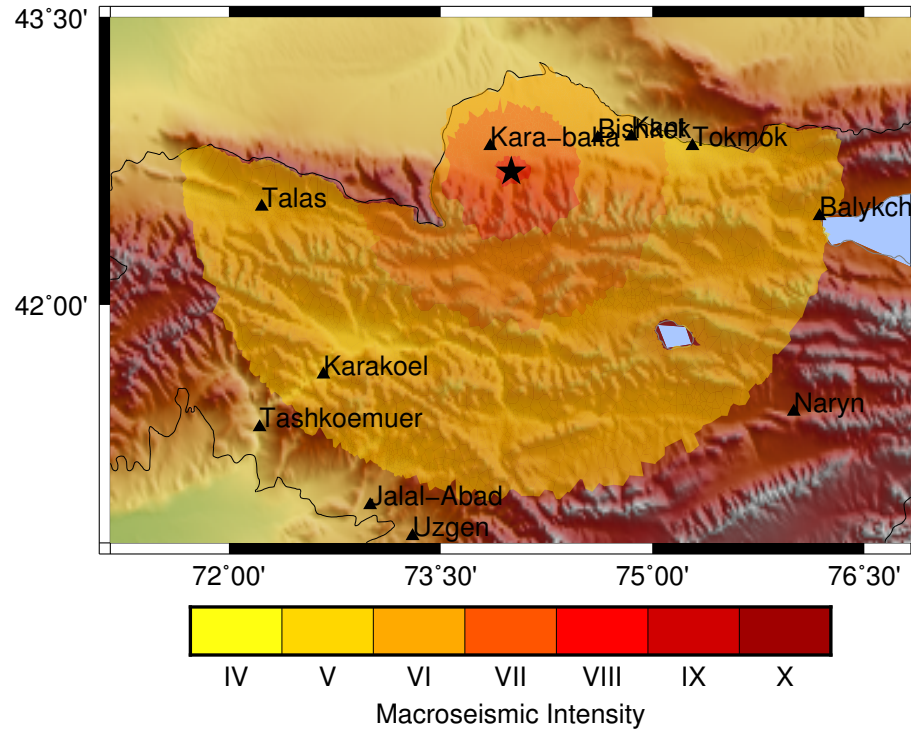


Figure 1: Estimated median macroseismic intensity

The maximum intensity, observed in geocell_id 20268 (usually in correspondence of the epicentre), is VIII. The area where the earthquake could have been felt is approximately 63790 qkm. The maximum macroseismic intensity distribution for the largest affected settlement geocell_id 13078 can be seen in Fig.2. Table2 lists the median intensity expected in the 10 largest affected settlements.

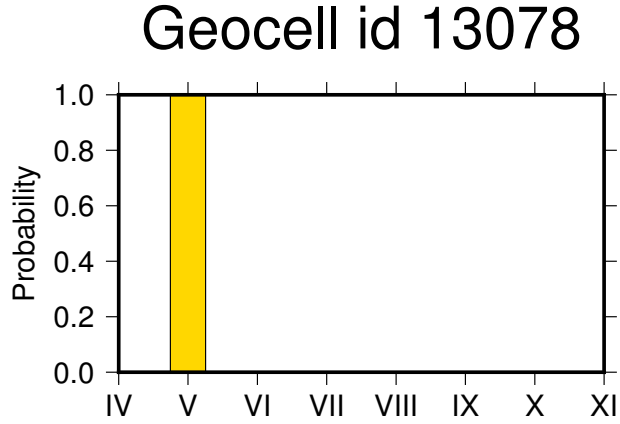


Figure 2: Estimated macroseismic intensity distribution

Exposure

The affected region can be characterized as an urban region. Table1 shows the 3 dominant residential building types in the target area and their relative percentage alongside their most likely vulnerability class. The population has been disaggregated based on the relative frequencies and expected occupation of the residential buildings, in order to compute the estimated number of buildings.

Table 1: Building type distribution

| EMCA-GEM Building Type | Relative | Most likely vulnerability |
|------------------------|----------|---------------------------|
| EMCA4.0 | 0.45 | A |
| EMCA1.3 | 0.21 | B |
| EMCA1.1 | 0.11 | B |

Vulnerability and expected fatalities

As we see from Table1 the buildings within the region are mainly of vulnerability classes A and B. Figure3 shows the expected distribution of casualties as forecasted by the CARAVAN system. The sum of the median expected fatalities over the whole area is 200-500. Table2 shows the most likely order of magnitude of fatalities in the 10 largest settlements in the affected area, the estimated population, and the estimated macroseismic intensity.

