

## MONTHLY TELESEISMIC BULLETIN of SZGRF-ERLANGEN - January 1999

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H. Aichele, K. Klinge, R. Hohl

date                    distance    backazimut  
 station    time        phase        comp    per[s]    ampl[nm]    magn  
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 SZGRF or NEIC-QED    LOCATION

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1999-01-01            D 15.0    AZ150  
 GRA1    03:23:27.9    e P            Z

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1999-01-01            D 74.5    AZ354  
 GRA1    04:26:01.6    e P            Z                            mb4.3  
 BEAM    04:26:01.6                            T0.8    A3  
 GRA1    04:26:08.7    e pP            Z  
 GRA1    05:09:02.3    e L            Z    T21.2    A176            MS4.3  
 NEIC:    OT 04:14:29.0    56N    158W    dep 33km    mb4.6  
 ALASKA PENINSULA

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1999-01-01            D155.5  
 GRA1    04:27:46.5    e PKPdf        Z  
 GRA1    04:27:59.2    e pPKPdf        Z  
 GRA1    04:28:09.0    e (sPKPdf) Z

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1999-01-01            D120.4  
 GRA1    07:30:50.1    e PKPdf        Z

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1999-01-01            D 46.5    AZ343  
 GRA1    09:36:38.6    i P            c Z                            mb5.1  
 BEAM    09:36:38.6                            T1.3    A21  
 GRA1    09:36:46.2    e pP            Z  
 GRA1    09:59:22.3    e L            Z    T20.4    A182            MS4.0

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1999-01-01            D 79.4    AZ 26  
 GRA1    11:59:54.6    e P            Z                            mb4.6  
 BEAM    11:59:54.6                            T1.0    A6

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1999-01-01      D 17.9
  GRA1 14:32:38.8 e P      Z
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1999-01-01      D 86.8 AZ 36
  GRA1 15:58:31.6 e P      Z      mb4.7
  BEAM 15:58:31.6          T1.3  A8
NEIC:  OT 15:46:05.5 37N 142E dep 33km mb4.4
  NEAR EAST COAST OF HONSHU, JAPAN
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1999-01-01      D 83.7 AZ 39
  GRA1 16:32:59.3 i P      c Z      mb5.3
  ALIGN 16:32:59.3          T1.0  A19
  GRA1 16:33:10.9 e pP     Z
  GRA1 16:33:15.6 e (sP)  Z
  GRA1 17:15:35.7 e L      Z T18.8 A698 MS5.1
SZGRF: OT 16:20:35.9 36N 140E dep 40km
  NEAR EAST COAST OF HONSHU, JAPAN
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1999-01-01      415km
  GRA1 17:28:33.6 e Pg     Z
  GRA1 17:29:21.8 e Sg     Z
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1999-01-01      D 84.5 AZ 37
  GRA1 18:42:58.9 e P      Z      mb4.7
  BEAM 18:42:58.9          T1.3  A7
SZGRF: OT 18:30:30.6 36N 143E dep 33km
  OFF EAST COAST OF HONSHU, JAPAN
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1999-01-01      D 87.0 AZ 34
  GRA1 22:21:10.6 e P      Z      mb4.6
  BEAM 22:21:10.6          T1.2  A6
  GRA1 22:21:22.1 e pP     Z
SZGRF: OT 22:08:30.8 35N 148E dep 40km
  OFF EAST COAST OF HONSHU, JAPAN
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1999-01-02      D 38.9 AZ101
  GRA1 03:35:32.9 e P      Z      mb4.0
  BEAM 03:35:32.9          T1.1  A5
NEIC:  OT 03:28:08.7 30N 57E dep 97km mb4.4
  NORTHERN IRAN
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1999-01-02
  GRA1 19:46:08.1 e PKPdf  Z
  GRA1 19:46:14.6 e (pPKPdf)Z
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1999-01-02

GRA1 19:47:08.2 e PKPdf Z

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1999-01-02

GRA1 19:49:28.3 e PKPdf Z

GRA1 19:49:44.3 e (pPKPdf)Z

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1999-01-02

D 3.3 371km

GRC1 21:02:57.2 e Pg Z

SZGRF: OT 21:01:58.3 47N 7E dep 10km

SE of Belfort/F, French-Swiss border region

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1999-01-03

GRA1 07:21:14.8 e PKPab Z

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1999-01-03

GRA1 08:13:07.3 e PKPdf Z

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1999-01-03

D150.6

GRA1 14:59:20.3 e (PKPdf) Z

GRA1 14:59:23.2 e PKPbc Z

GRA1 14:59:31.9 e PKPab Z

NEIC: OT 14:40:35.4 21S 178W dep577km mb3.9

FIJI ISLANDS REGION

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1999-01-03

GRA1 15:31:45.2 e PKPab Z

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1999-01-04

D 8.2

GRA1 00:34:00.2 e Sn N

SZGRF: OT 00:30:34.5

ROMANIA

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1999-01-04

D 87.5 AZ288

GRA1 01:32:04.6 e P Z

BEAM 01:32:04.6 T0.9 A7

GRA1 01:32:14.4 e pP Z

SZGRF: OT 01:19:20.8 14N 91W dep 34km

NEAR COAST OF GUATEMALA

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1999-01-04

D 87.2

GRA1 05:03:10.1 e P Z

BEAM 05:03:10.1 T1.8 A12

mb4.8

mb4.7

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1999-01-04 D 84.0 AZ274  
 GRA1 08:56:13.9 e P Z mb5.1  
 BEAM 08:56:13.9 T1.2 A16  
 GRA1 08:56:27.4 e pP Z  
 GRA1 09:29:19.4 e L Z T21.7 A543 MS4.9

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1999-01-04 D 70.9 AZ118  
 GRA1 12:28:00.2 e P Z mb5.3  
 BEAM 12:28:00.2 T1.8 A44  
 GRA1 12:28:06.7 e pP Z  
 GRA1 13:02:05.7 e L Z T18.4 A304 MS4.6

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1999-01-05 D 4.0 440km  
 GRA1 03:23:16.8 e Pn Z M13.6  
 GRA1 03:23:32.5 e Pg Z  
 GRA1 03:24:22.1 e Sg N  
 SZGRF: OT 03:22:17.8 46N 11E dep 10km  
 NORTHERN ITALY

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1999-01-05 D 3.6 405km  
 GRA1 04:01:16.9 e Pn Z M14.4  
 GRA1 04:02:14.5 e Sg E  
 SZGRF: OT 04:00:19.3 51N 16E dep 1km  
 POLAND

