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INL Seismic Monitoring Annual Report: January 1, 2009 – December 31, 2009

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September 2010

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Idaho National Laboratory
Seismic and Structural Analysis
Idaho Falls, Idaho 83415

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SUMMARY

During 2009, the INL Seismic Monitoring Program evaluated 7,509 earthquakes from around the world, the western United States, and local region of the eastern Snake River Plain (ESRP). 2,061 earthquakes and man-made blasts occurred within the local region outside and within a 161-km (or 100-mile) radius of INL. Of these events, 25 were small-to-moderate size earthquakes ranging in magnitude from 3.0 to 4.2. 865 earthquakes occurred within the 161-km radius of INL and the majority of these earthquakes were located in active regions of the Basin and Range Province that surrounds the ESRP. There were seven earthquakes within the boundary of the ESRP, all of M_c 2.1 and less. Four of those were located within and near the ESRP at Craters of the Moon National Monument (COM) at mid- and lower-crust depths and are interpreted to be related to fluid movement. Since 1972, INL has recorded 40 small-magnitude microearthquakes ($M < 2.2$) within the ESRP (not including COM events) and 17 microearthquakes ($M < 2.3$) in the vicinity of Craters of the Moon National Monument.

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ACKNOWLEDGEMENTS

We thank Alan Marley for his continued support. We also thank staff at the University of Utah Seismograph Stations, U. S. Geological Survey, and Montana Bureau of Mines and Geology for their earthworm data shares. The research was funded in part by the Idaho National Laboratory through the U.S. Department of Energy Idaho Operations Office contract DE-AC07-05ID14517.

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ACRONYMS

ANL	Argonne National Laboratory
BLM	Bureau of Land Management
CFA	Central Facilities Area
COM	Craters of the Moon National Monument and Preserve
DAAS	Data Acquisition/Analysis System
DOE	Department of Energy
DSL	Digital Subscriber Line
EFS	Experimental Field Station
ESRP	Eastern Snake River Plain
GPS	Global Positioning System
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IP	Internet Protocol
IRC	INL Research Center
LOFT	Loss of Fluid Test
MFC	Materials and Fuels Complex
NEIC	National Earthquake Information Center
NRF	Naval Reactor Facility
PBF	Power Burst Facility
PBO	Plate Boundary Observatory
P-wave	Compressional Wave
RTC	Reactor Technology Complex
RWMC	Radioactive and Waste Management Complex
S-wave	Shear Wave

SMC	Special Manufacturing Complex
SMA	Strong Motion Accelerograph
SSCs	Structures, Systems, and Components
STC	Science and Technology Complex
TA	Transportable Array
TAN	Test Area North
TRA	Test Reactor Area
USGS	United States Geological Survey

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1. Introduction

The Idaho National Laboratory (INL) has accumulated 37 years of earthquake data (1972-2009). This report covers the earthquake activity from January 1, 2009 through December 31, 2009 and is a continuation of previous annual reports on earthquake activity surrounding the eastern Snake River Plain (ESRP) and within and near the INL. It discusses the earthquake activity that has occurred around the local region and within a 161-km radius around the INL centered at 43° 39.00' N, 112° 47.00' W (Figure 1). It discusses the seismic station and strong motion accelerograph instrumentation used to record earthquake data and how they were analyzed. It also includes a brief discussion of continuous GPS (Global Positioning System) stations co-located at INL seismic stations.

1.1 History of INL Seismic Monitoring Program

1.1.1 Purpose

The purpose of the INL Seismic Monitoring Program is to provide the INL with earthquake data and staff expertise to support the requirements set forth by Presidential executive orders, DOE directives, orders and standards, and the Nuclear Regulatory Commission for seismic safety of: Structures, Systems, and Components (SSCs); workers and the public; and operations at INL of reactors and waste management activities. The program supports safety of operations through continuous monitoring of earthquake activity, the development of INL seismic design criteria, assessments of seismic hazards for existing facilities and acquisition of major new programs, and early warning of potential future volcanic eruptions near INL. For example, the earthquake data are used to assess seismic hazards and develop seismic design criteria for the INL as required by DOE Order 420.1A “Facility Safety” (DOE, 2003).

