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SIGNIFICANT EARTHQUAKES OF THE WORLD

1985 - 1989

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NATIONAL EARTHQUAKE INFORMATION CENTER
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INTRODUCTION

This publication is a final listing of all the significant earthquakes for the five-year period of 1985 through 1989. Significant earthquakes are defined for this publication as those of magnitude 6.5 or greater or ones that caused fatalities, injuries or substantial damage. The locations, comments and other data were taken from the Preliminary Determination of Epicenters Monthly Listing, U.S. Geological Survey. This listing of significant earthquakes was compiled to provide an accurate and readily available summary of the world's most important earthquakes for a given period of time.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MS		STA USED	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1985								
JAN 18	15 00 09.6	29 374 S	70.793 W	83 D	5.7		224	CENTRAL CHILE. mb 6.0 (PAS). Mo=3.7*10**18 Nm (GS) Mo=3 6*10**18 Nm (HRV). Damage (VII) in the La Serena-Vicuna area. Felt strongly in northern Chile. Also felt in Cardoba, Mendazo and San Juan Provinces, Argentina. The focal mechanism is maderately well cantrolled and carresponds to strike-slip faulting with a maderate reverse camponent.
JAN 21	00 55 22.7	0 953 S	128 507 E	33 N	5.8	6.7	157	HALMAHERA. Ms 6.6 (BRK). Mo=2.4*10**19 Nm (GS). Mo=1.4*10**19 Nm (HRV). The focal mechanism is moderately well cantrolled and carresponds to strike-slip faulting with a small reverse component
JAN 26	03 06 57.8	33 053 S	68.467 W	5 G	6.0	5.9	225	MENDOZA PROVINCE, ARGENTINA. Ms 5.8 (BRK). Mo=2.0*10**18 Nm (GS). Mo=1.0*10**18 Nm (HRV). Six people killed, at least 238 injured and abaut 12,500 hames destroyed or damaged (VII) in the Mendaza area. Felt (V) at La Ligua, (IV) at Curavil and (II) at Santiago, Coquimbo and Vina del Mar, Chile. The facal mechanism is paarly cantrolled and carresponds ta reverse faulting.
FEB 2	20 52 34.2	28.399 N	53.997 E	37	5.2	5.3	213	SOUTHERN IRAN. Mo=1.8*10**17 Nm (GS). One persan killed, 80 injured and abaut 1,500 buildings destrayed or damaged in the Firuzabad-Jahram area.
MAR 2	15 47 33.4	1.964 S	119.727 E	44	5.8	6.7	222	SULAWESI. Felt (IV) at Palu. Mo=1.1*10**19 Nm (HRV).
MAR 3	22 47 07.2	33.135 S	71.871 W	33 N	6.7	7.8	146	NEAR COAST OF CENTRAL CHILE. Ms 7.5 (BRK). Mo=2.0*10**20 Nm (GS). Mo=1.0*10**21 Nm (HRV). At least 177 people killed, 2,575 injured and extensive damage in central Chile, including the cities of San Antonio, Valparaisa, Vina del Mar, Santiaga and Rancagua. Maximum intensity VIII in the Valparaisa area. Liquefactian occurred in saturated beach dune sands in the Vina del Mar and San Antonio areas. Reports af extensive ground cracks and subsidence throughaut mast of the epicentral area. Numeraus landslides in the caastal mauntains. Felt in Chile alang a 2,000 km strip fram Copiapa to Valdivia. Felt (VI) at Mendaza and (V) at San Juan, Argentina. Also felt by peaple in highrise buildings in Buenos Aires, Argentina and Sao Paula, Brazil. Tsunami generated with wave heights at selected tide stations as follaws: 1.1 m at Valparaiso; 48 cm at Hilo, Hawaii; 15 cm at Sand Paint, Alaska; 12 cm at Adak, Alaska; 11 cm at Rikitea, Gambier Islands; 10 cm at Papeete, Tahiti; 10 cm at Kushira, Nemuro and Miyako, Japan. 5 cm at Seward, Alaska. 4 cm at Kadiak, Alaska; and 3 cm at Honolulu and Pearl Harbar, Hawaii. The facal mechanism is poorly cantrolled and corresponds to reverse faulting.
MAR 3	23 38 31 4	32 738 S	71.215 W	33 N	6.3	6 4	1 3 127	NEAR COAST OF CENTRAL CHILE Ms 7.0 (BRK). Felt (IV) at Santiago
MAR 4	00 32 21 8	33 207 S	71 663 W	33 N	6.0	6.7	1.0 111	NEAR COAST OF CENTRAL CHILE. Mo=1 3*10**20 Nm (HRV).
MAR 4	03 32 49 1	32 925 S	71.793 W	33 N	5 7	6.6	1 1 111	NEAR COAST OF CENTRAL CHILE
MAR 14	23 03 50.8	41 631 N	14.263 E	15	4.3		1.2 84	SOUTHERN ITALY ML 4.3 (TRI), 4.2 (TTG), 4.1 (LDG) One persan died af fright Slight damage (V) in Isernia Province
MAR 16	14 54 00.7	17.013 N	62.448 W	13	6.3	6.3	1.0 400	LEEWARD ISLANDS. Ms 6.8 (BRK), 6.1 (PAS). Mo=5.5*10**18 Nm (GS). Mo=4.2*10**18 Nm (HRV). Six peaple injured and damage (VI) on Guadeloupe. Minar damage an Mantserrat. Alsa felt on Antigua, St. Kitts and Puerto Rico. Several centimeter local tsunami recorded at Basse Terre, Guadeloupe. The facal mechanism is moderately well cantrolled and corresponds to strike-slip faulting.
MAR 17	10 41 38.4	32.633 S	71.551 W	33 N	5.9	6.6	1.2 267	NEAR COAST OF CENTRAL CHILE. Ms 6.6 (BRK), 6.4 (PAS). Mo=1.1*10**19 Nm (GS). Mo=7.9*10**18 Nm (HRV). One persan died from a heart attack at Santiago. Damage (VII) in the Valparaisa-Vina del Mar area. Felt (VI) at San Antonia and Melipilla and (V) at Santiago. Felt fram La Serena to Cancepcian. Also felt in Mendoza and San Juan Provinces, Argentina. The facal mechanism is moderately well cantrolled and carresponds to reverse faulting.
MAR 18	19 49 45.8	7.758 N	123 544 E	33 N	6 0	6 5	1.1 275	MINDANAO, PHILIPPINE ISLANDS. Mo=1.2*10**19 Nm (GS). Mo=6 7*10**18 Nm (HRV). Two people died af heart attacks, 25 injured and abaut 30 buildings destroyed in the Pagadian area Felt (V RF) at Zamboanga and (IV RF) at Dipalag and Cagayan de Oro Also felt (II RF) at Puerto Princesa, Palawan and Palo Leyte. The facal mechanism is paarly cantrolled and carresponds to strike-slip faulting with a large reverse component

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAG ME	MAG MS	MAG MB	NO STA USED	CONTRIBUTED MAGNITUDE AND COMMENTS
1985									
MAR 19	04 01 08.0	33.198 S	71.653 W	42	5.9	6.6	1.2	235	NEAR COAST OF CENTRAL CHILE. Ms 6.6 (BRK), 6.4 (PAS). Mo=1.2*10**19 Nm (GS) Mo=1.2*10**19 Nm (HRV). Felt (VI) at San Antonio, Valparaiso and Vina del Mar and (IV) at Santiago. Felt from Concepcion to Coquimbo. The focal mechanism is poorly controlled and corresponds to reverse faulting.
MAR 19	10 28 36.4	18.628 S	63.658 W	33 N	5.5	5.2	1.1	132	BOLIVIA. Mo=5.6*10**17 Nm (HRV). Two people killed and damage in the Monteagudo area. Felt at Santa Cruz and Sucre.
MAR 29	11 15 06.1	29.377 N	105.025 E	33 N	4.9	4.3	1.1	51	SICHUAN PROVINCE, CHINA. One person killed, 120 injured and some damage in the Neijiang area.
APR 9	01 56 59.4	34.131 S	71.618 W	38 D	6.3	7.2	1.1	356	NEAR COAST OF CENTRAL CHILE. Ms 7.5 (BRK), 7.0 (PAS). Mo=6.1*10**19 Nm (GS). Mo=5.0*10**19 Nm (HRV) One person died from a heart attack, several people injured and some damage (VI) in the Santiago-Valparaiso area. One additional person died from a heart attack at Chillan. Felt throughout much of central Chile from La Serena to Osorno. Felt (IV) at Mendoza, Argentina. Also felt in San Juan, San Luis, Cordoba, Tucuman and Santa Fe Provinces, Argentina. The focal mechanism is poorly controlled and corresponds to reverse faulting.
APR 13	03 00 06.7	1.622 N	126.411 E	51 D	6.4	6.7	1.2	394	MOLUCCA PASSAGE. Ms 6.7 (BRK), 6.6 (PAS). Mo=3.4*10**19 Nm (GS). Mo=2.8*10**19 Nm (HRV). Felt at Monado, Sulawesi. The focal mechanism is moderately well controlled and corresponds to reverse faulting.
APR 18	05 52 52.8	25.926 N	102.871 E	5 G	5.7	5.8	1.4	239	YUNNAN PROVINCE, CHINA. Ma=4.9*10**17 NM (HRV). Twenty-three people killed, 300 injured and damage in the Luquan-Xundian area.
APR 24	01 07 14.5	16.498 N	120.815 E	33 N	5.6	6.1	1.3	203	LUZON, PHILIPPINE ISLANDS. Mo=1.5*10**18 Nm (HRV). Six people killed, 11 injured and damage (VII RF) and landslides in Benguet Province. Same damage (VII RF) at Baguio. Felt (IV RF) at Carmen, Pangasian and d Santa; (III RF) at Baler, Dagupan and Manila and (II RF) at Quezon City.
MAY 10	15 35 50.5	5.599 S	151.045 E	27	6.3	7.1	1.3	269	NEW BRITAIN REGION. Ms 7.3 (BRK). Mo=6.4*10**19 Nm (GS). Ma=6.9*10**19 Nm (HRV). One person killed Damage (VIII) in the Bialla-Haskins area. Extensive landslides, debris flows and fallen trees in the Nakanai Mountains. Ground cracks and subsidence occurred. A temporary hot springs was observed near Malasi. Felt (V) at Rabaul Felt strongly in many parts of Papua New Guinea. The focal mechanism is well controlled and corresponds to strike-slip faulting with a small reverse component.
MAY 10	23 45 29.5	43.313 N	20.926 E	19	5.2	4.6	1.1	198	YUGOSLAVIA. ML 5.0 (TTG). 5.0 (LJU). Damage (VIII) in the Kapaanik Mountains region. Felt at Belgrade and in many parts of southeastern Yugoslavia.
MAY 14	18 11 08.9	10.562 S	41.424 E	10 G	6.4	6.0	0.9	355	NORTHWEST OF MADAGASCAR Ms 6.3 (BRK). Ma=4.3*10**18 Nm (GS). Ma=3.3*0**18 Nm (HRV). Felt at Mtwara and Newala, Tanzania and in the Macimbao da Praia area, Mozambique. Believed to be the largest instrumentally located hypocenter in this area. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a moderate normal component.
MAY 15	20 12 45.8	56.637 S	25.330 W	33 N	5.8	6.3	1.1	196	SOUTH SANDWICH ISLANDS REGION. Ms 6.5 (BRK), 6.0 (PAS). Ma=6.2*10**18 Nm (GS). Mo=5.8*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.
JUN 3	12 06 21.1	15.289 S	173.516 W	33 N	6.2	6.8	1.0	374	TONGA ISLANDS. Ms 7.0 (BRK), 6.7 (PAS). Mo=1.1*10**19 Nm (GS). Ma=1.0*10**19 Nm (HRV) Felt (IV) at Apia, Western Samoa. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a moderate reverse component.
JUN 6	02 40 12.9	0.932 N	28.432 W	10 G	6.3	6.5	1.1	316	CENTRAL MID-ATLANTIC RIDGE. Ms 6.6 (BRK), 6.5 (PAS). Ma=9.3*10**18 Nm (GS). Ma=5.6*10**18 Nm (HRV). The focal mechanism is moderately well controlled and corresponds to right-lateral strike slip faulting with a small reverse component.

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1985									
JUN 23	13 01 37.1	11.012 S	163.584 E	36	5.7	6.5	1.3	171	SOLOMON ISLANDS Ms 6.1 (BRK), 6.1 (PAS) Mo=7.4*10**18 Nm (HRV). Felt strongly in the eastern Solomon Islands.
JUL 3	04 36 51.7	4.439 S	152.828 E	33 N	6.3	7.2	1.0	345	NEW BRITAIN REGION. Ms 7.4 (BRK). Mo=1.0*10**20 Nm (GS). Mo=8.3*10**19 Nm (HRV). Damage (VII) landslides and ground cracks on New Ireland and in the Rabaul area, New Britain. A 1.3-meter tsunami was observed in Rabaul's harbor fallowed by a seiche that lasted for 15 haurs. Felt (IV) at Panguna, Bougainville. The facal mechanism is poorly controlled amd corresponds to strike-slip faulting with a large reverse component.
JUL 3	15 55 48.7	17.243 S	167.834 E	29	5.8	6.4	1.1	173	VANUATU ISLANDS. Ms 6.7 (BRK), 6.2 (PAS). Mo=7.0*10**18 Nm (GS). Mo=5.9*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting with a large strike-slip component.
JUL 22	09 26 53.8	6.291 S	148.783 E	49	5.8	6.9	1.1	252	NEW BRITAIN REGION. Mo=2.2*10**19 Nm (GS). Mo=2.1*10**19 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.
JUL 29	07 54 44.0	36.190 N	70.896 E	99	6.6		1.0	509	HINDU KUSH REGION. Mo=1.1*10**20 Nm (GS). Mo=1.5*10**20 Nm (HRV) At least 5 people killed, 38 injured and considerable damage and landslides in the Chitral and Swat districts, Pakistan. Damage (VIII) and many people homeless in the Khorog-Ishkashim area, USSR Damage (VII) in the Dushanbe area, USSR Extensive damage in the Kurgan-Tyube area, USSR. Felt (VI) in the Kulyab and Termez area, (V) in the Leninabad-Samarkand-Tashkent area and (IV) at Frunze, USSR. Avalanches reported in northern India. Avalanches and landslides reported in southern Tajikiston, USSR. Felt strongly in northeastern Afghaniston, northern Pakiston and much of northern India, including New Delhi The focal mechanism is poorly controlled and corresponds to reverse faulting.
AUG 2	07 46 53.3	36.174 N	70.780 E	120	6.1		0.9	378	HINDU KUSH REGION. mb 6.5 (PAS). Mo=3.5*10**18 Nm (GS). Mo=3.8*10**18 Nm (HRV) Felt (V) at Khorog; (IV) at Kulyab, Dushanbe, and Obigorm; (III) at Leninabod and Samarkand; and (II) at Tashkent, USSR. Felt strongly in parts of Kashmir amd felt in a large area of northern India including New Delhi Also felt in the Peshawar-Islamabad-Lahore area, Pakistan. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a large reverse component.
AUG 4	12 01 57.0	36.130 N	120.127 W	11 G	5.4	5.9		214	CENTRAL CALIFORNIA ML 5.8 (PAS), 5.6 (BRK). Mo=2.3*10**24 Nm (BRK). Mo=1.6*10**18 Nm (HRV) Six people suffered minor injuries in the Avenal area. Slight damage (VI) at Avenal, Hanford, Kettleman City and Lemoore Felt (V) at Coalinga, Huron, Laton, Burrel, Alpaugh, Waukena, Lost Hills, Creston, Goshen, Templeton, Reedley, California Valley, Firebaugh, Clovis, Wasco, Santa Morgarita, Orange Cove, Strathmore, McKittrick, Porterville, Los Osos, Tupman, Fellows, Bakersfield, Woody and Los Alamos. Felt throughout much of central California
AUG 7	15 43 22.8	27.840 N	53.040 E	15 D	5.5	5.2	1.2	191	SOUTHERN IRAN. Mo=2.6*10**17 Nm (HRV). Two people injured and extensive damage at Mahmeleh.
AUG 15	04 28 46.9	47.045 N	18.054 E	10 G	4.7	5.0	1.3	169	HUNGARY. ML 4.9 (TTG), 4.8 (KRA). Mo=6.4*10**16 Nm (GS). Moderate damage (VII) in the Berhida-Peremarton area. Slight damage at Budapest. Felt throughout western Hungary. Felt (VI) at Komarna, (V) at Nove Zamky and Hurbanova and (IV) at Bratislova, Czechoslovakia Also felt at Zagreb, Yugoslavia and (III) in Burgenland and at Vienna, Austria.
AUG 21	11 26 28.7	9.159 S	78.887 W	57 D	6.1		1.0	301	NEAR COAST OF NORTHERN PERU. mb 6.3 (PAS), 6.1 (BRK). Mo=4.1*10**18 Nm (HRV). At least 100 people injured, 60 hames destroyed and damage to other buildings in the Chimbote area. Felt along the coast of Peru from Chiclayo to Chincha.
AUG 23	12 41 56.1	39.431 N	75.224 E	7 D	6.4	7.3	1.2	417	SOUTHERN XINJIANG, CHINA. Ms 7.2 (BRK), 7.0 (PAS), 7.5 (PAL). Mo=1.4*10**19 Nm (GS). Mo=3.3*10**19 Nm (HRV). At least 71 people killed, 162 injured, about 15,000 homeless and about 85 percent of the buildings destroyed in the Wuqia-Shufu area Cracks in highways and sandblows reported in Wuqia County. Slight damage at Kashi. Felt (VII) at Sufi-Kurgan and (VI) at Osh, Namangan and Andizhan, USSR. Felt throughout much of Tajikiston, Kirghizia and Fergana Basin, USSR. Felt also at Rawalpindi, Islamabad and Peshawar, Pakiston. The focal mechanism is poorly controlled and corresponds to reverse faulting
AUG 31	06 03 48.3	39.159 N	20.618 E	43	4.5		1.3	114	GREECE-ALBANIA BORDER REGION. Same minor injuries, damage and landslides in the Preveza area, Greece.
SEP 11	20 45 49.5	39.356 N	75.407 E	15	5.8	6.5	1.0	278	SOUTHERN XINJIANG, CHINA. Ms 6.4 (PAS). Mo=2.1*10**18 Nm (HRV). Four people killed, 61 injured and damage in the Wuqia-Kashi-Shufu area. Felt (IV) at Sufi-Kurgan and Osh and (III) at Andizhan and Fergana, USSR.