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1999-01-05 D149.5  
 GRA1 08:52:29.2 e PKPdf Z  
 GRA1 08:52:33.5 i PKPbc d Z  
 GRA1 08:52:37.1 e PKPab Z  
 GRA1 08:52:48.6 e pPKPbc Z  
 GRA1 08:52:52.2 e pPKPab Z  
 NEIC: OT 08:32:46.8 18S 174W dep 33km mb5.4  
 TONGA ISLANDS

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1999-01-05 D 74.6 AZ 16  
 GRA1 10:24:00.5 i P c Z mb5.3  
 ALIGN 10:24:00.5 T1.7 A47  
 SZGRF: OT 10:12:26.6 54N 165E dep 33km  
 KOMANDORSKY ISLANDS REGION

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1999-01-05  
 GRA1 15:39:16.7 e PKPdf Z

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1999-01-05 D 71.9  
 GRA1 16:02:09.8 e P Z mb5.0

BEAM 16:02:09.8 T1.1 A16

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 1999-01-05 D 85.1 AZ 50  
 GRA1 16:08:56.3 i P c Z mb5.1  
 ALIGN 16:08:56.3 T1.1 A13  
 GRA1 16:09:14.2 i pP Z  
 SZGRF: OT 15:56:28.6 29N 131E dep 64km  
 RYUKYU ISLANDS REGION

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 1999-01-05 D 61.1 AZ149  
 GRA1 18:36:27.7 i P d Z mb4.9  
 ALIGN 18:36:27.7 T1.5 A32  
 GRA1 18:36:46.2 e (pP) Z  
 GRA1 19:10:14.8 e L Z T20.6 A181 MS4.2  
 NEIC: OT 18:27:40.7 6N 38E dep 10km mb4.9  
 ETHIOPIA

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 1999-01-05 D 25.4 AZ 90  
 GRA1 20:25:08.4 e P Z mb4.2  
 BEAM 20:25:08.4 T1.1 A6

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 1999-01-05 D 70.1 AZ279  
 GRA1 21:38:23.8 e P Z mb4.4  
 BEAM 21:38:23.8 T1.0 A4  
 GRA1 21:38:27.9 e pP Z  
 SZGRF: OT 21:27:12.6 21N 72W dep 14km  
 BAHAMA ISLANDS

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 1999-01-06 D 3.6 401km  
 GRA1 01:11:19.1 e Pn Z M13.5  
 GRA1 01:12:17.4 e Sg N  
 SZGRF: OT 01:10:21.9 51N 16E dep 1km  
 POLAND

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 1999-01-06 D101.4  
 GRA1 17:24:08.0 e Pdiff Z  
 GRA1 18:12:51.3 e L Z T21.9 A93 MS4.3  
 NEIC: OT 17:10:27.5 6N 126E dep100km mb5.4  
 MINDANAO, PHILIPPINE ISLANDS

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 1999-01-07 D 23.7 AZ320  
 GRA1 04:03:08.6 e P Z  
 BEAM 04:03:08.6 T1.4 A5  
 GRA1 04:11:00.7 e L Z T20.9 A116 MS3.3  
 SZGRF: OT 03:57:59.7 64N 24W dep 33km  
 ICELAND REGION

1999-01-07 D119.3  
GRA1 05:35:39.6 e PKPdf Z

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1999-01-07 D 75.1 AZ 19  
GRA1 08:40:44.9 e P Z mb4.5  
BEAM 08:40:44.9 T0.9 A4  
NEIC: OT 08:29:03.5 52N 159E dep 48km mb4.6  
OFF EAST COAST OF KAMCHATKA

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1999-01-07 D 79.6 AZ 29  
GRA1 11:50:11.1 i P c Z mb5.2  
ALIGN 11:50:11.1 T0.9 A31  
GRA1 11:50:29.1 e pP Z  
SZGRF: OT 11:38:13.0 44N 149E dep 66km  
KURIL ISLANDS

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1999-01-07 D 58.2 AZ 22  
GRA1 18:23:26.7 i P c Z mb5.6  
ALIGN 18:23:26.7 T1.4 A89  
GRA1 18:23:43.1 e pP Z  
GRA1 18:23:48.0 e sP Z  
GRA1 18:51:10.6 e L Z T21.6 A955 MS4.9  
SZGRF: OT 18:13:40.4 66N 140E dep 58km  
EASTERN SIBERIA

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1999-01-07  
GRA1 22:35:57.8 e PKPdf Z  
GRA1 23:49:04.5 e L Z T19.7 A93  
NEIC: OT 22:16:07.5 20S 174W dep 33km mb4.9  
TONGA ISLANDS

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1999-01-08 D 85.3 AZ 53  
GRA1 02:33:49.9 e P Z mb4.9  
ALIGN 02:33:49.9 T1.0 A8  
GRA1 02:34:00.4 e (pP) Z  
SZGRF: OT 02:21:17.4 27N 128E dep 36km  
RYUKYU ISLANDS

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1999-01-08 D 3.5 394km  
GRA1 03:16:32.2 e Pn Z M13.6  
GRA1 03:17:30.9 e Sg E  
SZGRF: OT 03:15:36.3 51N 16E dep 1km  
POLAND

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1999-01-08 D150.3  
GRA1 14:27:07.0 e PKPdf Z

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1999-01-08      D132.3
  GRA1 21:39:59.1 e PKPdf  Z

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1999-01-09      D 78.9
  GRA1 03:17:28.7 e P      Z      mb6.2
  ALIGN 03:17:28.7      T0.9  A194
  GRA1 03:57:27.9 e L      Z      T18.8 A362  MS4.7
NEIC: OT 03:05:36.9 44N 147E dep114km mb5.8
  KURIL ISLANDS

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1999-01-09      D 3.5 395km
  GRA1 20:32:03.5 e Pn     Z      M13.4
  GRA1 20:33:01.5 e Sg     E
SZGRF: OT 20:31:08.8 51N 16E dep 1km
  POLAND

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1999-01-09      D 89.7 AZ 89
  GRA1 23:36:55.3 e (P)   Z

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1999-01-10      D 75.5 AZ355
  GRA1 02:51:10.9 e P      Z      mb4.3
  BEAM 02:51:10.9      T1.2  A4
  GRA1 02:51:23.7 e (pP)  Z

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1999-01-10      D 3.6 399km
  GRA1 03:22:08.6 e Pn     Z      M13.8
  GRA1 03:23:03.4 e Sg     E
SZGRF: OT 03:21:11.4 51N 16E dep 1km
  POLAND

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1999-01-10      D 49.0
  GRA1 09:18:25.0 e P      Z      mb4.7
  BEAM 09:18:25.0      T1.4  A12
  GRA1 09:18:37.0 e pP    Z