The INL Seismic Monitoring Program operates 27 permanent seismic stations for the purpose of determining the time, location, and size of earthquakes occurring in the vicinity of the INL. The seismic data are compiled to develop an historical database that defines the zones and frequency of earthquake activity. Seismic stations are located within and around the INL near potential earthquake sources that include major range-bounding normal faults and volcanic rift zones (Figure 1). Additionally, GPS receivers are co-located at 15 seismic stations for the purpose of determining rates of crustal deformation. GPS velocities are used to identify regions of higher crustal deformation rates (such as Yellowstone, Wyoming) relative to regions of lower deformation rates (e.g. Snake River Plain, Idaho).

The INL Seismic Monitoring Program operates 23 strong-motion accelerographs (SMAs) for the purpose of recording strong ground motions from local moderate or major earthquakes. Most SMAs are located within INL buildings to determine the response of these buildings to ground motions in the event of a large earthquake. Several SMAs are located at “free-field” sites (not within buildings) at INL facility areas and are used to determine the levels of earthquake ground motions at the ground (rock or soil) surface. SMAs and accelerometers are also co-located with several INL seismic stations to record acceleration data and assess attenuation effects of small to large magnitude normal faulting earthquakes.

1.1.2 Seismic Stations

The INL seismic network has evolved from a single analog station to its current configuration of 27 digital seismic stations. The INL Seismic Monitoring Program also records data from seismic stations

owned and operated by other seismic networks. The INL seismic network began with a single station in 1971 and expanded to three stations by October of 1972. In 1977, the INL began monitoring a station operated by BYU-Idaho in Rexburg, Idaho. The INL installed two additional stations in 1979 and from 1979 to 1985, the INL monitored earthquake activity using six seismic stations. In 1985, the INL installed a simulated Wood-Anderson system to improve the capabilities of measuring the magnitude of local earthquakes ($3.0 \leq M_L \leq 5.0$). During 1986, the INL began receiving seismic data from a station located in Pocatello, Idaho and operated by the University of Utah in Salt Lake City, Utah. Also in 1986, the INL began receiving data from a station located near Palisades Reservoir, Idaho that is operated by BYU-Idaho. A seismic station within the INL boundaries was added to the INL seismic network in 1987.

From 1990 to 1994, INL seismic network under went a major expansion of seismic stations. During 1990, four seismic stations were installed within the INL boundaries. From 1991 to 1992, thirteen new stations were installed in support of construction and operation of the proposed New Production Reactor at INL. Shallow boreholes (<20 m) were drilled for seismic stations located within the ESRP. Also, monitoring of BYU-Idaho seismic station near Palisades Reservoir was terminated in 1991 to accommodate the addition of the new INL seismic stations. In 1994, two new INL seismic stations were installed near Gray's Lake, Idaho.

Several changes occurred to seismic stations from 1999 to 2003. During 1999, the INL Howe Scarp, Idaho (HWSI) seismic station was relocated further east to a new location now referred to as the Howe Fault, Idaho or HWFI because of a lawsuit filed against the Bureau of Land Management (BLM). With the implementation of the EARTHWORM computer software in 2000, up to 14 stations from several nearby networks were being recorded in real-time along with the INL seismic stations. During 2001-2003, analog seismic instruments at all INL seismic stations were replaced with digital instruments. In 2003, the University of Utah transferred ownership of the Pocatello, Idaho (PTI) seismic station to the INL Seismic Monitoring Program at which time a digital seismic station was installed. With addition of the PTI station, INL has operated 27 seismic stations from 2003 through 2009.

Beginning in 2007 and continuing through 2009, INL recorded data from Transportable Array (TA) seismic stations deployed in Idaho as part of the EarthScope Science program funded under the National Science Foundation (EarthScope, 2007). These seismic stations are three-component broadband stations that are temporarily deployed for 18-24 months in a grid that systematically covers the United States. One TA station is co-located at the INL's Crow's Nest, Idaho (CNCI) seismic station, which the INL acquired in 2009 as part of its seismic network. During 2009, data from 30 TA stations were recorded by INL. Also, INL began recording data from six additional stations within the National Earthquake Information Center's Intermountain West network. As with the TA stations, three-component, broadband seismometers are installed at these stations.