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1985									
SEP 15	02 42 54.8	4 130 S	136 049 E	10 G	5 9	6 3	1.4	266	WEST IRIAN REGION. Ms 6.3 (BRK), 6.0 (PAS). Mo=3 3*10**18 Nm (GS). Mo=3.3*10**18 Nm (NVR) At least 10 people killed, 7 injured and damage in the Enarotali area. Slumping observed in the epicentral area. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a moderate reverse component
SEP 19	13 17 47.3	18 190 N	102.533 W	28	6.8	8.1	1.3	311	MICHOACAN, MEXICO. Ms 7.9 (BRK), 7.9 (PAS). Mo=1.1*10**21 Nm (HRV). At least 9,500 people were killed, about 30,000 were injured more than 100,000 people were left homeless, and severe damage was caused in parts of Mexico City and in several states of central Mexico. According to some sources, the death toll from this earthquake may be as high as 35,000. It is estimated that the quake seriously affected an area of approximately 825,000 square kilometers, caused between 3 and 4 billion U.S dollars of damage, and was felt by almost 20 million people Four hundred twelve buildings collapsed and another 3,124 were seriously damaged in Mexico City. About 60 percent of the buildings were destroyed at Ciudad Guzman, Jalisco. Damage also occurred in the states of Colimo, Guerrero, Mexico, Michoacan, Morelos, parts of Veracruz and in other areas of Jalisco. The maximum Modified Mercalli intensity was IX at Mexica City, Ciudad Guzmon and the Pacific Coast towns of Lazara Cardenas, Ixtapo and La Union. Felt reports were received from Mazatlan, Sinaloa to Tuxtla Gutierrez, Chiapas, and as far away as Guatemala City, Guatemala and Houston, Texas. The quake was also felt at Brownsville, McAllen, Corpus Christi, Ingram and El Paso, Texas It was felt very strongly by people on board the ship "Nedlloyd Kyoto" located at 17 35.4' North, 102 36.9' West Landslides caused damage at Atenquique, Jalisco and near Jala, Colima. Rockslides were reported along the highways in the Ixtapo area and sandblows and ground cracks were observed at Lazaro Cardenas. A tsunami was generated which caused some damage at Lazaro Cardenas, Zihuatenejo and Manzanillo. Estimated wave heights were 3 meters at Zihuatenejo and 2.8 meters at Lazaro Cardenas Tide stations recorded maximum wave heights (peak-to-trough) of 1.4 meters at Acapulco, Mexico; 60 cm at La Libertad, Ecuador; 58 cm at Acajutla, El Salvador; 24 cm at Kahului, Hawaii and at Pago Pago, American Samoa; 22 cm at Hilo, Hawaii; 21 cm at Baltra Island, Galapagos; 14 cm at Apia, Samoa; 7 cm at Rikitea, Gambier Islands; and 5 cm at Papeete, Tahiti There were some reports, still unconfirmed, that some ships off the Pacific coast of Mexico observed unusually heavy seas up to 30 meters high near the time of the earthquake. Seiches were observed in East Galveston Bay, Texas and in swimming pools in Texas, New Mexico, Colorado and Idaho Water well fluctuations were recorded at Ingleside, Texas; Santa Fe, New Mexico; Rolla, Missouri; Hillsborough County, Florida; and Smithsburg, Maryland. A large percentage of the buildings which were damaged in Mexico City were between 8 and 18 stories high, indicating possible resonance effects with dominant two-second period horizontal ground accelerations which were recorded in the area. The focal mechanism is poorly controlled and corresponds to reverse faulting. (Compiled from press reports, Foreign Broadcast Information Service and personal communication with Cinna Lomnitz, Universidad Nacional Autonoma de Mexico, Mexico City and Lloyd S. Cluff, Pacific Gas and Electric Co., San Francisco.)
SEP 21	01 37 13.4	17.802 N	101.647 W	31	6.3	7.6	1.2	344	NEAR COAST OF GUERRERO, MEXICO. Ms 7.2 (BRK), 7.5 (PAL). Mo=2.4*10**20 Nm (GS). Mo=2.5*10**20 NM (HRV). Additional casualties and damage (VI) in the Mexico City area. Felt in many parts of central Mexico. Local tsunami recorded at Acapulco with maximum amplitude (peak-to-trough) of 1.4 meters. Water well fluctuations recorded at Santa Fe, New Mexico. The focal mechanism is poorly controlled and corresponds to reverse faulting.
SEP 26	07 27 51.1	34.693 S	178.656 W	52 D	6.3	7.0	1.1	448	SOUTH OF KERMADEC ISLANDS Ms 7.0 (BRK), 6.8 (PAS). 6.8 (PAL). Mo=2.5*10**19 Nm (GS). Mo=2.4*10**19 Nm (HRV). Felt on Raoul Island. Also felt in the eastern and southern parts of North Island and at Christchurch and Dunedin, South Island, New Zealand. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a large reverse component.
SEP 27	03 39 08.5	9.829 S	159.854 E	32	6.2	6.9	1 1	348	SOLOMON ISLANDS Ms 6.8 (BRK), 6.6 (PAS). Mo=1.1*10**19 Nm (GS). Mo=9.3*10**18 Nm (HRV). Several houses destroyed. Felt (VII) at Viso and (VI) at Honiara Felt throughout Guadalcanal. Several landslides in southern Guadalcanal. The focal mechanism is poorly controlled and corresponds to reverse faulting.
SEP 28	14 50 15.2	41.581 N	22.254 E	7	5.0		1 1	200	YUGOSLAVIA ML 5.3 (SKO), 5.2 (TTG), 4.9 (ATH). Mo=9 0*10**16 Nm (GS). Mo=2.9*10*17 Nm (HRV). Sixteen people injured and about 500 buildings damaged (VII) in the Demir Kapija-Negotino area.

DATE	ORIGIN TIME UT HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES MB	MS	NO	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1985								
OCT 4	12 25 51.8	35.816 N	140.093 E	85	5.9	1.0	398	NEAR EAST COAST OF HONSHU JAPAN mb 6.2 (BRK), 6.1 (PAS) Mo=8.8*10**17 Nm (GS). Mo=8.7*10**18 Nm (HRV) Eighteen people injured. Felt (V JMA) at Tokyo; (IV JMA) at Nikko Toteyama and Kumagoyo and (III JMA) at Mito, Kofu and Moebashi. Felt (I JMA) as far north as Obihiro, Hokkaido south to Hachijo-jima and west to Toyooka The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a moderate normal component.
OCT 4	15 17 07.1	18.304 S	48.433 E	10	5.3	5.2	1.0	161 MALAGASY REPUBLIC. Mo=2.5*10**17 Nm (GS) One person injured at Ambatandrazaka. Felt at Antananarivo.
OCT 5	15 24 02.2	62.237 N	124.266 W	10 G	6.5	6.6	1.0	425 NORTHWEST TERRITORIES, CANADA. Ms 6.8 (BRK), 6.2 (PAS). Mo=1.1*10**19 Nm (GS). Mo=8.4*10**18 Nm (HRV) Slight damage (VI) at Wrigley, Nahanni Butte and Fort Liard. Felt (V) at Fort Simpson. Numerous landslides observed in the epicentral area. Felt in parts of Yukon Territory, British Columbia, Alberta and Saskatchewan. Also felt at Juneau, Skagway and Sitka, Alaska. Fluctuation of well water levels observed at Rolla, Missouri. The focal mechanism is poorly controlled and corresponds to reverse faulting.
OCT 9	09 33 32.4	54.765 N	159.613 W	30 D	6.2	6.6	1.0	424 SOUTH OF ALASKA. Ms 6.6 (BRK), 6.6 (PAL), 6.0 (PAS). Mo=8.7*10**18 Nm (GS). Mo=8.7*10**18 NM (HRV). Slight damage (VI) at Sand Point. Felt (V) at Cold Bay, Chignik Lake and Chignik Lagoon. Felt (IV) at False Pass, King Cove, Perryville and Port Heiden. The focal mechanism is poorly controlled and corresponds to reverse faulting.
OCT 11	03 39 10.9	15.299 N	90.863 W	5 G	4.5		1.0	68 GUATEMALA. Several people injured and about 500 houses destroyed at San Miguel Uspantan. About 80 percent of the buildings in the town sustained some damage. Felt strongly in western Guatemala. Felt also at Guatemala City.
OCT 13	15 59 51.2	40.301 N	69.823 E	16 G	5.8	5.9	1.0	327 TAJIK SSR. Mo=5.6*10**17 Nm (GS). Mo=5.7*10**17 Nm (HRV). At least 29 people killed, 80 injured and about 8,000 homeless in the Kayrakkum-Gafurov area. About 90 percent of multi-story brick buildings destroyed (IX) at Kayrakkum and about 900 buildings destroyed (VIII) at Gafurov. Damage (VII) at Leninabad Landslides reported in the area. Felt (VI) at Isfara and Proletarsk; (V) at Tashkent and in the Fergana Basin; (IV) at Samarkand and in the Dushanbe-Kulyab area and (III) at Khorog The focal mechanism is poorly controlled and corresponds to reverse faulting
OCT 27	19 34 57.1	36.460 N	6.761 E	10 G	5.5	5.9	1.3	285 ALGERIA. Mo=6.2*10**17 Nm (HRV). Six people killed and damage in the Constantine-Skikda area Felt in the Annaba-Setif-Souk Ahras area
OCT 29	14 10 39.4	9.569 S	150.989 E	10 G	6.1	6.7	1.1	219 EAST PAPUA NEW GUINEA REGION Ms 6.6 (BRK), 6.5 (PAS). Mo=4.4*10**18 Nm (HRV) Felt (V) at Arawa and Panguna, Bougainville. Also felt at Alotau, New Guinea
OCT 29	15 02 27.8	18.158 N	102.548 W	39	5.6	5.4	1.3	169 MICHOACAN, MEXICO Mo=9.4*10**17 Nm (HRV). Thirteen people injured because of panic in the Mexico City area. Felt (IV) at Mexico City
NOV 7	08 26 21.4	40.310 N	42.307 E	33	5.1	4.2	1.2	151 TURKEY. Mo=7.3*10**16 Nm (HRV). Fourteen people injured and at least 113 houses damaged in the Erzurum area.
NOV 16	04 12 18.8	38.577 S	78.368 E	10 G	5.8	6.4	1.3	112 MID-INDIAN RISE. Ms 6.6 (PAS), 6.5 (BRK). Mo=5.1*10**18 Nm (GS) Mo=5.5*10**18 Nm (HRV).
NOV 17	09 40 21.2	1.639 S	134.911 E	10 G	6.0	7.1	1.4	179 WEST IRIAN REGION. Ms 6.9 (PAS), 6.8 (BRK). Mo=5.1*10**19 Nm (GS). Mo=4.9*10**19 Nm (HRV). Damage at Manokwari. Felt strongly in many parts of West Irian. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting.
NOV 28	02 25 42.3	14.043 S	166.240 E	33 N	6.0	7.0	1.0	336 VANUATU ISLANDS. Ms 7.2 (BRK), 6.5 (PAS) Mo=2.6*10**19 Nm (GS). Mo=3.0*10**19 Nm (HRV). The focal mechanism is poorly controlled and corresponds to normal faulting.
NOV 28	03 49 54.1	13.987 S	166.185 E	33 N	6.3	7.1	1.1	302 VANUATU ISLANDS. Ms 7.6 (BRK), 6.1 (PAS) Mo=3.7*10**19 Nm (GS). Mo=3.6*10**19 Nm (HRV).
DEC 16	02 44 36.0	11.725 N	85.838 W	22	5.9	6.0	1.0	259 NICARAGUA. Ms 6.1 (BRK), 5.9 (PAS). Mo=3.7*10**18 Nm (GS). Mo=1.6*10**18 Nm (HRV) Six people injured by landslides and damage (VI) in the Rivas-Masaya area Felt strongly along the Pacific coast of Nicaragua Felt (IV) at Las Chiles, Liberia and Upala; (III) at Tilaran and Puntarenas; and (II) at Atenas and San Jose, Costa Rica Felt (II) at San Salvador, El Salvador The focal mechanism is moderately well controlled and corresponds to strike-slip faulting.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES CS MB	Ms	S	NO STA USED	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1985									
DEC 16	08 04 07.0	14.073 S	166.251 E	37	6.0	6.7	1.2	228	VANUATU ISLANDS. Ms 6.8 (BRK), 6.4 (PAS). Mo=7.6*10**18 Nm (GS). Mo=6.5*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to normal faulting.
DEC 21	01 13 22.4	13.966 S	166.516 E	43 G	6.0	7.3	1.2	263	VANUATU ISLANDS. Ms 7.6 (BRK), 6.9 (PAS). Mo=5.5*10**19 Nm (GS). Mo=5.7*10**19 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faultinmg.
DEC 21	02 46 33.2	14.092 S	166 654 E	33 N	5.8	6.5	1.1	240	VANUATU ISLANDS. Mo=7.1*10**18 Nm (HRV).
DEC 23	05 16 03.3	62.222 N	124.239 W	6 G	6.4	6.9	0.9	381	NORTHWEST TERRITORIES, CANADA. Ms 6.6 (BRK). Mo=2.3*10**19 Nm (GS). Mo=1.5*10**19 Nm (HRV). Felt (VI) at Fort Simpson and Wrigley. Felt strongly at Fort Liard. Some people fled from buildings in Edmonton, Alberta about 1100 km from the epicenter. Felt in parts of Yukon Territory, British Columbia, Alberta, Saskatchewan and Manitoba. Felt (III) at Camas, Washington; Grand Forks, North Dakota and Metlakatla, Alaska; (II) at Juneau, Alaska and Helena, Montana. Also felt at Spokane, Washington. The focal mechanism is poorly controlled and corresponds to reverse faulting.
DEC 25	02 38 56.5	37.688 N	15.068 E	10 G	4.3		1.4	27	SICILY. One person killed, 14 injured and damage on Sicily. Eruption of Mt. Etna.
DEC 27	05 38 53.4	5.763 S	104.191 E	25 D	5.8	6.6	1.2	267	SOUTHERN SUMATERA. Ms 6.5 (BRK), 6.3 (PAS). Mo=3.7*10**18 Nm (GS). Mo=6.2*10**18 Nm (HRV). Felt strongly at Metro and Tanjungkarang-Telukbetung. Felt at Jakarta, Java. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small reverse component.
DEC 28	15 41 03.7	13.192 S	166.507 E	36 G	5.7	6.2	1.2	191	VANUATU ISLANDS. Ms 6.6 (BRK), 5.9 (PAS). Mo=3.5*10**18 Nm (GS). Mo=3.2*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.
1986									
JAN 11	19 42 21.9	9.505 S	77.512 W	39 *	5.3		1.1	60	PERU. Mo=5.0*10**16 Nm (HRV). One person killed, about 20 houses destroyed, another 60 damaged and about 100 people homeless in the Huarmey area. About 40 animals killed by landslides. Felt (IV) at Casma and Huaraz and (II) at Chimbote.
JAN 15	20 17 42.7*	21.277 S	170.102 E	150 G	6.2		1.2	30	LOYALTY ISLANDS REGION. mb 6.6 (PAS). Mo=4.4*10**19 Nm (GS). Mo=4.6*10**19 Nm (HRV). Felt (IV) on Tana and (II) at Port Vila, Vanuatu Islands. Also felt (II) at Noumea, New Caledonia. The focal mechanism is poorly controlled and corresponds to normal faulting with a small strike-slip component.
JAN 16	13 04 31.3	24.771 N	122.013 E	13	5.5	5.8	1.2	170	TAIWAN REGION Mo=1.1*10**18 Nm (HRV). Four people injured on Taiwan. Felt strongly at Taipei.
JAN 29	11 56 34.6	3.904 S	103.461 E	33 N	5.0		1.4	32	SOUTHERN SUMATERA. At least two people injured and severe damage in the Lahat area. Felt in the Pagaralam-Muaraenim area.
JAN 31	16 46 43.3&	41.650 N	81.162 W	10	5.0			124	OHIO. <SPEC>. Mo=3.4*10**16 Nm (HRV). Seventeen people treated for minor injuries and some damage (VI) sustained in the Painesville-Mentor area. Minor damage also occurred at Bainbridge, Bowling Green, Chardon, Geneva, Huntsburg, Kirtland, Leroy, Madison, Metals Park, Middlefield, Perry, Perry Nuclear Plant, Thompson, Warren and Willoughby. Minor damage in Pennsylvania at Albion and Linesville. Felt throughout most of Ohio and parts of Illinois, Indiana, Kentucky, Michigan, New York, Pennsylvania, West Virginia and Ontario, Canada. Some additional states with only a few felt reports included Delaware, Maryland, New Jersey, Virginia, Wisconsin and the District of Columbia.
FEB 03	15 12 46.7	15.075 N	92.072 W	16	4.7		1.2	46	MEXICO-GUATEMALA BORDER REGION. About 500 houses damaged at Ixchiguan, San Marcos Province, Guatemala. Damage to adobe houses in Mexico near Tacana Volcano. Felt at Tapachula, Mexico.
FEB 03	20 47 35.3	27.791 N	139.552 E	508 G	5.8		1.2	432	BONIN ISLANDS REGION. mb 6.5 (PAS). Mo=5.8*10**18 Nm (GS). Mo=5.3*10**18 Nm (HRV). Felt (I JMA) on Chichi-shima. Felt (I JMA) at Gifu, Tokyo and Fukushima, Honshu. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a small strike-slip component.

DATE	ORIGIN TIME UT HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms	SE	NO ST- -SEL	REGION (CONTRIBUTED MAGNITUDES AND COMMENTS
1986									
MAR 06	00 05 38.3	40.368 N	51.555 E	33 N	6.2	6.3	1.1	346	CASPIAN SEA. Ms 6.6 (BRK). Mo=6.1*10**18 Nm (GS). Mo=6.4*10**18 Nm (HRV). Minor damage at Baku. Felt (VI) at Krasnovodsk; (IV) at Sumgoit, Lenkoran and Kirovabad; (III) at Makhachkala, USSR. The focal mechanism is poorly controlled and corresponds to normal faulting.
MAR 12	16 32 56.0&	47.470 N	115.800 W	1				1	MONTANA. <SPEC>. ML 2.0 (GS). Rockburst in the Lucky Friday mine near Mullan, Idaho. One person killed and two injured.
MAR 24	19 31 39.3	2.488 S	138.696 E	29 *	5.8	6.8	1.2	146	WEST IRIAN. Ms 6.6 (BRK), 6.4 (PAS). Mo=9.3*10**18 Nm (GS). Mo=1.1*10**19 Nm (HRV). The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small reverse component
MAR 31	11 55 40.0&	37.483 N	121.690 W	8	5.5	5.5		196	CENTRAL CALIFORNIA. <BRK>. ML 5.7 (BRK). Mo=2.6*10**24 Nm (BRK). Mo=3.2*10**17 Nm (HRV). Six people were treated for minor injuries. Slight damage (VI) in the Fremont area and power outages in parts of Fremont and San Jose. Felt (V) at many cities in the southern San Francisco Bay area including Alameda, Cupertino, Milpitas, Mountain View, Palo Alto, Pleasanton, Redwood City, San Jose, San Leandro, Santa Clara, Sunnyvale and Union City. Felt throughout much of central California from Santa Rosa to San Luis Obispo and east to Yosemite National Park.
APR 05	20 14 28.7	13.410 S	71.785 W	51	5.3	4.6	1.3	84	PERU. Mo=7.7*10**16 Nm (HRV) At least 16 people killed, 170 injured and 2,000 houses destroyed in the Cuzco area. Landslides occurred near Cuzco.
APR 08	18 02 44.6	7.946 S	73.860 W	173 G	5.8		0.9	339	PERU-BRAZIL BORDER REGION. mb 6.5 (BRK). Mo=3.5*10**17 Nm (GS). Mo=3.5*10**17 Nm (HRV). Felt (IV) at Pucallpa, Peru. Felt strongly at Chimbote, Trujillo and Huaraz, Peru. Felt also at Lima. The focal mechanism is moderately well controlled and corresponds to normal faulting with a moderate left-lateral strike-slip component.
APR 14	00 25 12.4	13.923 S	166.831 E	29 G	6.0	6.2	1.3	266	VANUATU ISLANDS. Ms 6.5 (BRK), 6.2 (PAS). Mo=5.8*10**18 Nm (GS). Mo=3.1*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.
APR 20	07 03 30.8	2.394 S	139.309 E	33 N	6.1	6.7	1.1	281	NEAR NORTH COAST OF WEST IRIAN. Ms 6.5 (BRK) Mo=1.6*10**19 Nm (GS). Mo=1.6*10**19 Nm (HRV) Felt in the northern coastal area. The focal mechanism is poorly controlled and corresponds to reverse faulting
APR 26	07 35 16.1	32.128 N	76.374 E	33 N	5.5	5.3	1.0	172	KASHMIR-INDIA BORDER REGION. Mo=2.3*10**17 Nm (HRV) Six people killed, about 30 injured and 85 percent of the houses damaged in the Dharmsala, India area. Felt at Lahore, Pakistan.
APR 30	07 07 18.1	18.404 N	102.973 W	27 G	6.2	7.0	1.2	334	MICHOACAN, MEXICO. Ms 6.9 (BRK), 6.8 (PAS). Mo=3.5*10**19 (GS). Mo=3.1*10**19 Nm (HRV). Some minor damage (V) in the Mexico City area. Slight damage at Ciudad Guzman and Guadalajara. Felt strongly in central and southwestern Mexico. The focal mechanism is poorly controlled and corresponds to reverse faulting.
MAY 05	03 35 38.8	37.993 N	37.806 E	10 G	5.9	5.9	1.1	318	TURKEY. Mo=1.2*10**18 Nm (GS). Mo=1.4*10**18 Nm (HRV). Fifteen people killed, 100 injured and approximately 4,000 houses damaged in the Dogansehir-Golbasi area. Damage to all houses in the village of Kapidere. Slight damage to houses around the cities of Adiyaman and Elbistan. Felt strongly at Gaziantep, Urfa, Kayseri, Sivas, Kahramanmaras, Diyarbakir, Antakya and Mardin. Some dangerous cracks in the arch of Surgu Dam. Slight damage to railroads in the epicentral area. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a moderate reverse component.
MAY 07	22 47 10.8	51.520 N	174.776 W	33 N	6.4	7.7	1.1	513	ANDREANOF ISLANDS, ALEUTIAN ISLANDS. Ms 7.9 (BRK), 7.8 (PAS) Mo=1.0*10**21 Nm (HRV). Multiple event. Damage (VI) on Adak and Atka. Tsunami generated with observed wave heights 91 to 122 cm at Kapaa, Kauai and 61 to 91 cm at Honalei, Kauai and along the coast of Washington. Maximum recorded wave heights at selected tide stations were as follows: 175 cm at Adak, 25 cm at Unalaska and 10 cm at Sand Point, Alaska; 55 cm at Hilo, 36 cm at Kahului and 27 cm at Honolulu, Hawaii; 45 cm at Coquimbo and 15 cm at Valparaiso, Chile; 46 cm at Kushiro, Hokkaido; 24 cm at Chichi-shima, Bonin Islands; 40 cm at Port Lyttleton, New Zealand; 12 cm at Crescent City, California; 10 cm at Wake Island and 5 cm at Apia, Samoa Negative tsunami reports were received from Bering Island, USSR; San Francisco, California and Ponape, Caroline Islands The focal mechanism is poorly controlled and corresponds to reverse faulting.
MAY 13	08 44 02.1	41.431 N	43.737 E	10 G	5.7	5.4	1.1	262	TURKEY-USSR BORDER REGION. Mo=5.0*10*17 Nm (HRV) Two people killed and about 1,500 buildings destroyed in the Akhalkalaki area, USSR. Slight damage in the Susuz area, Turkey. Felt (VII) at Akhalkalaki and Bakuriani; (V) at Stepanavan and Tbilisi; (IV) at Abastumani, Leninakan and Gegechkori; (III) at Garis, USSR Also felt at Cildir, Ardahan and Hanak, Turkey

