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A catalogue of earthquakes between 810BC and 2012 for the Bay of Bengal

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Abstract Assumptions about regional earthquake hazard in the Bay of Bengal and the frequency of such events were brought into question by the 26 December 2004 Indian Ocean earthquake and tsunami. An initial element of earthquake risk management is to quantify the hazard, and catalogues of past events are a major contribution to that effort. We have developed a new comprehensive catalogue of earthquakes with a felt intensity occurring before 31 December 1899 and of magnitude of four and above for instrumentally recorded events from 1 January 1900 using all available sources. Between 810BC and 2012, we find that 562 earthquakes were experienced in the Bay of Bengal and Bangladesh. Unsurprisingly, data on events become increasingly scarce the further back in time the catalogue extends and significant conflicts and discrepancies are identified for events listed in different sources. Nonetheless, our new data catalogue provides a useful foundation upon which further archival research may build in order to develop a richer understanding of regional earthquake hazard.

Keywords Earthquakes · Records · Hazards · Bangladesh · Bay of Bengal

1 Introduction

Earthquakes occur frequently in the countries surrounding the Bay of Bengal. The northern part of the Bay of Bengal, particularly the Andaman region (7°–22°N and 88°–100°E), experienced 348 earthquakes between 1900 and 1980 (Bapat 1982). The Sunda Subduction

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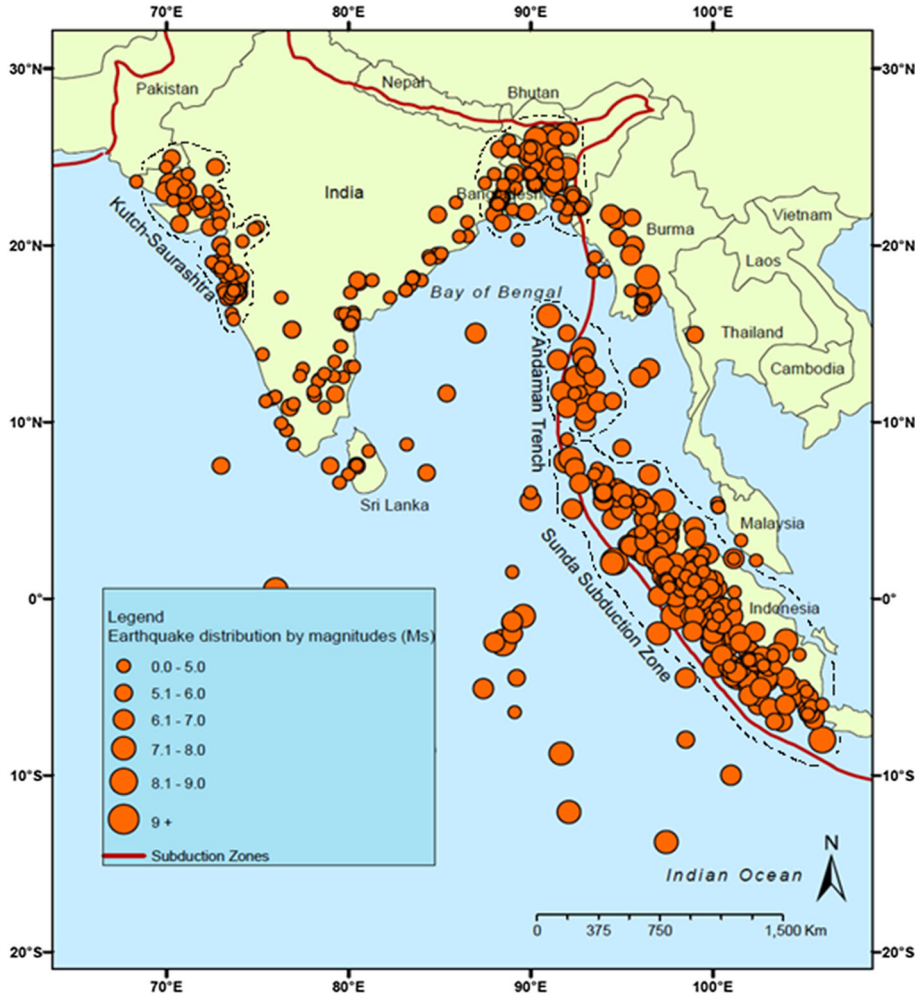

Fig. 1 The distribution of 562 earthquakes between 810BC and 2012, showing four clusters (shown by *black dashed lines*) of earthquake: west coast of Sumatra, Andaman and Nicobar Island, Bangladesh and adjoining regions and NW coast of India. Key features include the AT = Andaman Trench and SSZ = Sunda Subduction Zone

Zone (SSZ), an elongated zone from Java to the Myanmar coast, is capable of triggering large tsunamigenic earthquakes (Satake and Atwater 2007). The 2004 Indian Ocean earthquake and tsunami (2004 IOT) has already challenged the perceived level of regional risk, rupturing around 1300 km of seafloor from Sumatra to the Andaman Island (Satake and Atwater 2007; Satake et al. 2006). The Bay of Bengal region has experienced several large historic earthquakes including the 19 August 1868 (Newcomb and McCann 1987), the 31 December 1881 (Ortiz and Bilham 2003) and the 26 June 1941 events all of which originated within the Andaman Trench (Fig. 1). Notably, the 2015 Nepal earthquake originating near the main frontal thrust between the subducting India plate and the

overriding Eurasia plate to the north caused approximately 8200 deaths in Nepal, India, China and Bangladesh (Fan and Shearer 2015). Thus, it is a region where large earthquakes can occur. It is difficult to gain a sophisticated understanding of the regional earthquake hazard because there is a fragmented historical record of past events. In order to quantify the hazard, it is necessary to have fundamental data about the occurrence, magnitude, impact and effects of past earthquakes. This research seeks to extend our understanding of the regional earthquake hazard by establishing a new catalogue of past earthquakes over as a long a time period as possible.

Earthquake hazard assessment may be enhanced by reviewing written and geological records of past events (Ambraseys 1971; Dominey-Howes 2002; Heidarzadeh et al. 2008). The historical record of earthquakes is one of the most important components of the seismic risk analysis of an area (Ambraseys 1980; Glade et al. 2001) because significant evidence of earthquakes and fault information has not been discovered and collected in many parts of the world (Ambraseys 1980). However, reports of earthquakes between BC800 and 1900 occurring in India have very limited information associated with them (e.g. just epicentre location and magnitude) that restricts their usefulness to stakeholders (Martin and Szeliga 2010).

For example, Bangladesh developed its policies to mitigate the effects of earthquake based on events occurring only after 1885, neglecting the potential for large earthquakes from adjacent active faults in NE India, Myanmar and the Bay of Bengal region (Choudhury 2005). Therefore, more detailed archival research is needed to understand the earthquake hazard of the northern Bay of Bengal and adjacent regions (Fig. 1). Interestingly, Satake and Atwater (2007) noted that for the Pacific Ocean region, there was a misalignment between the size of earthquakes actually observed and the size of those inferred from geological records with the former being smaller. Consequently, it is reasonable to assume that the earthquake (and tsunami risk) in the northern Bay of Bengal region is similarly higher than that would be expected from existing records of past events. To understand natural hazards, it is very important to use long-term historical hazard data and geological records that are longer than short-term instrumental data (Ambraseys 1980; Nott 2003). If this is not done in the northern Bay of Bengal region, governmental authorities may significantly underestimate risk. This has important implications for disaster risk reduction (DRR) policy and practice.

Regional earthquake catalogues exist for many areas of the world including Greece (Papazachos and Papazachou 1997); Turkey (Ambraseys and Finkel 1995); Thailand (Nutalaya et al. 1985); Indonesia (Soetardjo et al. 1985); India (Bapat et al. 1983; Chandra 1977; Oldham 1883; Rao and Rao 1984); and China (Lee et al. 1976). From an analysis of the available documents listed in Table 1, it is apparent that in most situations, the authors do not provide baseline data about each earthquake event they list. Instead, they only observe the magnitude and date of occurrence where that information is available. In most situations, only one source record is cited for each unique earthquake event. Further, they only cite sources derived from the modern research literature.

The earthquake catalogue of Milne (1911) includes earthquakes affecting Bangladesh, India and Myanmar from AD7 to 1899. Oldham (1883) provided details of earthquakes in India and Bangladesh for the period between the years 893 and 1869. Earthquake catalogues that focused on Southeast Asia (Nutalaya et al. 1985) and the SSZ (Soetardjo et al. 1985) report the extent of earthquake effects as far afield as India and Bangladesh. In the last 50 years, several authors (Bapat et al. 1983; Chandra 1977; Iyengar et al. 1999; Rao and Rao 1984; Singh and Shankar 1992) have attempted to collect, collate and analyse earthquake data from India. Ambraseys (Ambraseys 2000, 2004; Ambraseys and Bilham

Table 1 List of formally published data sets of earthquake events documented as occurring in the NE Indian Ocean and Bay of Bengal region

Formally published earthquake data sets	Number of earthquake events documented in Bangladesh and India	First reported event	Last reported event	Comments
Oldham (1883)	220	893	1869	The oldest database of Indian earthquakes
Milne (1911)	47	7	1899	A world earthquake database
Singh (1966)	44	1505	1956	Historical seismicity in India
Chandra (1977)	380	1594	1975	Earthquakes in peninsular India
Rao and Rao (1984)	297	1341	1984	Historical earthquakes in peninsular India
Nutalaya et al. (1985)	6	1762	1930	SE Asian earthquake database with focus on Thailand
Newcomb and McCann (1987)	14	1681	1921	Mainly describes seismic history and tsunamis from the SSZ
Gupta (1993)	45	1839	1950	Earthquakes in Himalayan region and Myanmar
Biswas and Majumdar (1997)	17	1964	1985	List earthquake in relation to analysing tectonics in the Bay of Bengal
Iyengar et al. (1999)	42	BC1250	1800	Mainly focuses on earthquakes of medieval period throughout India
Ali and Choudhury (2001)	7	1869	1950	Major earthquakes affecting Bangladesh
Ambraseys and Jackson (2003)	7	1411	1806	A note on early earthquakes in northern India and southern Tibet
Bilham (2004)	35	BC1500	2000	Historical seismicity in India
Ambraseys (2004)	3	893	1668	List of three earthquakes in medieval period
Islam (2004)	17	1548	1999	Earthquakes in Bangladesh
Rajendran et al. (2004)	11	BC810	1897	Mainly focuses on palaeo-seismic events in NE India
Akhter (2010)	17	1548	2009	List of earthquakes affecting Dhaka
Martin and Szeliga (2010)	570	1636	2009	Felt intensity data for 570 earthquakes in India
BMD (2011)	131	893	2010	Earthquakes in Bangladesh and adjacent region

2003; Ambraseys and Douglas 2004) and Bilham (Bilham 2004; Bilham and England 2001) have analysed earthquake hazards in India and Bangladesh. Akhter (2010) has specifically analysed historical and instrumentally recorded earthquakes that affected Dhaka. However, to the best of our knowledge, no attempt has been made to synthesise all available data sources and records of past earthquake events in order to explore the earthquake hazard in Bangladesh. In this paper, we undertake this task.

2 Methods

2.1 Process of new earthquake catalogue development

The new earthquake catalogue shown in Table 2 utilised global online earthquake databases (e.g. the National Geophysical Data Center (NGDC 2012) and Geoscience Australia (GA), (Geoscience Australia, 2011), the International Seismological Centre (ISC 1964–1990), the Incorporated Research Institutions for Seismology (IRIS 2011), regional catalogues (i.e. Oldham 1883), annals, chronicles, diaries, letters, travellers and their accounts, previously published earthquake catalogues (Table 1), journal articles in the peer-reviewed literature, books, reports, newspaper articles, local historical books, institutional and administrative memoirs and the historical archive from the India Office Records of the British Library and Royal Society, London.

Global earthquake databases (i.e. NGDC, NTL, GA, ISC, IRIS) incorporate data from both historical and instrumental records of earthquake. While we focus on identifying events that have affected the northern Bay of Bengal and Bangladesh, we have broadened the study to include the area located between latitude 15°S to 28°N (i.e. Sunda Subduction Zone) and longitude 70°E to 106°E (i.e. Kutch–Saurashtra) to ensure the comprehensive coverage of the study area and adjacent seismically active regions (Fig. 1). Consequently, the study area includes Bangladesh, India, Myanmar, Sri Lanka, the Andaman and Nicobar Islands, Thailand, Malaysia and NW Indonesia.

A portion of China lies within the above-mentioned latitude and longitude boundaries, but we chose not to include earthquake events whose epicentres were located in China. The reason for this is that the emphasis of this work is on earthquakes occurring along the coastline of the NE Indian Ocean, Bangladesh and adjacent regions. The selection of the study region is mainly dependent on three factors: (1) the lead researcher has personal research interests in Bangladesh and adjacent regions, (2) no up to date earthquake catalogue is available for Bangladesh and adjacent regions, and (3) there is a need to understand earthquake hazards and associated risks in Bangladesh by considering all earthquakes from adjacent and distant active seismic sources. The locations of earthquakes with epicentres within 300 km of the coast were included as well as all data from marine sources (i.e. the Bay of Bengal and the NE Indian Ocean). Setting these boundaries ensured that all earthquake events occurring in Bangladesh and adjacent regions (i.e. the Dauki Fault and the Sylhet Fault) were included in the catalogue.

In developing the catalogue, we took great care to identify all records of past earthquakes as far back in time as possible. This is primarily because limited historical work on pre-seventeenth century earthquakes has been completed and because such data can provide useful insights into longer-term hazard useful for stakeholders. Since we emphasise recording historic and prehistoric events, we have documented all felt intensity earthquake data available from archival sources. Detailed data sets from instrumentally recorded periods were readily accessible via NGDC, NTL, GA, ISC, IRIS sources. However, to construct a geography of earthquake hazards in Bangladesh, we have selected an earthquake magnitude above 4 as the inclusion criteria for the instrumental period. The reason for selecting magnitude 4 as below level of threshold for earthquake events inclusion in the catalogue is that the people may feel and concern from this level earthquake event. Subsequently, the government of Bangladesh may take mitigate measures reducing the effects of earthquakes. Geological (Rajendran et al. 2004) and archaeological records of past earthquakes (Banerji 1923; Chaudhury 1964) are limited, but, where available, have been