1.1.3 Strong Motion Accelerographs

The INL began an accelerograph network by installing SMAs in buildings at INL facility areas, and more recently at free-field sites for both rock and soil conditions. In 1973, the INL began an accelerograph network by installing eleven SMAs in critical INL facilities. Three were located within buildings at the Idaho Nuclear Technology and Engineering Center (INTEC) (formerly referred to as Idaho Chemical Processing Plant - ICPP), two within the Materials and Fuels Complex (MFC) facilities (formerly referred to as Argonne National Laboratory – ANL), three within the Power Burst Facility (PBF), two within buildings at the Reactor Technology Complex (RTC) (formerly referred to as Test Reactor Area – TRA), and one at the Old Fire Station (OFS). From 1978 to 1979, four SMAs were installed at Test Area North (TAN) within the Containment Test facility (formerly referred to as Loss of Fluid Test – LOFT facility). Just prior to the October 1983 M_s 7.3 Borah Peak, Idaho earthquake, one SMA was installed at the INL Research Center (IRC), which is now part of the Science and Technology

Complex (STC) in Idaho Falls, Idaho. Following the 1983 earthquake, two SMAs were installed within buildings at the Naval Reactor Facility (NRF). In 1984, two additional SMAs were placed within buildings at INTEC. During 1990, one SMA was installed at the Central Facilities Area (CFA). A digital SMA was co-located with an analog SMA at MFC in 1993. In 1996, two free-field SMA sites were installed, one at NRF and the other at PBF. In 1997, one SMA was installed as a free-field site at the Radioactive Waste Management Complex (RWMC). In 2003, the SMAs were upgraded to digital NetDAS SMAs. At that time, one NetDAS digital SMA replaced two SMAs co-located at Building ANL-767 (Kinemetrics analog SMA-1 and digital SSA-2 accelerograhs). The SMA on the crane beam at PBF-620 was not upgraded, but removed due to decommissioning activities.

Over the years, several SMAs have been relocated because buildings have been decommissioned and demolished. In 1995, the SMA at OFS was moved to a storage building directly behind the fire station because the fire station was decommissioned. In 1997 when the storage building was demolished, this SMA was relocated to the Experimental Field Station (EFS). In 1996, the Containment Test facilities or LOFT facilities were decommissioned. Three of the SMAs from LOFT were moved to the TAN Hot Shop and one was placed at the TAN Air Monitoring building. In 1997, the SMA at CFA was relocated to CFA-1607 Refueling Building. In 2004, the TAN Air Monitoring building was demolished so the SMA was removed and was reinstalled in 2005 as a free-field near the TAN Hot Shop. In 2004, the PBF building was demolished and the three SMAs were removed. The SMAs were reinstalled in 2005 as free-field sites near PBF and RWMC. In 2006, four SMAs at TAN were removed due to demolition of the TAN Hot Shop. In 2007, two of these SMAs were reinstalled; one was installed at the Special Manufacturing Complex (SMC) and the other at a free-field site east of SMC. In 2008, two SMAs were removed and three SMAs were installed as a result of building demolition activities. One SMA at INTEC in building CPP-668 and one at RTC were removed. This SMA and two others were reinstalled at TAN, RTC, and the New Production Reactor (NPRI) seismic station. During 2009, two SMAs were removed at INTEC from building CPP-601 as a result of building demolition activities.

Three-component accelerometers were added to some of the seismic stations. In 2002, accelerometers were added to four seismic stations: Bear Canyon (BCYI), Gray's Range (GRRI), NPRI, and HWFI. In 2003, accelerometers were added to seismic stations Telchick Spring, Idaho (TCSI), Split Crater (SPCI), and PTI. In 2004, the accelerometer at TCSI was uninstalled. In 2008, a free-field SMA was installed at the Craters of the Moon (COMI) seismic station. During 2009, the INL Accelerograph Network operated up to 20 SMAs within or near INL Site facility areas, two sites outside of the INL boundary (IRC and COMI), and five three-component accelerometers installed at seismic stations for a total of 27 sites with acceleration recording capabilities.