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES ME	Ms	SD	NO STA USED	REMARKS AND CONTRIBUTED MAGNITUDES AND COMMENTS
1986									
MAY 17	16 20 22.2	52.327 N	174.504 W	26 G	5.8	6.6	1.0	210	ANDREANOF ISLANDS, ALEUTIAN ISLANDS. Ms 6.5 (BRK), 6.5 (PAS). Mo=4.7*10**18 Nm (GS). Mo=7.4*10**18 Nm (HRV). Slight damage (VI) on Atka. Felt strongly on Adak. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small reverse component.
MAY 20	05 25 46.9	24 125 N	121 619 E	19 G	6.1	6.4	1.2	382	TAIWAN. Ms 6.0 (BRK), 5.8 (PAS). Mo=2.6*10**18 Nm (GS). Mo=2.4*10**18 Nm (HRV) One person killed and five injured in the Huo-lien area. Felt throughout Taiwan. The focal mechonism is moderately well controlled and corresponds to reverse faulting with a large strike-slip component.
MAY 26	19 06 15.9	20.190 S	178.860 E	538 G	6.4		0.9	508	SOUTH OF FIJI ISLANDS. mb 6.7 (BRK), 6.3 (PAS). Mo=5.6*10**19 Nm (HRV). Felt on Raoul Island, Kermadec Islands. The focal mechonism is well controlled and corresponds to reverse faulting with a large strike-slip component.
JUN 06	10 39 46.9	38.001 N	37.917 E	10 G	5.6	5.6	1.1	272	TURKEY. Ms 5.8 (PAS). Mo=6.4*10**17 (HRV). One person killed, 20 injured and damage in the Surgu area. Additional cracks in the Surgu Dam. A landslide blocked the road between Erkenek and Adiyaman. Felt at Malatya, Diyorbakir, Adiyaman and Urfa.
JUN 11	13 48 01.3	10.597 N	62.928 W	19 G	6.0	6.2	1.2	345	NEAR COAST OF VENEZUELA. Ms 6.1 (PAS), 5.9 (BRK). Mo=3.0*10**18 Nm (GS). Mo=2.9*10**18 Nm (HRV). Two people killed, 45 injured and many left homeless in the Cariaco area. Damage (VII) at Carupano, El Pilar and Rio Caribe. Felt (V) at Cumana and Maturin; (III) at Caracas. Felt at Barcelona, Puerto La Cruz and Valencia. Felt strongly on Trinidad; also felt at Bogota and Bucaramongo, Colombia. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a moderate reverse component.
JUN 19	23 18 26.8	30.944 S	177.757 W	10 G	5.5	6.3	1.3	132	KERMADEC ISLANDS. Ms 6.6 (BRK), 6.0 (PAS). Mo=1.6*10**18 Nm (HRV).
JUN 20	17 12 46.9	31.240 N	86.847 E	33 N	5.9	6.1	1.2	232	TIBET. Mo=1.6*10**18 Nm (GS). Mo=1.4*10**18 Nm (HRV). At least 58 houses collapsed and many damaged in the Ombu area. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small normal component
JUN 24	03 11 30.9	4.448 S	143.943 E	102 G	6.6	7.1	1.0	422	PAPUA NEW GUINEA. mb 6.9 (PAS). Mo=8.4*10**19 Nm (HRV) Damage (VII) and landslides occurred throughout the Papua New Guinea highlands. Submarine cables from Madang to Guam and Madang to Cairns were damaged. Preliminary estimate of damage approximately 500,000 U.S. dollars. Felt on New Guinea from Tabubil to Port Moresby and from Vanimo to Daru. Felt (III) at Arawa and Panguna, Bougainville. The focal mechanism is poorly controlled and corresponds to reverse faulting with a small strike-slip component.
JUL 08	09 20 44.5&	33.998 N	116 606 W	12	5.8	6.0		300	SOUTHERN CALIFORNIA. <PAS> ML 5.6 (PAS). Mo=2.3*10**18 Nm (GS). Mo=1.3*10**18 Nm (HRV). At least 29 people injured and some damage in the Palm Springs-Morongo Valley area. Landslides occurred in the area. The most serious damage (VII) occurred at the Devers substation of Southern California Edison Company. Also, some residences in the Whitewater Canyon area were badly damaged. Preliminary estimate of damage approximately 4.5 million U.S. dollars. Damage (VI) at Angelus Oaks, Desert Hot Springs, North Palm Springs, Palm Desert, Palm Springs and Yucca Valley. Felt throughout much of southern California. Also felt at Las Vegas, Nevada; Lake Havasu City, Arizona and in northern Baja California, Mexico. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a large reverse component.
JUL 09	23 10 53.1	1.904 N	126.525 E	28 G	6.2	6.5	1.1	352	MOLUCCA PASSAGE. Ms 6.4 (BRK). Mo=1.7*10**19 Nm (GS) Mo=1.6*10**19 Nm (HRV) Felt (IV) at Manado, Sulawesi. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a small strike-slip component.
JUL 12	07 54 26.8	29.962 N	51.582 E	10 G	5.7	5.6	1.2	272	SOUTHERN IRAN. Mo=4.1*10**17 Nm (HRV). One person killed, four injured and about 300 homes damaged in the Mamasani area. Felt at Shiraz.
JUL 13	13 47 08.2&	32.978 N	117.858 W	9	5.6	5.8		268	CALIFORNIA-MEXICO BORDER REGION. <PAS>. ML 5.3 (PAS) Mo=6.5*10**17 Nm (HRV). Twenty-nine people injured, one critically and at least 50 buildings damaged in the Newport Beach-San Diego area. Preliminary estimate of damage 720 thousand U.S. dollars. Also some damage reported in the Tijuana area, Mexico. A small landslide occurred near Lakeside in eastern San Diego County. Felt throughout the coastal area of southern California, from Santa Barbara to San Diego, east to Palm Springs and as far as Yuma, Arizona.
JUL 18	17 22 38.2	10.770 N	69.428 W	7 G	5.9	4.9	1.0	307	VENEZUELA. Mo=1.8*10**17 Nm (HRV). One person died from a heart attack and about 30 homes damaged in the Churuguara area. Felt in Falcon, Lara, Carabobo, Zulia, Aragua and Miranda.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms	S:	NO. STA USE:	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1986									
JUL 21	14 42 26.6&	37.537 N	118.447 W	9	6.0	6.2		311	CALIFORNIA-NEVADA BORDER REGION. <BRK> ML 6.5 (BRK). 6.0 (PAS). Mo=3.5*10**24 Nm (BRK) Mo=2.8*10**18 Nm (GS). Mo=2.6*10**18 Nm (HRV) About 20 mobile homes were damaged and a number of others shaken off their foundations in the Chalfant Valley, California Several buildings were damaged (VI) at Bishop, California Landslides occurred in the area Fault rupture with a maximum of 5 cm of right-lateral slip, occurred along faults in the Volcanic Tableland west of Chalfant Valley and the White Mountains fault zone The earthquake was felt throughout a large area of California and Nevada from San Francisco to Reno and south to Los Angeles and Las Vegas. Felt in highrise buildings as far away as Salt Lake City, Utah. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a moderate reverse component.
AUG 03	01 33 20.3	37.200 N	37.300 E	12	5.0	4.1	1.1	130	TURKEY. Seventy houses damaged at Yesilce, Ucgaze and Sam, Gaziantep Province; three houses damaged at Karobiyikli, Kahraman Maras Province. Felt at Kahramanmaras, Adiyaman and Malatya. Felt also in the Eskisehir area.
AUG 14	19 39 13.6	1.795 N	126.519 E	33 N	6.6	7.2	1.4	441	MOLUCCA PASSAGE. Ms 7.4 (BRK). Mo=1.5*10**20 Nm (GS). Mo=2.3*10**20 Nm (HRV). Felt (IV) at Manado, Sulawesi and (II RF) at Cagayan de Oro, Mindanao. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a moderate strike-slip component.
AUG 20	21 23 54.8	34.572 N	91.633 E	33 N	5.4	6.5	1.2	191	QINGHAI PROVINCE, CHINA. Mo=4.9*10**18 Nm (HRV).
AUG 23	23 47 48.8	34.549 S	179.288 E	32 D	6.1	6.5	1.2	115	SOUTH OF KERMADEC ISLANDS. Ms 6.3 (BRK). Mo=8.0*10**18 Nm (GS). Mo=4.9*10**18 Nm (HRV). The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small normal component.
AUG 30	21 28 35.4	45.547 N	26.316 E	132 G	6.4	6.9	1.1	554	ROMANIA. Mo=5.6*10**19 Nm (GS). Mo=7.9*10**19 Nm (HRV). Damage (VIII) in the Focsani-Birlad area, including the collapse of a church. Felt (VII) at Bucharest. Two people killed, 558 injured, and about 55,000 homes damaged, leaving more than 12,500 people homeless in the Kishinev-Kagul area, USSR. Felt (VII) in northern Bulgaria; (V) in the Skopje area, Yugoslavia; (IV) at Simferapal and Kiev, USSR and Belgrade, Yugoslavia; (III) at Moscow, USSR and Titograd, Yugoslavia. Felt throughout central and eastern Hungary. Also felt in Greece, Turkey, southern Italy and eastern Poland. The focal mechanism is well controlled and corresponds to reverse faulting with a moderate strike-slip component.
SEP 11	00 18 25.5	5.187 S	152.442 E	51 D	5.8	6.4	1.3	298	NEW BRITAIN REGION. Ms 6.7 (BRK) Mo=5.4*10**18 Nm (GS). Mo=6.3*10**18 Nm (HRV). Felt (V) at Rabaul. The focal mechanism is poorly controlled and corresponds to reverse faulting.
SEP 13	17 24 31.4	37.014 N	22.176 E	11 G	6.0	5.8	1.4	362	SOUTHERN GREECE. ML 5.7 (ATH). Mo=6.6*10**17 Nm (GS). Mo=9.8*10**17 Nm (HRV) At least twenty people killed, about 300 injured, 2,500 homeless and 1,500 buildings damaged or destroyed (X) in the Kalamai area. Felt in Lakonia and on Zakinthas. Also felt at Athens and in central Greece. The focal mechanism is moderately well controlled and corresponds to normal faulting with a moderate strike-slip component.
SEP 15	11 41 27.8	36.930 N	22.175 E	10 G	4.9	4.8	1.4	180	SOUTHERN GREECE. ML 4.8 (ATH) Thirty-seven people injured and additional damage in the Kalamai area.
SEP 16	18 20 17.7	19.376 N	146.301 E	48	6.5	6.7	1.1	521	MARIANA ISLANDS REGION. Ms 6.8 (BRK). Mo=1.2*10**19 Nm (GS). Mo=9.5*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to normal faulting.
OCT 06	23 28 07.2	25.498 N	102.422 E	10 G	5.4	4.5	1.0	179	YUNNAN PROVINCE, CHINA. Several people injured and some houses damaged in the Fumin area.
OCT 10	17 49 24.1	13.827 N	89.118 W	7 G	5.0	5.4	1.2	131	EL SALVADOR Ms 5.5 (PAS). Mo=4.7*10*17 Nm (HRV). At least 1,000 people killed, 10,000 injured, 200,000 homeless and severe damage and landslides in the San Salvador area. Some damage at Tegucigalpa, Honduras. Felt strongly in parts of Guatemala and Honduras.
OCT 11	09 00 10.5	37.931 N	28.574 E	5 G	5.5	5.5	1.1	260	TURKEY. ML 5.5 (ATH). Mo=3.6*10**17 Nm (HRV). Three people injured and at least 50 homes destroyed and 150 damaged in the Aydin area; also felt in the Denizli-Izmir-Manisa area and on the Dodecanese Islands, Greece.
OCT 14	16 53 08.1	5.030 S	153.616 E	41 G	6.2	6.6	1.2	304	NEW IRELAND REGION. Ms 6.0 (PAS). Mo=1.6*10**19 Nm (GS). Mo=1.5*10**19 Nm (HRV). Felt (V) at Rabaul, New Britain and (IV) at Arawa and Panguna, Bougainville. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a moderate strike-slip component
OCT 16	19 54 10.4	27.727 N	66.650 E	43 *	5.2	4.5	0.9	121	PAKISTAN Mo=4.2*10**16 Nm (HRV). About 150 buildings damaged in the Khuzdar area

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms2	SE	NO STA USED	REGION. CONTRIBUTED MAGNITUDES AND COMMENTS
1986									
Oct 20	06 46 09.9	28.117 S	176.367 W	29 G	6.6	8.1	1.2	489	KERMADEC ISLANDS REGION. MS 8.3 (BRK) Mo=2.3*10**20 Nm (GS). Mo=4.5*10**20 Nm (HRV) Objects knocked from shelves on Raoul Island. Felt at Napier and Wellington, New Zealand. Tsunami generated with maximum wave heights 22 cm at Hilo, 15 cm at Kahului, 13 cm at Honolulu and 7 cm at Kana, Hawaii; 14 cm at Papeete, Tahiti and 10 cm at Pago Pago, Samoa Islands The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a large reverse component
OCT 23	15 48 43.7	11.037 S	165.204 E	19 D	5.4	6.5	1.1	153	SANTA CRUZ ISLANDS. Ms 6.5 (BRK). Mo=1.4*10**19 Nm (HRV).
OCT 30	01 28 54.5	21.702 S	176.616 W	188 G	6.4		0.9	453	FIJI ISLANDS REGION. mb 6.8 (PAS). 6.4 (BRK) Mo=6.3*10**19 Nm (GS). Mo=6.4*10**19 Nm (HRV). Appears to be two events about 5 seconds apart, with slightly different locations. Depth based on first event. The focal mechanism is poorly controlled and corresponds to normal faulting.
NOV 07	19 48 58.8	28.591 S	176.407 W	33 N	5.7	6.3	1.3	155	KERMADEC ISLANDS REGION. Ms 6.8 (BRK). Mo=1.9*10**18 Nm (HRV).
Nov 14	21 20 10.5	23.901 N	121.574 N	34 G	6.3	7.8	1.2	79	TAIWAN. MS 7.5 (BRK). Mo=9.4*10**19 Nm (GS). Mo=1.3*10**20 Nm (HRV). Fifteen people killed, 44 injured and damage (V JMA) in the Taipei-Hua-lien area, mostly in the Taipei area. Landslides occurred along the highway between Su-ao and Hua-lien. Taiwan-to-Guam and Taiwan-to-Okinawa undersea telecommunication cables were damaged. Felt strongly thraughout Taiwan. Felt (III JMA) an Yonaguni-jima and (II JMA) an Ishigaki-shima, Ryukyu Islands. Felt (II RF) at Pasuquin, Luzan, Philippine Islands. The facal mechanism is paarly cantralled and carresponds to reverse faulting.
NOV 25	13 59 42.3	44.120 N	16.339 E	30	5.3	5.5	1.2	273	YUGOSLAVIA. ML 5.5 (TRI), MD 5.5 (TTG). Mo=2.6*10**17 Nm (HRV). At least 12 people injured, damage (VIII) and landslides in the Knin-Grahova area. Felt strongly in many parts of Yugoslavia. Felt (IV) at Trieste, Udine and Venice, Italy and (III) in the Graz-Klagenfurt area, Austria. Also felt at Naples, Italy.
NOV 30	05 19 48.2	5.494 S	35.769 W	5 G	4.9	4.8	1 0	32	BRAZIL. Mo=5.4*10**16 Nm (HRV). Approximately 1,500 homes damaged in the Jaoa Camara area. Felt at Natal
DEC 07	14 17 09.5	43.274 N	25.912 E	21	5.2	5.6	1.2	246	BULGARIA. ML 5.5 (TTG). Mo=3.1*10**17 Nm (HRV). At least 3 people killed, 60 injured and damage (VII) in the Veliko Turnava-Turgavishte area. Felt throughaut Bulgaria. Alsa felt at Buchorest, Ramania; Istanbul, Turkey and in eastern Yugoslavia.
DEC 18	20 01 59.5?	50 30 N	19.24 E	10 G			1.8	5	POLAND. ML 2.8 (KRA). Three people killed and five injured in the Zabrze-Bielszawice mine near Katawice
DEC 19	05 47 29.0	33 071 S	72.084 W	33 N	5.0		1.3	32	OFF COAST OF CENTRAL CHILE. Several people were injured and 16 homes and 12 vehicles were damaged or destroyed due to flaading caused by the rupture of a large water main at Valparaiso.
DEC 20	23 47 08.9	29.985 N	51.623 E	26	5.5	5.0	1.0	240	SOUTHERN IRAN. Mo=1.6*10**17 Nm (HRV). About 80 hames damaged in the Mamasani area. Felt at Shiraz and Narabad.
DEC 21	01 10 51.1	28.101 S	176.737 W	17 G	6.1	6.6	1.2	277	KERMADEC ISLANDS REGION. Ms 6.1 (PAS). Mo=6.0*10**18 Nm (GS). Mo=6.9*10**18 Nm (HRV). The focal mechanism is paorly cantralled and carresponds to reverse faulting.
1987									
JAN 03	22 04 04.8	14.998 S	167.929 E	15 G	6.0	6.5	1.1	266	VANUATU ISLANDS. Ms 6.7 (BRK), 6.6 (PAS). Mo=8.5*10**18 Nm (GS) Mo=1.2*10**19 Nm (HRV). Complex rupture. Depth based on daminant secand event. The focal mechanism is paorly cantralled and corresponds to reverse faulting.
JAN 05	12 11 55.7	52.448 N	169.381 W	33 N	6.1	6.7	1.1	361	FOX ISLANDS, ALEUTIAN ISLANDS. Ms 6.5 (BRK), 6.3 (PAS). Mo=1.5*10**19 Nm (HRV). Complex rupture. Felt (V) at Unalaska and (III) at False Pass. Alsa felt strongly at Nikolski. The focal mechanism is poorly controlled and corresponds to reverse faulting
JAN 05	22 52 46.5	41.964 N	81.319 E	17 G	5 9	5.8	1.0	338	SOUTHERN XINJIANG, CHINA. Ma=3.4*10**17 Nm (GS). Mo=4.1*10**17 Nm (HRV). Several people injured and damage in the Baicheng area. Felt in the Aksu-kuqa-Wushi area. The facal mechanism is paorly cantralled and corresponds to reverse faulting.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms	SD	NO STA USED	REGION	CONTRIBUTED MAGNITUDES AND COMMENTS
1987										
JAN 09	06 14 44.8	39.895 N	141 67[illegible] E	68 G	6 4		1 0	485	HONSHU, JAPAN. mb 6.8 (PAS), 6.6 (BRK) Mo=9.6*10**18 Nm (GS) Mo=8.8*10**18 Nm (HRV)	
	Two events about 3 sec apart Depth based on the first event Minor damage (V JMA) in the Morioka-Ofunato area. Felt (IV JMA) at Hachinohe Ishinomaki, Miyako, Sakato and Sendai; (III JMA) in the Tokyo-Yokohama area and as far north as Kushiro, Hokkaido The focal mechanism is poorly controlled and corresponds to reverse faulting with a small strike-slip component									
JAN 09	08 01 35.9	19.469 S	176.538 W	33 N	5.9	6.6	1.1	171	FIJI ISLANDS REGION. Ms 6.8 (BRK), 6.7 (PAS) Mo=5.6*10**18 Nm (GS). Mo=7.1*10**18 Nm (HRV) The focal mechanism is poorly controlled and corresponds to strike-slip faulting.	
JAN 11	12 31 26.0	29.969 N	51.788 E	10 *	4.9	4.1	1.5	53	SOUTHERN IRAN. Three hundred houses damaged in the Doshman Ziari area.	
JAN 14	11 03 48.7	42.565 N	142.850 E	102 G	6.5		1.1	521	HOKKAIDO, JAPAN REGION. mb 6.6 (BRK). Mo=1.8*10**19 Nm (GS). Mo=1.7*10**19 Nm (HRV). Six people injured. Felt (V JMA) at Kushiro; (IV JMA) at Hiroo, Nemuro, Obihiro and Urakawa. Also felt (IV JMA) at Hachinohe and Morioka, Honshu. Felt (II in the Tokyo-Yokohama area, Honshu. The focal mechanism is moderately well controlled and corresponds to normal faulting.	
JAN 22	05 10 51.1	43.515 N	10.154 E	22			1.1	62	CENTRAL ITALY. ML 4.2 (KBA), 3.9 (LDG). MD 4.1 (FIR). Two people died of heart attacks. Felt in the Livorno area.	
JAN 24	08 09 21.3	41.529 N	79.318 E	29 D	5.9	5.9	1 2	254	KIRGHIZ-XINJIANG BORDER REGION. Mo=1.2*10**18 Nm (GS). Mo=2.0*10**18 Nm (HRV). At least 417 houses damaged in the Wushi area, China. Felt (IV) in the Alma Ata-Przhevalsk area and (III) in the Frunze-Naryn area, USSR. The focal mechanism is poorly controlled and corresponds to reverse faulting	
JAN 26	11 11 41.8	35.964 N	1.374 E	10 G	4.9	4.3	1.2	146	ALGERIA. One person killed, 7 injured and 629 homes damaged in the Mohammadia area. Felt at Oued Fodda and Tissemsilt.	
JAN 30	22 29 42.0	60.063 S	26.916 W	48 D	6.2	7.0	1.4	172	SOUTH SANDWICH ISLANDS REGION. Ms 6.9 (BRK), 6.8 (PAS). Mo=3.8*10**19 Nm (GS). Mo=3.3*10**19 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.	
FEB 06	13 16 17.8	36.988 N	141.689 E	48	6.1	6.3	1.0	455	NEAR EAST COAST OF HONSHU, JAPAN. Ms 6.5 (PAS), 6.3 (BRK). Mo=1.7*10**19 Nm (GS). Mo=1.3*10**19 Nm (HRV).	
	Two events about 4 seconds apart. Felt (V JMA) at Onahama and (IV JMA) at Mito, Sendai, Tokyo, Utsunomiya and Yokohama. Felt from Hikone and Wajima, Honshu to Kushiro, Hokkaido. Also felt on Oshima and Hachijo-jima. Local tsunami recorded with maximum wave heights 12 cm at Onahama, 8 cm at Ishinomaki and 7 cm at Ofunato. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a moderate left-lateral strike-slip component.									
FEB 08	18 33 58.3	6.088 S	147.689 E	55		7.4	1.3	290	EAST PAPUA NEW GUINEA REGION. Ms 7.6 (BRK), 7.0 (PAS). Mo=1.1*10**20 Nm (GS). Mo=1.1*10**20 Nm (HRV).	
	Multiple event Three people killed by a landslide and some damage (VI) on the Huon Peninsula. Several hundred people homeless and moderate damage (VII), landslides and ground cracks on Umboi Island. Liquefaction occurred in some sands on Malai Island. Felt (VI) in the Cape Gloucester area, New Britain Felt (III) as far away as Wewak and Port Moresby, New Guinea and Rabaul, New Britain. The focal mechanism is poorly controlled and correponds to strike-slip faulting with a moderate reverse component.									
FEB 11	07 56 12.9	15.834 S	167.355 E	24 G	5.9	6.4	1.2	310	VANUATU ISLANDS. Ms 6.6 (BRK), 6.4 (PAS). Mo=5 5*10**18 Nm (GS). Mo=4.8*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting	
FEB 13	07 18 29.0	0 670 N	126.167 E	32	6.2	6.5	1.3	344	MOLUCCA PASSAGE. Ms 6.4 (PAS). Mo=1.7*10**19 Nm (GS). Mo=1 4*10**19 Nm (HRV) Felt on Ternate and at Manado, Sulawesi. The focal mechanism is poorly controlled and corresponds to reverse faulting.	
FEB 17	06 16 12.1	32.793 S	179.304 W	10 G	5.9	6.6	1.2	294	SOUTH OF KERMADEC ISLANDS. Ms 6.5 (BRK), 6.4 (PAS). Mo=1.5*10**29 Nm (GS). Mo=1.1*10**19 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.	
FEB 27	08 31 54.4	53.470 N	167.291 W	10 G	6.2	6.7	1.1	428	FOX ISLANDS, ALEUTIAN ISLANDS. Ms 6.8 (BRK), 6.5 (PAS). Mo=1.3*10*19 Nm (GS). Mo=2.6*10**19 Nm (HRV). Minor damage at Dutch Harbor and Unalaska. Felt (V) at Akutan, (III) at Cold Bay and False Pass and (II) at Sand Point. The focal mechanism is poorly controlled and corresponds to normal faulting.	