Table 2 A catalogue of earthquakes between 810BC and 2012 for the Bay of Bengal

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
1**	810BC–400	*	*	India: Assam	26.1	92.56	*	*	*
2	535BC–530	*	*	India: Assam	26.1	92.56	*	*	*
3	326BC	11	*	India: Kutch	23	71	*	*	*
4	645–980	*	*	India: Assam	26.1	92.56	*	*	*
5	825–835	*	*	India: Assam	26.1	92.56	8	*	*
6	893	12	28	India	17.6	73.17	*	*	*
7	1341	*	*	India: Malabar Coast	9.53	76.14	M_s 5.7[55]	7[55]	*
8	1440–1470	*	*	Bangladesh	25.15	90.3	*	*	*
9	1548	*	*	India and Bangladesh	26	94	7	9	*
10	1594	*	*	India: Mahim	19.1	73.2	3.7[55]	4[10, 55]	*
11	1596	*	*	India: Assam	26.1	92.56	7	9	*
12	1601	*	*	India: Assam	26.1	92.56			*
13	1618	5	26	India: Bombay	18.9	72.9	6.9[55]	9[10]	*
14	1642	*	*	India: Assam	26.1	92.56	6	*	*
15	1649	*	*	India: Assam	26.1	92.56	3	3	*
16	1663	2	19	India: Assam	26.1	92.56	8		*
17	1664	*	*	Bangladesh	25	90	M_w 7.79		*
18	1669	6	4	India	22.53	87.4	7	9	*
19	1668	5	*	India: Indus Delta	23	68	7	9	*
20	1676	8	26	India: Orissa	20.49	85.6	3.7	4	*
21	1676	Sep/Oct	*	Bangladesh	22.22	91.48	5.7	7	*
22	1678			India: Vasai	19.1	73.2	5[55]	6[10]	*
23	1679	1	28	Myanmar	19.42	93.57	7	9	*
24	1681	12	11	Indonesia: Sumatra	−0.35	101.2		*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
25	1684	*	*	India	21.2	72.9	3.7	*	*
26	1696	*	*	India: Assam	26.1	92.56		*	*
27	1702	*	*	India: near the Bhima River	19.7	73.1	3.7	4[10]	*
28	1714	8	4	Myanmar: Ava (Innwa)	19.24	94.33	7	9	*
29	1737	10	11	India: Kolkata	22.3	88.2	7	10[10, 111,113]	*
30	1749	*	*	India: Assam	26.1	92.56			*
31	1750	*	*	Myanmar coast	18.5	93.4	5.7	7	*
32	1751	12	9	India	19.1	73.2	4.3	5[55], 6[10]	*
33	1752	1	5	India	19.1	73.2	4.3	5	*
34	1752	2	5	India	18.7	73.4	4.3	5	*
35	1757	10	31	India	18.2	74.2	3.7	4[55] 5[10]	*
36	1760			India	18.5	73.9	3.7	4	*
37	1762	4	2	Bangladesh: Chittagong	22	92	8	11	*
38	1762	7	13	India: Kolkata	22.3	88.2	4.3	5[111]	*
39	1764	6	4	Bangladesh–India: on the bank of the Ganga River	24	88	6	8[10, 111]	*
40	1764	8	17	India: Mahabaleshwar	17.9	73.7	6[55]	7[10]	*
41	1770	11	30	Indonesia: Sumatra	−5	102	7	*	*
42	1772	*	*	India: Assam	26.1	92.56	M_s 6.5	*	*
43	1775	4	10	Bangladesh: Dhaka	23.38	90.25	4.3	5	*
44	1787	*	*	Bangladesh	24.26	89.43	7	10	*
45	1792	5	29	India	18.5	73	4.3	5	*
46	1797	2	10	Indonesia: SW Sumatra	−1	100	M_s 8	*	*
47	1799	*		Indonesia: SE Sumatra	−3.19	104.75		*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
48	1800	10	19	India	15.6	80.1	4.3(55)	6(10)	*
49	1807	12	10	India	13.1	80.1	4.3	*	*
50	1808	4	13	India: Kolkata	22.6	88.4	4.3	5(10)	*
51	1810	4	1	India: Kolkata	22.3	88.2	3.7	4(10)	*
52	1810	5	13	India: Kolkata	22.3	88.2	4.3	5(10)	*
53	1811	2	1	India: Kolkata	22.3	88.2	5	6(10)	*
54	1812	2	23	India: Pune	18.31	73.51	3.7	4(10)	*
55	1812	5	11	Bangladesh		Dhaka	6	8	*
56	1816	4	29	Malaysia: Penang Island	5.38	100.25	*	*	*
57	1816	5	1	Malaysia: Penang Island	5.15	100.29	*	*	*
58	1816	7	11	India: Kolkata	22.3	88.2	3.7	4(10)	*
59	1816	9	15	India	13.1	80.3	4.3		*
60	1818	3	18	Indonesia: Sumatra	−3.76	102.26	M_s 7		*
61	1819	6	16	India	23	71	7.7	11(10)	*
62	1821	8	13	India	22.7	72.7	4.3(55)	5(10)	*
63	1822	1	29	India: Madras	12.5	79.7	5(55)	6(10)	*
64	1822	4	3	Bangladesh	24.3	90.5	7.1(167)	8(10)	*
65	1822	8	16	India: Kolkata	22.3	88.2	5	6(10)	*
66	1823	2	9	India and Sri Lanka	7.5	80.46	5.7(55)	6(10) 7(55)	*
67	1823	4	3	Kolkata	22.3	88.2	4.3	5(10)	*
68	1823	11	26	Kolkata	22.3	88.2	4.3	5(10)	*
69	1825	1	8	Bangladesh	24.4	90.33	4.3	5	*
70	1826	3	20	India	16.1	73.6	5(55)	6(10, 55)	*
71	1827	1	6	India: Vishakhapatnam	17.42	83.15		5(10)	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
72	1827	1		India: Kolkata	22.3	88.2	4.3	5(10)	*
73	1827	1	19	India: Kolkata	22.3	88.2	4.3	5(10)	*
74	1828	7	8	India: Kolkata	22.32	88.23	5.7	7(10)	*
75	1828	9	18	India: Kolkata	22.3	88.2	4.3	5(10)	*
76	1828	10	8	Bangladesh: Dhaka	23.42	90.24	5		*
77	1829	3	12	India: Bangalore	12.58	77.35	4.3	5(10)	*
78	1829	9	18	India: Kolkata	22.3	88.2	5	6(10)	*
79	1830	12	31	Bangladesh: Chittagong	22.47	91.59	6.5	*	*
80	1832			India: Assam	26.1	92.56	6.5	*	*
81	1832	10	4	India	15.8	73.7	5(55)	6(55)	*
82	1833	1	29	Indonesia: Bengkulu, Sumatra	−3.5	102.15	*	*	*
83	1833	11	24	Indonesia: Sumatra: Bengkulu	−3.5	102.2	8.3	*	*
84	1834	7	8	Bangladesh: Rangpur	25.33	89.1	6	8(10)	*
85	1834	7	21	Bangladesh: Rangpur	25.33	89.1	6	8(10)	*
86	1935	8	3	Indonesia	4.5	96.25	7	*	*
87	1835	8	26	Indonesia: W Sumatra	2.24	101.15	*	*	*
88	1836	1	24	India: Chandernagore and Sook Sagur	22.9	88.4	4.3	5(10)	*
89	1837	6	15	India: Ganjam	19.5	85.1	5	6(10)	*
90	1837	8	31	Indonesia: Banda Aceh	5.5	96	7.2	*	*
91	1837	9	29	Indonesia: Banda Aceh	5.5	96	7.3	*	*
92	1838	*	*	Myanmar: Ava (Innwa)	21.8	96	5.7	7	*
93	1839	3	23	Myanmar	21.9	96	7	9	*
94	1841	12	16	Indonesia: Banda sea	−3.24	103.31	*	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
95	1842	5	21	India: Bengal	25	87	5.7	7(10)	*
96	1842	5	23	India: Bengal	25	87	4.3	5(10)	*
97	1842	10	23	Bangladesh: Chittagong	22.47	91.59	4.3	5	*
98	1842	11	11	Bangladesh	24	89.2	M_w 7.3	9(10)	*
99	1843	1	5/6	Indonesia: SW Sumatra	1.5	98	M_w 7.3		*
100	1843	2	6	Myanmar: Khyouk-Phyoo and Ramree	19.3	93.52	6	8	*
101	1843	2	8	India: Ahmadabad	23.02	72.33	4	5(10)	*
102	1843	3	31	India: Deccan	15.2	76.9	3.7	4(10)	*
103	1843	4	1	India: Bellary	15.2	76.9	5.8(10)	7(10) 8(55)	*
104	1843	10	30	Myanmar: Ramree and Cheduba	18.5	94.1	6	8	*
105	1845	7	24	India: Serampore, Kolkata	22.7	88.4	4.3	5	*
106	1945	7	26	India: Serampore	22.7	88.4	4.3	5	*
107	1845	8	6	India: Guwahati, Sylhet(7)	22.7	88.4	M_w 7.1(167)	7(10)	*
108	1846	10	18	Bangladesh	23.52	90.23	M_s 6.2	*	*
109	1846	12	10	India	26	93	7.5	*	*
110	1847	5	5	India: Kolkata	22.3	88.2	5	6(10)	*
111	1847	10	31	India: Little Nicobar Island	7.33	93.66	M_w 7.5–7.9	*	*
112	1848			India: Assam	26.1	92.56	5.7	7	*
113	1848	2	20	India: Kolkata	22.3	88.2	4.3	5(10)	*
114	1848	4	26	India	24.4	72.7	6		*
115	1848	11	30	India: Kolkata	22.3	88.2	3.7	4(10)	*
116	1849	1	22	India: Kolkata	22.3	88.2	3.7	4(10)	*
117	1849	11	23	India: Travancore	9.5	76.6	4.3	5(10)	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
118	1849	12	26	India: Bombay	19.01	72.51	3.7	4[10]	*
119	1851	1	8	Bangladesh: Chittagong	22.47	91.59	5.7	7	*
120	1851	2	9	India: Kolkata	22.3	88.2	5.7[111]	7[10]	*
121	1851	5	4	Indonesia: Lampung Bay	−5	105			*
122	1852	2	9	India: Kolkata	22.3	88.2	3.7	4[10]	*
123	1852	8	9	Bangladesh: Dhaka	23.43	90.24	4.3	5	*
124	1852	11	11	Indonesia: Sibolga, Sumatra	1.7	98.8	M_s 6.8	*	*
125	1854	11		India: Bombay	19.01	72.51	3	*	*
126	1856	8	11	India: Trevandrum	8.7	77	4.3	5[10]	*
127	1856	8	25	India: Trevandrum	8.7	77	4.3	5[10]	*
128	1856	9	1	India: Travancore	9.5	76.6	4.3	5[10]	*
129	1856	12	25	India: Bombay, Surat	20	73	5.7[55]	7[10]	*
130	1857	8	16	Sri Lanka	7.52	80.46	4.3	5[10]	*
131	1858	3	16	India: Balasore	21.29	86.53	4.3	5[10]	*
132	1858	8	13	India: Malabar	11.4	76	4.3	5[10]	*
133	1858	8	23	India: Malabar	11.4	76	5	6[10]	*
134	1858	8	24	Myanmar	21.54	95.57	6		*
135	1858	10	3	India: Ganjam	19.35	84.41	3.7	4[10]	*
136	1858	10	12	India: Chicacole	18.18	83.54	5	6[10]	*
137	1858	12	30	India: Salem District	12.4	78.4	4.3	5[10]	*
138	1858	12	31	India: Khandeish	21	75	4.3	5[10]	*
139	1859	1	3	India: North Arcot	12.54	79.19	5	6[10]	*
140	1859	2	5	India: Tirupattur	12.29	78.34	4.3	5[10]	*
141	1859	7	21	India: Guntur	16.17	80.26	5	6[10]	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
142	1859	8	2	India: Guntur	16.17	80.26	4.3	$5^{(10)}$	*
143	1859	8	9	India: Guntur	16.17	80.26	4.3	$5^{(10)}$	*
144	1859	8	24	India: Visakhapatnam	17.42	83.15	4.3	$5^{(10)}$	*
145	1859	12	17	India: Salem	11.6	78.1	4.3	$5^{(10)}$	*
146	1859	12	17	India: Tirupattur	12.29	78.34	4.3	$5^{(10)}$	*
147	1860	1	17	India: Shevaroys	11.5	78.13	4.3	$5^{(10)}$	*
148	1860	1	20	India: Shevaroys	11.5	78.13	3.7	$4^{(10)}$	*
149	1860	2	2	India: Tirupati	13.39	79.25	4.3	$5^{(10)}$	*
150	1860	2	25	India: Berhampur in Ganjam	19.18	84.48	4.3	$5^{(10)}$	*
151	1861	2	16	Indonesia: SW Sumatra	−1	97.9	8.5	9	70
152	1861	2	16	Malaysia: Malacca St	5.15	100.29	5.7	7	*
153	1861	2	16	India: Kolkata	22.3	88.2	5.7	$7^{(10)}$	*
154	1861	3	4	India: Shevaroys	11.5	78.13	4.3	$5^{(10)}$	
155	1861	3	9	Indonesia: SW Sumatra	0	98	7		20
156	1861	4	18	India: Kolkata	22.3	88.2	3.7	$4^{(10)}$	*
157	1861	4	26	Indonesia: SW Sumatra	1	97.5	M_s 7	*	*
158	1861	6	17	Indonesia: SW Sumatra	1	97.5	M_s 6.8	*	*
159	1861	9	25	Indonesia: SW Sumatra	−1.5	100	M_s 6.5	*	*
160	1863	11	18	India	21.8	75.3	$5.7^{(55)}$	$6^{(10)}$ $7^{(55)}$	*
161	1864	1	5	Bangladesh: Dhaka	23.42	90.24	4	*	*
162	1864	2	16	India: W Sumatra	−0.57	100.21	*	*	*
163	1864	4	29	India: Ahmadabad and Surat	22.3	72.8	$5^{(55)}$	$7^{(10)}$ $6^{(55)}$	*
164	1864	7	23	Myanmar: Rangoon and Thayetmyo	16.48	96.09	3.7	4	*
165	1865	*	*	Bangladesh: Chittagong	22.22	91.50	5.7	7	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
166	1865	8	2	India: Palar Hills	12.7	78.7	4.3	$5^{(10)}$	*
167	1865	11	17	Bangladesh: Jessore	23.2	89.2	4.3	$5^{(10)}$	*
168	1865	12	19	Bangladesh	23.23	91.13	5.5		*
169	1865	12	25	India: Kishnagar	23.4	88.5	5	$6^{(10)}$	*
170	1866	1	6	Bangladesh: Chittagong	22.22	91.48	3.7	4	*
171	1866	5	23	India: Bengal	25	87	$5.6^{(111)}$	$8^{(10)}$	*
172	1866	12	19	Sri Lanka	7.52	80.46	5	$6^{(10)}$	*
173	1867	1	3	India: Kennalapud	16.1	79.6	3.7	$4^{(10)}$	*
174	1867	1	6	India: Vinukonda	16.1	79.8	3.7	$4^{(10)}$	*
175	1867	3	11	India: Guntur-Ongole	16	80.3	4.3	$5^{(10)}$	*
176	1867	7	3	India: Madras	11.56	79.29	$5.7^{(55)}$	$5^{(10)}$ $7^{(55)}$	*
177	1868	8	19	India: Andaman Islands	11.67	92.73			*
178	1869	1	10	India: Assam	24.75	93.25	M_w 7.3		*
179	1869	6	9	India: Kolkata	22.3	88.2	$4.3^{(111)}$	$5^{(10)}$	*
180	1869	7	4	India: Nashik, Chandore	20.2	74.2	4.3	$5^{(10)}$	*
181	1869	7	12	India: Dhulia	20.9	74.8	4.3	$5^{(10)}$	*
182	1869	9	1	India: Nellore	14.25	79.58	5	$6^{(10)}$	*
183	1869	9	2	India: Nellore	14.25	79.58	4.3	$5^{(10)}$	*
184	1869	12	19	India: Cocanada	17	82.3	4.3	$5^{(10)}$	*
185	1870	4	22	Bangladesh: Dhaka	23.42	90.24	5.5		*
186	1870	12	19	India: Visakhapatnam	17.7	83.4	4.3	$5^{(10)}$	*
187	1871	8	18	Indonesia: Bengkulu	−3.48	102.15	*	*	*
188	1873	8	19	Indonesia: Mandailing	2.06	99.32	*	*	*
189	1873	10	7	Indonesia: Tapanuli	1.24	98.54	*	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
190	1874	5		Bangladesh: Bhola	22	89	*	*	*
191	1876	12	13	Bangladesh	23.42	90.25	4.3	5	*
192	1881	12	31	Andaman Islands	8.5	92.4	M_w 7.9		*
193	1882	1	1	Sri Lanka: Trincomalee	8.57	81.23	6	8[10]	*
194	1884	12	31	Indonesia	−6.1	105.4			*
195	1885	1	1	India	25.4	90	7.3		*
196	1885	7	14	Bangladesh	24.8	89.5	M_w 6.87	7[10]	*
197	1885	7	29	Indonesia: Sumatra	0.2	99.38	M_s 6.8	*	*
198	1885	12	14	Indonesia: Banda Aceh	5.5	96	*	*	*
199	1886			Indian Ocean	−6.44	89.13	*	*	*
200	1886	1	31	Indonesia: Aceh	5.5	96	*	*	*
201	1888	10	10	Myanmar: Rangoon	16.48	96.18	5.5	*	*
202	1889	1	10	India	25.16	92.28	M_s 7.5	*	*
203	1889	8	16	Indonesia: Java	−6	106	M_s 6	*	*
204	1891	6	17	Bangladesh: Sirajganj	20.5	86.55	5	5[10]	*
205	1892	5	17	Indonesia: Sumatra	2.5	99.5	5	6	*
206	1894	12	13	Myanmar: Rangoon	16.8	96.2	6	*	*
207	1895			Myanmar: Rangoon	16.8	96.2		*	*
208	1896	10	10	Indonesia: SW Sumatra	−3.5	102.5	M_s 6.8	*	*
209	1897	6	12	India: Assam	26	91	M_s 8.7	*	60
210	1897	6	22	India: Berhampur	19.4	84.9	5.5[55]	7[55]	*
211	1900	2	8	India: Coimbatore	10.8	76.8	6 55	7 10	*
212	1901	4	27	India: N of Calicut	11.15	75.46	5	6[10]	*
213	1901	9	10	India: Nicobar Islands	7.01	93.51	5.7	7[10]	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
214	1902	7	27	Indonesia: Bengkulu	3.28	101.56		*	*
215	1903	2	27	Indonesia: S of Java	−8	106	8.1	*	*
216	1904	7	4	Indonesia: W Sumatra	0.35	101.2		*	*
217	1906	9	29	India: Kolkata	22.3	88.2	$5^{(111)}$	$6^{(10)}$	*
218	1906	12	6	India: Kolkata	22.3	88.2	$5^{(111)}$	$6^{(10)}$	*
219	1907	1	4	Indonesia: NW Sumatra	2	94.5	M_s 7.6	*	50
220	1908	2	6	SW Sumatra	−2	100	M_s 7.5	*	130
221	1908	9	23	India: Andaman Islands	11.58	92.41		$7^{(10)}$	
222	1908	11	2	Indonesia	−2	97	M_s 7.3		
