

**DEPARTMENT OF THE INTERIOR  
U.S. GEOLOGICAL SURVEY**

**Digital Intensity Catalog of Earthquakes Felt in Alaska  
and the Aleutian Islands, 1786-1981**

by

**S. R. Brockman, A. F. Espinosa and J. A. Michael**

**Open-File Report 87-68**

**This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.**



# DIGITAL INTENSITY CATALOG OF EARTHQUAKES FELT IN ALASKA AND THE ALEUTIAN ISLANDS, 1786-1981

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A database of historic and instrumental earthquakes that have been felt in Alaska since 1786 has been compiled from several sources in support of the Seismic Hazard Studies, Anchorage, Alaska project. All of Alaska is represented, including the western Aleutian Islands (figure 1). More than 5200 intensity entries, comprising over 3100 earthquakes, are contained in the database. Shown in figures 2a and 2b are the maximum Modified Mercalli intensity ratings ( $I_0$ 's) for earthquakes with  $I_0 \geq VI$ . These figures provide the user with an overview of the locations of the most significant earthquakes in Alaska and the Aleutians for which there are intensity data available.

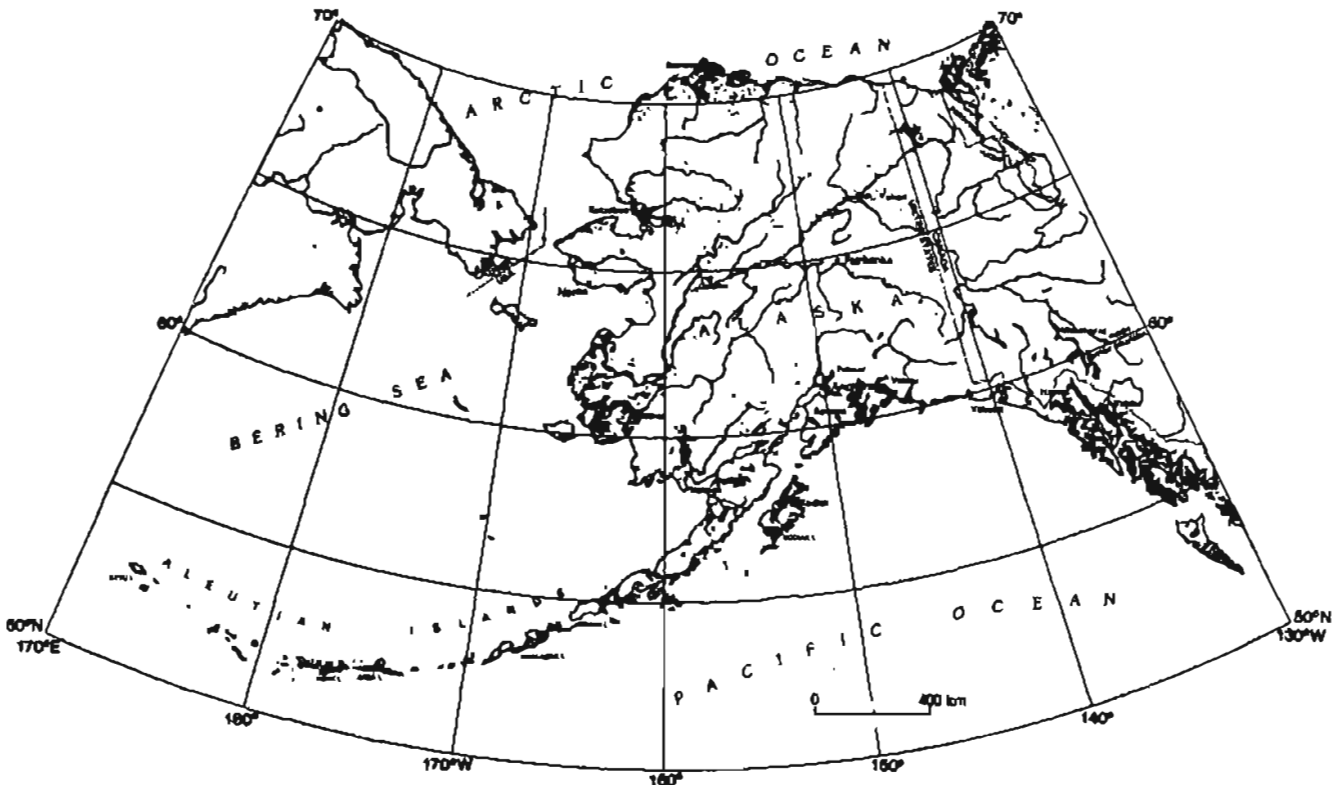


Figure 1.—Selected geographic features and localities in Alaska and vicinity. Modified-Stereographic Conformal Projection.