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms7	SD	NO STA USED	REGION CONTRIBUTED MAGNITUDES AND COMMENTS

1987

MAR 02 01 42 34.1 37.965 S 176.765 E 19 G 5.9 6.6 1.5 198 NORTH ISLAND, NEW ZEALAND Ms 6.8 (BRK), 6.4 (PAS). Mo=6.4*10**18 Nm (HRV). One person died from a heart attack, 25 injured and extensive damage (X) in the Edgecumbe-Kawerau-Whakatane area. Felt throughout much of North Island. Landslides and sandblows occurred. A southwest trending fault scarp 6 km long had extension openings of up to 1 m and as much as 1.5 m of downthrow on the northwest side. Peak ground accelerations of 0.33 g was recorded within 15 km of the epicenter. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a large normal component.

MAR 05 09 17 05.2 24.388 S 70.161 W 62 G 6.5 7.3 1.2 303 NEAR COAST OF NORTHERN CHILE. Ms 7.2 (BRK), 7.0 (PAS). mb 6.8 (PAS). Mo=2.4*10**20 Nm (GS). Mo=2.5*10**20 Nm (HRV). One person killed and damage (VI) in the Antofagasta area. Felt (VI) at Chuquicamata, (V) in the Taltal-Taconao-Calama area, (IV) at Arica and (III) at Vallenar. Felt (II) at Arequipa, Peru. Also felt at La Paz, Bolivia. Local tsunami generated with maximum wave heights 22 cm at Caldera, 20 cm at Coquimbo, 14 cm at Valparaiso and 18 cm at Arica. The focal mechanism is poorly controlled and corresponds to reverse faulting.

MAR 06 04 10 41.9 0.151 N 77.821 W 10 G 6.5 6.9 1.2 344 COLOMBIA-ECUADOR BORDER REGION. Ms 7.0 (BRK), 6.7 (PAS). Mo=3.5*10**19 Nm (GS). Mo=6.4*10**19 Nm (HRV). Approximately 1,000 people killed, 4,000 missing, 20,000 homeless, extensive damage, landslides and ground cracks in Napo Province and in the Quito-Tulcan area, Ecuador. About 27 km of the oil pipeline in Ecuador, between Lago Agrio and Baiao, were destroyed or badly damaged. Landslides occurred in the Pasto-Macao area, Colombia. Felt (IV) at Iquitos, Peru. Felt strongly in many parts of Ecuador and southwestern Colombia. Also felt in central Colombia and northern Peru. The focal mechanism is poorly controlled and corresponds to reverse faulting.

MAR 12 23 07 48.7? 51.37 N 20.21 E 10 G 0.1 5 POLAND. ML 2.6 (KRA). Three people killed and three injured in the Slask Mine at Ruda Slaska.

MAR 18 03 36 30.3 32.034 N 131.837 E 54 D 6.4 1.2 534 KYUSHU, JAPAN. Ms 6.7 (BRK), 6.6 (PAS). Mo=9.6*10**18 Nm (GS). Mo=1.2*10**19 Nm (HRV). One person killed; also one person died from a heart attack and five people were injured. Damage (V JMA) and landslides in the Miyazaki area. Felt (IV JMA) in the Kumamoto-Nobeoka-Oita-Sago area, (III JMA) in the Fukuoka-Kagoshima area and in southwestern Shikoku. Felt (I JMA) from Naze, Ryukyu Islands to Mito, Honshu. Seven cm tsunami recorded along the coast of Kyushu. The focal mechanism is moderately well controlled and corresponds to normal faulting with a large strike-slip component.

APR 07 00 40 43.4 37.363 N 141.796 E 29 G 6.4 6.6 1 0 545 NEAR EAST COAST OF HONSHU, JAPAN. Ms 6.4 (PAS), 6.2 (BRK). Mo=1.1*10**19 Nm (GS). Mo=1.1*10**19 Nm (HRV) Minor damage (V JMA) in the Onahama-Watari area. Felt (IV JMA) at Fukushima, Sendai and Tokyo; (III JMA) at Niigata, Maebashi, and Yokohama; (II JMA) at Hachinohe and Ajiro, Honshu and Obihiro, Hokkaido. Felt (I JMA) from Shizuoka, Honshu to Kushiro, Hokkaido and on Hachijo-jima. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a large strike-slip component.

APR 11 02 26 23.6 41.639 N 12.606 E 18 1.2 68 SOUTHERN ITALY. MD 4.1 (FIR), 3.8 (ROM). One person injured slightly and minor damage in the Genzano di Roma-Velletri area. Felt at Rome.

APR 22 20 13 23.1 37.155 N 141.573 E 30 G 6.1 6.6 1.1 505 NEAR EAST COAST OF HONSHU, JAPAN. Ms 6.6 (PAS), 6.4 (BRK). Mo=1.2*10**19 Nm (GS). Mo=1.1*10**19 Nm (HRV). Slight damage (V JMA) at Shirakawa. Felt (IV JMA) at Fukushima, Mito and Onahama; (III JMA) from the Tokyo-Kofu-Toteyama area to Miyako and Morioka; (II JMA) in the Moeboshi-Niigata-Akita area and at Kushiro, Hokkaido. Felt (I JMA) an Hachijo-jima and Oshima and from Shizuoka, Honshu to Hakadate and Urakawa, Hokkaido. The focal mechanism is well controlled and corresponds to reverse faulting.

APR 25 19 22 07.2 2.244 N 98.866 E 11 D 5.9 6.6 1.3 284 NORTHERN SUMATERA. Ms 6.3 (PAS). Mo=2.7*10**18 Nm (GS). Mo=5.1*10**18 Nm (HRV). Two people killed, 22 injured and more than 300 buildings damaged in the Tarutung-Lake Toba area. A hot spring in the area stopped flowing but resumed later. Felt in the Sibolga-Berastagi area Also felt in the Kuala Lumpur area, Malaysia. The focal mechanism is poorly controlled and corresponds to reverse faulting.

APR 29 14 27 35.7 19.013 S 177.736 W 385 G 5.9 1.1 441 FIJI ISLANDS REGION. mb 6.5 (PAS), 6.2 (BRK). Mo=6.3*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting

MAY 02 20 43 53.0 44.818 N 10.723 E 10 G 4.8 1.3 204 NORTHERN ITALY. ML 5.2 (FUR), 5.0 (LDG), 5.0 (TTG) One person died from a heart attack at Parma. Several people injured and slight damage (VII) in the Reggio nell'Emilia-Modena area. Felt from Lucca and Genoa to Milan, Verona and Padova.

MAY 06 04 06 14.1 51.272 N 179.898 W 20 G 6.3 6.4 1.0 477 ANDREANOF ISLANDS, ALEUTIAN IS. ML 6.1 (PMR), Ms 6.5 (BRK), 6.2 (PAS) Mo=1.5*10**19 Nm (GS). Mo=8.5*10**18 Nm (HRV). Felt (V) on Adak. The focal mechanism is poorly controlled and corresponds to reverse faulting