223	1909	6	3	Indonesia: SW Sumatra	−2	101	M_s 7.6		40
224	1910	11	24	Indian Ocean	6	90	*	$7^{(10)}$	*
225	1912	5	11	British Indian Territory	−9	72	6.8	*	*
226	1912	9	11	Indonesia	5	96.5	M_s 6.5	*	*
227	1913	8	13	Indonesia	−5.5	105	7.2	*	*
228	1914	6	25	Indonesia: Sumatra	−4.5	102.5	M_s 7.6	*	*
229	1915	7	26	Indonesia: Sumatra	−3.5	102		*	*
230	1915	8	12	India: Andaman Islands	9	92		*	*
231	1916	1	7	India: Bangalore	13	77.5	$5^{(55)}$	$6^{(55)}$	*
232	1916	5	10	Indian Ocean	1.5	89		*	*
233	1916	7	27	Indonesia	4	96.5	7	*	*
234	1917	4	17	India: Vizianagaram	18	84	$5^{(55)}$	$7^{(55)}$	*
235	1918	4	13	Indian Ocean	−8.6	84.2	M_s 6.5	*	*
236	1918	7	8	Bangladesh	24.5	91.7	M_s 7.6	*	14
237	1918	9	22	Indonesia: Sumatra	−1	100	M_s 6.8	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
238	1919	4	21	India	22	72	$5.5^{(55)}$	$8^{(10)}$	*
239	1921	4	1	Indonesia: Tapanuli	2.06	99.32			*
240	1922	3	13	India	22	71	4.3	$5^{(10)}$	*
241	1922	4	10	Indonesia: SW Sumatra	−0.98	100.33	*	*	*
242	1922	7	8	Indonesia: Aceh	5.46	95.23	*	*	*
243	1922	10	17	India: Andaman Sea	12.5	96	M_s 6.3	*	*
244	1923	5	28	Indian Ocean	−5.1	87.4	M_s 6.5	*	*
245	1923	9	9	Bangladesh	25.18	91	7.1	*	*
246	1925	6	28	India: Andaman Islands	11	93	M_s 6.5	*	*
247	1926	1	19	Indonesia	−2	89	6.8	*	*
248	1926	5	30	Bay of Bengal	15	92	5.6	*	*
249	1926	6	28	Indonesia: Sumatra	−1.5	99.5	M_s 5.8	*	*
250	1926	8	4	Indonesia: Sumatra	1	97.5	M_s 6.0	*	*
251	1927			India: Visakhapatnam	17.42	83.15	4.3	$5^{(10)}$	*
252	1927	7	29	Bay of Bengal	15	87	$6.5^{(10)}$	*	*
253	1928	2	7	Indian Ocean	−2.5	88	6.8	*	*
254	1928	3	9	Indian Ocean	−2.5	88.5	M_s 8.1	*	33
255	1928	5	19	Bay of Bengal	13.5	91.5	6.3	*	*
256	1929	8	1	Bay of Bengal	10	93	6.5	*	*
257	1929	12	9	Indonesia	4.5	94.5	6.8	*	*
258	1930	5	5	Myanmar: Pegu	17.3	96.5	M_s 7.2	*	*
259	1930	6	19	Indonesia: Java Sea	−5.6	105.3	M_s 6	*	*
260	1930	7	2	India: Assam	25.8	90.2	M_s 7.1	*	*
261	1930	7	18	Myanmar: Tharrawaddy	17.4	95.5	*	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
262	1930	9	2	Bangladesh	25.3	90	7.1	*	*
263	1930	12	3	Myanmar: Pyu	18.2	96.4	7.3	*	*
264	1931	1	21	Indonesia: Sumatra	4	99	6.3	*	*
265	1931	2	10	Indonesia	−5.2	102.5	7.1	*	*
266	1931	9	25	Indonesia: S Sumatra	−5	102.75	M_s 7.4	*	*
267	1931	12	18	Indonesia	−5.5	102	6.3	*	*
268	1932	3	24	Bangladesh: North	25	90	7.4	*	*
269	1932	3	27	Bangladesh	24.3	92	7.4	*	*
270	1932	3	28	Indian Ocean	−8	98.5	6	*	*
271	1932	4	22	Indonesia	−4.5	103	6.5	*	*
272	1932	8	16	Indonesia	**3**	**97.5**	6.8	*	*
273	1932	9	11	India	26.3	92	7.4	*	*
274	1933	3	6	Bangladesh	26	90.3	7.6	*	*
275	1933	5	16	Indonesia	7	96.5	6.5	*	*
276	1933	6	24	Indonesia: S Sumatra	−5.5	104.8	M_s 7.5	*	60
277	1933	6	25	Indonesia: S Sumatra	−3.19	103.54	7.5[146]	*	*
278	1934	1	15	Bihar-Nepal	26.5	86.5	M_s 8.4	*	*
279	1934	2	19	India	2.5	99.75	6.3	*	*
280	1934	5	1	Indonesia	3.5	97.5	7	*	*
281	1934	9	21	Indonesia: N Sumatra	1	99	7.5	*	*
282	1935	3	21	Bangladesh: Pabna	24	89.14	6.3[10]	*	*
283	1935	5	31	India: Andaman Islands	16	91	M_w 7.5	*	*
284	1935	7	20	India: Mumbai	20	73	5.7[55]	6[10]	*
285	1935	7	20	India: Near Dumas	21	72.4	5.7[55]	7[55]	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
286	1935	8	3	Indonesia	4.5	96.25	7		*
287	1935	11	25	Indonesia: Celebes Sea	5.5	94	6.5	*	*
288	1935	12	28	Indonesia: NW Sumatra	0.001	98.25	M_w 7.8	*	60
289	1936	4	19	Andaman Islands	10.5	93	6.5	*	*
290	1936	5	9	Indonesia: Sumatra	0	99	6.8	*	*
291	1936	8	23	Indonesia: Banda Aceh	6.1	94.7	M_s 7.3	8	*
292	1936	9	9	Indonesia: N Sumatra	3.8	97.5	7.2	8	*
293	1936	9	19	Indonesia: N Sumatra	3.5	97.5	7.2	*	*
294	1936	10	27	Indonesia: N Sumatra	−0.2	98.8		*	*
295	1937	7	1	Indonesia	3.5	96.5	6.8	*	*
296	1937	11	30	Indian Ocean	5.5	90	6.5[10]	*	*
297	1938	1	18	Indonesia	−4	101.5	6.5	*	*
298	1938	7	29	Indonesia	−1	99	6.5	*	*
299	1938	8	18	Indonesia: Bengkulu	−3.8	102.8		*	*
300	1938	9	10	India: the Gulf of Mannar	7.5	79	5.6[10]	7[55]	*
301	1938	11	16	Indonesia	−4.5	98.5	6.5		*
302	1939	3	21	Indonesia	−1	89.6	M_s 7.2		*
303	1939	5	27	India	24.5	94	M_s 6.8		*
304	1940	5	12	Myanmar	23.75	94.25	M_s 6.5		*
305	1940	10	31	India: Dwarka	22.5	70.4	5	6[10]	*
306	1941	1	21	Bhutan	27	92	6.8	*	*
307	1941	3	16	Laccadive-Maldives Islands	7.5	73	5.6	*	*
308	1941	6	26	Andaman Islands	12.5	92.5	M_w7.6	*	55
309	1941	10	11	Indonesia: N Sumatra	0.6	97.6	*	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
310	1941	11	12	Indonesia	6	94	6.3	*	*
311	1942	5	24	Indonesia: Sumatra	5	96.5	6.8	*	*
312	1943	4	1	Indonesia	−6.5	105.5	7	*	*
313	1943	6	9	Indonesia: S Sumatra	−1	101	M_s 7.6	*	50
314	1943	10	23	India	26	93	M_s 7.2	*	*
315	1943	11	27	Indonesia	−2.5	100	7.1	*	*
316	1948	6	2	Indonesia: off NW coast	6	95	6.2	*	*
317	1949	1	23	Indian Ocean	−12.1	92.1	M_s 7.1	*	*
318	1949	5	9	Indonesia: Banda Aceh	5	95	M_s 6.7	*	*
319	1949	7	21	Indian Ocean	−10	101	6.3	*	*
320	1950	3	28	Indonesia	−6	102.5	7	*	*
321	1950	6	14	India: Bhuj	24	71.2	4.3	$5^{(10)}$	*
322	1950	8	15	India: Assam	28.12	94.05	8.3	*	*
323	1950	9	1	Indian Ocean	−4.5	89.25	6	*	*
324	1951			India: Jaigarh	17.3	73.2	4.3	$5^{(10)}$	*
325	1951	1	9	Indonesia: S Sumatra	−5.26	105.15		*	*
326	1951	10	31	Indonesia	1	98.25	6.6	*	*
327	1951	11						*	*
328	1952	5	25	Indonesia	−1	98.8	6.6	*	*
329	1953	5	17	Indonesia	−3.6	102.2	6	*	*
330	1953	7	7	Indonesia	1	100	6.6	*	*
331	1953	7	26	India: Cochin	9.9	76.3	5	$6^{(10)}$	*
332	1954	1	5	India: Kothagudem	18	81.3	4.3	$5^{(10)}$	*
333	1954	3	22	Myanmar	24.5	95.3	7.7	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
334	1954	7	4	Indonesia	−6.5	105.5	6.9	*	*
335	1955	3	6	Indian Ocean	−8.8	91.67	M_s 7.1	*	*
336	1955	5	17	India: Little Nicobar Island	6.5	94	7.3	*	*
337	1955	9	9	Indonesia	−2	100	6.4	*	*
338	1956	4	10	Indonesia	−3	102	7	*	*
339	1956	7	17	Myanmar	22.25	96	7	*	*
340	1956	7	21	India	23	70	$6.1^{(10)}$ $7^{(55)}$	*	*
341	1957	7	1	India-Myanmar border	25	94	M_s 7	*	*
342	1957	3	11	Indonesia	1.25	97.25	6.4	*	*
343	1957	6	19	Bay of Bengal	13	96.5	6.5	*	*
344	1957	7	9	Indonesia	−6	104	6.1	*	*
345	1957	12	6	Bangladesh: Dhaka	24	90		*	*
346	1958	1	13	India: Port Blair	12.5	93.5	6.2	*	*
347	1958	4	21	Indonesia: Sumatra	−4.5	104	M_w 6.6		200
348	1959	10	12	India: Ongole	15.7	80.1	$5^{(55)}$	$6^{(10)}$	*
349	1959	10	13	India: Ongole	15.7	80.1	$5^{(55)}$	$6^{(10)}$	*
350	1959	11	26	Indonesia: Sumatra	−5.5	102.5	6.5		*
351	1959	12	17	India	11.7	78.1	4.3	$5^{(10)}$	*
352	1959	12	23	India: Vizianagaram	18.1	83.5	4.3	$5^{(10)}$	*
353	1960	1	7	Indonesia: Sumatra	6	94	6	*	*
354	1960	3	30	Indonesia	−3.5	102	M_s 6.0	*	*
355	1960	7	10	Indonesia	1	98.5	6.5	*	*
356	1960	10	8	India: Ongole and Guntur	16	80.3		*	*
357	1960	12	22	Andaman Sea	8.5	95	4.5	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
358	1961	6	13	Bay of Bengal	8.7	83.2		*	*
359	1962	9	28	India: Ratnagiri	17	73.5	4.3	5[10]	*
360	1963	7	13	India	24.9	70.3	5.6[10]	*	*
361	1963	12	16	Indonesia: Java	−6.2	105.4	5[146]	*	*
362	1964	1	4	Indonesia: Sumatra	−1.9	102.3	6.7[146]	*	
363	1964	2	27	Myanmar	21.7	94.4	6.4	*	
364	1964	4	2	Indonesia: Banda Aceh	5.8	95.4	6.9, 5.2[146]	7	100
365	1964	4	15	India: Midnapore	21.7	88	5.5[10]	*	*
366	1964	9	15	Bay of Bengal	8.9	93.1	M_b 6.2	*	*
367	1964	10		India: Calicut	11.3	75.8	5[10]	*	*
368	1965	3	26	India: Kutch	24.4	70	5[55]	*	*
369	1965	6	4	India: Ratnagiri	17	73.4	5.4[10]	*	*
370	1965	7	25	Indonesia: N Sumatra	2	99.3	5.3[146]	*	*
371	1965	6	11	Bhutan	27.12	91.36	4.8	*	*
372	1966	5	4	India: Alibag	18.7	73	4.3	5[10]	
373	1967	3	27	India: Ongole	15.6	80.1	5.4[10]	7[55]	
374	1967	4	12	Indonesia-Malaysia: N Sumatra	5.5	97.3	7.5	*	100
375	1967	4	25	India: Mahad	18.2	73.4	5.6[10]	*	*
376	1967	6	20	India: Alibag	18.7	73	4.3	5[10]	*
377	1967	7	16	India: E Asansol	23.5	87.5	4.3	5[10]	*
378	1967	9	6	Bangladesh	24.6	91.42	5	*	*
379	1967	9	13	India: Koyna Region	17.4	73.7	5.8[10]	*	*
380	1967	9	13	India: Koyna Region	17.4	73.7	5.6[10]	*	*
381	1967	9	15	Bhutan	27.24	91.48	5.8	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
382	1967	11	14	Bangladesh	25	91.3	5.1	*	*
383	1967	12	10	India: Koyna Region	17.7	73.9	$6^{(10)}$ $7^{(55)}$	9^{55}	33
384	1967	12	10	India: Koyna Region	17.4	73.7	$5^{(10)}$	*	*
385	1967	12	11	India: Koyna Region	17.3	73.7	$5.2^{(10)}$	*	*
386	1967	12	12	India: Koyna Region	17.6	73.9	$5.4^{(10)}$	*	*
387	1967	12	12	India: Koyna Region	17.4	73.9	$5^{(10)}$	*	*
388	1967	12	13	India: Koyna Region	17.3	73.7	$5.5^{(10)}$	*	*
389	1967	12	13	India: Koyna Region	17.5	73.6	$5.6^{(10)}$	*	*
390	1967	12	24	India: Koyna Region	17.5	73.9	$5.5^{(10)}$	*	*
391	1967	12	25	India: Koyna Region	17.2	73.9	$5.1^{(10)}$	*	*
392	1968	2	7	India: Koyna Region	17.4	73.7	5	$6^{(10)}$	*
393	1968	3	4	India: Koyna Region	17.4	73.7	5	$6^{(10)}$	*
394	1968	8	31	India: Koyna Region	17.3	74	$5.7^{(10)}$	*	*
395	1968	10	29	India: Pophali	17.3	73.9	$5.4^{(10)}$	*	*
396	1968	12	27	Bangladesh	24.06	91.36	5.2	*	*
397	1969	3	7	India: Sangameshwar	17.2	73.6	4.3	$5^{(10)}$	*
398	1969	4	13	India: Bhadrachalam	17.9	80.6	$5.3^{(10)}$	$7^{(55)}$	*
399	1969	4	14	India: Bhadrachalam	18	80.5	$5.2^{(10)}$	*	*
400	1969	11	3	India: Koyna Region	17.3	73.7	$5.7^{(10)}$	*	*
401	1969	5	11	Bhutan	27.42	90.12	5	*	*
402	1969	11	21	Indonesia: off NW coast of Sumatra	2.1	94.6	8.2	*	20
403	1970	3	23	India: Broach	21.7	73	$5.4^{(10)}$		3
404	1970	4	16	India: Koyna Region	17.4	73.7	4.3	$5^{(10)}$	*
405	1970	6	8	India: Koyna Region	17.4	73.7	4.3	$5^{(10)}$	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
406	1970	6	17	India: Koyna Region	17.4	73.7	4.3	5[(10)]	*
407	1970	7	25	Bangladesh	25.42	88.3	5.2	*	*
408	1970	8	28	Bangladesh	24.42	91.42	4.9	*	*
409	1970	9	25	India: Koyna Region	17.4	73.6	5[(10)]	*	*
410	1970	9	26	India: Koyna Region	18	74	5.5[(10)]	*	*
411	1971	2	2	Bangladesh	23.48	91.48	5.4	*	*
412	1971	2	4	Indonesia: Natal	0.6	98.8	7.1, 6.3[(146)]	9	40
413	1971	7	28	India: Ongole	15.6	80.1	4.3	5[(10)]	*
414	1972	7	29	India: Coimbatore	11	77	5	6[(10)]	*
415	1972	11	6	India: Assam	27	88.42	4.8	*	*
416	1972	11	24	Bay of Bengal	11.6	85.4	5.4[(10)]	*	*
417	1973	8	30	Bay of Bengal	7.1	84.3	5.9[(10)]	*	*
418	1973	10	17	India: Koyna Region	17.4	73.7	5	6[(10)]	*
419	1973	11	15	India: Sindgi	17	76.3	4.3	5[(10)]	*
420	1974	2	17	India: W coast	17.5	73.1	5[(55)]	*	*
421	1974	5	12	India	13.8	75.3	5[(10)]	*	*
422	1974	9	21	India: Assam	25.42	90.54	4.7	*	*
423	1974	11	9	Indonesia: W Java	−6.5	105.3	6.1[(146)]	*	*
424	1975	7	8	Myanmar: Pagan	21.49	94.7	6.5	*	157
425	1976	6	20	Indonesia: Aceh	3.2	96.3	6.1[(146)]	*	*
426	1976	6	23	Bangladesh	21.24	88.42	5.3	*	*
427	1977	3	8	Indonesia: Sumatra	0.45	100.02	6	*	22
428	1977	5	8	Bangladesh	24.89	92.25	M_b 5.6	*	*
429	1977	5	12	Bangladesh-Myanmar border	21.75	92.99	M_s 5.7	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
430	1979	4	11	Bangladesh	25.9	88.8	4.7[111]	*	*
431	1979	4	28	Indonesia: W Sumatra	0.54	98.78	5.8[146]	*	*
432	1979	12	15	Indonesia: S Sumatra	−3.29	102.7	6.6, 5.8[146]	*	33
433	1982	1	20	India: Little Nicobar Island	6.95	94	6.3	*	19
434	1982	2	24	Indonesia: Java Trench	4.37	97.75	5.4	*	52
435	1983	4	4	Indonesia: Sumatra: Banda Aceh	5.72	94.72	6.6	*	79
436	1983	4	22	Thailand: Bangkok	14.92	99.02	5.9	*	10
437	1983	11	30	Indian Ocean: Chagos Archipelago	−6.85	72.11	M_s 7.7	*	10
438	1984			Indonesia: off W coast of Sumatra	0.18	97.95	7.2	*	*
439	1984	5	21	Bangladesh	23.42	91.3	5.3	*	
440	1984	8	27	Indonesia: N Sumatra	1.76	99.07	5.2	*	33
441	1984	9	30	Bangladesh	23.42	91.3	5.3	*	*
442	1984	12	31	India: Assam	24.64	92.89	M_w 6	*	*
443	1986	1	29	Indonesia: Sumatra	−3.9	103.46	5	*	33
444	1987	4	25	Indonesia: Sumatra	2.24	98.86	6.6	*	11
445	1988	2	6	Bangladesh: Sylhet	24.68	91.57	5.8	*	
446	1988	8	6	Myanmar	25.14	95.12	M_s 7.3	*	
447	1988	8	21	India-Nepal border	26.7	86.8	M_s 7.8	*	998
448	1988	9	7	Indonesia	95.9	95.9	5.5	*	
449	1989	3	1	Myanmar	21.72	97.99	6	*	
450	1989	6	12	Bangladesh: Banaripara	21.86	89.76	5.1	*	6
451	1990	11	15	Indonesia: N Sumatra	3.9	97.45	6.8, 4.6[146]	*	48
452	1993	6	12	Bangladesh: South	21.83	89.7	5.7[111]	*	*
453	1993	9	29	India: Latur-Osmanabad	18.06	76.45	6.2	*	7