Figure 2a.—Maximum intensity ( $I_0$ ) for earthquakes which have occurred from 1899 through 1981 in Alaska with  $I_0 = VI$  (○), and  $I_0 = VII$  (●). The earthquake number for each epicenter is shown in parentheses. Modified-Stereographic Conformal Projection. (From Brockman and others, 1987.)

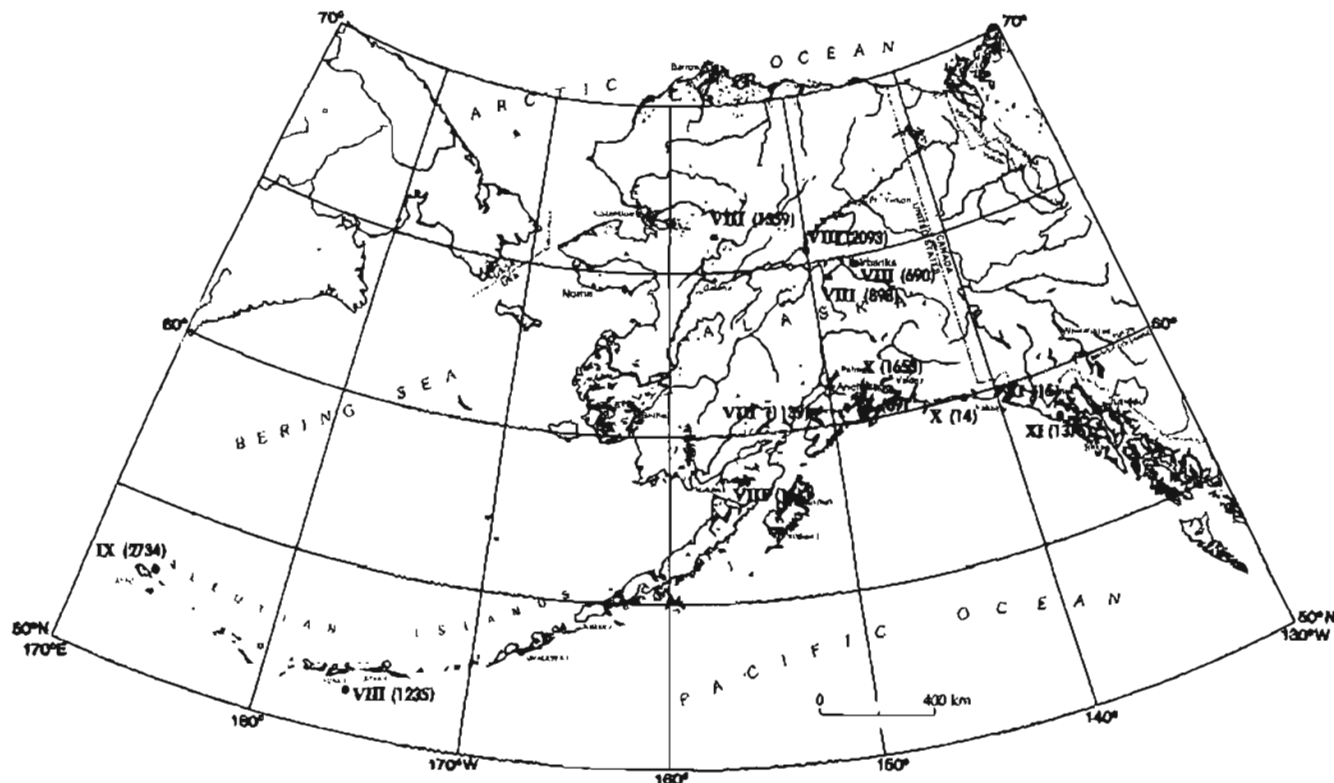


Figure 2b.—Maximum intensity ( $I_0$ ) for earthquakes which have occurred from 1899 through 1981 in Alaska with  $I_0 \geq VIII$ . Epicenters are shown as dots. Their  $I_0$  ratings are denoted by Roman numerals adjacent to the dots. The earthquake number for each epicenter is shown in parentheses. Modified-Stereographic Conformal Projection. (From Brockman and others, 1987.)