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms	SD	NO STA USED	REGION, CONTRIBUTED MAGNITUDES AND COMMENTS
1987									
MAY 07	03 05 49.1	46.736 N	139.232 E	430 G	6 0		0.9	653	NEAR EAST COAST OF EASTERN USSR. mb 6.6 (BRK), 6.5 (PAS) Mo=2.1*10**19 Nm (GS). Mo=1.8*10**19 Nm (HRV).Two events about 4 seconds apart. Depth based on first event. Felt (IV) in parts of the Sikhote-Alin mountain range. Felt (II JMA) at Aomari, Hachinohe, Morioka and Miyako; (I JMA) at Akita, Takada, Tokyo and Yokohama, Honshu. Felt (II JMA) at Kushiro and Urakawa; (I JMA) at Wakkanai, Rumoi and Asahikawa, Hokkaido The focal mechanism is moderately well controlled and corresponds to reverse faulting with a large strike-slip component
MAY 12	01 30 25.0	7.090 N	126.701 E	25 G	6.2	6.4	1.1	455	MINDANAO, PHILIPPINE ISLANDS. Ms 6.5 (BRK), 5.9 (PAS) Mo=1.2*10*19 Nm (GS). Mo= 5.6*10**18 Nm (HRV) Felt (II RF) at Cagayan de Oro. Also felt at Palo, Leyte. The focal mechanism is poorly controlled and corresponds to reverse faulting.
MAY 18	07 27 00.2	8.302 N	125.362 E	16 *	5.5	5.9	1.3	82	MINDANAO, PHILIPPINE ISLANDS. Mo=2.9*10**18 Nm (HRV) One person killed in Bukidnon Province. Felt (III RF) at Cagayan de Oro. Also felt in the Davao area
MAY 23	17 09 04.4	8.047 N	125.410 E	32	5.1	5.2	1.2	99	MINDANAO, PHILIPPINE ISLANDS. Mo=4.3*10**17 Nm (HRV) One person killed, two people injured and damage in the Talakag-Malaybalay area. Felt (II RF) at Cagayan de Oro and (I RF) at Butuan and Surigao.
MAY 29	06 27 50.7	34.076 N	48.266 E	41	4.9	4.6	1.2	147	WESTERN IRAN. Mo=1.0*10**17 Nm (HRV). Two people killed, 50 injured and damage in the Nahavand-Hamadan-Tuysarkan area.
JUN 10	23 48 53 9&	38.710 N	87.950 W	5	4.9	4.4		173	SOUTHERN INDIANA. <SLM>. mbLg 5.2 (SLM), Ms 4.6 (BRK). One person injured and minor damage (VI) at Lawrenceville, Illinois. Minor damage also reported at Bridgeport, Mt. Carmel and Olney, Illinois; Bloomfield and New Albany, Indiana, and Louisville, Kentucky. Felt in parts of 21 states from Kansas to Pennsylvania and from South Carolina to Minnesota. Also felt in southern Ontario, Canada.
JUN 17	01 32 53.7	5.577 S	130.791 E	67 G	6.6		1.1	523	BANDA SEA. Ms 6.8 (BRK), 6.5 (PAS). mb 6.3 (PAS). Mo=4.7*10**19 Nm (GS). Mo=4.8*10**19 Nm (HRV). Felt on Banda and Ambon. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a large reverse component.
JUN 18	10 01 07.3	17.291 N	121.356 E	43	5.5	6.0	1.4	165	LUZON, PHILIPPINE ISLANDS. Mo=8.0*10**17 Nm (HRV) Eight people killed, five injured, one missing and five houses damaged from landslides. Felt (V RF) in the epicentral area; (IV RF) at Baguio; (III RF) at Manila and Cagayan; (II RF) at Santa and Tuguegarao.
JUN 20	00 37 55.8	51.472 N	16.126 E	13	4.9		1.2	64	POLAND. ML 4.9 (GRF), 4.9 (VKA), 4.7 (KBA). At least three people injured in a mine in the Lubin area.
JUN 24	03 30 30.7	21.179 S	173.581 E	33 N	5.7	6.4	1.3	204	VANUATU ISLANDS REGION. Ms 6.7 (BRK), 6.4 (PAS). Mo=5.6*10**18 Nm (HRV).
JUN 27	00 17 04.6	2.164 S	138.170 E	21 G	5.7	6.5	1.3	231	WEST IRIAN. Ms 6.5 (BRK). Mo=9.1*10**18 Nm (GS). Mo=8.2*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a moderate reverse component.
JUL 06	02 49 42.7	14.074 S	167.828 E	48	5.9	6.6	1.0	304	VANUATU ISLANDS. Ms 7.1 (BRK), 6.5 (PAS). Mo=9.6*10**18 Nm (HRV). Felt strongly on the Banks Islands. A small local tsunami was reported.
JUL 15	07 16 13.5	17.522 N	97.153 W	67 D	5.9		1.1	392	OAXACA, MEXICO. mb 6.5 (BRK), 5.9 (PAS). Mo=2.5*10**18 Nm (GS) Mo=2.6*10**18 Nm (HRV). Felt in Oaxaca, Guerrero and in the Mexico City area. The focal mechanism is poorly controlled and corresponds to normal faulting.
AUG 02	09 07 35.5	24.924 N	115.608 E	29 *	4.9		1.0	97	NEAR SOUTHEASTERN COAST OF CHINA. Eighty-four people injured and about 37,000 houses damaged in the Ganzhou-Xunwu area. Felt (IV) at Hong Kong. Also felt at Guangzhou and Macau.
AUG 08	15 48 56.7	19.022 S	69.991 W	70 G	6.4	6.9	1.1	379	NORTHERN CHILE. mb 6.3 (BRK). Mo=7.3*10**19 Nm (GS) Mo=7.9*10**19 Nm (HRV). Appears to be two events about 5 seconds apart. Depth based on first event. Five people killed, 112 injured and more than 1,000 houses destroyed (VII) in the Arica area. Several landslides occurred along the Chile-Peru border. Damage (VI) at Iquique. Felt (V) at Tacapilla and (III) at Calama and Antofagasta. Felt (III) at La Paz, Bolivia. Felt strongly at Tacna, Moquegua and Lima, Peru. The focal mechanism is moderately well controlled and corresponds to normal faulting.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms	SD	NO STA USED	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1987									
AUG 13	15 23 06.9	17.897 S	70.931 W	37 G	6 1	6.4	1.2	310	NEAR COAST OF PERU. Ms 6.2 (BRK). Mo=9.8*10**18 Nm (GS). Mo=6.7*10**18 Nm (HRV). One person killed, one injured ond additional damage (V) at Arico, Chile. Felt (IV) at Arequipo ond Tacno, Peru. The focal mechanism is poorly controlled ond corresponds to reverse faulting
AUG 14	06 24 04.6	43.734 N	20.413 E	14	5.0		1.2	198	YUGOSLAVIA. ML 4.7 (TTG). Two people injured and domage (VII) in the Kraljevo-Bogutovacka Bonjo areo. Felt (III) at Belgrade and in northern Montenegro. Felt (IV) in the Sofia-Pernik-Vidin area, Bulgoria.
SEP 03	06 40 13.9	58.893 S	158.513 E	33 N	5.9	7.3	1.0	292	MACQUARIE ISLANDS REGION. Ms 7.7 (BRK), 6.9 (PAS). Mo=1.4*10**20 Nm (HRV).
SEP 03	08 01 36.2	59.538 S	159.005 E	33 N	6.1	6.8	1.2	275	MACQUARIE ISLANDS REGION. Mo=1.9*10**19 Nm (HRV).
SEP 04	16 42 49.1	43.242 N	13.874 E	19	5.1	4.6	1.2	225	CENTRAL ITALY. ML 4.7 (VKA), 4.7 (LDG), 4.7 (TRI). MD 5.1 (TTG), 4.8 (KBA). Two people injured and damage (VIII) in the Porto San Giorgio-Fermo-Pedaso area. Some damage in the Civitanova Marche-Porto Recanati area. Felt from Pesoro to Campobasso.
SEP 07	11 57 09.4	31.089 S	177.968 W	33 N	5.8	6.7	1.3	249	KERMADEC ISLANDS REGION. Ms 6.7 (BRK). Mo=8.2*10*18 Nm (GS). Mo=8.6*10**18 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.
SEP 22	13 43 37.6	0.978 S	78.050 W	10 G	6.1	6.2	1.0	306	ECUADOR. Ms 6.1 (BRK). Mo=1.5*10**18 Nm (GS). Mo=4.1*10**18 Nm (HRV). At least 2 people killed, 12 injured, severol houses destroyed or seriously damaged and landslides in the Ambato area. Minor damoge in the Latocunga and Riobambo area. Felt in southern Colombio and northern Peru. The focol mechanism is d poorly controlled and corresponds to reverse faulting with a large strike-slip component.
SEP 28	11 47 08.6	18.411 S	168.058 E	31 D	5.7	6.8	1.3	199	VANUATU ISLANDS. Ms 6.7 (BRK), 6.7 (PAS). Mo=2.0*10**19 Nm (GS). Mo=1.9*10**19 Nm (HRV). Felt
SEP 28	13 46 13.9	18.546 S	168.161 E	25 D	5.8	6.5	1.1	254	VANUATU ISLANDS. Mo=7.4*10**18 Nm (GS). Mo=7.6*10**18 Nm (HRV). The focal mechanism is poorly controlled and carresponds to reverse faulting.
OCT 01	14 42 20.0&	34.061 N	118.078 W	10	5.8	5.7		292	SOUTHERN CALIFORNIA. <PAS>. ML 5.9 (PAS), 6.1 (BRK). Mo=8.4*10**17 Nm (GS). Mo=8.6*10**17 Nm (HRV). Eight people killed, many injured, about 2,200 homeless and more than 10,400 buildings damoged in the Los Angeles-Whittier-Pasadeno area. The earthquake caused 358 million U.S. dollars in property damage. Maximum intensity (VIII) ot Whittier. Felt strongly in much of southern Californio. Felt as far away as Las Vegas, Nevado. The focal mechanism is poorly controlled ond corresponds to reverse faulting with a moderote right-lateral strike-slip component.
OCT 02	22 27 55.8	8.143 S	77.954 W	20 *	5.4	5.1	1.0	144	PERU. Mo=3.3*10**17 Nm (HRV). Three people killed and several homes domaged at Santiago de Chuco. Felt (IV) at Trujillo ond (III) at Chimbote.
OCT 04	10 59 38.2&	34.074 N	118.098 W	8	5.2	4.8		151	SOUTHERN CALIFORNIA. <PAS>. ML 5.3 (PAS), 5.6 (BRK). Mo=8.1*10**16 Nm (HRV). One person died from a heart attack. Some injured and additional damage in the Pasodena-Alhambra-Whittier area. Felt from Ventura County to San Diego to Palm Springs.
OCT 06	04 19 06.0	17.940 S	172.225 W	16 G	6.7	7.3	1.0	455	TONGA ISLANDS REGION. Ms 7.3 (BRK), 7.2 (PAS). Mo=9.6*10**19 (GS) Mo=8.9*10**19 Nm (HRV). Felt at Nukualofo. Felt on American Samoo. Twenty-five cm tsunami recorded at Pago Pago, American Samoa. The focal mechonism is poorly controlled and correspands to to strike-slip faulting with o large normal component.
OCT 12	13 57 04.7	7.288 S	154.371 E	25	6.3	6.8	1.1	363	SOLOMON ISLANDS. Ms 6.8 (BRK), 6.7 (PAS). Mo=3.4*10**19 Nm (HRV). Felt (V) ot Arawa and Panguno, Bougainville. Felt (III) at Rabaul, New Britain. Eight cm tsunami recorded ot Rabaul. The facal mechanism is poorly controlled ond corresponds to strike-slip faulting.
OCT 16	20 48 01.6	6.266 S	149.060 E	48 G	5.9	7.4	1.2	345	NEW BRITAIN REGION. Ms 7.7 (BRK), 7.0 (PAS). Mo=5.3*10**19 Nm (GS). Mo=1.3*10**20 Nm (HRV). Multiple event. Domoge (VIII) at Kandrian. Felt (V) at Kimbe ond Hoskins, (IV) at Bialla and (III) at Rabaul. Felt (V) ot Finschhafen and also felt at Port Moresby, New Guinea. Felt (IV) on Bougainville. Local tsunami generated with 30-meter runup reported at Kandrion. Thirteen cm tsunami recorded at Raboul. The focol mechanism is moderately well controlled and corresponds to reverse foulting with o moderote strike-slip component.
OCT 25	16 54 05.6	2.323 S	138.364 E	33 N	6.2	7.0	1.1	290	WEST IRIAN Ms 6.7 (BRK), 6.7 (PAS). Mo=9.1*10**18 Nm (GS) Mo=1.9*10**19 Nm (HRV). Felt at Jayapura. The focal mechanism is paorly controlled and corresponds to strike-slip faulting with a large reverse component.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Msz	SD	NO STA USED	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1987									
NOV 17	03 40 08.9	12.534 N	87.030 W	76 D	5.8		1.2	392	NEAR COAST OF NICARAGUA. mb 6.2 (PAS) Mo=5.8*10**18 Nm (HRV) Three people injured and damage in the Chinandega-Leon-El Viejo area, Nicaragua. Felt throughout Nicaragua and (IV) at San Salvador, El Salvador Also felt in Honduras, Guatemala and northern Costa Rico. The focal mechanism is poorly controlled and corresponds to reverse faulting with a small right-lateral strike-slip component.
NOV 17	08 46 53.3&	58.586 N	143.270 W	10 G	6.6	6.9		581	GULF OF ALASKA. <AGS>. ML 7.0 (PMR). Ms 7.0 (BRK), 6.8 (PAS). Mo=6.3*10**19 Nm (GS). Mo=6.6*10**19 Nm (HRV). Complex event. Felt (V) at Anchorage, Haines, Seward, Trapper Creek, Valdez and Yakutat. Felt (IV) throughout much of southern Alaska from Juneau to Anchorage. Also felt (IV) at Whitehorse, Yukon Territory. Felt at Kodiak, Alaska and Carcross and Haines Junctian, Yukon Territory Ten cm tsunami recorded at Yakutat. The focal mechanism is well controlled and corresponds to strike-slip faulting with a small reverse component.
NOV 24	01 54 14.5&	33.082 N	115.775 W	5	5.7	6.2		237	SOUTHERN CALIFORNIA. <PAS>. ML 5.8 (PAS), 6.5 (BRK). Mo=9.1*10**17 Nm (GS). Mo=1.4*10**18 Nm (HRV). Two people killed in an earthquake-related automobile accident about 80 km east of Mexicali, Mexico. Slight damage (VI) at Calipatria, El Centro, Heber and Westmorland. Felt throughout much of southern California from San Diego and Los Angeles to Las Vegas, Nevada and Yuma, Arizona. Also felt at Mexicali, Tijuana and Ensenada, Mexico. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting.
NOV 24	11 23 16.9	32.658 N	59.105 E	41	5.3	4.4	1.1	163	IRAN. Mo=1.0*10**17 Nm (HRV). About 485 buildings damaged in 15 villages west of Birjand. Felt at Birjand and Qaen.
NOV 24	13 15 56.5&	33.013 N	115.838 W	2	6.0	6.6		327	SOUTHERN CALIFORNIA. <PAS>. ML 6.0 (PAS), 6.7 (BRK). Mo=6.2*10**18 Nm (GS). Mo=7.2*10**18 Nm (HRV). Multiple event. At least 94 people injured and an estimated 4 million dollars damage in Imperial County. Additional injuries and damage occurred in the Mexicali area, Mexico, with an estimated 3,000 people temporarily homeless. Maximum intensities (VI-VII) at El Centro and Westmorland, (VI) at Brawley, Calexico, Calipatria, Heber, Holtville, Imperial and Seeley. Felt throughout much of southern California from San Diego and Los Angeles to Las Vegas, Nevada and Tempe, Arizona. Also felt at Tijuana and Ensenada, Mexico. Surface fault rupture and afterslip were mapped by California Division of Mines and Geology along a 23 kilometer segment of the Superstition Hills fault. A maximum of 65 centimeters of right-lateral displacement with a few centimeters of vertical displacement was measured. Strong-motion records indicate peak accelerations of 0.21g at Westmorland and 0.36g at El Centro. The focal mechanism is well controlled and corresponds to strike-slip faulting.
NOV 26	01 43 14.0	8.247 S	124.155 E	33 N	5.8	6.5	1.3	158	TIMOR. Ms 6.3 (BRK), 6.3 (PAS). Mo=1.4*10**19 Nm (GS). Mo=8.0*10**18 Nm (HRV). At least 37 people killed, 108 injured and 237 buildings damaged on Pantar Island. Landslides also occurred on the island. Mount Sirung started erupting on December 2. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small normal component.
NOV 30	19 23 19.5&	58.679 N	142.786 W	10 G	6.7	7.6		584	GULF OF ALASKA. <SPEC>. Ms 7.7 (BRK), 7.4 (PAS). ML 7.1 (PMR). Mo=6.6*10**20 Nm (GS). Mo=7.3*10**20 Nm (HRV). Held to foreshock location. Complex event, with major subevent occurring about 15 seconds after onset of the foreshock, observed on broadband displacement seismograms. Damage (VI) at Yakutat from earthquake and tsunami. Felt (V) at Anchorage, Copper Center, Gakona, Haines, Homer, Juneau, Levelock, Petersburg, Seward and Skwentna. Also felt (V) in sections of Whitehorse, Yukon Territory, Canada. Felt (IV) throughout southern Alaska from the Ketchikan area to Glennallen and Kodiak Island and (III) as far away as Bethel and Fairbanks. Also felt at Sand Point and (II) at Anaktuvuk Pass. Some damage caused to two ships at sea in the epicentral area; felt strongly on three other ships in the area. Tsunami generated with wave heights (peak to trough) 85 cm at Yakutat and 25 cm at Sitka, Alaska; 15 cm at Hilo, 12 cm at Nawiliwili and 5 cm at Honolulu, Hawaii; and 5 cm at Presidio, California. The focal mechanism is well controlled and corresponds to strike-slip faulting.
DEC 07	12 26 11.7	13 632 S	167.393 E	48	5.7	6.2	1.0	201	VANUATU ISLANDS. Ms 6.7 (BRK). Mo=3.0*10**18 Nm (HRV).
DEC 07	13 14 34.9	13.559 S	167.454 E	33 N	5.8	6.3	1.0	230	VANUATU ISLANDS. Ms 6.7 (BRK). Mo=2.6*10**18 Nm (HRV).
DEC 17	02 08 19.9	35.362 N	140.214 E	63 D	6.0		1.0	535	NEAR EAST COAST OF HONSHU, JAPAN. Ms 6.4 (BRK). Mo=1.2*10**19 Nm (GS). Mo=7.1*10**18 Nm (HRV). Two people killed, 66 injured and damage in Chiba Prefecture and the Tokyo area. Felt (V JMA) at Chashi, Chiba and Katsuura; (IV JMA) in the Tokyo-Yokohama-Mito-Kumagaya area; (III JMA) in the Onahama-Shizuoka-Iida area and on Oshima and Hachijo-jima. Felt (I JMA) from Tottori to Sendai. The focal mechanism is well controlled and corresponds to strike-slip faulting with a small reverse component.
DEC 17	20 22 58.3	9.169 S	114.610 E	46 G	5.7	5.5	1.1	234	SOUTH OF BALI ISLAND. Mo=1.2*10**18 Nm (HRV). Twenty people injured on Bali. Felt (III) on Lombok and in eastern Java The focal mechanism is poorly controlled and corresponds to normal faulting with a large strike-slip component.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORD'NATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Msz	SD	NO. STA USED	REGION, CONTRIBUTED MAGNITUDES AND COMMENTS
1988									
JAN 03	21 32 25.3	38.111 N	106.336 E	14 D	5.5		1.0	185	NORTHERN CHINA. ML 5.7 (BJI). Mo=8.3*10**16 Nm (HRV). Approximately 60 people injured, more thon 10,000 houses collapsed or damaged and 16 farm animals killed in the Lingwu area. Sandblows alsa occurred in the area.
JAN 05	06 41 16.9	26.807 S	26.639 E	5 G	5.2		1.1	21	REPUBLIC OF SOUTH AFRICA. At least eight people killed at the Vaal Reefs gold mine.
JAN 09	01 02 46.7	41.246 N	19.630 E	24 D	5.3	5.8	1.3	323	ALBANIA. ML 5.5 (TTG), 5.1 (ATH). Mo=9.0*10**17 Nm (HRV). Same people injured and 188 buildings damaged (VII) in the Tirana area. Felt throughaut Albania. Felt (VI) in the Ulcinj-Bar area; (V) in the Petravac-Kotar-Titograd area and in western Macedonia; (IV) in northern Montenegro and sauthern Serbia, Yugoslavia.
JAN 12	07 29 27.9	28.827 S	177.423 W	15 D	6.1	6.4	1.1	373	KERMADEC ISLANDS REGION. Ms 6.7 (BRK). Mo=9.0*10**18 Nm (GS). Mo=7.9*10**18 Nm (HRV). Felt on Raoul. The facal mechanism is poorly contralled and correspands to reverse faulting.
JAN 19	07 30 31.8	24.710 S	70.568 W	33 N	6.3	6.7	1.3	296	NEAR COAST OF NORTHERN CHILE. Ms 6.4 (BRK). Mo=3.8*10**19 Nm (GS). Mo=3.5*10**19 Nm (HRV). Felt (V) at Antofagasta and Taltal; (IV) at Calama, Chanaral and Copiapo; (III) at Tacapilla. The facal mechanism is paorly contralled and carresponds to reverse faulting.
JAN 22	03 57 25.2	19.798 S	133.910 E	5 G	6.1	6.4	1.0	309	NORTHERN TERRITORY, AUSTRALIA. Ms 6.6 (BRK). Mo=3.3*10**18 Nm (GS). Mo=3.5*10**18 Nm (HRV). Damage in the Tennant Creek area. The facal mechanism is paarly controlled and carresponds to strike-slip faulting with a maderate reverse campanent.
JAN 22	12 04 57.8	19.829 S	133.882 E	5 G	6.5	6.7	1.1	344	NORTHERN TERRITORY, AUSTRALIA. Ms 6.9 (BRK). Mo=5.9*10**18 Nm (GS). Mo=9.2*10**18 Nm (HRV). Damage in the Tennant Creek area. Felt over two-thirds af Australia. According to preliminary reparts fram the Australian Bureau af Mineral Resaurces, Geology and Geophysics, two fault scarps abaut 8 km apart striking approximately east-sautheast were observed in the epicentral area. The southernmast scarp was abaut 15 km lang with a maximum throw af about ane meter. The facal mechanism is paarly cantralled and carresponds to reverse faulting.
FEB 05	14 01 02.7	24.753 S	70.433 W	37 D	6.2	6.7	1.1	313	NEAR COAST OF NORTHERN CHILE. Ms 6.7 (PAS), 6.6 (BRK). Mo=5.3*10**19 Nm (GS). Mo=6.6*10**19 Nm (HRV). Minar damage (VI) in the Taltal area. Felt (VI) at Antofagasta; (V) at Mejillones, Calama, Copiapa and Chanaral; (III) at Caldera. Alsa felt at La Serena. A tsunami with a maximum amplitude af 12 cm peak ta traugh was recorded at Caldera. The facal mechanism is paarly cantrolled and carresponds to reverse faulting with a maderate right-lateral strike-slip campanent.
FEB 06	14 50 45.2	24.688 N	91.570 E	33 N	5.8	5.8	1.2	309	INDIA-BANGLADESH BORDER REGION. Mo=6.0*10**17 Nm (GS). Mo=6.7*10**17 Nm (HRV). Two people killed, at least 100 injured and damage in the Sylhet, Bangladesh area. Felt throughaut Bangladesh. Felt strangly in the Tripura-Assam, India area. Alsa felt at Gauhati and Shillong, India. The facal mechanism is paarly cantralled and corresponds to strike-slip faulting with a large reverse campanent.
FEB 11	15 25 55.6&	34.077 N	118.047 W	12	4.8			54	SOUTHERN CALIFORNIA. <PAS>. ML 4.7 (PAS), 4.8 (BRK). One person died fram a heart attack. Same minar injuries and damage (VI) in the Whittier area. Felt (V) at Alhambra, Arcadia, Azusa, Baldwin Park, Bell Gardens, Commerce, Dawney, Fullerton, Glendale, Inglewood, La Mirada, La Puente, Las Angeles, Maywaad, Montebello, Narwalk, Pasadena, San Gabriel and Vernan. Felt strangly in much af southern Califarnia.
FEB 24	03 52 03.2	13.477 N	124.616 E	25 D	6.0	7.0	1.0	453	LUZON, PHILIPPINE ISLANDS. Ms 7.1 (BRK), 6.9 (PAS). Mo=8.1*10**19 Nm (GS). Mo=8.6*10**19 Nm (HRV). Slight damage (VI RF) at Virac. Felt (V RF) in the Naga-Legaspi-Catbalagan area and (III RF) at Cebu and Manila. The facal mechanism is paarly controlled and corresponds to reverse faulting.
FEB 26	06 17 31.5	37.319 S	47.989 E	10 G	6.1	6.7	1.1	375	ATLANTIC-INDIAN RISE. Mo=1.7*10**19 Nm (GS). Mo=1.8*10**19 Nm (HRV).
FEB 29	05 31 41.4	55.149 N	167.430 E	33 N	6.1	6.8	1.1	446	KOMANDORSKY ISLANDS REGION. Ms 6.6 (PAS), 6.5 (BRK). Mo=2.6*10**19 Nm (HRV). The facal mechanism is poorly cantralled and corresponds to strike-slip faulting with a maderate reverse component.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	MS	SE	NO STA USED	REGION, CONTRIBUTED MAGNITUDES AND COMMENTS
1988									
MAR 06	22 35 38.1&	56.953 N	143.032 W	10 G	6.8	7.6		759	GULF OF ALASKA. <AGS>. ML 7.4 (PMR), Ms 7.5 (BRK). Mo=1.0*10**20 Nm (GS). Mo=4.9*10**20 Nm (HRV). Felt (V) at Anchorage, Cordova, Glennallen, Gustavus, Homer, Juneau, Metlakatla, Pelican, Port Graham, Sitka and Valdez. Also felt (V) in some sections of Whitehorse, Yukon Territory, Canada. Felt (IV) at Kodiak, (III) at Craig and Ketchikan and (II) at King Salmon. Estimated 5,000 dollars damage caused to the ships "Exxon North Slope," "Exxon Boston" and "Exxon New Orleans" located at 57° 38' North, 142° 45' West. Tsunami generated with wave heights (peak to trough) 38 cm at Yakutat, 12 cm at Sitka and 8 cm at Kodiak. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small normal component.
MAR 10	06 17 23.3	10.402 N	60.587 W	56 D	6.2	6.4	1.1	458	TRINIDAD. Ms 6.6 (BRK), 6.3 (PAS). Mo=1.1*10**19 Nm (GS). Mo=1.1*10**19 Nm (HRV). Slight damage (VI) on Trinidad. Felt strongly throughout Trinidad, on offshore oil platforms and in northeastern Venezuela. *Also felt in Guyana and on Tobago, Martinique, Grenada* and St. Vincent. Felt as far away as Caracas, Venezuela. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a large normal component.
MAR 17	20 34 29.2	35.633 N	139.619 E	103	5.4		1.1	325	NEAR SOUTH COAST OF HONSHU, JAPAN. Mo=3.1*10**17 Nm (HRV). Ten people injured in the Tokyo area. Slight damage (IV JMA) at Chiba, Kawaguchi-ko, Kumagaya, Tateyama and Utsunamiya. Felt (III JMA) in the Onahama-Choshi-Ajiro-Kofu area and on Oshima and Miyake-jima. Felt (I JMA) from Hikone to Miyako and on Hachijo-jima.
MAR 30	02 12 42.8	30.890 N	50 194 E	33	5.4	5.7	1.1	306	IRAN. Mo=7.4*10**17 Nm (HRV). Twenty-four people injured, at least 700 houses damaged and landslides in the Deh Dasht area.
APR 08	23 13 24.1	3.409 S	145.697 E	32 D	5.6	6.4	1.3	121	NEAR NORTH COAST OF PAPUA NEW GUINEA. Ms 6.7 (BRK), 6.3 (PAS). Mo=3.6*10**18 Nm (GS). Mo=4.9*10**18 Nm (HRV). Two events about 4.5 seconds apart. The focal mechanism is well controlled and corresponds to strike-slip faulting with a small normal component.
APR 12	23 19 55.5	17.192 S	72.305 W	33 G	6.1	7.0	1.2	353	NEAR COAST OF PERU. Ms 6.9 (BRK), 6.5 (PAS) Mo=2.9*10**19 Nm (GS). Mo=4.8*10**19 Nm (HRV). Felt (IV) at Arequipa. Also felt in the Ica area. Felt (III) at Arica and Iquique, Chile. The focal mechanism is *poorly controlled and corresponds* to reverse faulting.
MAY 09	16 23 59.7	18.090 N	76.500 W	10 G	4.5	4.0	1.0	20	JAMAICA REGION. Three people injured and slight damage (VI) in the Kingston-Linstead-lower St. Andrew area. Felt widely on Jamaica.
MAY 30	21 11 11.3	7.501 S	128.325 E	86 G	6.5		1.1	410	BANDA SEA. Mo=2.4*10**19 Nm (GS). Mo=2.0*10**19 Nm (HRV). Felt strongly in northern Australia. The focal mechanism is poorly controlled and corresponds to reverse faulting.
JUN 18	22 49 42.3	26.856 N	110.996 W	10 G	5.9	7.0	1.2	290	GULF OF CALIFORNIA. Mo=8.4*10**18 Nm (GS). Mo=1.1*10**19 Nm (HRV). Felt at Caborca, Ciudad Obregan, Guaymas and Navojoa, Mexico. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting.
JUN 19	20 19 52.6	12.376 N	121.067 E	17 D	5.6	6.4	1.4	172	MINDORO, PHILIPPINE ISLANDS. Mo=1.0*10**19 Nm (GS). Mo=2.6*10**18 Nm (HRV). Two people killed, four injured and damage (VII RF) in the San Jose area. Felt (VI RF) at Calapan. Also felt (II RF) at Legaspi, Luzon. The focal mechanism is moderately well controlled and correponds to strike-slip faulting with a small reverse component.
JUL 03	05 20 39.7*	25.109 N	121.542 E	21 *	4.7		1.3	10	TAIWAN. Eleven people injured by rockslides. Felt in northern Taiwan.
JUL 05	20 32 07.2	5.964 S	148.780 E	53 G	6.0	6.8	1.0	112	NEW BRITAIN REGION. Ms 6.4 (PAS), 6.3 (BRK). Mo=1.5*10**19 Nm (GS). Mo=1.5*10**19 Nm (HRV). Seven water tanks and four bush houses destroyed (V) in the Kandrian area. A tsunami was generated, but caused no damage, in the Arawe Islands area. Felt (V) at Kimbe and (IV) at Rabaul. Felt (IV) at Papondetta and (III) at Lae, New Guinea. The focal mechanism is poorly controlled and corresponds to reverse faulting.
JUL 20	23 15 36.6	23.902 N	121.598 E	51 G	5.8	5.7	1.1	344	TAIWAN. Ms 5.4 (BRK). Mo=7.7*10**17 Nm (GS). Mo=8.1*10**17 Nm (HRV). One person killed and one injured. Landslides damaged a major highway between Hua-lien and Su-hua. Felt throughout most of Taiwan. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a large reverse component