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
454	1993	11	12	India: Latur	18.12	76.53	4.6	*	10
455	1994	2	15	Indonesia: S Sumatra	−4.96	104.3	M_w 6.8	*	23
456	1995	10	6	Indonesia: Sumatra	−2.04	101.43	6.8	*	33
457	1997	5	8	Bangladesh	24.89	92.25	M_w 6.0[157] M_b 5.6	*	34
458	1997	8	20	Indonesia: N Sumatra	4.35	96.49	6	*	33
459	1997	11	21	India-Bangladesh border: Chittagong	22.21	92.7	M_w 6.1	*	54
460	1999	7	22	Bangladesh: Moheshkhali Island	21.54	91.89	M_b 5.2[157] M_s 4.2 [52]	*	10
461	1999	11	15	Indian Ocean	−1.374	88.969	7	*	*
462	1999	11	29	Indian Ocean	−1.301	89.005	6.4	*	*
463	1999	12	21	Indonesia: SE Sumatra	−6.84	105.55	6.5	*	
464	2000	1	3	India-Bangladesh border	22.13	92.77	4.6	*	33
465	2000	6	4	Indonesia: Sumatra	−4.72	102.09	M_w 7.9	*	33
465	2000	6	7	Indonesia: S Sumatra	−4.61	101.9	6.7	*	33
466	2000	6	18	Australia: S Cocos Islands	−13.8	97.45	M_w 7.9	*	10
467	2000	1	19	Bangladesh			M_s 4.5	*	*
468	2001	1	26	India: Gujarat	23.41	70.23	7.7	*	16
469	2001	2	13	Indonesia: Sumatra	−4.618	102.937	M_w7.4	*	*
470	2002	1	15	Indonesia: Sumatra	−6.255	105.24	6.3	*	*
471	2002	6	27	Indonesia: SW of Sumatra	−6.99	103.79	6.6	*	*
472	2002	9	13	India: Andaman Islands	13.03	93.06	M_w 6.5	*	21
473	2002	11	2	Indonesia: Sumatra	2.82	96.08	7.3	*	30
474	2003	7	15	Indian Ocean	−2.59	68.38	7.6	*	10
475	2003	7	26	Bangladesh: Borkal	22.85	92.31	M_w 5.7	*	10

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
476	2003	9	21	Myanmar: Taungdwingyi	19.91	95.67	6.6	*	10
477	2004	2	16	Indonesia: Sumatra	−0.46	100.65	5.1	*	56
478	2004	2	22	Indonesia: Sumatra	−1.55	100.48	6	*	42
479	2004	4	9	Indonesia: Sumatra	−1.54	100.54	5.4	*	66
480	2004	7	25	Indonesia: Sumatra	−2.4	104.02	7.5	*	
481	2004	12	26	Indonesia: Sumatra	3.29	95.98	9	*	30
482	2005	1	1	Indian Ocean	5.05	92.28	6.5	*	*
483	2005	1	24	Indian Ocean	7.37	92.45	6.3	*	*
484	2005	3	28	Indonesia: Sumatra	2.08	97.1	8.7	*	30
485	2005	3	30	Indonesia	3.01	95.37	6.4	*	
486	2005	4	10	Indonesia: Padang	−1.64	99.6	6.7	*	19
487	2005	5	10	Indonesia	−6.198	103.126	6.4	*	
488	2005	5	14	Indonesia	0.56	98.38	6.9	*	
489	2005	5	19	Indonesia	2	96.97	6.7	*	
490	2005	7	5	Indonesia: Sumatra	1.81	97.08	6.7	*	21
491	2005	7	24	India: Andaman Islands	7.92	92.19	7.2	*	16
492	2005	11	19	Indonesia	2.232	96.769	6.5	*	
493	2006	3	7	India: Gujarat	23.77	70.89	5.5	*	10
494	2006	3	28	Indonesia: N Sumatra	3.46	97.22	5	*	30
495	2006	4	6	India: Gujarat	23.32	70.47	5.5	*	10
496	2006	5	16	Indonesia: Nias Islands	0.13	97.02	6.8	*	*
497	2006	6	27	India: Nicobar Islands	6.53	92.71	6.2	*	*
498	2006	8	11	Indonesia: Simeulue Island	2.4	96.31	6.2	*	*
499	2006	9	12	Indonesia: SW Sumatra	−4.35	101.45	7.8	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
500	2006	12	1	Indonesia: N Sumatra	3.42	99.06	6.3	*	*
501	2006	12	17	Indonesia: Sumatra	0.62	99.85	5.8	*	30
502	2007	3	6	Indonesia: Sumatra	−0.49	100.49	6.4	*	19
503	2007	5	20	India	27.15	88.44	5.3	*	*
504	2007	7	30	Myanmar	19.41	95.51	6.2	*	*
505	2007	8	11	India: Assam	26.27	89.24	4.9	*	*
506	2007	9	12	Indonesia: Sumatra	−4.43	101.36	8.4	*	34
507	2007	9	19	India	25.18	90.59	4.6	*	*
508	2007	9	20	Indonesia	−1.89	99.99	6.6	*	*
509	2007	10	10	Indonesia	−1.88	98.9	6.2	*	*
510	2007	10	24	Indonesia: S Sumatra	−3.85	100.96	7.2	*	*
511	2007	11	6	India: Gujarat	21.18	70.72	5.1	*	10
512	2007	11	7	Bangladesh: Bandarban, Chittagong, Rangamati	22.15	92.38	5.1	*	29
513	2007	12	1	Indonesia: Nias Island	2	98	6.1	*	
514	2008	1	12	Bangladesh: Rangamati	22.76	92.33	5	*	34
515	2008	1	22	Indonesia: Sumatra: Nias Island	1.01	97.44	6.1	*	20
516	2008	2	20	Indonesia: Sumatra: Aceh	2.76	95.96	7.4	*	26
517	2008	2	25	Indonesia: Sumatra	−2.48	99.97	6.5	*	25
518	2008	3	13	Bhutan	27.46	91	4.5	*	*
519	2008	3	30	Indonesia: N Sumatra	2.96	95.48	6.3	*	*
520	2008	5	19	Indonesia	1.51	99.5	6.1	*	*
521	2008	5	29	India	26.24	91.46	4.9	*	*
522	2008	6	28	India: Andaman Islands	11.68	91.69	6.3	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
523	2008	7	5	India	26.07	91.39	5.1	*	*
524	2008	8	10	Bay of Bengal	10.8	92	6.2	*	*
525	2008	9	9	Indonesia: S Sumatra	−3.93	103.05	5.4	*	25
526	2008	9	16	India: Maharashtra	17.43	73.91	5	*	10
527	2008	9	20	Bangladesh: Sylhet	23.5	91.07	4.8	*	*
528	2008	11	22	Indonesia	−4.42	101.07	6.5	*	*
529	2008	12	31	Indonesia: S Sumatra	−4.21	101.32	6.1	*	*
530	2009	1	6	Bangladesh	24.11	89.25	4.7	*	*
531	2009	2	27	Bangladesh	20.29	89.31	4.8	*	*
532	2009	4	16	Indonesia: S Sumatra	−3.21	100.49	6.3	*	*
533	2009	7	13	India	26.09	89.39	4.5	*	*
534	2009	8	10	India: Andaman Island	14.09	92.88	M_w 7.5	*	5
535	2009	8	16	Indonesia: Padang	−1.47	99.49	6.7	*	20
536	2009	9	21	Bhutan	27.4	91.36	6.4	*	*
537	2009	9	21	Myanmar	20.404	94.793	5.7	*	*
538	2009	9	30	Indonesia: S Padang	−0.72	99.86	M_w 7.5	*	81
539	2009	10	1	Indonesia: Sumatra	−2.51	101.5	6.6	*	10
540	2009	10	16	Indonesia	−6.569	105.21	4.2	*	
541	2009	10	30	Bhutan	27.29	91.46	5.2	*	
542	2009	12	12	India: Maharashtra	17.1	73.76	5.1	*	10
543	2009	12	31	Bhutan	27.31	91.15	5.4	*	
544	2010	3	5	Indonesia	−3.85	100.92		*	
545	2010	3	30	India: Andaman Islands	13.609	92.884	6.6	*	34
546	2010	4	6	Indonesia: Sumatra	2.3	97.13	7.7	*	31

Table 2 continued

Event number	Year	Month	Day	Earthquake locations			Earthquake parameters		
				Location names	Lat	Long	Magnitude	Intensity	Focal depth
547	2010	5	5	Indonesia-Malaysia	−4.093	101.08	6.3	*	
548	2010	5	9	Indonesia: N Sumatra	3.77	96.05	7.2	*	38
549	2010	5	31	India: Andaman Sea	11.119	93.698	6.4	*	*
550	2010	6	12	India: Little Nicobar Island	7.74	91.93	7.5	*	35
551	2010	6	19	India: Andaman Islands	13.24	93.08	5.9	*	*
552	2010	7	24	Indonesia	1.09	99.68	6.2	*	*
553	2010	8	21	Indonesia: N Sumatra	2.24	96.77	6.1	*	*
554	2010	9	7	Indonesia: SW Sumatra	−6.97	103.38	6	*	*
555	2010	9	11	India	25.52	90.39	5.2	*	*
556	2010	10	25	Indonesia: Sumatra	−3.84	100.08	7.7	*	*
557	2011	1	17	Indonesia: N Sumatra	−5.051	102.631	M_s 6.1	*	*
558	2011	1	26	Indonesia	2.36	96.96	6.1	*	*
559	2011	2	2	India: Andaman Islands	11.15	94.51	5.6	*	*
560	2011	4	6	Indonesia: N Sumatra	1.81	97.31	6.1	*	*
561	2011	9	18	India: Sikkim	27.73	88.15	6.9	*	*
562	2012	3	18	Bangladesh	23.66	90.26	M_b 4.5	*	*