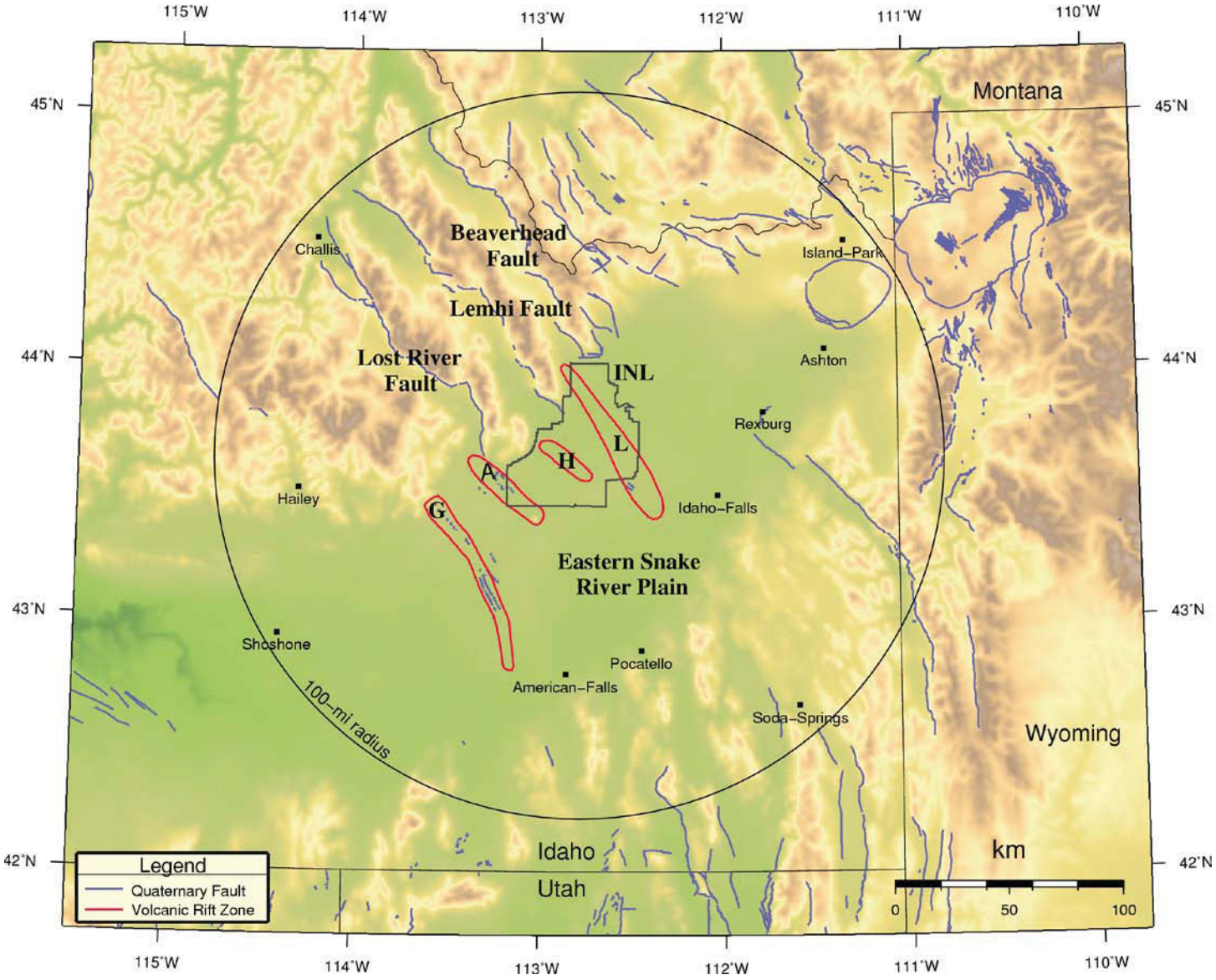

Figure 1. Map shows locations of the earthquake reporting area within a 161-km (100 mile) radius around the INL, Quaternary faults, and volcanic rift zones: G – Great Rift, A – Arco, H – Howe-East Butte, and L – Lava Ridge-Hell's Half Acre.