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1999-01-11      D 82.0 AZ 41
  GRA1 00:23:01.3 e P      Z      mb4.4
  BEAM 00:23:01.3      T0.9  A3
NEIC: OT 00:10:42.2 36N 137E dep 33km mb4.4
  WESTERN HONSHU, JAPAN

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1999-01-11      D 5.5
  GRC1 03:37:56.7 e Pn     Z      M14.0
  GRA1 03:38:03.9 e Pn     Z      M14.3
  GRA1 03:38:24.9 e Pg     Z

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GRA1 03:39:45.6 e Sg N  
 NEIC: OT 10:48:51.0 52N 160E dep 33km mb5.4  
 OFF EAST COAST OF KAMCHATKA

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 1999-01-11 D 75.5 AZ 19  
 GRA1 11:00:31.1 i P c Z mb5.8  
 ALIGN 11:00:31.1 T1.6 A162  
 GRA1 11:00:41.6 e pP Z  
 GRA1 11:00:46.1 e sP Z  
 GRA1 11:16:07.2 e S Z  
 GRA1 11:38:48.1 e L Z T18.8 A1510 MS5.3

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 1999-01-11 D 23.6 AZ341  
 GRA1 16:09:55.7 e P Z mb3.9  
 BEAM 16:09:55.7 T0.7 A3

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 1999-01-11 D 23.8 AZ 98  
 GRA1 18:08:31.7 e (P) Z

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 1999-01-12 D 91.7 AZ 39  
 GRA1 02:44:44.7 i P d Z mb6.7  
 ALIGN 02:44:44.7 T1.1 A497  
 GRA1 02:47:46.1 e Z  
 GRA1 02:48:27.6 e PP Z  
 GRA1 03:30:00.1 e L Z T18.1 A626 MS5.1  
 NEIC: OT 02:32:25.6 27N 140E dep441km mb5.9  
 BONIN ISLANDS REGION

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 1999-01-12 D124.9  
 GRA1 09:08:17.7 e PKPdf Z  
 GRA1 09:08:49.6 e pPKPdf Z  
 GRA1 10:05:12.4 e L Z T21.7 A2651 MS5.9  
 NEIC: OT 08:49:21.3 5S 152E dep 47km mb5.5  
 NEW BRITAIN REGION, P.N.G.

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 1999-01-12 D 83.1 AZ 35  
 GRA1 13:22:12.0 i P c Z mb5.4  
 ALIGN 13:22:12.0 T1.2 A29  
 GRA1 13:22:21.0 e pP Z  
 GRA1 14:00:00.3 e L Z T19.5 A220 MS4.5  
 SZGRF: OT 13:09:50.4 39N 145E dep 31km  
 OFF EAST COAST OF HONSHU, JAPAN

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 1999-01-13 D 49.6 AZ 77  
 GRA1 06:46:15.9 e P Z mb4.5  
 BEAM 06:46:15.9 T0.8 A5



SZGRF: OT 06:37:28.8

SOUTHERN SINKIANG PROV., CHINA

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1999-01-13 D 22.2 AZ 31

GRA1 13:28:54.5 e P Z mb3.9

BEAM 13:28:54.5 T0.8 A4

SZGRF: OT 13:24:01.6

EUROPEAN USSR

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1999-01-13 D146.4

GRA1 20:31:42.8 i PKPdf d Z

GRA1 20:32:17.2 e pPKPdf Z

GRA1 20:32:29.5 e sPKPdf Z

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1999-01-14 D150.3

GRA1 02:31:15.3 e (PKPdf) Z

GRA1 02:31:17.2 i PKPbc d Z

GRA1 02:31:26.9 e PKPab Z

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1999-01-14 D 83.7 AZ 37

GRA1 04:59:47.4 i P c Z mb5.3

ALIGN 04:59:47.4 T1.2 A22

GRA1 04:59:58.2 e pP Z

SZGRF: OT 04:47:23.9 37N 142E dep 37km

OFF EAST COAST OF HONSHU, JAPAN

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1999-01-14 D 79.4 AZ 27

GRA1 07:17:53.7 i P c Z T0.8 A17 mb5.2

GRA1 07:17:58.6 e pP Z

SZGRF: OT 07:05:49.9 45N 152E dep 17km

KURIL ISLANDS REGION

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1999-01-14

GRA1 07:19:39.1 e PKPdf Z

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1999-01-14

GRA1 08:34:01.3 e PKPdf Z

NEIC: OT 08:14:25.8 18S 168E dep 33km mb4.7

VANUATU ISLANDS

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1999-01-14 D 90.0 AZ202

GRA1 20:37:20.4 e P Z mb5.1

BEAM 20:37:20.4 T1.3 A17

SZGRF: OT 20:24:22.2

SOUTH ATLANTIC RIDGE

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1999-01-14

GRA1 20:39:17.0 e PKPab Z

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1999-01-14 D151.0

GRA1 20:41:11.2 e (PKPdf) Z

GRA1 20:41:14.8 e PKPbc Z

GRA1 20:41:23.7 e PKPab Z

NEIC: OT 20:20:07.9 24S 180W dep539km mb4.8

SOUTH OF FIJI ISLANDS

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1999-01-14 D 41.5 AZ104

GRA1 22:20:20.7 i P d Z mb4.8

ALIGN 22:20:20.7 T0.9 A19

GRA1 22:20:27.9 e pP Z

GRA1 22:20:30.8 e sP Z

GRA1 22:20:38.5 e Z

SZGRF: OT 22:12:36.2 28N 58E dep 27km

SOUTHERN IRAN

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1999-01-14 D 24.3 AZ101

GRA1 22:50:36.7 e P Z T2.0 A88 mb4.9

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1999-01-15 D 64.9 AZ 62

GRA1 02:09:23.1 e (P) Z

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1999-01-15 D 15.0 AZ146

GRA1 10:20:56.2 e P Z

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1999-01-15 D 87.2 AZ 43

GRA1 11:26:55.3 i P d Z mb5.5

ALIGN 11:26:55.3 T1.1 A44

GRA1 11:28:58.3 e pP Z

SZGRF: OT 11:15:09.8 31N 138E dep565km

SOUTH OF HONSHU, JAPAN

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1999-01-15 D 34.2 AZ109

GRA1 19:20:05.4 i P c Z mb5.1

BEAM 19:20:05.4 T1.2 A32

GRA1 19:20:12.4 e pP Z

SZGRF: OT 19:13:22.1 31N 50E dep 27km

WESTERN IRAN

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1999-01-16 D 78.3 AZ 27

GRA1 01:47:14.0 i P c Z mb5.5

BEAM 01:47:14.0 T1.0 A43

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1999-01-16 D 81.0 AZ\*\*\*  
GRA1 03:13:09.9 i P d Z mb5.7  
BEAM 03:13:09.9 T1.3 A112  
GRA1 03:13:27.6 e pP Z  
SZGRF: OT 03:01:04.3 50N 169W dep 64km  
ALEUTIAN ISLANDS REGION