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
1**	810BC–400	*	*	*	*	*	*	–	167	Radiocarbon dating of sediments calibrated age 810BC–400
2	535BC–530	*	*	*	*	*	*	–	167	Radiocarbon dating of sediments calibrated age 535BC–530
3	326BC	11	*	*	*	*	*	–	1, 8, 147, 148	The earthquake probably generated a tsunami
4	645–980	*	*	*	*	*	*	–	167	Radiocarbon dating of sediments calibrated age 645BC–980
5	825–835	*	*	*	*	*	*	–	5, 15, 167	The earthquake destroy temples and palaces in Assam
6	893	12	28	150,000	*	*	*	–	21, 164	The earthquake destroyed the Daibul town
7	1341	*	*	*	*	*	*	144	55	The Island Vaypi was uplifted during the earthquake
8	1440–1470	*	*	*	*	*	*	–	45	The radiocarbon age of charcoals shows date as 1440–1470
9	1548	*	*	*	*	*	*	68	45, 64, 81, 166	The first recorded earthquake in Bangladesh. Sylhet and Chittagong were violently shaken
10	1594	*	*	*	*	*	*	113	10, 55	–
11	1596	*	*	*	*	*	*	–	160	–
12	1601	*	*	*	*	*	*	–	160	–
13	1618	5	26	2000[10, 21]	*	*	*	–	1, 7, 10, 21, 55	Simultaneously there was a severe tropical cyclone and 60 vessels lost in Mumbai (former Bombay)[21]

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
14	1642	*	*	*	*	*	*	–	23, 64, 69, 160	Most severe damage occurred in Bangladesh
15	1649	*	*	*	*	*	*	–	69	–
16	1663	2	19	*	*	*	*	–	64, 160, 164, 165, 166	The earthquake was so devastating that Mir Jumla is believed to have fled Assam
17	1664	*	*	*	*	*	*	–	45, 80	The earthquake may be relevant to the activity of the Dauki Fault
18	1669	6	4	*	*	*	*	–	69	Land changes occurred such as creating ditches
19	1668	5	*	30,000	*	*	*	–	21, 164	The earthquake caused 30,000 houses to sink
20	1676	8	26	*	*	*	*	–	69	Ships at sea oscillated and houses were shaken tremendously
21	1676	Sep/Oct	*	*	*	*	*	–	69	Chittagong was destroyed by an earthquake and severe tropical cyclone
22	1678			*	*	*	*	113	10, 55, 157	–
23	1679	1	28	*	*	*	*	–	69	The earthquake was very severe and affected a wide area of Arakan, Bengal and India
24	1681	12	11	*	*	*	*	–	72	A sea quake was observed
25	1684	*	*	*	*	*	*	–	157	–
26	1696	*	*	*	*	*	*	–	160	The reign of King Rudra Singha experienced earthquakes twice in 1696 and 1749

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
27	1702	*	*	*	*	*	*	113	10	–
28	1714	8	4	*	*	*	*	6	1	River water flooded into the city and residential properties and Pagodas collapsed
29	1737	10	11	3000[82] 300,000[7, 21]	*	*	*	11,12,13,14,16	1, 7, 10, 21, 61, 82, 111	After careful review of the effects of this event Bilham (1994) concluded this was actually a tropical cyclone
30	1749	*	*	*	*	*	*	–	160	–
31	1750	*	*	*	*	*	*	1	1, 17	The earthquake may have caused eruptions of mud volcanoes
32	1751	12	9	*	*	*	*	–	1, 10, 55	–
33	1752	1	5	*	*	*	*	–	1	–
34	1752	2	5	*	*	*	*	–	1	–
35	1757	10	31	*	*	*	*	–	10, 55	–
36	1760			*	*	*	*	–	157	–
37	1762	4	2	200	*	*	*	6, 8,9,11,17, 18, 19, 20, 21	1, 2, 3, 4, 7, 51, 61,65, 79, 81, 129, 140,142, 54, 159, 161	Alam et al. (2012) concluded the earthquake caused local tsunamis and huge effects on social infrastructures
38	1762	7	13	*	*	*	*	–	10, 21, 111	–
39	1764	6	4	*	*	*	*	106	10, 21, 111	Many houses destroyed and large number of people and cattle were killed[21]

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
40	1764	8	17	*	*	*	*	113	10, 55	–
41	1770	11	30	*	*	*	*	29	1	Volcanic eruption occurred simultaneously with this event
42	1772	*	*	*	*	*	*	–	161	The earthquakes damaged the part of Assam
43	1775	4	10	*	*	*	*	–	64, 166	Severe earthquake felt in Dhaka
44	1787	*	*	*	*	*	*	–	69, 86, 166	The earthquake caused shifting of river courses
45	1792	5	29	*	*	*	*	–	157	–
46	1797	2	10	*	*	*	*	24	1, 17	–
47	1799	*		*	*	*	*	–	29, 147	Waves rose approximately 15.24 m above ordinary water level
48	1800	10	19	*	*	*	*	–	10, 21, 55, 131	Earthquake lasted a minute occurred during a violent tropical cyclone
49	1807	12	10	*	*	*	*	–	10, 21, 157	Earthquake occurred in the middle of a terrible tropical cyclone and was accompanied by heavy sea waves
50	1808	4	13	*	*	*	*	85	10, 21, 111	Cracks in house walls were observed
51	1810	4	1	*	*	*	*	85	10, 21, 111	The earthquake felt very severely in Kolkata
52	1810	5	13	*	*	*	*	85	10, 21, 111	–
53	1811	2	1	*	*	*	*	85	10, 21, 111	–
54	1812	2	23	*	*	*	*	113	10	–
55	1812	5	11	*	*	*	*	–	64, 166	The earthquake felt violently in Sylhet

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
56	1816	4	29	*	*	*	*	–	1, 29	–
57	1816	5	1	*	*	*	*	87	21	Severely felt in the northern and central parts of the Penang Island
58	1816	7	11	*	*	*	*	–	10, 21, 111	–
59	1816	9	15	*	*	*	*	–	157	–
60	1818	3	18	*	*	*	*	6	1, 29	–
61	1819	6	16	2000	*	*	*	8, 9, 11, 12, 13, 25, 26	1, 7, 10, 21	Ground was sunk approximately 6.27 m and long areas were uplifted
62	1821	8	13	*	*	*	*	141	10, 21, 55	–
63	1822	1	29	*	*	*	*	88	7, 10, 21, 55	The severe shaking broke up roofs of houses in several places
64	1822	4	3	*	*	*	*	88	21, 111, 166	Several shocks felt in Bengal
65	1822	8	16	*	*	*	*	89	10, 21, 111	Walls of houses were moved from north to south
66	1823	2	9	*	*	*	*	115	10, 21, 55	–
67	1823	4	3	*	*	*	*		10, 21, 111	–
68	1823	11	26	*	*	*	*	90	10, 21, 111	Accompanied by subterranean noises
69	1825	1	8	*	*	*	*	91, 92	21	–
70	1826	3	20	*	*	*	*	113	10, 55	–
71	1827	1	6	*	*	*	*	93	10, 21, 55	Severe shocks from the sea
72	1827	1		*	*	*	*		10, 21, 111	–
73	1827	1	19	*	*	*	*	93	10, 21, 111	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
74	1828	7	8	*	*	*	*	94	10, 21	–
75	1828	9	18	*	*	*	*	95	10, 21, 111	–
76	1828	10	8	*	*	*	*	95	21	Four distinct shocks in successions
77	1829	3	12	*	*	*	*	96	10, 21	Houses were much shaken
78	1829	9	18	*	*	*	*	97	10, 21, 111	–
79	1830	12	31	*	*	*	*	98	21, 75	Very violent earthquake and all houses were seriously cracked
80	1832			*	*	*	*	–	161	The earthquakes damaged the part of Assam
81	1832	10	4	*	*	*	*	113	55	–
82	1833	1	29	*	*	*	*	–	17	Sea wave was reported in Padang
83	1833	11	24	*	*	*	*	–	1, 28	A severe earthquake caused some buildings to collapse
84	1834	7	8	*	*	*	*	118	10, 21, 111	–
85	1834	7	21	*	*	*	*	118	10, 21, 111	–
86	1935	8	3	*	*	*	*	–	156	–
87	1835	8	26	*	*	*	*	–	146	–
88	1836	1	24	*	*	*	*	91	10, 21, 111	–
89	1837	6	15	*	*	*	*	–	10, 21	–
90	1837	8	31	*	*	*	*	–	74	–
91	1837	9	29	*	*	*	*	–	1, 29, 36, 84	Shocks continued seven days and volcanic eruptions occurred near Aceh
92	1838	*	*	*	*	*	*	6	1	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
93	1839	3	23	400	*	*	*	–	21	In many places earth fissures were produced
94	1841	12	16	*	*	*	*	–	24	Moderate sea wave up to 1.2 to 1.5 m high
95	1842	5	21	*	*	*	*	117	10, 21, 111	–
96	1842	5	23	*	*	*	*	117	10, 21, 111	–
97	1842	10	23	*	*	*	*	117	21	Motion east to west
98	1842	11	11	*	*	*	*	102	10, 21, 111, 117, 166	Felt also sharply at sea
99	1843	1	5/6	*	*	*	*	–	1, 17, 21	There were two shocks accompanied by sea waves
100	1843	2	6	*	*	*	*	103	21	Huge eruptions occurred
101	1843	2	8	*	*	*	*	103	10, 21	–
102	1843	3	31	*	*	*	*	103	10, 21	–
103	1843	4	1	*	*	*	*	103	1, 7, 10, 21, 55	Huge damage occurred in town
104	1843	10	30	*	*	*	*	103	21	Very sharp at Gukiong, on sea, 145 miles to south
105	1845	7	24	*	*	*	*	–	10, 21, 111	–
106	1945	7	26	*	*	*	*	–	10, 21, 166	–
107	1845	8	6	*	*	*	*	–	7, 10, 21, 111	–
108	1846	10	18	*	*	*	*	Friend of India	7, 21	Masonry buildings were cracked in every direction in Dhaka
109	1846	12	10	*	*	*	*		27	–
110	1847	5	5	*	*	*	*	Friend of India	10, 21, 111	Houses cracked

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
111	1847	10	31	*	*	*	*	–	1, 7, 21, 128, 147	Landslides occurred and also fire seen on the top of the mountain
112	1848			*	*	*	*	–	161	The earthquake damaged the part of Assam
113	1848	2	20	*	*	*	*	Friend of India	21, 111	–
114	1848	4	26	*	*	*	*		157	–
115	1848	11	30	*	*	*	*	Friend of India	10, 21, 111	–
116	1849	1	22	*	*	*	*	105	10, 21, 111	–
117	1849	11	23	*	*	*	*	100	10, 21	–
118	1849	12	26	*	*	*	*	119	10, 21	–
119	1851	1	8	*	*	*	*	Hooker's Journal vol. 2	21	Motion apparently from south
120	1851	2	9	*	*	*	*	Friend of India	10, 21	–
121	1851	5	4	*	*	*	*	–	29	The normal flood tide level was exceeded by a tidal wave up to 1.5 m
122	1852	2	9	*	*	*	*	–	10, 21	–
123	1852	8	9	*	*	*	*	Perry	21	Oscillation lasted fifteen seconds
124	1852	11	11	*	*	*	*	–	1, 29	There was an earthquake on the west coast of Sumatra Island
125	1854	11		*	*	*	*	–	–	–
126	1856	8	11	*	*	*	*	–	10, 21	–
127	1856	8	25	*	*	*	*	–	10, 21	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
128	1856	9	1	*	*	*	*	–	10, 21	–
129	1856	12	25	*	*	*	*	Perry	7, 10, 55	–
130	1857	8	16	*	*	*	*	Friend of India	10, 21	–
131	1858	3	16	*	*	*	*	100	10, 21	–
132	1858	8	13	*	*	*	*	120	10, 21	–
133	1858	8	23	*	*	*	*	Official Record	10, 21	–
134	1858	8	24	*	*	*	*	11	1, 7, 21	Strongly felt in Chittagong and coseismic subsidence occurred in False Island
135	1858	10	3	*	*	*	*	Official Record	10, 21	–
136	1858	10	12	*	*	*	*	Official Record	10, 21	–
137	1858	12	30	*	*	*	*	Official Record	10, 21	–
138	1858	12	31	*	*	*	*	Official Record	10, 21	–
139	1859	1	3	*	*	*	*	Official Record	10, 21	–
140	1859	2	5	*	*	*	*	Official Record	10, 21	–
141	1859	7	21	*	*	*	*		10, 21	–
142	1859	8	2	*	*	*	*	Official Record	10, 21	–
143	1859	8	9	*	*	*	*	Official Record	10, 21	–
144	1859	8	24	*	*	*	*	121	10	–
145	1859	12	17	*	*	*	*	–	10, 21	–
146	1859	12	17	*	*	*	*	–	10, 21	–
147	1860	1	17	*	*	*	*	–	10, 21	–
148	1860	1	20	*	*	*	*	–	10, 21	–
149	1860	2	2	*	*	*	*	–	10, 21	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
150	1860	2	25	*	*	*	*	Friend of India	10, 21	–
151	1861	2	16	*	*	*	*	29	1,28, 146	Tsunami was observed at Singkil, Nias and Tello[28]
152	1861	2	16	*	*	*	*	Friend of India	21	The rise of and fall of water occurred
153	1861	2	16	*	*	*	*	Friend of India	10, 21	Water in tanks rose about 0.3 m above its level
154	1861	3	4	*	*	*	*	–	10, 21	–
155	1861	3	9	*	*	*	*	–	1, 7, 29	–
156	1861	4	18	*	*	*	*	–	10, 21, 111	–
157	1861	4	26	*	*	*	*	–	1, 29, 72	Water rose more than once to the same height
158	1861	6	17	*	*	*	*	–	1, 29	Long-period undulating tremors for about 1 min at Ajerbangis
159	1861	9	25	*	*	*	*	–	1, 72	Sea waves damaged the coast
160	1863	11	18	*	*	*	*	122	10, 21	Walls of houses fell at the Burwani coast
161	1864	1	5	*	*	*	*	Friend of India	10, 21	Houses much shaken
162	1864	2	16	*	*	*	*		17, 24	Earthquake and tsunami reported from Padang to Pulau Pulau Batu
163	1864	4	29	*	*	*	*	100	10, 21, 55	Several people thrown down
164	1864	7	23	*	*	*	*	Friend of India	21	Doors of houses were rattled
165	1865	*	*	*	*	*	*	–	62	A violent shock of an earthquake triggered mud volcanoes
166	1865	8	2	*	*	*	*	Official Record	10, 21	Appeared to travel north-west

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
167	1865	11	17	*	*	*	*	Official Record	10, 21, 111	–
168	1865	12	19	*	*	*	*	–	7, 21, 54, 159	Many buildings were cracked in Chittagong
169	1865	12	25	*	*	*	*	–	10, 21, 111	Severe shock
170	1866	1	6	*	*	*	*	Friend of India	10, 21	Light shock
171	1866	5	23	*	*	*	*	Friend of India	7, 10, 21, 111	Some houses fell down
172	1866	12	19	*	*	*	*	Friend of India	10, 21	Light shock
173	1867	1	3	*	*	*	*	Official Record	10, 21	Slight shock
174	1867	1	6	*	*	*	*	Official Record	10, 21	Slight shock
175	1867	3	11	*	*	*	*	123	10	–
176	1867	7	3	*	*	*	*	Times	7, 10, 55	–
177	1868	8	19	*	*	*	*	–	43, 82	Tsunami at Port Blair
178	1869	1	10	*	*	*	*	–	80, 161, 165, 166	–
179	1869	6	9	*	*	*	*	–	10, 21, 111	–
180	1869	7	4	*	*	*	*	Bombay Gazetteer	10, 21	–
181	1869	7	12	*	*	*	*	–	10, 21	–
182	1869	9	1	*	*	*	*	Englishman	10, 21	–
183	1869	9	2	*	*	*	*	Englishman	10, 21	–
184	1869	12	19	*	*	*	*	Englishman	10, 21	–
185	1870	4	22	*	*	*	*	Times	7	–
186	1870	12	19	*	*	*	*	121	10	–
187	1871	8	18	*	*	*	*	–	146	–
188	1873	8	19	*	*	*	*	–	146	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
189	1873	10	7	*	*	*	*	–	146	–
190	1874	5		*	*	*	*	–	147, 148	–
191	1876	12	13	*	*	*	*	–	151, 166	It was felt in Dhaka
192	1881	12	31	*	*	*	*	6, 109	1,43, 56, 82, 110	Tsunami waves were observed widely from Sri Lanka as far as the Ganges Delta of Bengal
193	1882	1	1	*	*	*	*	–	1, 7, 10, 24	Tsunami at Trincomalee, Sri Lanka
194	1884	12	31	*	*	*	*	–	74	–
195	1885	1	1	*	*	*	*	–	27	–
196	1885	7	14	75	*	*	*	–	7, 10, 41, 70, 80, 111, 151, 152	The felt areas extended in the entire northeast India and Myanmar
197	1885	7	29	*	*	*	*	–	1, 29,74	The force of breaking waves at the coast greatly increased
198	1885	12	14	*	*	*	*	–	1, 29	River water levels were observed to be high
199	1886			*	*	*	*	–	43, 82	–
200	1886	1	31	*	*	*	*	–	74	–
201	1888	10	10	*	*	*	*	–	7	–
202	1889	1	10	*	*	*	*	–	64	It affected Sylhet town and adjacent areas
203	1889	8	16	*	*	*	*	–	74, 155	–
204	1891	6	17	*	*	*	*	–	7, 10	–
205	1892	5	17	*	*	*	*	29, 36	1, 29, 74, 146	Rivers along the eastern coast of Sumatra experienced strong surf