The intensity data have been fully documented and formatted into three tables (see samples in figure 3) in a U. S. Geological Survey Bulletin publication (Brockman and others, 1987). Information included in the database are: date, time, latitude, longitude, magnitude, depth, distance to the locality that felt the earthquake, the name of the locality and the Modified Mercalli intensity value that was reported there.

The data are being made available in the form of three files on magnetic tape in order to ensure timely access to other users. Shown in figures 4, 5 and 6 are sample portions of the three files displaying some of the data and how it is formatted. A generalized list of references and sources of information that were used in compiling the data is also included at the end of this paper.

File 1 is the primary intensity database and is the first file on the tape. In it, all known earthquake parameters (date, time, epicentral location, magnitude, and depth) and intensity information (name and location of the reporting locality, the distance of the locality from the earthquake, and the reported intensity) are listed. Numbers have been sequentially assigned to each earthquake and are intended to be used as earthquake cross reference numbers between this file and the other two described below. A detailed description of the record format for each file is given below and a sample portion of the file is shown in figure 4.

File 2 is a subset of the data listed in File 1. The earthquake epicenters have been ordered into groups by the maximum intensity rating ( $I_0$ ) for the event and are listed in descending order by  $I_0$  group beginning with  $I_0 = XI$ . Events are listed chronologically within each group. Each record contains the sequential earthquake number, date, epicentral location, magnitude (if any), and  $I_0$ . Figure 5 shows a sample of File 2.

File 3 contains a listing (a portion of which is shown in figure 6) of those events that have magnitudes assigned to them. Because there are often several different magnitudes computed for a given event, there are multiple entries for many of the earthquakes identified with the same earthquake number. The events are listed chronologically, with each record containing the earthquake number, date, epicentral location,  $I_0$ , a magnitude, the magnitude type and a code representing the source of the magnitude data. An explanation of the codes and their associated references is given below in the record format description for File 3.

EARTHQUAKE PARAMETERS						INTENSITY INFORMATION									
Eq. No.	Date			Time		Epicenter		Mag	Dep	$\Delta$	Obs. Location		INT	Locality	
	Yr	Mo	Dy	Hr	Mn	Sec	Lat °N	Lon °W		km	km	Lat °N	Lon °W	MM	
1514	1961	03	28	12	29	12.7	51.70	176.20	6.3	60	36	51.86	176.66	3	Adak
1515	1961	03	28	13	58	58.8	52.00	176.00		89	48	51.86	176.66	3	Adak
1516	1961	04	04	12	52							60.58	151.31	3	Kenai
1517	1961	04	27	02	15							51.86	176.66	3	Adak
1518	1961	04	29	05	34	13						65.00	150.63	3	Manley Hot Springs
1519	1961	05	17	19	29	19.3	52.20	173.90E	6.0	21	60	52.72	174.11E	3	Shemya
1520	1961	05	26	13	57							51.86	176.66	3	Adak

Figure 3a.-A sample portion of table 1, from Brockman and others (1987), listing the earthquake parameters and intensity data. Compare with figure 4 which is a sample of the digital data as it is formatted in File 1 on the magnetic tape.

Eq.No.	Year Mo Dy	Lat °N	Lon °W	Mag
5	1812	52.00	174.50	
20	1903 07 26	59.00	138.00	
22	1904 08 27	64.00	151.00	8.3
30	1907 12 29	66.00	168.00	
31	1908 02 14	61.00	146.25	
32	1908 05 15	59.00	141.00	
33	1908 10 29	60.50	144.00	
34	1908 11 02	60.50	144.00	

Figure 3b.-A sample portion of table 2, from Brockman and others (1987), listing the data by  $I_0$ . Compare with figure 5 which is a sample of the digital data as it is formatted in File 2 on the magnetic tape.