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1999-01-16 D113.4  
GRA1 03:22:41.6 e PKPdf Z  
GRA1 03:23:36.8 e pPKPdf Z  
NEIC: OT 03:01:04.3 51N 169W dep 33km mb5.4  
FOX ISLANDS, ALEUTIAN ISLANDS

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1999-01-16  
GRA1 04:22:11.0 e (PKPbc) Z  
GRA1 04:22:15.2 e PKPab Z

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1999-01-16 D 87.3 AZ 89  
GRA1 09:36:58.6 e P Z  
SZGRF: OT 09:24:14.7  
NORTHERN SUMATERA

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1999-01-16 D 73.3 AZ347  
GRA1 10:56:08.8 i P c Z mb6.1  
ALIGN 10:56:08.8 T1.9 A278  
GRA1 10:56:19.7 e pP Z  
GRA1 10:56:26.1 e sP Z  
GRA1 10:59:03.0 e PP Z  
GRA1 11:33:41.4 e L Z T19.0 A2899 MS5.6

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1999-01-16 D 96.5  
GRA1 15:04:35.3 e PKPdf Z  
GRA1 15:04:49.2 e pPKPdf Z

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1999-01-17 D 80.0  
GRA1 05:41:17.4 i P c Z mb5.3  
ALIGN 05:41:17.4 T1.3 A54  
GRA1 05:41:32.0 e pP Z  
GRA1 05:41:37.4 e sP Z  
NEIC: OT 05:29:12.6 43N 148E dep 54km mb5.2  
KURIL ISLANDS

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1999-01-17  
GRA1 11:44:23.2 e (PKPdf) Z

GRA1 11:44:38.5 e pPKPdf Z  
 GRA1 11:44:42.3 e sPKPdf Z

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 1999-01-17 D158.2  
 GRA1 18:14:51.1 e PKPdf Z  
 GRA1 18:15:28.9 e PKPab Z  
 GRA1 18:16:50.3 e pPKPab Z  
 NEIC: OT 17:55:34.0 29S 179W dep329km mb5.1  
 KERMADEC ISLANDS, NEW ZEALAND

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 1999-01-17 AZ151  
 GRA1 19:35:00.3 e Pn Z  
 NEIC: OT 19:32:09.8 39N 18E dep 10km  
 IONIAN SEA

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 1999-01-17 D 38.7 AZ 6  
 GRA1 20:33:43.9 e P Z mb4.4  
 ALIGN 20:33:43.9 T1.4 A13  
 GRA1 20:33:52.6 e pP Z  
 SZGRF: OT 20:26:24.6 85N 75E dep 33km  
 NORTH OF SEVERNAYA ZEMLYA

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 1999-01-18  
 GRA1 00:53:10.0 e PKPdf Z  
 GRA1 00:53:25.5 e pPKPdf Z  
 GRA1 00:53:31.9 e (sPKPdf)Z  
 NEIC: OT 00:33:27.3 22S 170E dep 33km mb4.9  
 LOYALTY ISLANDS REGION

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 1999-01-18 D 79.0 AZ 4  
 GRA1 01:17:16.5 e P Z mb4.7  
 BEAM 01:17:16.5 T1.3 A11  
 GRA1 01:17:30.3 e pP Z  
 SZGRF: OT 01:05:19.8 52N 174W dep 48km  
 ANDREANOF ISLANDS, ALEUTIAN IS.

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 1999-01-18 D 70.6  
 GRA1 07:12:11.1 e P c Z mb4.8  
 ALIGN 07:12:11.1 T1.4 A11  
 SZGRF: OT 07:00:54.0 33N 88W dep 1km  
 ALABAMA

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 1999-01-18 D 54.6 AZ 78  
 GRA1 07:25:24.0 e P Z mb4.5  
 BEAM 07:25:24.0 T0.9 A4  
 GRA1 07:25:32.1 e (pP) Z  
 NEIC: OT 07:17:19.4 39N 74E dep100km mb4.5  
 TAJIKISTAN-XINJIANG BORDER REG.

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1999-01-18      D148.2
  GRA1 16:44:09.4 e PKPdf  Z
  GRA1 16:44:14.1 e PKPbc  Z
  GRA1 16:44:20.2 e PKPab  Z
  GRA1 16:44:27.2 e pPKPbc Z
  GRA1 16:44:36.2 e pPKPab Z
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1999-01-18
  GRA1 17:14:38.8 e PKPdf  Z
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1999-01-18      D 81.2  AZ 34
  GRA1 17:47:40.3 e P      Z          mb4.7
  BEAM 17:47:40.3                T1.3  A9
  GRA1 17:48:07.7 e pP     Z
SZGRF: OT 17:35:38.2 40N 144E dep107km
  OFF EAST COAST OF HONSHU, JAPAN
-----

1999-01-18      D 71.3  AZ273
  GRA1 19:52:31.3 e P      Z          mb5.3
  ALIGN 19:52:31.3                T1.4  A35
  GRA1 19:52:43.7 e pP     Z
  GRA1 19:52:50.4 e sP     Z
  GRA1 20:15:42.9 e L      Z  T21.6  A166  MS4.3
SZGRF: OT 19:41:16.7 16N 68W  dep 46km
  CARIBBEAN SEA
-----

1999-01-19      D 80.4  AZ359
  GRA1 01:36:12.2 i P      c Z          mb4.7
  ALIGN 01:36:12.2                T0.9  A8
  GRA1 01:36:17.7 e (pP)   Z
NEIC:  OT 01:24:10.1 52N 174W  dep 33km  mb4.7
  ANDREANOF ISLANDS, ALEUTIAN IS.
-----

1999-01-19      D124.7
  GRA1 03:54:24.3 e PKPdf  Z
  GRA1 03:54:48.6 e pPKPdf Z
  GRA1 03:56:19.7 e (PP)   Z
  GRA1 04:54:29.1 e L      Z  T21.8  A4159  MS6.1
NEIC:  OT 03:35:33.8 5S 153E  dep116km  mb5.7
  NEW IRELAND REGION, P.N.G.
-----

1999-01-19
  GRA1 05:15:10.1 e PKPdf  Z
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1999-01-19

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GRA1 06:29:32.4 e PKPdf Z

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1999-01-19

GRA1 06:53:24.6 e PKPdf Z

-----  
1999-01-19

GRA1 09:17:04.4 e PKPdf Z

NEIC: OT 08:58:13.9 4S 153E dep100km mb4.7

NEW IRELAND REGION, P.N.G.