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
206	1894	12	13	*	*	*	*	–	7, 21	–
207	1895			*	*	*	*	6	1	–
208	1896	10	10	*	*	*	*	–	1,29, 74	The sea was more restless than during the preceding 6 h
209	1897	6	12	1626	*	*	*	9, 11, 12, 13, 14, 19, 25	1, 7, 22, 26, 27, 48, 61, 77, 104, 117,153, 54, 159, 160	A great tidal wave penetrated up the Brahmaputra River to a distance of some 250 miles from the coast
210	1897	6	22	*	*	*	*	Statesman	55	–
211	1900	2	8	*	*	*	*	125, 136	10, 55	–
212	1901	4	27	*	*	*	*	–	10	–
213	1901	9	10	*	*	*	*	–	10	–
214	1902	7	27	*	*	*	*	–	146	–
215	1903	2	27	*	*	*	*	30	1	–
216	1904	7	4	*	*	*	*	–	17, 28, 146	The boats on sea adjacent to the coast of Siri-Sori sank due to the high waves[28]
217	1906	9	29	*	*	*	*	130	10, 111	–
218	1906	12	6	*	*	*	*	130	10, 111	–
219	1907	1	4	*	*	*	*	30	1, 29, 74	Tidal water flooded huts
220	1908	2	6	*	*	*	*	–	1, 29, 31	The seaward side of islands experienced tsunami damage
221	1908	9	23	*	*	*	*	–	10	–
222	1908	11	2	*	*	*	*	–	156	–
223	1909	6	3	*	*	*	*	32, 33, 34	1, 30, 74, 156	At Kambang, significant water movements were observed

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
224	1910	11	24	*	*	*	*	128	10	–
225	1912	5	11	*	*	*	*	–	156	–
226	1912	9	11	*	*	*	*	–	156, 158	–
227	1913	8	13	*	*	*	*	–	156	–
228	1914	6	25	20	20	*	*	35, 36	1, 74, 30	Earthquake triggered upheaval of the sea and ships occurred
229	1915	7	26	*	*	*	*	–	29, 74	Oscillations of the sea
230	1915	8	12	*	*	*	*		156	–
231	1916	1	7	*	*	*	*	136	55	–
232	1916	5	10	*	*	*	*	–	156	–
233	1916	7	27	*	*	*	*	–	156	–
234	1917	4	17	*	*	*	*	136	55	–
235	1918	4	13	*	*	*	*	–	156	–
236	1918	7	8	9	50	*	*	–	27, 145, 61, 126, 160, 166	Severe damage in Srimangal, but minor effects in Dhaka
237	1918	9	22	*	*	*	*	–	156	–
238	1919	4	21	*	*	*	*	131	10, 55	–
239	1921	4	1	*	*	*	*		146	–
240	1922	3	13	*	*	*	*	131	10	–
241	1922	4	10	*	*	*	*	29	1	–
242	1922	7	8	*	*	*	*	–	1, 74	–
243	1922	10	17	*	*	*	*	–	156	–
244	1923	5	28	*	*	*	*	–	156	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
245	1923	9	9	50	*	*	*	–	61, 156, 160, 163, 166	The earthquake caused heavy damage in Mymensingh
246	1925	6	28	*	*	*	*	–	156	–
247	1926	1	19	*	*	*	*	–	156	–
248	1926	5	30	*	*	*	*	–	156	–
249	1926	6	28	222	Many[87]	*	*	37, 38	1, 87	–
250	1926	8	4	*	*	*	*	–	156	–
251	1927			*	*	*	*	132	10	–
252	1927	7	29	*	*	*	*	–	10, 35	–
253	1928	2	7	*	*	*	*	–	156	–
254	1928	3	9	*	*	*	*	–	1, 30, 35	–
255	1928	5	19	*	*	*	*	–	156	–
256	1929	8	1	*	*	*	*	–	156	–
257	1929	12	9	*	*	*	*	–	156	–
258	1930	5	5	550	*	*	*	9, 11, 40	1, 6, 39, 107	–
259	1930	6	19		*	*	*	–	1, 29,74,155	The ship extremely vibrated
260	1930	7	2	1	*	*	*	–	41, 160, 162	In Eastern Rangpur District, significant earthquake damage occurred
261	1930	7	18	*	*	*	*	6	1	–
262	1930	9	2	*	*	*	*	–	61	–
263	1930	12	3	36	*	*	*	–	1, 6	–
264	1931	1	21	*	*	*	*	–	156	–
265	1931	2	10	*	*	*	*	–	156	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
266	1931	9	25	*	*	*	*	28, 29	1, 146, 74	–
267	1931	12	18	*	*	*	*	–	156	–
268	1932	3	24	*	*	*	*	–	10, 61, 111	–
269	1932	3	27	*	*	*	*	–	61	–
270	1932	3	28	*	*	*	*	–	156	–
271	1932	4	22	*	*	*	*	–	156	–
272	1932	8	16	*	*	*	*	–	156	–
273	1932	9	11	*	*	*	*	–	61	–
274	1933	3	6	*	*	*	*	–		–
275	1933	5	16	*	*	*	*	–	156	–
276	1933	6	24	*	*	*	*	–	1, 30	–
277	1933	6	25	76(146)	*	*	*	–	146	–
278	1934	1	15	*	*	*	*	–	126, 156	The earthquake caused damage in Rangpur
279	1934	2	19	*	*	*	*	–	156	The effects were scaled MMI VI in Dhaka
280	1934	5	1	*	*	*	*	–	156	–
281	1934	9	21	*	*	*	*	–	146	–
282	1935	3	21	*	*	*	*	35	10,111,166	–
283	1935	5	31	*	*	*	*		43, 148	–
284	1935	7	20	*	*	*	*	131	10, 55	–
285	1935	7	20	*	*	*	*	136	55	–
286	1935	8	3	*	*	*	*	–	156	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
287	1935	11	25	*	*	*	*	–	1, 43	–
288	1935	12	28	*	*	*	*	8, 28, 36	1, 29, 74, 87, 156	–
289	1936	4	19	*	*	*	*	–	156	–
290	1936	5	9	*	*	*	*	–	156	–
291	1936	8	23	$9^{(1)}$ $91^{(146)}$	20	*	*	28	1,43,74, 146, 156	–
292	1936	9	9	17	*	*	*	28	1	–
293	1936	9	19	17	*	*	*	–	146, 156	–
294	1936	10	27	*	*	*	*	–	146	–
295	1937	7	1	*	*	*	*	–	156	–
296	1937	11	30	*	*	*	*	35	10, 156	–
297	1938	1	18	*	*	*	*	–	156	–
298	1938	7	29	*	*	*	*	–	156	–
299	1938	8	18	*	*	*	*	–	146	–
300	1938	9	10	*	*	*	*	35, 136	10, 55	–
301	1938	11	16	*	*	*	*	–	156	–
302	1939	3	21	*	*	*	*	–	156	–
303	1939	5	27	*	*	*	*	–	156	–
304	1940	5	12	*	*	*	*	–	156	–
305	1940	10	31	*	*	*	*	131	10, 55	–
306	1941	1	21	*	*	*	*	–	61	–
307	1941	3	16	*	*	*	*	35	10, 55	–
308	1941	6	26			*	*	6,8,9,35	1, 42, 43,156	–
309	1941	10	11	*	*	*	*	–	146	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
310	1941	11	12	*	*	*	*	–	156	–
311	1942	5	24	*	*	*	*	–	156	–
312	1943	4	1	*	*	*	*	–	156	–
313	1943	6	9	*	*	*	*	–	156, 30	–
314	1943	10	23	*	*	*	*	–	160, 27	–
315	1943	11	27	*	*	*	*	–	156	–
316	1948	6	2	*	*	*	*	–	1, 29, 74	–
317	1949	1	23	*	*	*	*	–	156	–
318	1949	5	9	*	*	*	*	–	1,43	–
319	1949	7	21	*	*	*	*	–	156	–
320	1950	3	28	*	*	*	*		156	–
321	1950	6	14	*	*	*	*	131	10	–
322	1950	8	15	*	*	*	*	–	43, 46, 47, 64	Water bodies in Dhaka remained in a state of agitation for an hour
323	1950	9	1	*	*	*	*	–	156	–
324	1951			*	*	*	*	–	10	–
325	1951	1	9	*	*	*	*	–	146	–
326	1951	10	31	*	*	*	*	–	156	–
327	1951	11		*	*	*	*	–		–
328	1952	5	25	*	*	*	*	–	156	–
329	1953	5	17	*	*	*	*	–	156	–
330	1953	7	7	*	*	*	*	–	156	–
331	1953	7	26	*	*	*	*	132	10, 55	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
332	1954	1	5	*	*	*	*	133	10	–
333	1954	3	22	*	*	*	*	–	1, 30, 166	In Dhaka residents woke up and ran outdoors
334	1954	7	4	*	*	*	*	–	156	–
335	1955	3	6	*	*	*	*	–	156	–
336	1955	5	17	*	*	*	*	44	1, 43, 156	–
337	1955	9	9	*	*	*	*	–	156	–
338	1956	4	10	*	*	*	*	–	156	–
339	1956	7	17	*	*	*	*	–	156	–
340	1956	7	21	156	*	*	*	50	1, 21, 55	–
341	1957	7	1	*	*	*	*	–	160	–
342	1957	3	11	*	*	*	*	–	156	–
343	1957	6	19	*	*	*	*	–	156	–
344	1957	7	9	*	*	*	*	–	156	–
345	1957	12	6	*	*	*	*	10	11	–
346	1958	1	13	*	*	*	*	–	156	–
347	1958	4	21	*	*	*	*	–	1, 29, 74, 156	–
348	1959	10	12	*	*	*	*	136	10, 55	–
349	1959	10	13	*	*	*	*	–	10, 55	–
350	1959	11	26	*	*	*	*	–	156	–
351	1959	12	17	*	*	*	*	–	10	–
352	1959	12	23	*	*	*	*	–	10	–
353	1960	1	7	*	*	*	*	–	156	–
354	1960	3	30	*	*	*	*	–	156	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
355	1960	7	10	*	*	*	*	–	156	–
356	1960	10	8	*	*	*	*	132	10	–
357	1960	12	22	*	*	*	*	–	156	–
358	1961	6	13	*	*	*	*	134	10	
359	1962	9	28	*	*	*	*	135	10	–
360	1963	7	13	*	*	*	*	134	10	–
361	1963	12	16	*	*	*	*	–	1, 29, 146, 156	–
362	1964	1	4	110(146)	147(146)	*	*	–	146	–
363	1964	2	27			*	*	–	158	–
364	1964	4	2	*	*	*	*	28, 29, 44	1, 146, 156	–
365	1964	4	15	*	*	*	*	134	10	–
366	1964	9	15	*	*	*	*		101	–
367	1964	10		*	*	*	*	132	10	–
368	1965	3	26	*	*	*	*	136	55	–
369	1965	6	4	*	*	*	*	136	10, 55	
370	1965	7	25	*	*	*	*	–	146	–
371	1965	6	11	*	*	*	*	–	61	–
372	1966	5	4	*	*	*	*	–	10	–
373	1967	3	27	*	*	*	*	134	10, 55	–
374	1967	4	12	14	*	*	2000	28, 29, 36	1, 29, 74, 156	The quake was followed by enormous tsunami

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
375	1967	4	25	*	*	*	*	136	10, 55	–
376	1967	6	20	*	*	*	*	–	10	–
377	1967	7	16	*	*	*	*	–	10	–
378	1967	9	6	*	*	*	*	–	61	–
379	1967	9	13	*	*	*	*	136	10, 55	–
380	1967	9	13	*	*	*	*	136	10, 55	–
381	1967	9	15	*	*	*	*	–	61	–
382	1967	11	14	*	*	*	*	–	61	–
383	1967	12	10	180	*	0.4	*	13, 39, 44, 134, 136	1, 10, 55	–
384	1967	12	10	*	*	*	*	134	10	–
385	1967	12	11	*	*	*	*	134	10	–
386	1967	12	12	*	*	*	*	134	10	–
387	1967	12	12	*	*	*	*	134	10	–
388	1967	12	13	*	*	*	*	136	10	–
389	1967	12	13	*	*	*	*	136	10	–
390	1967	12	24	*	*	*	*	134	10	–
391	1967	12	25	*	*	*	*	134	10	–
392	1968	2	7	*	*	*	*	136	10	–
393	1968	3	4	*	*	*	*	136	10	–
394	1968	8	31	*	*	*	*	136	10	–
395	1968	10	29	*	*	*	*	134	10	–
396	1968	12	27	*	*	*	*	–	61	–
397	1969	3	7	*	*	*	*	–	10	–
398	1969	4	13	*	*	*	*	134, 136	10	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
399	1969	4	14	*	*	*	*	136	10	–
400	1969	11	3	*	*	*	*	134	10	–
401	1969	5	11	*	*	*	*	–	61	–
402	1969	11	21	*	*	*	*	30	1	–
403	1970	3	23	26	200	*	*	44, 53, 134	1, 10, 55	–
404	1970	4	16	*	*	*	*	136	1	–
405	1970	6	8	*	*	*	*	136	10	–
406	1970	6	17	*	*	*	*	136	10	–
407	1970	7	25	*	*	*	*	–	61	–
408	1970	8	28	*	*	*	*	–	61	–
409	1970	9	25	*	*	*	*	136	10	–
410	1970	9	26	*	*	*	*	136	10	–
411	1971	2	2	*	*	*	*		61	–
412	1971	2	4	*	*	*	*	28, 57, 59	1, 146	–
413	1971	7	28	*	*	*	*	136	10	–
414	1972	7	29	*	*	*	*	136	10	–
415	1972	11	6	*	*	*	*	–	61	–
416	1972	11	24	*	*	*	*	–	10, 49	–
417	1973	8	30	*	*	*	*	–	10, 49	–
418	1973	10	17	*	*	*	*	137	10	–
419	1973	11	15	*	*	*	*	137	10	
420	1974	2	17	*	*	*	*	136	55	–
421	1974	5	12	*	*	*	*	138, 136	10	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
422	1974	9	21	*	*	*	*	–	61	–
423	1974	11	9	*	*	*	*	–	146	–
424	1975	7	8	1	*	1	*	59, 60	1	–
425	1976	6	20	*	*	*	*	–	146	–
426	1976	6	23	*	*	*	*	–	61	Water movement in sea adjacent to the Chittagong coast was observed by local people
427	1977	3	8	*	*	*	*	28, 59	1, 146	–
428	1977	5	8	*	*	*	*	–		The earthquake had led to cracking of at least 5 buildings in Sylhet
429	1977	5	12	*	200	*	*	–	157, 166	Cracks were developed in buildings in Chittagong and numerous people were injured
430	1979	4	11	*	*	*	*	112	111	–
431	1979	4	28	5.8[146]	73[146]	*	*	–	146	–
432	1979	12	15	8	162	*	2500	59	1, 146	–
433	1982	1	20	*	*	*	*	59	1	–
434	1982	2	24	*	*	*	*	–	1, 71, 78, 156	–
435	1983	4	4	*	100	1	*	28, 39, 57, 59	1, 146	–
436	1983	4	22	*	*	*	*	57, 59	1	–
437	1983	11	30	*	*	*	*	57, 59, 63	1, 148, 156	–
438	1984			*	*	*	*	–	147	–
439	1984	5	21	*	*	*	*		61	–
440	1984	8	27	*	123	1	414	39, 57, 59	1, 146	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
441	1984	9	30	*	*	*	*	–	61	–
442	1984	12	31	*	*	*	*	–	161	–
443	1986	1	29		2			57, 59	1	–
444	1987	4	25	2	22	1	300	39, 57, 59, 63	1, 146	–
445	1988	2	6	2	100	*	*	–	1	–
446	1988	8	6	2	12	*	*	–	161	–
447	1988	8	21	*	*	*	*	–	53,166	Seismic seiches observed in many rivers including capsizing boats in the Jamuna River killing 2 people and missing almost 30 people
448	1988	9	7	*	*	*	*	–	156	–
449	1989	3	1	*	*	*	*	–	158	–
450	1989	6	12	1		*	*	57, 59	1	–
451	1990	11	15	1		2.1	*	59	1, 146	–
452	1993	6	12	*	*	*	*	–	111	–
453	1993	9	29	11,000	30,000	300	*	39,50,59, 66,67,68	1	–
454	1993	11	12		25		100	59	1	–
455	1994	2	15	207	2000[(1)] 1351[(146)]	170.46	6000	39, 59	1, 146, 156	–
456	1995	10	6	84	1868		17,600	59	1, 146	–
457	1997	5	8	*	*	*	*	–	124, 150	The earthquake had led to cracking in at least 5 buildings in Sylhet