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms	SE	NO STA USED	REGION. CONTRIBUTED MAGNITUDES AND COMMENTS
1988									
JUL 23	14 25 36.7	22.127 S	174 900 E	19 G	5.9	6.4	1.0	279	LOYALTY ISLANDS REGION. Ms 6.6 (BRK), 6.0 (PAS) Mo=7.5*10**18 Nm (GS). Mo=4.4*10**18 Nm (HRV) The focal mechanism is poorly controlled and corresponds to normal faulting.
JUL 23	15 17 08.1	6.526 S	152.779 E	17 G	6.7	6.7	0.9	402	NEW BRITAIN REGION. Ms 6.8 (BRK), 6.5 (PAS). Mo=1.2*10**19 Nm (GS). Mo=3.2*10**19 Nm (HRV) Felt (IV) at Robaul. Also felt (IV) at Arowa and Panguno, Bougainville. The focal mechanism is moderately well controlled and corresponds to normal faulting with o moderate strike-slip component.
JUL 25	06 46 06.6	6.081 S	133.667 E	28 G	6.5	6.7	1.0	419	AROE ISLANDS REGION. Ms 6.9 (BRK), 6.7 (PAS). Mo=3.2*10**19 Nm (GS). Mo=2.8*10**19 Nm (HRV). Two events about 5 seconds apart. Felt at Darwin, Australia. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a large normal component.
AUG 06	00 36 24.6	25.149 N	95.127 E	91 G	6.8	7.2	1.1	654	BURMA-INDIA BORDER REGION. Ms 7.3 (BRK). Mo=8.9*10**19 Nm (HRV). Three people killed, 12 injured and considerable damage and landslides in the Gauhoti-Sibsagar-Imphal area, India. Subsidence of about 20 centimeters occurred in the Gauhati area, India. About 30 people injured and some damage in Bangladesh. Two people killed and about 30 missing when a possible seiche on the Jamuna River at Aricha, Bangladesh caused a ferry boat to capsize. Some damage in the Homalin area, Burma. Felt throughout Bangladesh and northeastern India, including Calcutta. Also felt in parts of northwestern Burma and at Kathmandu, Nepal. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a moderate strike-slip component.
AUG 10	04 38 26.1	10.366 S	160.819 E	34 G	6.1	7.4	1.5	255	SOLOMON ISLANDS. Ms 7.4 (BRK), 7.1 (PAS). Mo=6.4*10**19 Nm (GS). Mo=2.5*10**20 Nm (HRV). Two events about 10 seconds apart. One person killed and about 100 homes washed away in 13 villages along the southwestern coast of San Cristobal where a tsunami flooded 50-100 meters inland. Felt widely on Guadalcanal, San Cristobal, Malaita and neighboring islands. Seventeen cm tsunami (peak to trough) recorded at Honiara, Guadalcanal. The focal mechanism is poorly controlled and corresponds to reverse faulting.
AUG 10	06 38 42.8	10.199 S	160.855 E	40 D	5.8	6.6	1.1	209	SOLOMON ISLANDS. Felt on Guadalcanal and San Cristobal.
AUG 11	16 04 45.6	29.974 N	51.679 E	33 N	5.7	6.1	1.3	288	SOUTHERN IRAN. Mo=1.4*10**18 Nm (HRV). One person killed, several injured and more than 2,000 houses damaged in the Mamasani area. Felt at Bushehr, Nurabad and Shiraz.
AUG 14	17 53 09.7	27.260 S	71.092 W	33 G	5.7	6.5	1.0	308	NEAR COAST OF NORTHERN CHILE. Ms 6.5 (BRK), 6.1 (PAS). Mo=1.0*10**19 Nm (GS). Mo=1.1*10**19 Nm (HRV). Felt (VI) at Caldera and Atacama, (V) at Copiapo, (IV) at Freirina and Valparaiso, (III) at Santiago and (II) at Linares. The focal mechanism is poorly controlled and corresponds to reverse faulting.
AUG 20	23 09 09.5	26.755 N	86.616 E	57 G	6.4	6.6	1.1	555	NEPAL-INDIA BORDER REGION. Ms 6.8 (BRK), 6.5 (PAS). Mo=2.1*10**19 Nm (GS). Mo=2.3*10**19 Nm (HRV). Seven hundred twenty-one people killed, 6,553 injured and 64,470 buildings damaged in eastern Nepal, including the Kathmandu Valley. Maximum intensity VIII. Liquefaction observed in a 5,500 sq. km area of southern Nepal. At least 277 people killed, thousands injured and extensive damage in northern Bihar, India, particularly in the Darbhanga-Madhubani-Saharsa area. Damage in the Gangtok area, Sikkim and in the Darjiling area, India. Felt in large parts of northern India from Delhi to the Burma border and in much of Bangladesh. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a large strike-slip component.
SEP 02	07 26 23.6	49.886 N	18.489 E	10 G			1.0	11	CZECHOSLOVAKIA. ML 3.8 (GRF), 3.0 (VKA), 2.9 (KRA). Three miners killed and four injured at Orlava.
SEP 06	00 42 33.7?	6.06 S	146.23 E	0 G			0.1	4	EAST PAPUA NEW GUINEA REGION. ML 4.3 (PMG). About 74 people killed and many houses destroyed by a massive landslide near Kaiapit. The P-waves recorded from this event appear to have been generated by the landslide itself.
SEP 25	20 52 14.7	37.180 N	71.811 E	11 D	5.5	5.0	1.1	249	AFGHANISTAN-USSR BORDER REGION. Mo=2.0*10**17 Nm (HRV). Several hundred houses, some schools, hospitals and other facilities were damaged (VI) in the Roshtkala-Khorog area, USSR. Felt at Ishkashim and Boidzhuan; (III) at Dushanbe, Rogun, Charsady, Kamarou and Dzherino, USSR.
OCT 08	04 46 24.5	18.771 S	172.415 W	35 G	6.6	6.8	1.0	500	TONGA ISLANDS REGION. Ms 6.8 (BRK), 6.5 (PAS). Mo=Mo=4.8*10**19 Nm (HRV). Two events about 6 seconds apart. Felt (IV) throughout Samoa. Felt on Raoul Island, Kermadec Islands. The focal mechanism is poorly controlled and corresponds to reverse faulting.
OCT 10	18 20 25.0	28.644 S	177.553 W	28 G	6.5	6.0	1.0	411	KERMADEC ISLANDS REGION. Ms 6.0 (BRK). Mo=3.1*10**18 Nm (GS). Mo=2.3*10**18 Nm (HRV). Felt on Raoul Island. The focal mechanism is poorly controlled and corresponds to reverse faulting with o large strike-slip component.

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1988									
OCT 16	12 34 05.6	37.938 N	20.932 E	25	5.5	5.8	1.4	300	IONIAN SEA. ML 5.5 (ATH). Mo=7.5*10**17 Nm (HRV). Twenty five people injured and extensive damage in the Killini-Vartholomion area, Greece. Damage and landslides on Zakinthos. Also felt in Aitolia-Akarnania Province and in the Athens area
OCT 31	10 12 58.4	36.443 N	2.759 E	12	5.4	5.6	1.2	271	ALGERIA Mo=3.1*10**17 Nm (HRV). Fifty-seven people injured. 200 left homeless and considerable damage in the Blido area. Felt in the Medea-Algiers area.
NOV 03	14 47 10.7	13.881 N	90.450 W	69 D	5.6		1.1	334	NEAR COAST OF GUATEMALA. Ms 6.0 (BRK), 6.0 (PAS). Mo=9.0*10**18 Nm (HRV). Five people killed, same injured and about 100 buildings damaged (VI) in southern Guatemala. Landslides occurred at Palin and in the San Vicente Pacaya area. Damage to roads in Chimaltenango Department. Felt (V) at San Salvador, El Salvador. Felt strongly at Tapachula, (IV) at Mexico City and also felt in parts of Oaxaca and Veracruz, Mexico. Felt in parts of Honduras and at Managua, Nicaragua.
NOV 06	13 03 19.3	22.789 N	99.611 E	18 G	6.1	7.3	1.6	397	BURMA-CHINA BORDER REGION. Ms 7.0 (BRK), 6.9 (PAS). Mo=4.5*10**20 Nm (GS). Mo=3.7*10**19 Nm (HRV). Three events about 9 seconds apart. Seven hundred thirty people killed, 3,900 injured, 267,000 homeless, 29 reservairs severely damaged and 67 percent of the public buildings destroyed in the Lancang-Menglian area, China. About 3.2 million people in China were affected by the quake. Several highways were cut or covered by mudslides and damage occurred in large parts of southwestern Yunnan Province, China. Felt strongly throughout Yunnan Province A number of aftershocks were felt throughout the province. Damage in the Chiang Rai area, Thailand. Also felt at Lashio, Burma and Bangkok, Thailand. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small reverse component.
NOV 06	13 15 43.3	23.181 N	99.439 E	10 G	6.4		1.0	318	BURMA-CHINA BORDER REGION. Damage and casualties included in the event of 06 November 1303 UTC. Felt at Lashia, Burma and Bangkok, Thailand.
NOV 07	03 50 00.8	22.239 S	175.018 E	22 D	5.7	6.7	1.1	211	SOUTH OF FIJI ISLANDS. Ms 6.8 (BRK), 6.5 (PAS). Mo=1.8*10**19 Nm (HRV).
NOV 10	01 17 49.4	21.230 N	108.545 E	10 G	4.6		1.1	24	EASTERN CHINA. Seventy-one people injured and damage in the Qinzhou-Fangcheng area. Felt strongly at Nanning. Also felt at Wuzhou and Guangzhou.
NOV 14	02 15 39.1	3.527 S	150.120 E	33 N	5.9	6.6	1.4	131	NEW IRELAND REGION. Ms 6.6 (BRK), 6.5 (PAS). Mo=1.3*10**19 Nm (HRV). Felt (V) at Kavieng. Felt (III) at Rabaul, New Britain. The focal mechanism is poorly controlled and corresponds to reverse faulting with a moderate strike-slip component.
NOV 17	06 55 46.0	12.399 N	124.537 E	19 G	6.0	6.6	1.5	288	SAMAR, PHILIPPINE ISLANDS. Ms 6.4 (BRK). Mo=9.4*10**18 Nm HRV). Two events about 3 seconds apart. Twenty-nine people injured and damage (VI RF) at Catarman. Felt (V RF) at Catbalogan and (IV RF) in southeastern Luzon and on Masbate. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a moderate reverse component.
NOV 18	19 38 54.6	6.125 S	149.785 E	61 G	5.8	6.4	1.3	252	NEW BRITAIN REGION. Ms 6.8 (BRK), 6.4 (PAS). Mo=9.5*10**18 Nm (GS). Mo=8.2*10**18 Nm (HRV). Felt (III) at Rabaul. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a large reverse component.
NOV 27	04 17 56.2	22.749 N	99.852 E	16 *	5.0	5.1	1.0	108	BURMA-CHINA BORDER REGION. Mo=1.9*10**17 Nm (HRV). One person injured and additional damage in southwestern Yunnan Province, China.
NOV 30	08 13 29.7	22.773 N	99.844 E	15 D	5.6	6.0	1.1	246	BURMA-CHINA BORDER REGION. Mo=1.5*10**18 Nm (HRV). Several people injured and substantial additional damage in southwestern Yunnan Province, China. Felt at Kunming, China.
DEC 03	11 38 26.4&	34.149 N	118.135 W	13 G	4.4	4.2		61	SOUTHERN CALIFORNIA. <PAS>. ML 4.9 (PAS), 5.0 (BRK). Some minor injuries and slight damage reported in the Pasadena area. Also slight damage (VI) at Bell Gardens, Los Angeles, Los Nietas, Norwalk and Pico Rivera. Felt (V) at Arcadia, Artesia, Azusa, Bell, Bellflower, Burbank, Cedarpines Park, Chatsworth, Dana Point, Downey, Glendale, Hawthorne, Huntington Beach, Hawaiian Gardens, Inglewood, La Canada, La Habra, Lynwood, Maywood, Montebello, Mount Wilson, Ontario, Palmdale, San Dimas, San Gabriel, Sierra Madre, South El Monte, Sun Valley, Torrance, Tujunga, Walnut and Whittier. Felt throughout much of southern California.
DEC 06	13 20 41.0	29.948 N	51.652 E	10 G	5.5	5.7	1.3	304	SOUTHERN IRAN. Mo=7.8*10**17 Nm (HRV). Seven people injured and damage to more than 21 villages in the Momasani area. Also felt at Shiraz and Bushehr.

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1988									
DEC 07	07 41 24.2	40.987 N	44.185 E	5 G	6.2	6.8	1.3	530	TURKEY-USSR BORDER REGION. Ms 7.0 (BRK), 6.9 (PAS) Mo=1.7*10**19 Nm (GS). Mo=1.6*10**19 Nm (HRV). Two events about 3 seconds apart. At least 25,000 people killed, 19,000 injured and 500,000 homeless in the Leninakan-Spitak-Kirovakan area of northern Armenia, USSR. More than 20 towns and 342 villages were affected and 58 of them were completely destroyed. Damage totalled 16.2 billion U.S. dollars. Damage (X) at Spitak and (IX) at Leninakan, Kiravakan and Stepanovan. Surface faulting 10 km in length and with a maximum throw of 1.5 m occurred. Power transmission lines were severely damaged and landslides buried railroad tracks in the epicentral area. Damage occurred in the Kelbadzhar area, Azerbaijan, USSR. Felt (VII) at Tabatskuri and Borzhomi; (VI) at Bogdanovka, Tbilisi and Yerevan; (V) at Goris; (IV) at Makhachkala and Groznyy; (III) at Sheki and Shemakha, USSR. Four people killed and damage in the Tuzluca-Kagizman-Kars area, Turkey. Felt in the Tabriz-Orumiyeh area, Iran. The focal mechanism is moderately well controlled and corresponds to right-lateral strike-slip faulting with a large reverse component.
DEC 07	07 45 44.8	40.974 N	44.246 E	10 G	5.9		1.3	91	TURKEY-USSR BORDER REGION. Additional damage and casualties.
1989									
JAN 10	05 55 01.4	3.162 S	130.556 E	47	5.9	6.5	1.2	206	CERAM. Ms 6.7 (BRK), 6.6 (PAS). Mo=9.6*10**18 Nm (GS). Mo=1.2*10**19 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.
JAN 19	06 53 28.8&	33.919 N	118.627 W	12	5.2	4.8		174	SOUTHERN CALIFORNIA. <PAS>. ML 5.0 (PAS), 5.2 (BRK). Several people injured, some broken windows and many items knocked from store shelves in the Malibu-Santa Monica-Redondo Beach area. Slight damage (VI) at Hollywood, Lancaster, Los Angeles, Malibu and Monterey Park. Felt in Kern, Orange, Los Angeles, San Bernardino, San Diego, Santa Barbara, Riverside and Ventura Counties.
JAN 22	23 02 07.1	38.465 N	68.694 E	33 N	5.3		0.9	205	TAJIK SSR. Two hundred seventy-four people killed, many injured, extensive damage (VII) and mudslides in the Gissar area. Nearly all the casualties were caused by mudslides which buried Sharora and two nearby villages. Felt (VI) at Gulkhani and Sarkishti; (V) at Dushanbe and Tursunzade; (IV) at Denau and Nurek
FEB 10	11 15 24.6	2.305 N	126.760 E	44 G	6.2	6.8	1.3	376	MOLUCCA PASSAGE. Ms 6.6 (BRK), 6.4 (PAS) Mo=4.0*10*19 Nm (PPT). Mo=4.8*10**19 Nm (GS). Mo=5.4*10**19 Nm (HRV). Felt at Manado and Bitung, Sulawesi. The focal mechanism is poorly controlled and corresponds to reverse faulting with a large strike-slip component.
FEB 19	12 27 09.9	35.964 N	139.788 E	60	5.5		1.1	287	NEAR SOUTH COAST OF HONSHU, JAPAN. Mo=2.6*10**17 Nm (HRV). One person killed and one injured. Felt (IV JMA) at Tokyo, Utsunomiya and Mito; (III JMA) at Kumagaya, Choshi, Yokohama and Tateyama; (II JMA) at Shirakawa, Maebashi and Kawaguchi-ko; (I JMA) at Ofunato.
FEB 25	11 26 35.4	29.915 S	177.885 W	31 G	6.1	6.7	1.1	353	KERMADEC ISLANDS. Ms 6.6 (BRK), 6.3 (PAS). Mo=1.3*10**19 Nm (PPT). Mo=2.1*10**19 Nm (GS). Mo=1.4*10**19 Nm (HRV). Felt (V) on Raoul Island. The focal mechanism is poorly controlled and corresponds to reverse faulting with a large strike-slip component
MAR 08	11 44 32.3	1.031 N	126.189 E	32 G	5.9	5.6	1.0	307	MOLUCCA PASSAGE. Mo=1.5*10**18 Nm (GS). Mo=1.4*10**18 Nm (HRV). Two hundred thirty-three houses and public buildings damaged and 5,500 people left homeless on Morotai, Indonesia. Sixteen houses damaged and some homeless at Tanawangu, Halmahera. The focal mechanism is poorly controlled and corresponds to reverse faulting.
MAR 10	14 14 10.2	4.346 S	152.797 E	53	5.6	5.4	0.9	259	NEW BRITAIN REGION. Mo=5.5*10**17 Nm (HRV). One person killed by a landslide in the Rabaul area. Felt (V) at Rabaul.
MAR 10	21 49 45.8	13.702 S	34.420 E	30 G	6.2	6.1	0.9	448	MALAWI. Ms 6.6 (BRK). Mo=4.3*10**18 Nm (GS). (Mo=3.1*10**18 Nm (HRV). At least 9 people killed, 100 injured and damage in the Salima-Dedza-Mchinji area. About 50,000 left homeless in Malawi. Felt strongly in much of central Malawi. Felt in Niasso and Tete Provinces, Mozambique. Also felt in Zambia The focal mechanism is poorly controlled and corresponds to normal faulting with a moderate strike-slip component.
MAR 11	05 05 00.6	17.766 S	174.761 W	230 G	6.4		1.3	515	TONGA ISLANDS. mb 6.7 (BRK). Mo=2.5*10**19 Nm (GS). Mo=2.5*10**19 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting.