-----  
1999-01-19 D 15.0 AZ150

GRA1 10:59:36.8 e P Z

NEIC: OT 10:55:31.4 35N 24E dep 33km mb4.2

CRETE

-----  
1999-01-19

GRA1 12:21:39.0 e PKPdf Z

GRA1 12:21:48.3 e pPKPdf Z

GRA1 12:21:55.2 e sPKPdf Z

NEIC: OT 12:01:58.6 21S 169E dep 33km mb4.9

LOYALTY ISLANDS REGION

-----  
1999-01-19

GRA1 19:20:53.7 e PKPdf Z

NEIC: OT 19:01:59.1 21S 179W dep500km mb3.7

FIJI ISLANDS REGION

-----  
1999-01-20 D 81.8 AZ 73

GRA1 02:23:49.0 e P Z

mb4.7

BEAM 02:23:49.0 T1.1 A7

NEIC: OT 02:12:57.3 27N 97E dep 33km mb4.3

MYANMAR-INDIA BORDER REGION

-----  
1999-01-20 D 15.0 AZ132

GRA1 02:49:38.5 e P Z

NEIC: OT 02:43:45.5 39N 20E dep 5km

GREECE

-----  
1999-01-20

GRA1 06:21:58.5 e PKPab Z

GRA1 06:22:11.8 e (pPKPab)Z

GRA1 07:27:14.5 e L Z T19.6 A259

-----  
1999-01-20 D 60.4 AZ 35

GRA1 13:37:58.4 e P Z

mb4.8

BEAM 13:37:58.4 T0.9 A10

GRA1 13:38:03.8 e pP Z  
NEIC: OT 13:28:00.6 58N 121E dep 10km mb4.5  
SOUTHEASTERN SIBERIA, RUSSIA

---

1999-01-20 D 59.4 AZ 36  
GRA1 13:49:50.6 e P d Z mb4.6  
BEAM 13:49:50.6 T1.1 A7  
NEIC: OT 13:39:52.8 57N 121E dep 10km mb4.4  
SOUTHEASTERN SIBERIA, RUSSIA

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1999-01-20 D146.8  
GRA1 14:02:27.6 i PKPbc c Z  
GRA1 14:02:31.1 e PKPab Z

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1999-01-20 D 42.5 AZ 85  
GRA1 22:17:15.8 i P c Z mb5.2  
ALIGN 22:17:15.8 T1.4 A68  
GRA1 22:18:53.1 e (PP) Z  
GRA1 22:36:24.8 e L Z T20.7 A422 MS4.3

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1999-01-20 D 98.9 AZ256  
GRA1 23:23:44.6 i P c Z mb5.8  
ALIGN 23:23:44.6 T1.2 A24  
GRA1 23:23:52.3 e pP Z  
GRA1 00:12:29.0 e L Z T18.3 A288 MS4.8

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1999-01-21 D 91.4 AZ 61  
GRA1 04:26:06.3 e P Z

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1999-01-21 D 80.8 AZ 35  
GRA1 22:14:37.0 i P c Z mb5.5  
ALIGN 22:14:37.0 T1.0 A48  
GRA1 22:14:49.6 e pP Z  
GRA1 22:15:09.6 e sP Z  
GRA1 22:15:53.6 e Z  
GRA1 22:55:55.8 e L Z T18.0 A4957 MS5.9  
SZGRF: OT 22:02:28.1 40N 143E dep 65km  
NEAR EAST COAST OF HONSHU, JAPAN

---

1999-01-22 D 80.6  
GRA1 06:19:16.8 e P Z  
NEIC: OT 06:06:57.2 44N 128W dep 10km mb4.6  
OFF COAST OF OREGON

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1999-01-22

GRA1 14:19:01.3 e PKPab Z

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 1999-01-22 D 86.4 AZ 56  
 GRA1 14:56:52.5 e P Z mb4.9  
 ALIGN 14:56:52.5 T0.9 A9  
 NEIC: OT 14:44:21.5 25N 126E dep100km mb4.6  
 SOUTHWESTERN RYUKYU ISLANDS

-----  
 1999-01-22 D148.8  
 GRA1 18:58:21.5 e PKPdf Z  
 GRA1 18:58:24.5 i PKPbc d Z  
 GRA1 18:58:27.9 e PKPab Z  
 NEIC: OT 18:39:41.3 18S 179W dep550km mb4.4  
 FIJI ISLANDS REGION

-----  
 1999-01-22 D 18.0 AZ130  
 GRA1 19:18:57.0 e P Z mb3.8  
 BEAM 19:18:57.0 T1.0 A7  
 GRA1 19:27:15.2 e L Z T18.5 A116 MS3.2

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 1999-01-22 AZ153  
 GRA1 22:56:49.9 e (P) Z

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 1999-01-23 D 46.4  
 GRA1 10:01:56.6 i P d Z mb5.1  
 ALIGN 10:01:56.6 T1.5 A30  
 GRA1 10:02:10.5 e Z  
 GRA1 10:03:46.0 e PP Z  
 GRA1 10:08:40.1 e S Z  
 GRA1 10:25:01.6 e L Z T18.1 A412 MS4.4  
 NEIC: OT 09:53:31.3 32N 70E dep 33km mb4.7  
 PAKISTAN

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 1999-01-23 D 85.3 AZ 40  
 GRA1 19:29:21.9 i P d Z mb5.4  
 ALIGN 19:29:21.9 T1.2 A28  
 GRA1 19:29:27.3 e (pP) Z  
 GRA1 19:30:36.1 e Z  
 GRA1 19:32:40.6 e PP Z  
 SZGRF: OT 19:16:47.3 34N 140E dep 18km  
 SOUTH OF HONSHU, JAPAN

-----  
 1999-01-23 D 79.0 AZ 29  
 GRA1 23:27:46.5 e P Z mb4.4  
 ALIGN 23:27:46.5 T0.8 A3  
 SZGRF: OT 23:15:47.4 45N 149E dep 33km