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
458	1997	8	20			*	*	59	1	–
459	1997	11	21	23	200	*	1	59	1, 21, 64, 75, 99, 157, 163	The collapse of buildings and deaths occurred in Chittagong
460	1999	7	22	6	200	*	700	59	1, 52, 75, 124,161	Houses cracked and in some cases collapsed
461	1999	11	15	*	*	*	*	–	156	–
462	1999	11	29	*	*	*	*	–	156	–
463	1999	12	21	5	220	3900	2800	59	1	–
464	2000	1	3	*	*	*	*	59	1	–
465	2000	6	4	103	2174	6	*	59, 66, 73	1, 74	–
465	2000	6	7	1	*	*	600	59	1	–
466	2000	6	18	*	*	*	*	59	1, 156	–
467	2000	1	19	*	100		*	–	166	Few buildings in areas of old Dhaka city were damaged
468	2001	1	26	20,005	166,836	2623	339,000	39, 59	116, 76	–
469	2001	2	13	*	*	*	*	–	156	–
470	2002	1	15	*	*	*	*	–	156	–
471	2002	6	27	*	*	*	*	–	156	–
472	2002	9	13	2	*	*	40	–	1, 59, 156	–
473	2002	11	2	3	65	*	994	59	1	–
474	2003	7	15			*		59	1	Felt in Maldives
475	2003	7	26	3	25	*	500	59	1, 75, 83, 157, 166	Transformer of power supply exploded in Chittagong

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
476	2003	9	21	*	*	*	*	59	1	–
477	2004	2	16	5	7			59	1	–
478	2004	2	22	*	1			59	1	–
479	2004	4	9	*	*	*	*	59	1	–
480	2004	7	25	*	*	*	*	–	156	–
481	2004	12	26	227,898	*	*	*	–	1, 59, 143	–
482	2005	1	1	*	*	*	*	–	156	–
483	2005	1	24	*	*	*	*	–	156	–
484	2005	3	28	1314	340		300	59	1, 156	–
485	2005	3	30	*	*	*	*	–	156	–
486	2005	4	10	*	*	*	*	59	1	–
487	2005	5	10	*	*	*	*	–	156	–
488	2005	5	14	*	*	*	*	–	156	–
489	2005	5	19	*	*	*	*	–	156	–
490	2005	7	5	*	*	*	*	59	1	–
491	2005	7	24	*	*	*	*	59	1	–
492	2005	11	19	*	*	*	*		156	
493	2006	3	7		7			59	1	–
494	2006	3	28	*	*	*	*	59	1	–
495	2006	4	6	*	*	*	*	59	1	–
496	2006	5	16	*	*	*	*	–	156	–
497	2006	6	27	*	*	*	*	–	156	–
498	2006	8	11	*	*	*	*	–	156	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
499	2006	9	12	*	*	*	*	–	156	–
500	2006	12	1	*	*	*	*	–	156	–
501	2006	12	17	7	100	*	680	59	1	–
502	2007	3	6	67	826	*	43,719	59	1	–
503	2007	5	20	*	*	*	*	–	61	–
504	2007	7	30	*	*	*	*	–	158	–
505	2007	8	11	*	*	*	*	–	61	–
506	2007	9	12	25	161		56,425	59	156	–
507	2007	9	19	*	*	*	*	–	61	–
508	2007	9	20	*	*	*	*	–	156	–
509	2007	10	10	*	*	*	*	–	156	–
510	2007	10	24	*	*	*	*	–	156	–
511	2007	11	6	1	5			59	1	–
512	2007	11	7	*	10	*	*	59	1	–
513	2007	12	1	*	*	*	*	–	156	–
514	2008	1	12	*	*	*	*	59	1	–
515	2008	1	22	1	5	*	*	59	1	–
516	2008	2	20	3	25	*	*	59	1, 74	–
517	2008	2	25	*	*	*	*	59	1, 156	–
518	2008	3	13	*	*	*	*	–	91	–
519	2008	3	30	*	*	*	*	–	156	–
520	2008	5	19	*	*	*	*	–	156	–
521	2008	5	29	*	*	*	*	–	61	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
522	2008	6	28	*	*	*	*	–	156	–
523	2008	7	5	*	*	*	*	–	61	–
524	2008	8	10	*	*	*	*	–	156	–
525	2008	9	9	2	*	*	*	59	1	–
526	2008	9	16	1	20			59	1	–
527	2008	9	20	*	*	*	*	–	61	–
528	2008	11	22	*	*	*	*	–	156	–
529	2008	12	31	*	*	*	*	–	156	–
530	2009	1	6	*	*	*	*	–	61	–
531	2009	2	27	*	*	*	*	–	61	–
532	2009	4	16	*	*	*	*	–	156	–
533	2009	7	13	*	*	*	*	–	61	–
534	2009	8	10	*	*	*	*	59	1, 156	–
535	2009	8	16	*	9			59	1, 156	–
536	2009	9	21	*	*	*	*	–	61	–
537	2009	9	21	*	*	*	*	–	158	–
538	2009	9	30	1117	1214	*	181,665	59	156	–
539	2009	10	1	3	*	10	*	59	1	–
540	2009	10	16	*	*	*	*	–	156	–
541	2009	10	30	*	*	*	*	–	61	–
542	2009	12	12	*	*	*	*	59	1	–
543	2009	12	31	*	*	*	*	–	61	–
544	2010	3	5	*	*	*	*	–	156	–
545	2010	3	30	*	*	*	*	–	156	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
546	2010	4	6	*	*	*	*	59	1	–
547	2010	5	5	*	*	*	*	–	156	–
548	2010	5	9	*	*	*	*	59	1	–
549	2010	5	31	*	*	*	*	–	156	–
550	2010	6	12	*	*	*	*	59	1, 156	–
551	2010	6	19	*	*	*	*	–	156	–
552	2010	7	24	*	*	*	*	–	156	–
553	2010	8	21	*	*	*	*	–	156	–
554	2010	9	7	*	*	*	*	–	156	–
555	2010	9	11	*	*	*	*	–	61	–
556	2010	10	25	*	*	*	*	59	1	
557	2011	1	17	*	*	*	*	–	156	–
558	2011	1	26	*	*	*	*	–	156	–
559	2011	2	2	*	*	*	*	–	156	–
560	2011	4	6	*	*	*	*	–	156	–
561	2011	9	18	97	*	*	*	–	1, 114, 157	–

Table 2 continued

Event number	Year	Month	Day	Earthquake effects				Primary	Secondary	Comments
				Deaths	Injuries	Damage (in m US $)	House destroyed/ damaged			
562	2012	3	18	44	*	*	*	–	157	People in Dhaka and adjacent district got panic

Asterisk (*) indicates no information available

Reference numbers and detail of primary and secondary sources for each earthquake event referred to in "Primary" and "Secondary" columns

Akhter (2010), Alam et al. (2006, 2012), Ali and Choudhury (2001), Ambraseys (2000, 2004), Ambraseys and Douglas (2004), Anon (1802, 1811, 1838, 1843a, b, 1844, 1849, 1864, 1897a, b, 1909, 1930, 1988, 2004, 2011, n.d.-b), Ansary et al. (2000), Asiatic Journal (1822a, 1823, 1824, 1825a, b, 1827, 1828, 1829a, b, 1831, 1834), Ballore (1904), Banerji (1923), Bapat (1982), Bapat et al. (1983), Basu (1964), Bath (1973), Bendick et al. (2001), Benerji (1957), Berninghausen (1966), Bilham (1994, 2004), Bilham and England (2001), Bilham et al. (2005), Biswas and Majumdar (1997), BMD (2011), Brewster (1826), Campbell (1809), Chakrabarti and Gosh (2011), Chandra (1977), Chaudbury (1965), Chaudhury (1964), Chaudhury and Srivastava (1974), Chhibber (1934), Chong-Hua et al. (1985), Choudhury (2005), Colby and Allen (1910), CRED (2011), Curray et al. (1982), Dahanayake and Kulasena (2008), Dasgupta (2011), Davidson (1936), Dominey-Howes et al. (2007), Duda (1965), Fergusson (1863), Foote (1879), Gahalaut and Chander (1992), Gait (1906), Geoscience Australia (2011), Gosavi et al. (1977), Gubin (1968), Gulston (1763), Gupta (1993, 1994), Gupta and Gahalaut (2009), Gupta et al. (1972), Gutenberg and Richter (1965), Hamzah et al. (2000), Heck (1947), Hirst (1763), Hough et al. (2005), Hunter (1876), IMD (2011), IRIS (2011), ISC (1964–1990), Islam (2004), Islamabadi (1987), ITIC (1982), Iyengar et al. (1994, 1999), Jaiswal et al. (2008), Kamaluddin and Rahman (1985), Kanamori (1977), Kelkar (1968), Khan (2004, 2010, 2012), Khan and Chouan (1996), Khan and Hossain (2005), Lomnitz (1974), Lyell (1875), Mandal et al. (2000), Martin and Szeliga (2010), McClleland (1980–1989), Middlemiss (1885), Milne (1911), Mithal and Srivastava (1962), Miyamura(1988), Morino et al. (2011), Murty and Bapat (1999), Murty and Rafiq (1991), Nandy (1994), NOAA (1928–1986), NEIC (1971), Newcomb and McCann (1987), NGDC (2012), NTL (2010), Nutalaya et al. (1985), O'Connell (1974), Oldham (1883, 1884), Ortiz and Bilham (2003), Pan et al. (2001), Paul and Bhuiyan (2010), Pervez and Ram (1997), Perry, Rajendran et al. (2004), Rao and Rao (1984), Rastogi (2007), Rastogi and Jaiswal (2006), Rennell and Banks (1781), Richter (1958), Rizvi (1969, 1970a, b), Rothe (1974–1975), Seismological Society of America (1926, 1930), Sharfuddin (2010), Sing and Sethumadhavan (1965), Singh (1966), Singh and Shankar (1992), Smith (1844), Soetardjo et al. (1985), Soloviev and Go (1974, 1975), Steckler et al. (2008), Stone (2011), Tandon (1950, 1959), Tillotson (1951), United Nations Office for the Coordination of Humanitarian Affairs (1993), USGS (2011), Verelst (1763), Webster (1911), Wei et al. (1987)

incorporated in the new catalogue because previously, such sources were not considered (Table 1).

2.2 Documentary sources

'Inscribed text' is the central feature of artefacts we call 'documents' (Scott 1990). There are also non-text-based documents that include photographs, film, video, television, displays, drawings and pictures, and graphical presentations (Mason 2002). Individuals, groups and organisations routinely produce documents throughout everyday life. While these documents are not produced for research purposes, they nonetheless provide evidence of events and possessions in the lived world (Payne and Payne 2004).

Historical archival documents include but are not limited to myths, inscriptions, annals, chronicles, diaries, letters, epistolaries, travellers and their accounts, antiquarian historiography, local histories, archive of institutional and administrative memories, newspapers, historical earthquake cartography, iconographic sources (paintings, drawings, relief carvings and other artistic depictions), photographs and films and ethnographic and anthropological sources (Guidoboni and Ebel 2009; Hay 2005).

Ensuring the quality of documentary sources is important for enhancing the scientific value of the evidence (Hay 2005). Scott (1990) recommends the use of authenticity, credibility, representativeness and meaning in order to evaluate the quality of a document. In regard to the idea of authenticity, Scott (1990) refers to whether unquestionable sources were used and whether the evidence can be considered as genuine. Raising questions about the credibility of a source document is important in helping to determine whether the evidence provided has been in anyway distorted and is free from errors (Scott 1990). While drawing conclusions from the source documents, it is also important to consider whether the evidence represents the subject under investigation. Lastly, evidence must be 'clear and comprehensive' in relationship to its meaning (Scott 1990).

To maximise authenticity, credibility, representativeness and quality of the secondary data of earthquake events, different strategies are used in this research. For example, for each individual earthquake event, we have attempted to search for multiple sources and have cross-referenced different source documents. None of the sources were considered on face value (Hay 2005). In order to verify the descriptions given in historical documents, we undertook content analysis and the results were checked against the context of descriptions, effects of events and locations of occurrence where available. This was necessary because the sources we used were not originally generated for the purpose of geographical analysis (Baker 1997).

2.3 Published palaeo-earthquake records

The short time period covered by instrumental records can only provide a partial geography of hazards and associated risks (deMenocal 2001). For instance, based on recent instrumental data the Sumatra–Andaman region was not thought to have a high tsunami risk (Berninghausen 1966; Jankaew et al. 2008). However, many researchers (Monecke et al. 2008; Satake and Atwater 2007) began to report geological evidence of tsunamis in the region after the 2004 Indian Ocean tsunami. Therefore, it is essential to turn to geological evidence that spans much longer time series (Nott 2003). Palaeo-records can act as powerful sources of additional evidence that extends the records of past hazard events improving risk assessment (Dominey-Howes 2002). We have used geological evidence of

earthquake events that are available in published sources to ascertain the source locations of these events in Bangladesh.

2.4 Recording of earthquake magnitudes

While collecting and collating earthquake magnitudes from secondary sources, we faced several challenges relating to the use of different magnitude scales and the lack of any magnitude scale for some events. On occasion, a source provides Modified Mercalli Intensity (MMI) values for the effects of an earthquake. However, when neither an MMI nor magnitude scale was provided, we have attempted to collect and review the effects of the earthquakes if available. After careful analysis of the effects, this has been converted to the MMI scale and a new MMI value is provided in Table 2.

2.5 Cross-checking and validation of data

A total of 168 sources were consulted to develop the new earthquake catalogue. With regard to those 168 sources, we identify and discuss issues arising such as differences in magnitude, inconsistencies in citations and variations in the date of occurrence. Accordingly, it was necessary to employ a rigorous system for cross-checking and data validation. This is achieved by cross-checking multiple sources and performing a content analysis. This process verifies the date of occurrence of an event, explores inconsistencies in citations, identifies problems relating to magnitudes of earthquakes and evaluates likely effects.