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1989									
MAR 13	13 02 14.7	50.711 N	9.896 E	1 G	5.4	4.7	1.3	324	GERMANY. ML 5.8 (ZUR), 5.7 (GRF), 5.6 (BNS), 5.5 (LDG) Rockburst triggered by blasting at the Ernst Thaelmann Mine near Merkers. Three people injured and 80 percent of buildings damaged in the Vaelkershausen area. Felt in large parts of Germany, as far west as Koln and Dusseldorf. Also felt in France, Czechoslovakia, Switzerland and Austria.
APR 11	03 56 36.9	49.488 N	159.185 E	16 G	6.3	6.6	1.0	545	KURIL ISLANDS REGION. Ms 6.1 (BRK), 6.0 (PAS) Mo=3.0*10**19 Nm (PPT). Mo=1.1*10**19 Nm (GS). Mo=1.5*10**19 Nm (HRV). Felt (V) at Severo-Kurilsk, Mys Vasilyevo and on Shumshu; (IV) at Petropavlovsk-Kamchatskiy. The focal mechanism is poorly controlled and corresponds to normal faulting.
APR 15	20 34 08.9	29.987 N	99.195 E	13 G	6.2	6.2	1.2	406	SICHUAN PROVINCE, CHINA. Mo=3.5*10**18 Nm (GS). Mo=5.3*10**18 Nm (HRV). Four people killed, five injured and considerable damage in the Batang area. Seven people killed, at least 37 injured and additional damage in the area due to a number of aftershocks. The focal mechanism is poorly controlled and corresponds to normal faulting.
APR 20	22 59 54.0	57.166 N	121.976 E	26 G	6.1	6.5	0.9	545	EASTERN USSR. Ms 6.3 (BRK), 5.9 (PAS). Mo=2.9*10**18 Nm (GS). Mo=3.1*10**18 Nm (HRV). Felt (VI) at Khani, Oleksa and Yuktali; (V) at Ikabya, Kuvykta, Khatymi, Neryungri and Berkakit; (IV) at Yakutsk, Chita and Blagoveshchensk. Also felt strongly at Ust-Nyukzha. The focal mechanism is poorly controlled and corresponds to reverse faulting.
APR 25	14 29 00.5	16.773 N	99.328 W	19 G	6.2	6.8	1.2	380	NEAR COAST OF GUERRERO, MEXICO. Ms 7.1 (BRK), 6.5 (PAS). Mo=1.4*10**19 Nm (PPT) Mo=2.4*10**19 Nm (HVR). Mo=2.6*10**19 Nm (PAR). Three people killed, a few injured and some damage at Mexico City. Minor damage reported in the Acapulco area. Felt strongly in much of southern Mexico and as far away as Guadalajara. The focal mechanism is poorly controlled and corresponds to reverse faulting.
APR 27	02 20 04.7	30.601 N	140.589 E	85 G	6 1		1.0	454	SOUTH OF HONSHU, JAPAN. mb 6.6 (BRK). Mo=6.0*10**17 Nm (PPT). Mo=1.7*10**18 Nm (GS). Mo=3.1*10**18 Nm (HRV). Felt (II JMA) at Tokyo, Tateyama and on Chichi-shima; (I JMA) at Chashi, Hiroo, Onahama and on Hachijo-jima. The focal mechanism is poorly controlled and corresponds to reverse faulting with a moderate left-lateral strike-slip component.
MAY 03	05 53 01.1	30.091 N	99.475 E	14 G	6.1	6.1	1.0	422	SICHUAN PROVINCE, CHINA. Mo=2.2*10**18 Nm (HRV). Two people injured by a landslide which blocked the highway between Chengdu and Batang. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a large normal component.
MAY 03	09 13 24.2	29.947 N	51.674 E	33 N	5.1	6.2	1.0	46	SOUTHERN IRAN Mo=8.4*10**16 Nm (HRV). Four people injured and seven villages severely damaged in the Mamasani area.
MAY 04	00 22 06.7	11.038 N	68.270 W	16	5.4	5.2	1.0	227	NEAR COAST OF VENEZUELA. Mo=2.1*10**17 Nm (HRV). More than 2,000 people made homeless in the Tucacas area. Felt strongly in the states of Falcon and Carabobo. Also felt at Caracas and in parts of Aragua and Miranda.
MAY 05	18 28 39.4	8.281 S	71.381 W	593 G	6.4		1.0	589	WESTERN BRAZIL. mb 6.7 (BRK), 6.5 (PAS). Mo=5.0*10**19 Nm (PPT). Mo=3.9*10**19 Nm (GS). Mo=4.8*10**19 Nm (HRV). Felt at Feijo, Brazil and Puyo, Ecuador. The focal mechanism is poorly controlled and corresponds to normal with a small right-lateral strike-slip component.
MAY 07	00 38 18.5	23.553 N	99.526 E	33 N	5.3	5.6	1.1	266	BURMA-CHINA BORDER REGION. Mo=3.3*10**17 Nm (HRV) At least one person killed, 91 injured and 5,300 houses destroyed in the Gengma area, China. Felt strongly in Lancang and Menglian Counties. Direct economic losses of more than 54 million U.S. dollars were sustained.
MAY 14	00 59 50.4	30.523 S	178.414 W	44 G	5.9	6.6	1.1	396	KERMADEC ISLANDS. Ms 6.4 (BRK), 6.3 (PAS). Mo=2.5*10**19 Nm (PPT). Mo=1.9*10**19 Nm (GS). Mo=2.5*10**19 Nm (HRV). Two events about 5 seconds apart Felt (IV) on Raoul Island. The focal mechanism is poorly controlled and corresponds to reverse faulting.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATE LAT	LONG	DEPTH	MAGNITUDE GS MB	MS	MO	NO. STA USED	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1989									
MAY 23	10 54 46.3	52.341 S	160.568 E	10 G	6 4	8.2	1.3	399	MACQUARIE ISLANDS REGION. Ms 8.0 (BRK), 7.8 (PAS) Mo=2.5*10**21 Nm (PPT). Mo=1.5*10**21 Nm (GS) Mo=1.4*10**21 Nm (HRV). Mo=2.1*10**21 Nm (PAR) Complex event. Felt (V) on Campbell Island. Also felt on Macquarie Island. Small tsunami reported along the southeastern coast of Tasmania and in Jervis Bay and Sydney Harbour, Australia. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting.
MAY 27	20 08 37.3	30.167 N	50.921 E	31	5.6	5.8	1.0	405	IRAN. Ms 5.4 (BRK). Mo=1.3*10**18 Nm (HRV). Seventeen people injured, several houses damaged and about 100 cattle killed in the Da Gabadan area. Felt in the Bushehr-Shiraz area and at Mamasani. Also felt in Kuwait.
MAY 31	05 54 20.5	45.383 S	167.086 E	23 G	5.8	6.3	1.2	278	SOUTH ISLAND, NEW ZEALAND. Ms 6.5 (BRK). Mo=3.6*10**18 Nm (GS). Mo=5.3*10**18 Nm (HRV). Mo=6.0*10**18 Nm (PPT). Felt strongly in the southwestern part of South Island. Also felt at Wellington. The focal mechanism is poorly controlled and corresponds to reverse faulting.
JUN 08	06 24 09.6	6.837 N	37.878 E	19	5.0	4.8	0.9	91	ETHIOPIA. Mo=2.9*10**16 Nm (GS). Minor injuries to a few people and damage at Soda.
JUN 12	00 04 09.7	21.861 N	89.763 E	6 G	6.1	5.1	0.9	412	BANGLADESH. Mo=4.3*10**17 Nm (GS). Mo=5.8*10**17 Nm (HRV). One person killed, at least 100 injured and minor damage in the Banaripara area. Felt throughout eastern Bangladesh from Chittagong to Rangpur. Also felt in Meghalaya, India. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small reverse component.
JUN 25	20 37 32.4	1.134 N	79.616 W	15 G	5.9	6.1	1.0	364	NEAR COAST OF ECUADOR. Ms 6.0 (BRK), 6.0 (PAS). Mo=3.6*10**18 Nm (GS). Mo=3.4*10**18 Nm (HRV). Thirty people injured and 12 homes damaged (VII) in the Esmeraldas area. Felt (III) at Guayaquil and (II) at Quito Felt throughout Ecuador and southwestern Colombia. The focal mechanism is poorly controlled and corresponds to reverse faulting.
JUN 26	03 27 03 9&	19.217 N	155.050 W	9	5.8	6.1		302	HAWAII <HVO> MD 6.2 (HVO). Ms 6.2 (BRK), 6.2 (PAS). Mo=5.4*10**18 Nm (GS). Mo=5.2*10**18 Nm (HRV). Two events about 5 seconds apart. Five people injured slightly, 5 homes destroyed and about 100 homes damaged in the Puna District. Landslides occurred in several places and blocked a road at Honamu. Slight damage (VI) at Hawaii National Park, Hilo, Honamu and Keaau. Felt (V) at Honakaa, Kapaau, Kurtistown, Ninole, Oakala, Paauhau and Volcano; (IV) at Hakalau, Hawi, Halualaa, Honaunau, Laupahoehoe and Pohala Felt throughout the island of Hawaii. Also felt on Maui and Oahu. A small tsunami was generated with maximum wave heights (peak-to-trough) of 57 cm at Hanuapa, 21 cm at Kapaho and 14 cm at Hilo. The focal mechanism is moderately well controlled and corresponds to reverse faulting with a moderate strike-slip component.
JUN 26	10 38 39.4	39.112 N	28.242 W	11 G	5.7	5.7	1.1	390	AZORES ISLANDS. Ms 5.4 (BRK). Mo=6.7*10**17 Nm (GS). Mo=5.4*10**17 Nm (HRV). Several people injured slightly and minor damage (VI) on Graciosa. Felt (V) on Terceira and (IV) on Faial, Pico and Sao Jorge. The focal mechanism is moderately well controlled and corresponds to strike-slip faulting with a small normal component.
JUL 09	02 09 09.1	34.942 N	139.193 E	5 G	5.1	5.0	1.2	138	NEAR SOUTH COAST OF HONSHU, JAPAN. Mo=8.0*10**16 Nm (HRV). At least 18 people injured (IV JMA), landslides and roads cracked in the Ito area. Felt (IV JMA) at Ajiro and (III JMA) at Tokyo, Yokohama, Mishima, Tateyama and on Oshima.
JUL 14	20 42 40.0	8.081 S	125.129 E	10 G	6.4	6.2	1.2	394	TIMOR. Mo=1.1*10**19 Nm (HRV). Mo=1.3*10**19 Nm (PPT) Seven people injured seriously and 38 buildings damaged on Alor. The focal mechanism is poorly controlled and corresponds to reverse faulting with a moderate strike-slip component.
AUG 01	00 18 04.8	4.511 S	139.022 E	14 G	6.0	5.8	1.3	235	WEST IRIAN. Ms 5.7 (BRK). Mo=3.3*10**18 Nm (GS). Mo=1.7*10**18 Nm (HRV). About 120 people killed and 125 injured by landslides which buried two villages in the Kurimo district. Landslides also blocked the Baliem River. Felt at Wamena. The focal mechanism is poorly controlled and corresponds to reverse faulting.
AUG 03	07 42 40.8	43.522 N	45.362 E	18 D	5.0	5.0	1.2	190	EASTERN CAUCASUS. Mo=6.3*10**16 Nm (HRV). One person killed and damage (VI) in the Groznyy area. Felt (IV) at Buynaksk and (III) at Makhachkala.

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LONG	DEPTH	MAGNITUDES GS MB	Ms	SE	NO STA USED	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1989									
AUG 08	08 13 27.5&	37.130 N	121.952 W	15	4.9	4 5		60	CENTRAL CALIFORNIA <BRK>. ML 5.4 (BRK). Mo=2.6*10**16 Nm (BRK) One person killed, some minor injuries ond damage (VI) in the Los Gatos, Compbell ond Saratoga areas. Also slight damage (VI) at Ben Lamond. Brookdale, Cupertino, Haly City, Redwood Estotes and Santa Cruz. Felt (V) throughaut much af the San Francisca Bay area. Felt fram San Luis Obispa to Sonoma and east as far as Tracy.
AUG 20	11 16 56 5	11 766 N	41.942 E	12 G	5.8	6 3	1.0	449	ETHIOPIA. Ms 6.1 (BRK), 5.5 (PAS). ML 5.8 (ARO). Mo=1.2*10**18 Nm (GS). Mo=6.2*10**18 Nm (HRV). Two people killed, twa injured and damage and rockslides caused in the Galafi-Yoboki areo, Djibouti. Ground cracks were abserved at Galafi and faur springs were destroyed in the area. Felt strangly throughout Djibouti. Damage and landslides occurred in northeostern Ethiopia, particularly alang the Aseb-Adis Abebo highway. Felt at Aseb. The focal mechanism is maderately well contralled and corresponds to narmal faulting with a maderate strike-slip component.
AUG 29	04 16 23.0	18.039 N	105.667 W	21 G	5.7	6.6	1.2	214	OFF COAST OF JALISCO, MEXICO. Ms 6.7 (BRK), 6.4 (PAS). Ma=1.3*10**19 Nm (PPT). Mo=4.8*10**18 Nm (GS). Mo=6.9*10**18 Nm (HRV). Felt along the coast of Jalisco. Alsa felt at Guadalajara and in the southern part af the Mexica City areo. The focal mechanism is moderately well controlled and corresponds ta strike-slip faulting with o small reverse campanent.
SEP 04	13 14 58.2	55.543 N	156.835 W	11 G	6.5	6.9	1.2	507	SOUTH OF ALASKA. ML 6.9 (PMR). Ms 6.7 (BRK), 6.4 (PAS). Mo=3.7*10**19 Nm (GS). Ma=4.6*10**19 Nm (HRV). Two events obout 2.5 seconds aport. Felt (V) ot Chignik, Chignik Lagoon and Part Heiden; (IV) at Perryville. Sand Point and Tagiok; (III) ot Egegik, Homer, King Cove, Pilat Point and Unaloska; (II) at King Salman. Also felt ot Cald Bay and Kenai The focal mechanism is poorly controlled and corresponds to reverse faulting
SEP 16	02 05 08.9	40.337 N	51.534 E	55 D	6.4	6.5	1.0	563	CASPIAN SEA. Ms 6.6 (BRK). 6.5 (PAS) Mo=5.6*10**18 Nm (GS). Ma=4.5*10**18 Nm (HRV). Felt (VI) at Baku and Neftyanyye Kamni, (V) at Sumgait and (IV) at Lenkaran, Divichi and Siazan, USSR. Same minor damage reported in the area. Felt in northwestern Iran. The focal mechanism is poorly controlled and carresponds to normal faulting.
SEP 16	23 20 53.2	16 497 N	93.671 W	108 G	6 0		1.3	415	CHIAPAS, MEXICO. mb 6.6 (BRK), 6.3 (PAS). Mo=3.0*10**18 Nm (PPT). Mo=1.8*10**18 Nm (GS) Mo=1 7*10**18 Nm (HRV). Felt in the central and southern regions of the country including Mexico City, Oaxaca, Tuxtla Gutierrez and Villahermosa. The focal mechanism is poorly controlled and correspands to reverse faulting.
SEP 22	02 25 50.8	31.583 N	102.433 E	15 G	6.1	6.1	1.1	441	SICHUAN PROVINCE, CHINA. Ma=1.6*10**18 Nm (GS). (Mo=1.8*10**18 Nm (HRV). At leost 54 people injured. about 4,270 houses destrayed, more than 300 animals killed and damage caused ta bridges, highways and to a phasphorus mine in Xiaojin County. The focal mechanism is moderately well cantrolled and corresponds to strike-slip faulting with a moderate reverse campanent.
OCT 01	02 59 06.3	30.960 N	51.421 E	42	5.2	4.7	1.0	246	IRAN At least 300 hames damaged and four landslides blocked roads in the Deh Borzarg-e Sisakht area. Felt in the Yasuj areo.
OCT 07	15 48 29.0	51.314 N	179.028 W	20 G	6.1	6.7	1.0	533	ANDREANOF ISLANDS, ALEUTIAN ISLANDS. Ms 6.2 (BRK). 6.1 (PAS). Ma=3.0*10**19 Nm (PPT). Mo=1.8*10**19 Nm (HRV). Twa events about 2.5 seconds apart. Felt (IV) on Adak and Amchitka. The facal mechanism is poorly controlled and corresponds to reverse faulting.
OCT 13	21 19 57.9	34.726 N	139.531 E	26 D	5.3	4.8	1.2	196	NEAR SOUTH COAST OF HONSHU, JAPAN. Ma=1.3*10**17 Nm (GS). Ma=1.5*10**17 Nm (HRV). Two people injured. Felt (IV JMA) at Yokahama and an Oshima; (III JMA) at Tateyama, Ajiro, Kofu, Mishima and Tokya; (II JMA) at Kawaguchi-ko and Nagatsuro; (I JMA) at Shizuoka. Also felt (IV) at Yakosuka.
OCT 18	00 04 15.2&	37.036 N	121.883 W	19	6.5	7.1		600	CENTRAL CALIFORNIA. <GM>. ML 7.0 (BRK). Mo=4.0*10**19 Nm (PPT). Mo=2.3*10**19 Nm (GS). Mo=2.5*10**19 Nm (HRV). Three events about 1.5 and 3.0 seconds apart, respectively. Sixty-two people killed, 3,757 injured and damage estimated at 5 6 billion U.S. dollars Maximum intensity IX in ports of Oakland and San Francisco. Numerous landslides occurred in the epicentral area and liquefaction occurred in same areas of Oakland and San Francisco. Felt fram Eureko to Las Angeles and east as far as Fallon. Nevada. Also felt in highrise buildings in San Diego. A small tsunami with maximum wave height (peak-to-trough) of 40 cm was recorded at Monterey The focal mechanism is maderately well controlled and carresponds to reverse faulting with a large strike-slip component

DATE	ORIGIN TIME UTC HR MN SEC	GEOGRAPHIC COORDINATES LAT	LON	DEPTH	MAGNITUDE MB	MS	NO	GAP	REGION CONTRIBUTED MAGNITUDES AND COMMENTS
1989									
OCT 18	14 57 22.4	39.893 N	113.884 E	10 D	5.1	5.3	1.3	125	NORTHEASTERN CHINA. Mo=1.4*10**17 Nm (HRV). At least 29 people killed, 150 injured and about 27,500 houses damaged in the Datong-Yangyuan area. Felt at Beijing
OCT 27	21 04 51.8	11.022 S	162.350 E	25 G	6.1	7.0	1.1	354	SOLOMON ISLANDS. Ms 7.1 (BRK), 6.8 (PAS). Mo=3.0*10**19 Nm (PPT). Mo=2.9*10**19 Nm (HRV). Two events about 3 seconds apart. Felt on San Cristobal and (IV) on Guadalcanal. Minor landslide and ground fissure at Mwoniwaro Village, Santa Catalina. The focal mechanism is poorly controlled and corresponds to reverse faulting.
OCT 29	05 25 38.2	39.571 N	143.333 E	10 G	6.0	6.6	1.0	409	OFF EAST COAST OF HONSHU, JAPAN. Ms 6.4 (PAS), 6.1 (BRK). Mo=2.7*10**19 Nm (GS). Mo=5.8*10**18 Nm (HRV). Felt (III JMA) at Hachinohe, Miyako, Morioka, Ofunato and Sakato; (II JMA) at Akita, Aomori, Sendai, Ishinomaki and Mutsu. Felt from central Honshu to Hokkaido. Small tsunami recorded with maximum wave heights 11 cm at Ofunato, 10 cm at Ayukawa, 6 cm at Miyako and 3 cm at Hachinohe. The focal mechanism is poorly controlled and corresponds to reverse faulting.
OCT 29	19 09 12.9	36.788 N	2.448 E	6 G	5.7	5.7	1.2	461	ALGERIA. Ms 5.9 (PAS). Mo=1.1*10**18 Nm (GS). Mo=9.6*10**17 Nm (HRV). At least 30 people killed, 245 injured and damage (VIII) in the Cherchell-Tifazo area. Felt (IV) in the Balearic Islands, Spain. The focal mechanism is poorly controlled and corresponds to strike-slip faulting with a moderate reverse component.
OCT 29	19 21 52.4	36.745 N	2.443 E	10 G	5.4	5.6	1.1	367	ALGERIA. Additional casualties and damage in the Cherchell-Tifaza area.
NOV 01	18 25 34.9	39.837 N	142.760 E	29 G	6.4	7.4	1.1	550	NEAR EAST COAST OF HONSHU, JAPAN. Ms 7.4 (BRK), 7.1 (PAS). MO=1.3*10**20 Nm (PPT). Mo=8.8*10**19 Nm (GS). Mo=1.4*10**20 Nm (HRV). Felt (IV JMA) at Aomori and Morioka, (III JMA) at Misawa and (I JMA) at Yamagata. Also felt (I JMA) in parts of Hokkaido. Tsunami generated with wave heights 56 cm at Miyako, 34 cm at Ayukawa, 24 cm at Hachinohe and 20 cm at Ofunato. The focal mechanism is poorly controlled and corresponds to reverse faulting with a moderate left-lateral strike-slip component.
NOV 20	03 21 07.8	29.882 N	106.804 E	33 N	5.2	4.7	0.9	177	SICHUAN PROVINCE, CHINA. Four people killed, 161 injured and at least 1,000 homes destroyed in Jiongbei County
NOV 20	04 19 04.6	29.892 N	57.718 E	18 D	5.6	5.7	1.1	312	SOUTHERN IRAN. Ms 5.5 (BRK). Mo=8.2*10**17 Nm (HRV) At least 3 people killed, 45 injured and damage in the Shahdad area.
NOV 29	01 00 14.8	15.808 S	73.242 W	71 G	6.1		1.1	366	SOUTHERN PERU. mb 6.5 (PAS), 6.1 (BRK). Mo=4.0*10**18 Nm (PPT). Mo=1.7*10**18 Nm (GS). Mo=3.2*10**18 Nm (HRV). Felt (IV) at Arequipa. The focal mechanism is poorly controlled and corresponds to reverse faulting with a moderate strike-slip component.
DEC 09	20 38 08.5	0.141 N	123.340 E	151 G	6.2		1.1	427	MINAHASSA PENINSULA. mb 6.8 (PAS). Mo=2.0*10**19 Nm (PPT). Mo=1.2*10**19 Nm (GS). Mo=1.2*10**19 Nm (HRV). The focal mechanism is poorly controlled and corresponds to reverse faulting with a moderate left-lateral strike-slip component.
DEC 15	18 43 45.0	8.337 N	126.729 E	24 G	6.2	7.3	1.4	204	MINDANAO, PHILIPPINE ISLANDS. Ms 7.4 (BRK), 6.9 (PAS). Mo=4.0*10**20 Nm (PPT). Mo=2.4*10**20 Nm (HRV). Mo=2.3*10**20 Nm (PAR). Two events about 10.5 seconds apart. At least one person killed and many injured on Mindanao. Damage (VII RF) at Bislig. Felt (VI RF) at Cotabato and Davao and (I RF) at Dipolog. Also felt (IV RF) on Camiguin, (III RF) on Cebu and (I RF) in southeastern Luzon. The focal mechanism is poorly controlled and corresponds to reverse faulting.
DEC 27	23 26 57.0	32.967 S	151.619 E	10 G	5.4		1.0	132	NEAR SOUTHEAST COAST OF AUSTRALIA. MD 5.5 (CNB). Twelve people killed, more than 100 injured and estimated 1.1 billion U.S. dollars damage (VIII) caused in the Newcastle area. Damage occurred as far away as Liverpool, Scone and Gladstone. Felt in a 200,000 sq. km area of New South Wales and the Australian Capital Territory from Albury and Coomo to Coffs Harbour and Inverell and as far west as Narromine. Also felt by people in highrise buildings in Gold Coast and Melbourne. Believed to be the first earthquake in Australian history that has caused deaths
DEC 30	23 18 51.6	3.406 S	145.966 E	38 D	5.6	6.6	1.3	144	NEAR NORTH COAST OF PAPUA NEW GUINEA. Ms 7.0 (BRK), 6.4 (PAS). Mo=1.6*10**19 (PPT). Mo=1.1*10**19 Nm (HRV). Felt (III) on Karkar and Manam.