## KURIL ISLANDS

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1999-01-24      D 84.0  AZ 50
  GRA1 00:49:33.1 i P      c Z      mb6.7
  ALIGN 00:49:33.1                T0.8  A451
  GRA1 00:49:34.5 e          Z
  GRA1 00:49:37.4 e          Z
  GRA1 00:49:44.6 e pP      Z
  GRA1 00:49:55.7 e          Z
  GRA1 00:52:45.8 e PP      Z
  GRA1 00:53:17.9 e pPP     Z
  GRA1 00:59:53.2 e S       Z
  GRA1 01:07:47.4 e PKKPbc  Z
  GRA1 01:31:35.9 e L       Z  T18.8  A57546  MS7.0
SZGRF: OT 00:37:07.7 30N    130E  dep 39km
  RYUKYU ISLANDS
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1999-01-24      D 23.5  AZ341
  GRA1 01:53:41.6 e P      Z      mb4.1
  BEAM 01:53:41.6                T1.1  A7
SZGRF: OT 01:48:34.8 71N    11W    dep 33km
  JAN MAYEN ISLAND REGION
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1999-01-24      D 83.0  AZ 46
  GRA1 01:15:52.2 i P      c Z      mb5.3
  ALIGN 01:15:52.2                T0.8  A15
  GRA1 01:19:10.6 e PP      Z
  GRA1 01:19:42.3 e pPP     Z
SZGRF: OT 01:03:31.1 33N    133E  dep 33km
  SHIKOKU, JAPAN
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1999-01-24      D151.2
  GRA1 07:21:44.5 e PKPdf  Z
  GRA1 07:21:50.7 e PKPbc  Z
  GRA1 07:22:02.5 e PKPab  Z
  GRA1 07:25:28.3 e PP      Z
  GRA1 08:32:23.8 e L       Z  T21.4  A2127  MS5.9
NEIC: OT 07:01:58.0 21S    175W  dep 33km  mb5.7
  TONGA ISLANDS
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1999-01-24      D 94.1  AZ124
  GRA1 08:13:29.2 i P      c Z      mb6.0
  ALIGN 08:13:29.2                T2.1  A155
  GRA1 08:13:35.3 e (pP)    Z
  GRA1 08:14:02.9 e          Z
  GRA1 08:14:12.4 e          Z
  GRA1 08:15:59.6 e          Z
  GRA1 08:16:43.6 e          Z
  GRA1 08:17:14.5 e PP      Z
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GRA1 08:59:18.3 e L Z T20.3 A3322 MS5.8  
NEIC: OT 08:00:08.4 27S 74E dep 10km mb6.2  
MID-INDIAN RIDGE

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1999-01-24 D 94.0  
GRA1 08:22:05.9 e P Z

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1999-01-24 D158.6  
GRA1 08:30:31.5 e PKPdf Z  
GRA1 08:31:05.2 e PKPab Z

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1999-01-24 D 73.3 AZ 17  
GRA1 13:27:22.0 i P c Z mb5.7  
ALIGN 13:27:22.0 T1.1 A64  
GRA1 13:27:33.4 e pP Z  
GRA1 13:28:04.8 e Z  
GRA1 13:28:19.6 e Z  
GRA1 14:01:02.2 e L Z T21.5 A343 MS4.6

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1999-01-24 D149.3  
GRA1 16:41:48.1 e PKPdf Z  
GRA1 16:41:55.8 e PKPab Z

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1999-01-24  
GRA1 20:15:57.5 e PKPdf Z

---

1999-01-25  
GRA1 00:32:56.3 e PKPdf Z

---

1999-01-25 D 72.2 AZ 75  
GRA1 04:10:43.2 i P c Z mb4.9  
ALIGN 04:10:43.2 T1.5 A13  
GRA1 04:42:26.5 e L Z T19.6 A81 MS4.0  
SZGRF: OT 03:59:22.1 23N 100E dep 33km  
YUNNAN PROVINCE, CHINA

---

1999-01-25 D 76.4 AZ 10  
GRA1 08:11:01.8 i P c Z mb5.2  
ALIGN 08:11:01.8 T1.0 A19  
GRA1 08:41:58.9 e L Z T21.5 A52 MS3.8  
NEIC: OT 07:59:41.4 56N 162E dep 60km mb4.8  
NEAR EAST COAST OF KAMCHATKA

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1999-01-25 D147.3  
GRA1 10:55:22.5 e PKPbc Z  
GRA1 10:55:25.0 e PKPab Z  
NEIC: OT 10:36:48.6 18S 179W dep650km mb4.1  
FIJI ISLANDS REGION  
-----

1999-01-25 D147.4  
GRA1 10:55:44.7 e PKPdf Z  
GRA1 10:55:48.5 i PKPbc d Z  
GRA1 10:58:15.6 e pPKPbc Z  
NEIC: OT 10:37:13.8 18S 179W dep640km mb5.0  
FIJI ISLANDS REGION  
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1999-01-25 D147.2  
GRA1 10:57:22.9 i PKPbc d Z  
NEIC: OT 10:38:48.1 18S 179W dep650km mb4.5  
FIJI ISLANDS REGION  
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1999-01-25 D102.9  
GRA1 11:59:49.9 e Pdiff Z  
GRA1 12:49:55.1 e L Z T19.6 A308 MS4.8  
NEIC: OT 11:45:53.8 4N 126E dep 33km mb5.2  
TALAUD ISLANDS, INDONESIA  
-----

1999-01-25 D 19.0  
GRA1 14:44:45.7 e P Z T1.4 A170 mb5.1  
-----

1999-01-25 D 84.7  
GRA1 18:31:51.7 i P d Z mb5.9  
ALIGN 18:31:51.7 T1.7 A128  
GRA1 18:32:01.6 e pP Z  
GRA1 18:35:06.9 e PP Z  
GRA1 19:06:48.4 e L Z T20.5 A6177 MS6.0  
-----

1999-01-25 D 5.7  
GRA1 22:47:21.4 e Pn Z M15.0  
GRA1 22:48:22.2 e Sn Z  
GRA1 22:48:57.3 e Sg Z  
GRA1 22:49:50.9 e L Z T19.9 A305 MS2.7  
NEIC: OT 22:45:57.3 44N 12E dep 10km mb5.3  
NORTHERN ITALY  
-----

1999-01-25 D 84.9 AZ273  
GRA1 22:53:00.5 e P Z mb5.5  
BEAM 22:53:00.5 T1.5 A45  
GRA1 22:53:06.4 e pP Z  
GRA1 23:27:49.5 e L Z T20.5 A517 MS4.9

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1999-01-26 D 3.6 399km  
GRA1 00:36:15.2 e Pn Z M14.1  
GRA1 00:37:12.6 e Sg E  
SZGRF: OT 00:35:18.4 51N 16E dep 1km  
POLAND

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1999-01-26 D150.9  
GRA1 07:24:13.3 i PKPbc c Z  
GRA1 08:29:52.8 e L Z T21.0 A142 MS4.7  
NEIC: OT 07:04:21.2 21S 175W dep 33km mb4.9  
TONGA ISLANDS