Every effort has been made to carefully and faithfully record details from the original document sources. However, as is understood for this type of research, no matter how careful the researcher, the possibility exists for transcription errors during compilation and we ourselves may have made errors and such errors will remain in the static catalogue we generate.

3 Results

A total of 562 earthquakes (Table 2) have been identified in the study region between 810BC and 2012. Of these events, one earthquake (event no. 5) was identified from archaeological sources, four earthquakes (event no. 1, 2, 4 and 8) were identified from geological sources, 218 (no. 3, 6, 7, 9–223) from historical records and the remaining 339 earthquakes (event no. 224–562) were identified from instrumental sources. Of the 562 earthquakes, magnitude data are not available for 63 events. Of the remaining 499 earthquakes, 253 events are recorded as having a magnitude of less than 6. The number of earthquakes with a magnitude ranging 3–3.9, 4–4.9 and 5–5.9 is 14, 93 and 146, respectively (Table 2). A total of 246 earthquakes are reported to have occurred with a magnitude of over 5.9. Of these, 14 events are reported to have had a magnitude over 7.9. These events occurred in 825–835, 1663, 1762, 1797, 1833, 1861, 1897, 1903, 1928, 1950, 1969, 2004, 2005 and 2007. The catalogue comprises the event number, the event date, earthquake locations (including coordinates and geographical location names), earthquake parameters (magnitude, intensity and focal depth), earthquake effects (deaths, injuries, damage in million US $ and house destroyed) and information about the sources used to identify that event. Last, any relevant notes about the event are listed in a column marked ‘comments’ (Table 2).

3.1 Problems identified in historical earthquake data

While collecting and collating data from the source documents, inconsistencies and discrepancies were observed in the data. For example, for the 23 August 1936 event, the NGDC (2012) reported nine deaths. However, Hamzah et al. (2000) reported 91 deaths. We note that there were differences in dating for the same event as well as incorrect and/or incomplete citations. These issues are detailed in the following sections.

3.2 Incorrect and incomplete citations

Numerous incorrect and incomplete citations in sources were found while recording the data. For example, for the 13 August 1821 event (no. 62), Oldham (1883) refers to the Asiatic Journal (1822b) volume 13. When referencing material for the 8 July 1834 (no. 84) and the 21 July 1834 (no. 85) events, Oldham (1883) refers to the Asiatic Journal (1834), volume 13. This raises questions regarding volume 13. So, volume 13 was published in 1822 and 1834? Rao and Rao (1984) identified the occurrence of an earthquake on 31 March 1843 (no. 102) and referenced Oldham (1883) as the original reference. However, after careful checking of Oldham (1883), we confirm that no event was recorded on that date. Another example of inconsistent referencing is found in relation to the 1861 Kolkata earthquake. For the 16 February 1861 (no. 153) Kolkata earthquake, Oldham (1883) referred to the 'Journal of Asiatic Society of Bengal' and 'Friends of India', but he failed to provide a year, volume and issue number for either source.

3.3 Differences in dating between sources for the same event

For a number of earthquakes, we observed that the event was given incorrect or different dates between the various sources. Oldham (1883) mentioned an earthquake that occurred on the 16 February 1861 (no. 153) in Kolkata. Later, Chandra (1977) and Nandy (1994) cited the date as the 18 February 1861, despite using Oldham (1883) as their original source. We have checked the original reference (Oldham 1883), where the event date is recorded as 16 February 1861. Rao and Rao (1984) indicated an earthquake on the 8 November 1863 providing the original reference of Oldham (1883). However, after careful checking we confirm that Oldham (1883) recorded the earthquake as occurring on the 18 November 1863 (no. 160).

3.4 Differences in magnitude and intensity of earthquakes

On some occasions, earthquake data sources do not include any magnitude scale. However, where magnitude has recorded, we also observed differences in the reported magnitude value between sources. For example, in our earthquake catalogue, some data have been collected from two Indian earthquake catalogues, Chandra (1977) and Rao and Rao (1984). Neither of these catalogues provides specific earthquake magnitudes for their events. While they listed magnitude scales such as M_L, M_b and M_s that are generally indicative of magnitude scales of their catalogues, they did not attribute these scales to individual events. When a specific magnitude scale (Table 2) was available for the events recorded from source documents, we have incorporated it in the new catalogue by providing superscript numerical values suggesting the source code for original references (Table 2).

For the 21 July 1956 earthquake (no. 340), Chandra (1977) provided a magnitude of 6.1, but Rao and Rao (1984) provided 7. Again, for the 2 March 1964 event (no. 364), Hamzah

et al. (2000) provided a magnitude of 5.2, but the NGDC (2012) provided a magnitude of 7, which indicates a substantially larger event. For the 9 December 1751 earthquake (no. 32), both Rao and Rao (1984) and Chandra (1977) cite Kelkar (1968) as their source for the intensity value. However, Rao and Rao (1984) indicate an intensity value of V, while Chandra (1977) lists an intensity value of VI. This means that they incorrectly copied from the source documents or came to different conclusions based on the same sources. The same thing occurs for the 31 October 1757 earthquake (no. 35). Quoting Kelkar (1968), Chandra (1977) provided an intensity value of V for this event, while Rao and Rao (1984) gave an intensity value of IV. Similarly for the 9 February 1823 earthquake (no. 66), quoting Oldham (1883) as the original reference, Chandra (1977) provided an intensity of value of VI, but Rao and Rao (1984) provided an intensity value of VII. Again for the 18 August 1828 event (no. 75), Rao and Rao (1984) provided an intensity value of V, but Chandra (1977) provided an intensity value of VII, even though they both quoted Oldham (1883).

We can only report eight earthquake events prior to 1500 (Table 2). A total of 47 events were reported prior to 1800 (Fig. 2a). Since 1800, the number of reported earthquakes increases greatly. This may be attributed to the introduction of instrumental methods of

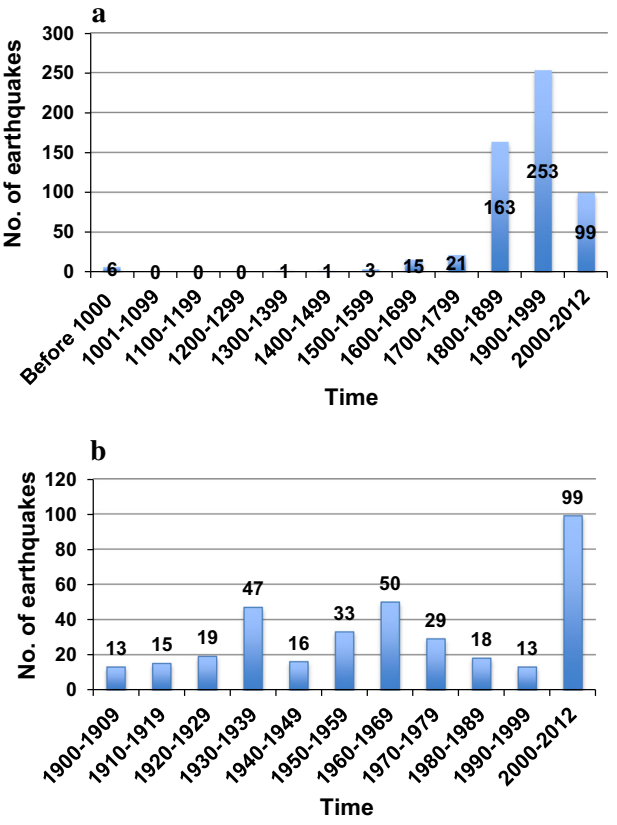

Fig. 2 Distribution of earthquakes in the NE Indian Ocean and adjacent coast through time. **a** By century, **b** by decade between 1901 and 2012. Few earthquakes were reported before 1800. The number of earthquakes reported greatly increased from the eighteenth century onwards

recording around 1900 (Bolt 1930). A total of 352 earthquake events are reported to have occurred between 1900 and 2012. Between 1900 and 1949, the NE Indian Ocean region experienced 110 earthquakes (Fig. 2b), while a further 242 earthquakes occurred in the same region between 1950 and 2012 (Fig. 2b).

4 Discussion and conclusions

This research documented and analysed geological, archaeological and documentary records of earthquakes in order to construct a complete history of past events of magnitude 4 and above—a first step towards improved earthquake risk reduction. The catalogue presented here (all earthquakes in the historic and prehistoric periods; and a magnitude of more than 4 in the instrumentally recorded period) supersedes all the previous catalogues that document earthquakes in the northern Bay of Bengal and Bangladesh. That said, such a document would likely miss some events due to the unavailability of complete information sets and the time constraint of the research. However, a more accurate reconstruction of the historical time series of earthquakes that has affected Bangladesh was hindered by a variety of problems in data. The types of data problems that we faced while collecting, collating and analysing historical data included incorrect and incomplete citations, incomplete records, inaccurate and contradictory description of the dates of occurrence, only one source for some events, under and over estimated magnitude and deaths associated with the events, non-stationary trends, missing data and misidentified phenomena.

Of some concern, we observe that former tsunami catalogues have variously described individual events as an earthquake, a tsunami or a cyclone. After a careful review of historical earthquakes in India provided by Oldham (1883) and the Bangladesh Meteorological Department (2011), this research revealed that on at least six occasions, earthquakes and tropical cyclones occurred *simultaneously* making classification of the events problematic. These events occurred on the 26 May 1618, 11 October 1737, 19 October 1800, 10 December 1807, 9 June 1869 and 2 September 1895. Oldham (1883) reports that on the 26 May 1618 a severe tropical cyclone and earthquake occurred simultaneously resulting in 2000 deaths and the loss of 60 vessels at Mumbai. However, no other descriptions of earthquake effects were mentioned. Later, Milne (1911), Chandra (1977) and Rao and Rao (1984) referred to Oldham (1883) and added this event to their respective earthquake catalogues, but did not add further descriptions of the effects (other than quoting the original reference). The event is also listed in other earthquake catalogues (e.g. Bapat et al. 1983; Chaudbury 1965; Milne 1911; NGDC 2012). This earthquake probably also caused great destruction to the Delta of the Indus River (Chaudbury 1965). Although major regional tropical cyclone catalogues (i.e. Jayanthi and Sarma 1986; Murty and El-Sabh 1992) failed to include this event, we have added it to both this earthquake catalogue and our previously published tropical cyclone catalogue (Alam and Dominey-Howes 2015). However, we recommend undertaking further research to validate the event.

The event of 1737 was reported by Murty and Rafiq (1991) as a tsunami that penetrated up the Hooghly River following an earthquake near Kolkata. Milne (1911) who referred to Oldham (1883) also listed this event as an earthquake. That said, we note in reference to Oldham (1883) that this event was reported as relating to an earthquake *and* a tropical cyclone (but not a tsunami) occurring simultaneously. Bilham (1994) decided that the

event was just a tropical cyclone based on field study and reference to documents contained in the British Library.

For the 19 October 1800 event, Oldham (1883) referred to the Asiatic Annual Registrar of 1801 published in 1802 (Anon 1802), mentioning a severe earthquake lasting a minute that occurred during a violent tropical cyclone in Andhra Pradesh. Both Chandra (1977) and Rao and Rao (1984) listed this event as an earthquake and cited Oldham (1883) and Kelkar (1968). The original reference, Anon (1802) stated:

> On the 19th about 10 minute after 4 A.M., the wind blew a hurricane, when we felt a severe shock of an earthquake; which kept the earth in continual agitation for nearly a minute. It shook down many houses, but I believe no person was killed in consequence.

The Indian state of Andhra Pradesh where the event occurred is seismically active and prone to tropical cyclones (Dube et al. 2009; Murty and El-Sabh 1992). From the descriptions of the original reference (Anon 1802), the occurrence and effects of a tropical cyclone and an earthquake are clear. Therefore, the event has been included in both our tropical cyclone (Alam and Dominey-Howes 2015) and earthquake catalogues.

For the 10 December 1807 event, Oldham (1883) referred to the Asiatic Annual Registrar of 1808 published in 1811 and described a sever tropical cyclone with accompanying heavy seas at Chennai during which three (earthquake) shocks occurred. No other effects of the earthquake were mentioned. Later, Chandra (1977) and Rao and Rao (1984) referred to Oldham (1883) and added this event in their respective earthquake catalogues without further validation and descriptions of the effects. Anon (1811) who is the author of 'the Annual Registrar 1808' mostly described the changes in the direction of wind, the formation of tropical depression and the occurrence of a tropical cyclone in Madras between 9 and 10 December. For example, Anon (1811, p. 128) stated:

> When it had completely veered round to the southward it suddenly burst into a hurricane, the like of which was never remembered at Madras.
> The canal forced its banks and overflowed the country as far as the government bridge on one side, and beyond the powder mills on the other, where the water was three feet deep. Boats were carried away, and several were found at the burying ground, and one near the government gardens.
> The sea rose much beyond its usual height, bringing some of the Massoulah boats within a few yards of the Custom House, and destroying others to the amount, we understood of about 40. …The mud houses of the natives are in most places swept away, and with them many of their wretched inhabitants. It is apprehended many thousands have perished. Dead bodies of men, women and children, were found lying in every direction when the storm abated.

From the accounts given by Anon (1811), the event was definitely a severe tropical cyclone. Jayanthi and Sarma (1986) in their historical tropical cyclone catalogue of India included this event as a tropical cyclone and did not mention any earthquake. We cannot obtain further original source documents for this event. To be consistent with the primary and secondary sources, we included the event in both our earthquake and tropical cyclone catalogues (Alam and Dominey-Howes 2015). However, we would recommend further validation of this event as to whether it should be included as a simultaneously occurring earthquake and tropical cyclone.

For the 9 June 1869 event, Oldham (1883) referred to the Times of India describing an earthquake shock during the occurrence of a tropical cyclone. However, no detailed

information about the source was provided, limiting validation of the original source. However, Oldham's (1883) description about the occurrence of a tropical cyclone and an earthquake is clear, mentioning slight shock of an earthquake during a tropical cyclone in Kolkata (formerly 'Calcutta'). Chandra (1977) listed the event in the earthquake catalogue referring to Oldham (1883) as a source document and provided a value of V on MMI scale for Kolkata. We have added the event in both the earthquake and tropical cyclone catalogues according to Oldham's (1883) description. We suggest that it is necessary to examine further sources to determine whether both a tropical cyclone and an earthquake actually did occur simultaneously.

The coincidence of an earthquake and tropical cyclone was reported to have occurred on the 3 September 1895 and struck Khulna in Bangladesh (BMD 2011). For this event, the Bangladesh Meteorological Department (2011) notes that the entire region was devastated by a simultaneous strong earthquake and tropical cyclone. No other catalogues of earthquakes for that region include any event occurring on this date. Additionally, the region only has a limited historic record of earthquakes. The Bangladesh Meteorological Department is responsible mainly for recording meteorological events and consequently may not accurately record earthquakes. Therefore, due to a lack of references for this event, we have only included it in the tropical cyclone catalogue. However, we would recommend further research to determine whether any earthquake occurred on that date.

Although we have undertaken rigorous validation of processes of our earthquake data through cross-checking and repeated document analysis, the catalogue still may not be error free. The reason for this is that it is a hand-entered catalogue. It should be borne in mind that MMI values are often skewed to higher values by locations with higher shaking susceptibility, certain types of soil texture or locations with buildings that respond to a particular ground shaking frequency in disastrous ways (Ambraseys and Douglas 2004). As such, the MMI that we have provided in Table 2 should be treated with caution for the purpose of reuse and further research to more accurately refine these MMIs is required but was beyond the scope of this research. If errors are identified in our new catalogue, we would be grateful if researchers could notify the lead author.

The data in the earthquake catalogue may be useful to formulate the earthquake risk reduction strategies in Bangladesh and adjacent region. We are undertaking further research and analysis of the earthquake data contained in the catalogue to understand frequency and intensity and to reconstruct spatial risk pattern in Bangladesh. The results of the analyses are forthcoming in different outlets.

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