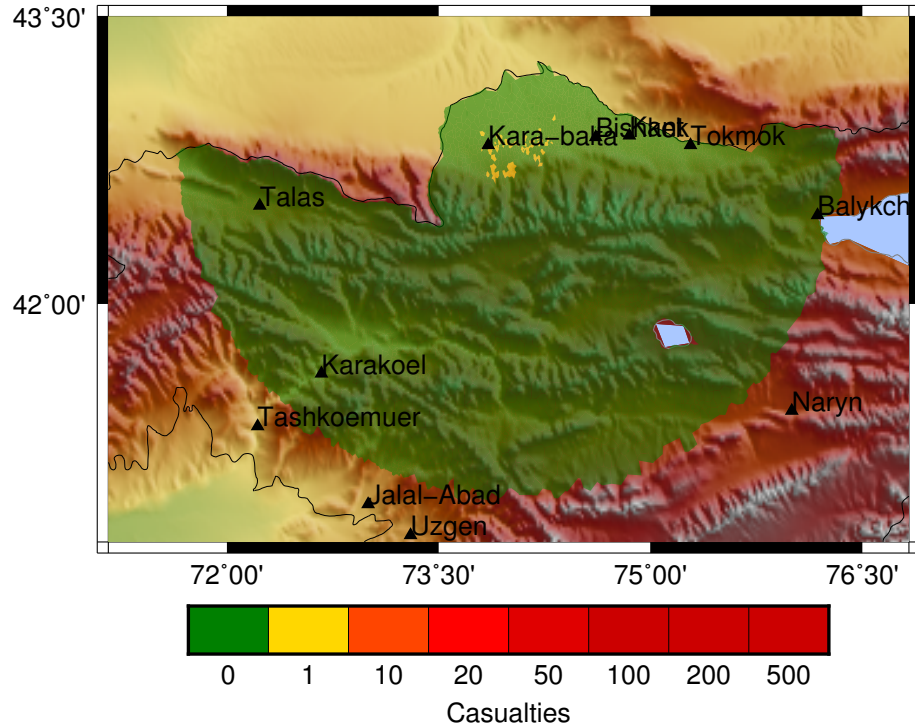


Figure 3: Estimated loss distribution

Table 2: Table showing loss, estimated population and estimated intensity for the 10 most affected locations

| Geocell id | Expected casualties | Estimated population | Estimated intensity |
|------------|---------------------|----------------------|---------------------|
| 20256 | 1-10 | 1366 | VII |
| 20351 | 1-10 | 1236 | VI |
| 13446 | 1-10 | 1793 | VI |
| 13519 | 1-10 | 1738 | VI |
| 13499 | 1-10 | 1240 | VII |
| 13637 | 1-10 | 1159 | VI |
| 13469 | 1-10 | 1543 | VI |
| 20195 | 1-10 | 669 | V |
| 13495 | 1-10 | 1546 | VIII |
| 20221 | 1-10 | 472 | VII |

Disclaimer

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typically improves as additional data are available. CARAVAN is regularly updated and users of CARAVAN hazard and loss estimates should account for uncertainty and always seek the most current CARAVAN release for any earthquake. There will be infrequent cases where the CARAVAN estimates will be inaccurate, and even outside the stated range of the postulated uncertainties. Population exposure is uncertain and varies by time of day, but these variations are not globally available so they are not currently considered for loss estimates in CARAVAN. In addition, CARAVAN model loss calculations are approximate and may be inaccurate for some regions. The uncertainties estimated for a given earthquake and for a particular CARAVAN version do not necessarily account for all the uncertainty associated with the estimated losses. Potential errors or additional uncertainties in magnitude, location, depth, and shaking characteristics maybe not modeled explicitly and may remain unaccounted for in the CARAVAN loss-estimate ranges. CARAVAN loss estimates also do not include losses due to tsunami or other secondary hazards (such as fire, liquefaction, and landsliding). The CARAVAN system also does not completely account for aftershocks that may add to damage and losses. Users of CARAVAN products should understand the potential uncertainties and or inaccuracies associated with CARAVAN's rapid loss-estimation capability: Individual or institutional users should use their own judgment and seek additional sources of information or advice before any decision making.