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1999-01-26 D150.7  
GRA1 12:50:38.4 i PKPbc c Z  
GRA1 14:00:06.9 e L Z T21.2 A673  
NEIC: OT 12:30:55.5 21S 174W dep 99km mb5.4  
TONGA ISLANDS

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1999-01-26  
GRA1 16:00:07.5 e PKPbc Z  
NEIC: OT 15:40:54.1 17S 178W dep300km mb4.3  
FIJI ISLANDS REGION

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1999-01-26 D101.1  
GRA1 16:07:07.6 e Pdiff Z  
GRA1 16:11:13.7 e (PP) Z  
GRA1 16:59:57.4 e L Z T21.3 A149 MS4.5  
NEIC: OT 15:53:27.4 8S 109E dep101km mb5.0  
JAWA, INDONESIA

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1999-01-26 D146.6  
GRA1 16:37:07.3 e (PKPdf) Z  
GRA1 16:37:08.6 i PKPbc c Z  
GRA1 16:37:11.8 e PKPab Z  
NEIC: OT 16:18:30.1 17S 179W dep593km mb4.7  
FIJI ISLANDS REGION

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1999-01-27 D153.0  
GRA1 03:56:45.7 e PKPdf Z  
GRA1 03:56:52.7 e PKPbc Z  
GRA1 03:57:02.8 e PKPab Z  
GRA1 03:58:45.7 e pPKPbc Z

---

1999-01-27 D 96.2 AZ200  
GRA1 04:38:14.2 e P Z mb5.6  
ALIGN 04:38:14.2 T1.3 A24

GRA1 05:16:30.9 e L Z T19.9 A211 MS4.6  
SZGRF: OT 04:24:44.1 44S 17W dep 10km  
SOUTH ATLANTIC RIDGE

-----  
1999-01-27 D122.3

GRA1 08:27:29.7 e PKPdf Z  
GRA1 08:28:30.1 e pPKPdf Z  
GRA1 08:29:11.8 e PP Z  
GRA1 08:30:00.1 e pPP Z  
NEIC: OT 08:09:02.3 5S 147E dep231km mb5.4  
EASTERN NEW GUINEA REG., P.N.G.

-----  
1999-01-27 D 77.8 AZ 23

GRA1 08:32:22.7 i P c Z mb5.5  
ALIGN 08:32:22.7 T1.2 A48  
GRA1 08:32:32.1 e Z  
GRA1 08:32:41.2 e pP Z  
GRA1 08:32:46.8 e (sP) Z  
GRA1 09:11:13.6 e L Z T20.9 A1235 MS5.2  
SZGRF: OT 08:20:34.5 48N 156E dep 65km  
KURIL ISLANDS REGION

-----  
1999-01-27 D 87.7 AZ277

GRA1 10:26:43.3 e P c Z mb5.8  
ALIGN 10:26:43.3 T2.5 A137  
GRA1 10:26:49.4 e pP Z  
GRA1 10:27:00.6 e Z  
GRA1 11:00:28.4 e L Z T21.5 A1719 MS5.4  
SZGRF: OT 10:13:56.2 6N 82W dep 21km  
SOUTH OF PANAMA

-----  
1999-01-27

GRA1 15:21:56.2 e PKPab Z  
GRA1 15:22:07.7 e (pPKPab) Z

-----  
1999-01-27

GRA1 15:23:57.3 e (PKPab) Z

-----  
1999-01-27

GRA1 16:12:58.3 e PKPdf Z

-----  
1999-01-28 D151.3

GRA1 01:37:08.0 e (PKPbc) Z  
GRA1 01:37:16.5 e PKPab Z  
GRA1 01:37:26.9 e pPKPab Z  
NEIC: OT 01:17:35.2 21S 175W dep200km mb4.3

## TONGA ISLANDS

-----  
 1999-01-28 D 84.3 AZ 37  
 GRA1 01:38:06.9 i P c Z mb5.2  
 ALIGN 01:38:06.9 T1.2 A18  
 GRA1 01:38:10.9 i pP d Z  
 SZGRF: OT 01:25:36.5 36N 143E dep 14km  
 OFF EAST COAST OF HONSHU, JAPAN  
 -----

1999-01-28 D 77.3 AZ359  
 GRA1 08:21:56.9 i P d Z mb6.7  
 ALIGN 08:21:56.9 T1.3 A814  
 GRA1 08:22:17.2 e (pP) Z  
 GRA1 08:22:51.0 e Z  
 GRA1 08:23:06.9 e Z  
 GRA1 08:25:07.4 e Z  
 GRA1 08:26:47.6 e Z  
 GRA1 08:28:08.9 e Z  
 GRA1 08:40:55.3 e PKKP Z  
 GRA1 08:48:45.5 e PKPPKP Z  
 GRA1 08:48:53.6 e L Z T41.7 A54364 MS6.5  
 GRA1 08:52:08.4 e (SKKKS) Z  
 SZGRF: OT 08:10:07.4 53N 168W dep 76km  
 FOX ISLANDS, ALEUTIAN ISLANDS  
 -----

1999-01-28 D 74.0 AZ 16  
 GRA1 18:18:33.0 e P Z mb4.8  
 BEAM 18:18:33.0 T1.5 A14  
 SZGRF: OT 18:07:02.2 54N 164E dep 33km  
 KOMANDORSKY ISLANDS REGION  
 -----

1999-01-28 D125.1  
 GRA1 18:43:15.7 e PKPdf Z  
 GRA1 18:43:41.5 e Z  
 GRA1 18:45:05.6 e PP Z  
 GRA1 19:38:07.0 e L Z T21.9 A2052 MS5.8  
 NEIC: OT 18:24:24.5 5S 154E dep 97km mb5.6  
 NEW IRELAND REGION, P.N.G.  
 -----

1999-01-28 AZ152  
 GRA1 19:04:28.3 e P Z  
 -----

1999-01-28 D 79.2 AZ 10  
 GRA1 20:50:08.6 i P c Z mb5.0  
 ALIGN 20:50:08.6 T1.1 A19  
 NEIC: OT 20:38:42.5 55N 162E dep 33km mb4.7  
 NEAR EAST COAST OF KAMCHATKA  
 -----