Eq.No.	Year Mo Dy	Lat °N	Lon °W	$I_0$	Magnitude
14	1899 09 04	60.00	142.00	10	8.3
					7.9 $M_S$ AN2
					7.7 $m$ BG
					6.3 $M_S$ CFR
					8.2 $M_S$ EPB
					8.35 $M_S$ GR
15	1899 09 10	60.00	140.00	11	8.2 $M_S$ SJD
					8.6
					8.0 $M_S$ AN2
					7.9 $m$ BG
					8.6 $M_S$ CFR
8.6 $M_S$ EPB					

Figure 3c.-A sample portion of table 3, from Brockman and others (1987), listing all available magnitudes for the earthquakes studied. Compare with figure 6 which is a sample of the digital data as it is formatted in File 3 on the magnetic tape.

The three files may be obtained by sending a 9-track tape and a note specifying

- 1) Preferred format, whether ASCII or EBCDIC.
- 2) Preferred density, either 1600 or 6250 bits per inch.

Send tapes and requests to the following address:

EIS request: B.G. Reagor  
 U.S. Geological Survey  
 Box 25046, MS 967  
 Denver Federal Center  
 Denver, Colorado 80225

Phone: (303)236-1500; FTS 776-1500

The files are separated from each other on the tape with single End of File (EOF) marks and the End of Information indicated after the last file by a second EOF mark.

## DESCRIPTIONS OF THE RECORD FORMATS

### File 1 Description

1514	1961	03	28	12	29	12.7	51.70	176.20	6.3	60	36	51.86	176.66	3	Adak
1515	1961	03	28	13	58	58.8	52.00	176.00		89	48	51.86	176.66	3	Adak
1516	1961	04	04	12	52							60.58	151.31	3	Kenai
1517	1961	04	27	02	15							51.86	176.66	3	Adak
1518	1961	04	29	05	34	13.0						65.00	150.63	3	Manley Hot Springs
1519	1961	05	17	19	29	19.3	52.20	173.90E	6.0	21	60	52.72	174.11E	3	Shemya
1520	1961	05	26	13	57							51.86	176.66	3	Adak

Figure 4.—Sample listing of the digital data described in this publication contained in File 1 on the magnetic tape. The data format is described in detail below.

*Columns    Format*

#### Earthquake Number

2-5        (I4)        A sequential number assigned to each earthquake;  
 used as identifier and cross-reference from file to file.

#### Date

7-10       (I4)        Year of the earthquake  
 12-13      (I2)        Month  
 15-16      (I2)        Day

#### Origin Time (UTC)

18-19      (I2)        Hour  
 21-22      (I2)        Minute  
 24-27      (F4.1)     Seconds

*Columns*   *Format*

**Epicenter Location**

- 29-33   (F5.2)   Geocentric latitude in degrees North.  
35-40   (F6.2)   Longitude, in degrees East or West  
          as indicated in the following column:  
41       (A1)     'E', if East Longitude; a blank implies West longitude.

**Magnitude**

- 43-45   (F3.1)   Usually a USGS (or predecessor agency) magnitude.  
          More information about magnitude type(s) and  
          identification source is available in File 3 Description.

**Depth**

- 47-49   (I3)     Hypocentral depth in kilometers.

**Distance**

- 51-54   (I4)     Epicentral distance,  $\Delta$ , to reporting location in kilometers.

**Coordinates of the reporting location**

- 56-60   (F5.2)   Geocentric latitude in degrees North.  
62-67   (F6.2)   Longitude, in degrees East or West as  
          indicated in the following column:  
68       (A1)     'E', if East longitude; a blank implies West longitude.

**Intensity**

- 70-71   (I2)     Modified Mercalli intensity rating assigned to  
          the reporting location.

**Locality**

- 73-98   (A26)    The name or a description of the locality from which the  
          report of damage or ground motion information originated.

**File 2 Description**

5	1812			52.00	174.50		6
26	1903	07	26	59.00	130.00		6
22	1904	08	27	64.00	151.00	8.3	6
30	1907	12	29	66.00	166.00		6
31	1908	02	14	61.00	148.25		6
32	1908	05	15	59.00	141.00		6
33	1908	10	29	60.50	144.00		6
34	1908	11	02	60.50	144.00		6

Figure 5.-Sample listing of the digital data described in this publication contained in File 2 on the magnetic tape. The data format is described in detail below.

*Columns*   *Format*

**Earthquake Number**

- 2-5     (I4)     A sequential number assigned to each earthquake;  
          used as identifier and cross-reference from file to file.