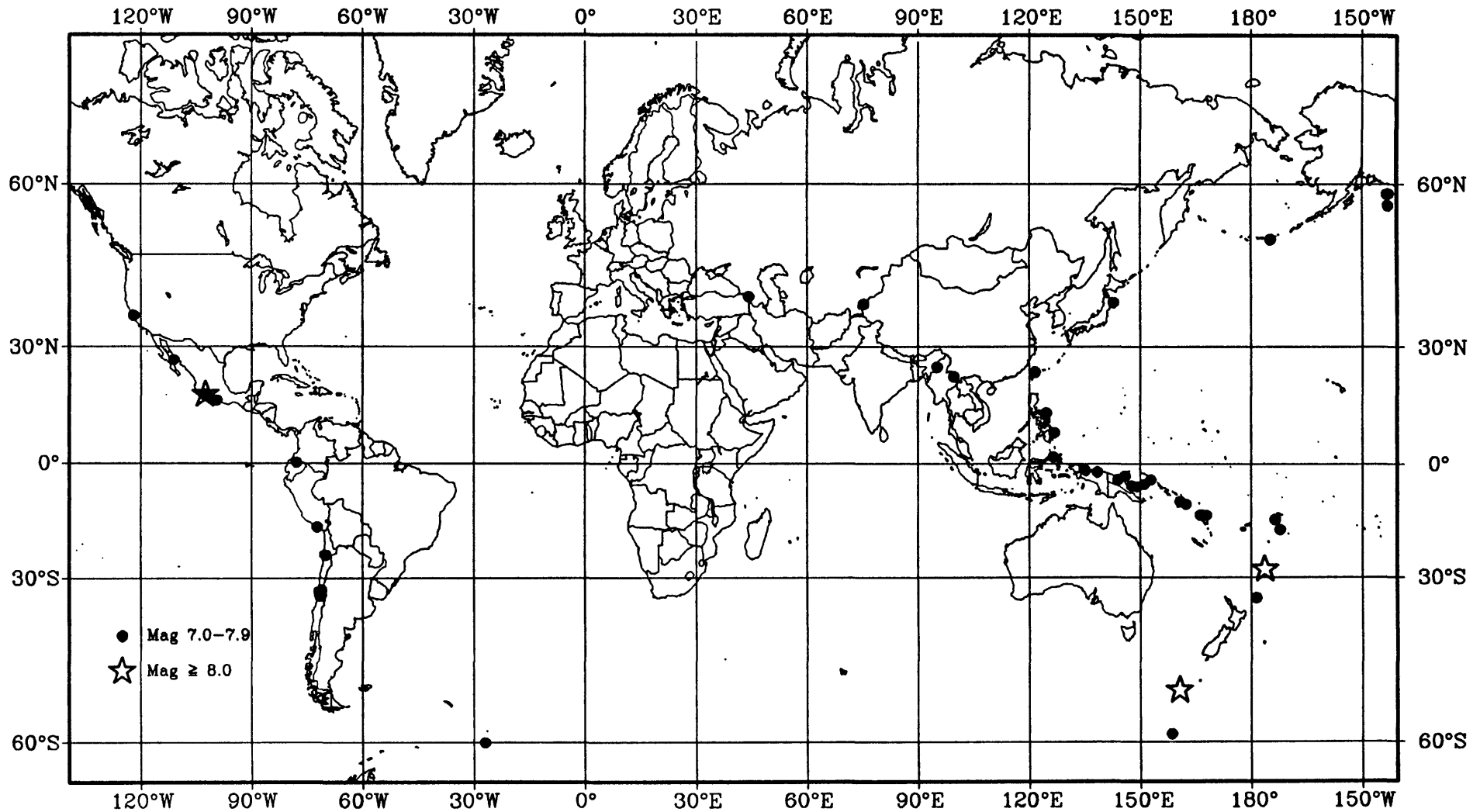
1988

AUG 14	20 03 03.9&	39.128 N	110.869 W	10	5 5	267	UTAH <SLC-P> ML 5.3 (SLC). Slight damage (VI) at Clawson, Cleveland, Elmo, Ferran, Orangeville and Sunnyside Felt (V) at Axtell, East Carbon, Fairview, Green River, Helper, Huntingtan, Hiawatha, Keniwarth, Moab, Spring City, Teasdale and Wellington Felt (IV) at Cisco Fountain Green, Hanksville, La Sal, Lyman, Lynndyl, Manti, Price, Spanish Fork, Tarrey and Vernal. Also felt (IV) at Dove Creek, Fruita, Grand Junction, Lomo and Mack, Colorado. Landslides in the epicentral area and at Canyonlands National Park. Felt throughout much of central and southern Utah and western Colorado. Felt as far as Golden, Colorado and Albuquerque, New Mexico
NOV 25	23 46 04.5&	48.117 N	71.183 W	29	5 9 5.8	534	SOUTHERN QUEBEC. <OTT>. Ms 5.7 (BRK). Damage in the Chicoutimi–La Malbaie area and in the Quebec City area. Maximum intensity VII. Landslides reported in the La Tuque area Felt in Canada from southern Ontario to Nova Scotia and western Labrador. Felt (V) in parts of Maine, Vermont, New Hampshire and New York. Felt in the New England states and in parts of Indiana, Michigan, New Jersey, New York, Ohio, Pennsylvania, Wisconsin and as far south as Washington, D.C.

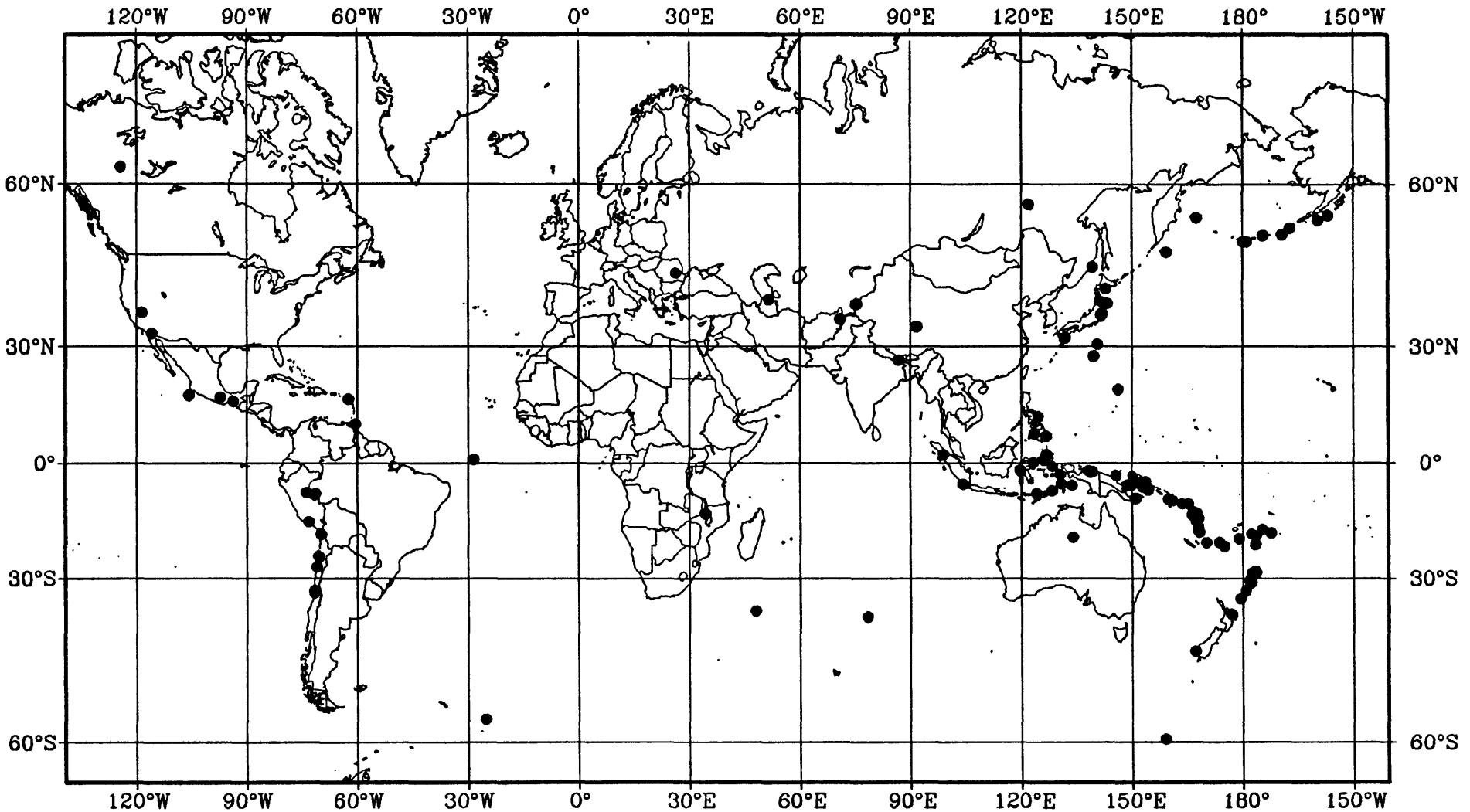
1989

DEC 25	14 24 32.6	60.080 N	73.445 W	5 G	6.2 6.3 0.8	465	NORTHERN QUEBEC. MS 6.2 (BRK), 6.2 (PAS), mbLg 6.1 (OTT). Felt strongly at Kuujjuaq

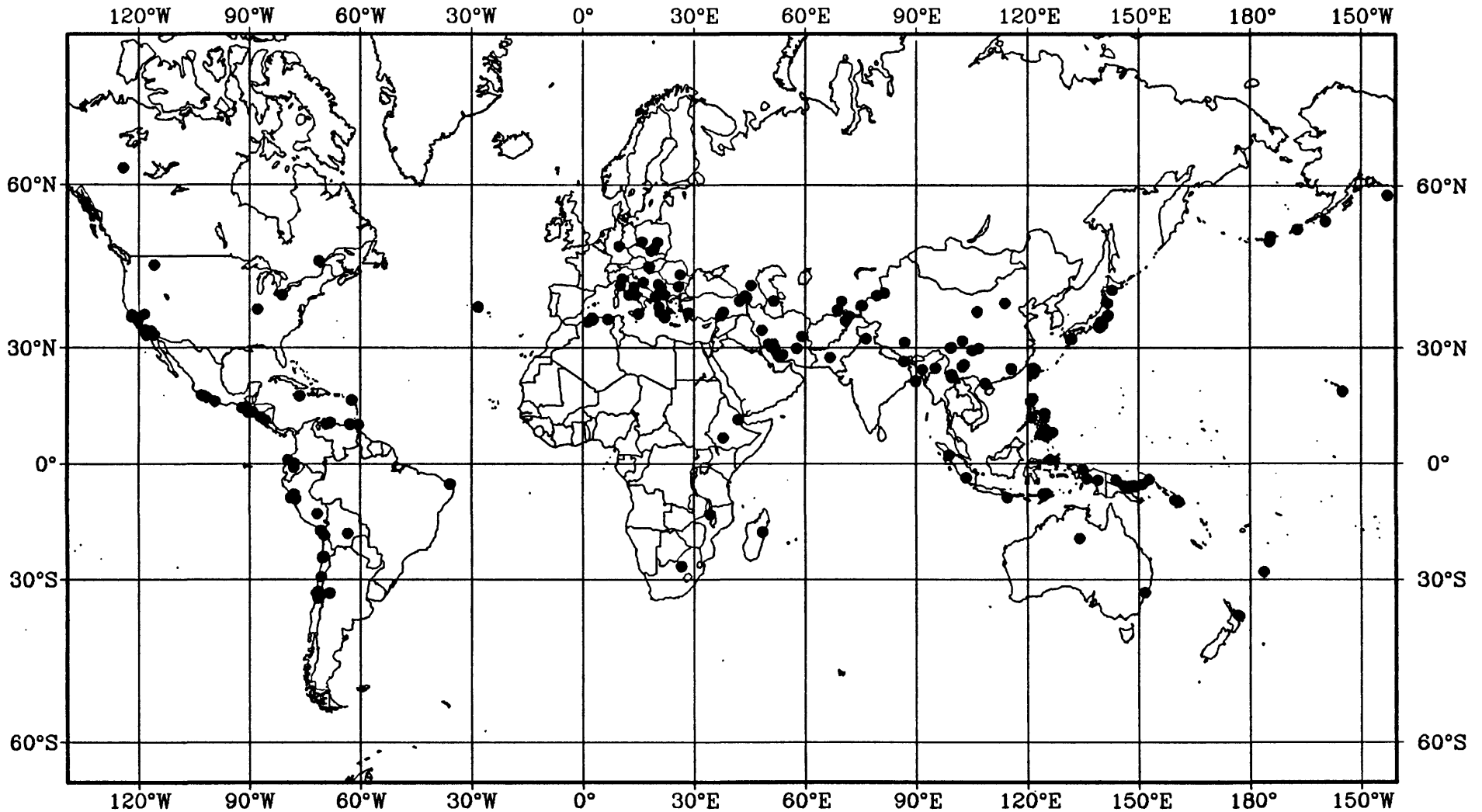
Earthquakes with Magnitude 7.0 or Greater (1985–1989)



Earthquakes with Magnitude 6.5 to 6.9 (1985–1989)



Significant Earthquakes (1985–1989) Causing Damage and/or Casualties



EXPLANATION OF ABBREVIATIONS AND SYMBOLS APPEARING IN THIS PUBLICATION

Abbreviations in Heading

MB - Body wave magnitudes.
Msz - Vertical surface wave magnitudes.
UTC - Coordinated Universal Time. HR MN SEC - Hour, minute, second
SD - Standard Deviation from the arithmetic mean of residuals
No. Sta. - Number of stations reporting P or PKP phases used in computation

Symbols and Abbreviations Used in Comments

BRK--University of California, Berkeley, CA. PAS--California Institute of Californina, Pasadena, CA.
PAL--Lamont Doherty Geophysical Observatory, Palisades, NY. AGS--USGS Alaska Seismic Project, Menlo Park, CA.
ARO--Arta Observatory, Djibouti. ATH--Athens Observatory, Greece. BJI--State Seismological Bureau, Beijing, China.
BNS--Nordrheim-Westfalen Bensberg, Germany. CNB--Canberra Observatory, Australia FIR--Firenze Ximeniano (Florence), Italy.
FUR--Geophysikaliches Observatorium, Fuerstenfeldbruck, Germany. GRF--Groefenberg Arroy, Erlangen, Germany.
HVO--Hawaiian Volcano Observatory KBA--Borrage Koelnbrein, Austria. KRA--Observatorium Sejsmologiczne, Krakow, Poland.
LDG--Laboratoire de Detection et de Geophysique, France. LJU--Seizmoloski zavod Slovenije, Ljubljana, Yugoslavia.
MHI--Mashad University. Mashad, Iran. OTT--Geological Survey of Canada, Ottawa, Canada. PMG--Port Moresby, Papua New Guinea
PMR--Alaska Tsunami Warning Center, Palmer, Alaska. ROM--Istituto Nazionale di Geofisica, Rome, Italy.
SKO--University Seismological Observatory, Skopje, Yugoslavia. SLM--St. Louis University, St. Louis, Missouri.
TRI--Instituto Nationale di Geofisica, Trieste, Italy. TTG--Seismological Institute of Montenegro, Titograd, Yugoslavia.
VKA--Universitat Wien, Vienna-Kobenzl, Austria. ZUR--Institute fur Geophysik, Zurich, Switzerland.

GM U.S. Geological Survey, Menlo Park, California.
GS U.S. Geological Survey, National Earthquake Information Service (NEIS), Golden, Colorado.
JMA Japan Meteorological Agency, Tokyo (also used to indicate 7-point Japanese Intensity Scale).
MD Duration Magnitude.
RF Rossi-Forel Intensity Scale.
SPEC An NEIS solution based on use of dense local networks, a local crustal model, or other methods not routinely applied in calculating the hypocenter parameters.
Roman Numerals Used to indicate intensity (when not followed by RF or JMA they refer to the Modified Mercalli Scale or any 12-point intensity scale closely related to it).

Symbols Following Depth

N Indicates the depth was restrained at 33 km for earthquakes whose character on seismograms indicates a shallow focus but whose depth is not satisfactorily determined by the data.

D Indicates the depth was restrained by the computer program based on 2 or more compatible pP phases and/or unidentified secondary arrivals used as pP.

G Indicates the depth was restrained by a geophysicist. Some depths are from broadband displacement seismograms.

* Indicates a less well-constrained free depth. The 90% marginal confidence interval on depth is greater than 8.5 km and less than or equal to 16.0 km.

The lack of any symbol indicates that the 90% marginal confidence interval on depth is less than or equal to 8.5 km, or that a contributed hypocenter was computed with a free depth, regardless of the size of the confidence interval.

Symbols Following Origin Time

& Indicates that parameters of the hypocenter were supplied or determined by a computational procedure not normally used by the National Earthquake Information Service (NEIS). The source or nature of the determination is indicated by a 2 to 5 letter code enclosed by angle brackets and appearing in the first line of comments. These codes are included with the list of abbreviations above.

* Indicates a less reliable solution. In general, the geometric mean of the semi-major and semi-minor axes of the horizontal 90% confidence ellipse is greater than 8.5 km and less than or equal to 16.0 km.

? *Indicates a poor solution, published for completeness of the catalog. In general,* the geometric mean of the semi-major and semi-minor axes of the horizontal 90% confidence ellipse is greater than 16.0 km. This includes a poor solution computed using data reported by a single network.

The lack of any symbol indicates that the geometric mean of the semi-major and semi-minor axes of the horizontal 90% confidence ellipse is less than or equal to 8.5 km.

APPROXIMATE CORRELATION OF GRADES FOR INTENSITY SCALES REPORTED IN THIS PUBLICATION

Modified Mercalli 1931	Japanese, 1950 (JMA)	Rossi-Forel, 1873 (RF)
I	0	I
II	I	I-II
III	II	III
IV	II-III	IV-V
V	III	V-VI
VI	IV	VI-VII
VII	IV-V	VIII-
VIII	V	VIII+-IX
IX	V-VI	IX+
X	VI	X
XI	VII	X
XII	VII	X

FAULT PLANE SOLUTION

A fault plane solution is determined when possible for any earthquake having a magnitude ≥ 5.6, using first motions from P, PKP, pP and pPKP waves. A description of the solution is reported in the Additional Focal Parameters section of the Preliminary Determination of Epicenters Monthly Listing. First motion data used to compute the solution are available upon request from the National Earthquake Information Center at the address given above.

TRAVEL-TIME TABLES

In general, all hypocenters have been computed based on the 1940 Jeffreys-Bullen P and 1968 Bolt PKP travel-time tables. Some other earth model or computational procedure may have been used for those hypocenters which have been indicated by an ampersand (&) following the origin time.

MACROSEISMIC INFORMATION

Macroseismic information is compiled from various sources, including newspaper articles, Foreign Broadcast Information Service messages, U.S. Geological Survey Earthquake Reports and seismological station reports. Macroseismic information for the Newcastle, Australia earthquake of December 27, 1989 was extracted fromthe January 1990 edition of the University of Queensland Geology Museum News Letter, which summarized results of a Queensland government task force on the earthquake. Sources of information for particular events can be supplied on request from: U.S. Geological Survey, National Earthquake Information Center, Stop 967, Box 25046, Denver Federal Center, Denver, CO 80225, U.S.A.

GEOGRAPHIC REGIONS

The regions shown in the comments column are from the seismic and geographical regionalization of Flinn, Engdahl and Hill (1974), *with occasional name changes which have been given in various issues of the Preliminary Determination of Epicenters Monthly Listing.* The boundaries of these regions are defined at one degree intervals and differ slightly from irregular political boundaries.

NEIS MAGNITUDES

All magnitudes are NEIS magnitudes unless otherwise indicated. Average magnitudes are computed by a 25% trimmed mean as described by Rosenberger, J. L. and Gasko, M., 1983, "Comparing location estimators: trimmed means, medians, and trimean" in Understanding Robust and Exploratory Data Analysis, ed. Hoaglin, D.C., Mosteller, F., and Tukey, J. W., John Wiley, New York.

Ms These surface wave magnitudes are computed from the I.A.S.P.E.I. formula:

$$Ms = \text{Log}(A/T) + 1.66 \text{ Log } D + 3.3$$

where,

A is the maximum ground amplitude in micrometers (microns) of the vertical component of the surface wave within the period range $18 \leq T \leq 22$

T is the period in seconds

D is the distance in geocentric degrees (station to epicenter) and $20^\circ \leq D \leq 160^\circ$.

No depth corrections are applied, and Ms magnitudes are not generally computed for depths greater than 50 km. The Ms value published is the average of the individual station magnitudes from reported T and A data.

If the uncertainty of the computed depth is considered great enough that the depth could be less than 50 km, an MS value may still be published, computed by the I.A.S.P.E.I. formula and not corrected for depth.

In general, the Ms magnitude is more reliable than the MB magnitude as a means of yielding the relative "size" of a shallow-focus earthquake.

MB These compressional body wave (P-wave) magnitudes are computed according to the formula:

$$MB = \text{Log}(A/T) + Q(D,h)$$

defined by Gutenberg and Richter (1956) except that T, the period in seconds, is restricted to $0.1 \leq T \leq 3.0$ and A, the ground amplitude in micrometers, is not necessarily the maximum in the P group. Q is a function of of distance (D) and depth (h) where $D \geq 5^\circ$.

mbLg These Lg body wave magnitudes are computed according to the formula:

$$mbLg = 3.75 + 0.90 \text{ Log } D + \text{Log}(A/T) \text{ for } 0.5^\circ \leq D \leq 4^\circ$$

$$mbLg = 3.30 + 1.66 \text{ Log } D + \text{Log}(A/T) \text{ for } 4^\circ \leq D \leq 30^\circ$$

as proposed by Nuttli (1973) where A is the ground amplitude in micrometers and T is the period in seconds calculated from the vertical component 1-second Lg waves. D is the distance in geocentric degrees.

ML These local magnitudes are computed according to the formula:

$$ML = \text{Log } A - \text{Log } Ao$$

defined by Richter (1935) where A is the maximum trace amplitude in micrometers recorded on a standard short-period torsion seismometer and Log Ao is a standard value as a function of distance where distance ≤ 600 km.

CONTRIBUTED MAGNITUDES

Magnitudes appearing in the comments which have been contributed by organizations operating a network of stations may have been calculated from any one station in the network or may be an average magnitude from a number of stations from the network.

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