1999-01-28

GRA1 22:37:53.4 e PKPdf Z

GRA1 22:38:06.1 e pPKPdf Z

-----  
1999-01-28

D 39.7 AZ 7

GRA1 23:00:18.2 i P d Z mb4.7

ALIGN 23:00:18.2 T1.4 A25

GRA1 23:00:26.0 e pP Z

GRA1 23:14:23.9 e L Z T25.1 A671 MS4.4

-----  
1999-01-29

D 3.7 408km

GRA1 01:13:48.4 e Pn Z M14.3

GRA1 01:14:46.7 e Sg E

SZGRF: OT 01:12:50.1 51N 16E dep 1km

POLAND

-----  
1999-01-29

D145.4

GRA1 01:28:53.3 e PKPdf Z

GRA1 02:31:33.5 e L Z T21.7 A1365 MS5.7

-----  
1999-01-29

D 33.4 AZ106

GRA1 05:29:24.5 i P c Z mb5.2

ALIGN 05:29:24.5 T1.5 A47

GRA1 05:29:29.1 e pP Z

GRA1 05:29:32.2 e sP Z

GRA1 05:29:35.5 e Z

GRA1 05:29:39.0 e Z

GRA1 05:47:10.1 e L Z T20.4 A285 MS4.0

SZGRF: OT 05:22:47.4 32N 50E dep 19km

WESTERN IRAN

-----  
1999-01-29

D 65.7 AZ 52

GRA1 05:55:09.1 e P Z mb4.7

ALIGN 05:55:09.1 T1.3 A7

GRA1 06:25:42.6 e L Z T18.0 A403 MS4.7

-----  
1999-01-29

D 3.6 398km

GRA1 06:10:12.9 e Pn Z M13.5

GRA1 06:11:11.8 e Sg N

SZGRF: OT 06:09:17.4 51N 16E dep 1km

POLAND

-----  
1999-01-29

D 88.0 AZ294

GRA1 06:40:57.0 e P Z mb4.8

BEAM 06:40:57.0 T0.9 A4

GRA1 06:41:07.7 e pP Z

-----  
1999-01-29

GRA1 13:56:09.3 e PKPdf Z

-----  
1999-01-29 D144.5

GRA1 15:23:37.7 i PKPdf c Z

GRA1 15:24:37.8 e pPKPdf Z

NEIC: OT 15:04:29.1 19S 169E dep237km mb5.3

VANUATU ISLANDS

-----  
1999-01-29

GRA1 16:26:50.6 e PKPdf Z

GRA1 16:26:57.8 e (pPKPdf)Z

-----  
1999-01-30 D 49.4 AZ 80

GRA1 03:13:06.0 e P Z

BEAM 03:13:06.0 T0.9 A6 mb4.6

GRA1 03:13:49.9 e pP Z

GRA1 03:14:05.2 e sP Z

SZGRF: OT 03:04:36.8 36N 78E dep188km

EASTERN KASHMIR

-----  
1999-01-30 D 52.5

GRA1 04:00:18.4 i P c Z mb6.0

ALIGN 04:00:18.4 T1.4 A267

GRA1 04:00:24.3 i pP d Z

GRA1 04:01:15.0 e Z

GRA1 04:01:28.4 e Z

GRA1 04:07:33.2 e S Z

GRA1 04:11:50.2 e SS Z

GRA1 04:23:30.9 e L Z T19.0 A2612 MS5.3

NEIC: OT 03:51:06.5 42N 88E dep 33km mb5.9

SOUTHERN XINJIANG, CHINA

-----  
1999-01-30 D105.0

GRA1 09:03:34.9 e Pdiff Z

GRA1 09:03:39.3 e pPdiff Z

NEIC: OT 08:49:29.1 2N 127E dep 33km mb5.2

NORTHERN MOLUCCA SEA

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1999-01-30

GRA1 19:47:36.1 e PKPdf Z

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1999-01-31 D 88.3 AZ291



GRA1 03:51:34.7 e P Z mb4.9  
 BEAM 03:51:34.7 T1.0 A7  
 GRA1 03:51:45.3 e pP Z  
 SZGRF: OT 03:38:47.5 15N 94W dep 36km  
 NEAR COAST OF CHIAPAS, MEXICO

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 1999-01-31 D 23.8  
 GRA1 05:12:38.5 e P Z mb5.0  
 ALIGN 05:12:38.5 T1.0 A52  
 GRA1 05:13:21.3 e Z  
 GRA1 05:17:04.6 e S Z  
 GRA1 05:23:27.7 e L Z T18.6 A6005 MS5.1  
 SZGRF: OT 05:07:25.7 41N 43E dep 10km  
 TURKEY-USSR BORDER REGION

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 1999-01-31 D 56.4 AZ237  
 GRA1 08:44:09.0 i P d Z mb5.1  
 ALIGN 08:44:09.0 T1.5 A29  
 GRA1 08:44:16.1 e pP Z  
 GRA1 08:44:20.5 e sP Z  
 GRA1 09:03:29.7 e L Z T21.4 A140 MS4.0  
 SZGRF: OT 08:34:29.5 7N 33W dep 28km  
 CENTRAL MID-ATLANTIC RIDGE

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 1999-01-31 D 23.3 AZ359  
 GRA1 12:11:59.5 e P Z  
 GRA1 12:25:43.7 e L Z T19.4 A680 MS4.1

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 1999-01-31 D 23.3 AZ302  
 GRA1 14:16:12.1 e P Z

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 1999-01-31 D150.6  
 GRA1 17:00:54.5 e PKPdf Z  
 GRA1 17:01:05.5 e (PKPab) Z

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 1999-01-31 D 82.5 AZ 38  
 GRA1 17:04:13.6 i P c Z mb5.8  
 ALIGN 17:04:13.6 T1.2 A92  
 GRA1 17:04:26.3 e pP Z  
 GRA1 17:04:29.5 e Z  
 GRA1 17:04:40.2 e Z  
 GRA1 17:07:24.2 e PP Z  
 GRA1 17:45:23.9 e L Z T20.3 A449 MS4.8  
 SZGRF: OT 16:51:57.4 38N 141E dep 44km  
 HONSHU, JAPAN

1999-01-31 D149.5  
GRA1 18:30:05.4 e PKPdf Z  
GRA1 18:30:13.6 e PKPab Z  
GRA1 18:30:20.2 e pPKPdf Z

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1999-01-31 D 80.1 AZ 31  
GRA1 19:41:15.9 i P c Z mb5.4  
ALIGN 19:41:15.9 T1.0 A52  
GRA1 19:41:17.2 e Z  
GRA1 19:41:21.1 e Z  
GRA1 19:41:29.3 e pP Z  
GRA1 19:41:33.6 e sP Z  
GRA1 20:22:30.7 e L Z T19.4 A1721 MS5.4  
SZGRF: OT 19:29:12.6 43N 148E dep 45km  
KURIL ISLANDS  
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