<i>Columns</i>	<i>Format</i>	
		<b>Date</b>
7-10	(I4)	Year of the earthquake
12-13	(I2)	Month
15-16	(I2)	Day
		<b>Epicenter location</b>
18-22	(F5.2)	Geocentric latitude in degrees North.
24-29	(F6.2)	Longitude, in degrees East or West as indicated in the following column:
30	(A1)	'E', if East Longitude; a blank implies West longitude.
		<b>Magnitude</b>
32-34	(F3.1)	Usually a USGS (or predecessor agency) magnitude. More information about magnitude type(s) and identification source is available in File 3 Description.
		<b>I<sub>0</sub></b>
32-33	(I2)	Maximum Modified Mercalli intensity rating assigned to the earthquake.

### File 3 Description

14	1899	09	04	60.00	142.00	10	7.9	Ms	AN2
14	1899	09	04	60.00	142.00	10	7.7	m	BG
14	1899	09	04	60.00	142.00	10	8.3	M <sub>s</sub>	CFR
14	1899	09	04	60.00	142.00	10	8.2	M <sub>s</sub>	EPB
14	1899	09	04	60.00	142.00	10	8.35	M <sub>s</sub>	GR
14	1899	09	04	60.00	142.00	10	8.2	M <sub>s</sub>	SJD
15	1899	09	10	60.00	140.00	11	8.0	M <sub>s</sub>	AN2
15	1899	09	10	60.00	140.00	11	7.9	m	BG
15	1899	09	10	60.00	140.00	11	8.6	M <sub>s</sub>	CFR
15	1899	09	10	60.00	140.00	11	8.6	M <sub>s</sub>	EPB

Figure 6.—Sample listing of the digital data described in this publication contained in File 3 on the magnetic tape. The data format is described in detail below.

<i>Columns</i>	<i>Format</i>	
		<b>Earthquake Number</b>
2-5	(I4)	A sequential number assigned to each earthquake; used as identifier and cross-reference from file to file.
		<b>Date</b>
7-10	(I4)	Year of the earthquake
12-13	(I2)	Month
15-16	(I2)	Day

<i>Columns</i>	<i>Format</i>	
		<b>Epicenter location</b>
18-22	(F5.2)	Geocentric latitude in degrees North.
24-29	(F6.2)	Longitude, in degrees East or West as indicated in the following column:
30	(A1)	'E', if East Longitude; a blank implies West longitude.
		<b>I<sub>0</sub></b>
32-33	(I2)	Maximum Modified Mercalli intensity rating assigned to the earthquake.
		<b>Magnitude</b>
35-38	(F4.2)	Numerical value of the magnitude.
40-41	(A2)	Magnitude type, where Ms=Surface-wave magnitude mb=Body-wave magnitude ML=Richter magnitude Mc=Coda-length magnitude m =Unified magnitude
43-45	(A3)	Magnitude reference code, where AN1=Abe and Noguchi, 1983a AN2=Abe and Noguchi, 1983b BD =Båth and Duda, 1979 BG =Gutenberg, 1956 BRK=University of California, Berkeley, California CFR=Richter, 1958 CGS=U.S. Coast and Geodetic Survey, until October, 1970 COL=U.S. Geological Survey, College, Alaska CUC=CIRES, Univ. of Colorado, Boulder, Colorado EPB=Earth Physics Branch, Seismological Services of Canada, Ottawa, Ontario, Canada ERL=Environmental Research Laboratories (NOAA), July 1971-August 1973 GIA=Univ. of Alaska, Geophysical Institute, Fairbanks, Alaska GOL=Bergen Park, Colo. School of Mines, Golden, Colorado GR =Gutenberg and Richter, 1954

GS = U.S. Geological Survey,  
August 1973 through the present  
GSM= U.S. Geological Survey,  
Menlo Park, California  
ISC=International Seismological Center,  
Newbury, United Kingdom  
KA1=Abe, 1981  
KA2=Abe, 1984  
NOS=National Ocean Survey (NOAA),  
October 1970-June 1971  
PAL=Lamont-Doherty Geol. Obs., Columbia Univ.,  
Palisades, New York  
PAS=California Inst. of Technology,  
Pasadena, California  
PMR=Tsunami Warning Center,  
Palmer, Alaska  
PRU=Pruhonice, Czechoslovakia  
SJD=Duda, 1965  
SSR=Kondorskaya and Shebalin, 1982  
UPP=Seismological Obs., Univ. of Uppsala,  
Uppsala, Sweden

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