2. Instrumentation

2.1 Seismic Station Network

During 2009, the INL Seismic Monitoring Program operated 27 permanent seismic stations and monitored up to 55 seismic stations from other nearby seismic networks (Figure 2). Table 1 lists the name, location, and date of installation for the seismic stations owned and operated by the INL Seismic Monitoring Program. Table 2 lists the name, location, and operation dates of seismic stations owned by other agencies. Table A-1 (Appendix A) lists the information for the EarthScope Science Program TA stations. The INL recorded seismic data from these other seismic stations to improve the quality of earthquake locations within the 161-km radius of INL.

Instrumentation for INL seismic stations consists of digital recorders, one- and three-component seismometers, and three-component accelerometers. The digital recorder is a DAQSystems NetDAS field unit, which is an embedded LINUX computer with a GPS clock and Symmetric Research 24 bit digitizer. The NetDAS units have nearly 22 bits of data resolution over ± 20 volts for a four-channel unit or ± 10 volts for an eight-channel unit. Four channel units (NetDAS-CH4) are located at seismic stations that have one or three sensors; eight channel units (NetDAS-CH8) are at seismic stations that have more than three sensors (such as three seismometers and three accelerometers). The seismic stations have pre-amplifiers that improve signal-to-noise ratios. The NetDAS digitizes data at the seismic station and time stamps the data with accuracies of ± 0.001 seconds. The seismic signals are transmitted by FreeWave Technologies DGR115 900 MHz Wireless Modem radios. These radios use standard IP (Internet Protocol) networking features that are included in the embedded LINUX.

Single-component seismic stations have vertically oriented velocity sensors (or seismometer) that are a Mark Products model L-4C, Teledyne Geotech (TG) model S-13 or TG model S-13 Jr. seismometer buried within 3 m of the ground surface. All seismic stations located within the ESRP have their vertical-component seismometer located at the bottom of 18 m or greater borehole to help dampen wind and cultural noise (Seismic, 1993). Seismic stations with horizontally-oriented velocity sensors have two Teledyne Geotech model S-13 seismometers located within a concrete vault, in addition to the vertically-oriented sensor. Seismic stations with acceleration sensors have Applied MEMs Inc. model SF1500A, SF2500A, or SF3000L tri-axial accelerometers.

During 2009, the INL acquired the broadband seismograph station I14A that was installed and previously operated by the USArray component of the EarthScope project (Earthscope, 2007). As part of the INL seismic network, the broadband station – still called I14A – is co-located with INL's Crow's Nest, Idaho (CNCI) short-period seismic station. Instrumentation at I14A consists of a Quanterra Q330 data acquisition system and Guralp CMG-3T seismometer. The instrumentation remains in the original vault installed by USArray and is currently networked to INL using the FreeWave radio at CNCI.

Where AC power is not available, seismic stations are powered by batteries, solar panels, and at some locations small wind generators. Radio frequency compatible antennas transmit and receive the seismic signals. Several seismic stations are used as relay stations to allow transmission of seismic signals to the IRC in Idaho Falls. The seismic data are relayed by digital radios or internet Digital Subscriber Line (DSL) links (Appendix A). The data are acquired through EARTHWORM data acquisition over the Internet (discussed in Section 2.5). Digital seismograms are continuously displayed on three of four computer monitors referred to as "Webicorders." The fourth monitor displays a map of current earthquakes located by the INL Seismic Monitoring Program.

2.2 Strong Motion Accelerographs

The INL accelerograph network has 22 strong-motion accelerographs at INL Site facilities; 21 are located at the INL Site and 1 is located in the IRC at the STC. Table 3 lists the location and date of installation for each of the SMAs in operation within the INL boundary. There are 1 to 5 accelerographs at each INL Site facility area (Figure 3). Additionally, in 2009 INL operated one SMA outside of the INL boundary co-located at the COMI seismic station (Table 4). During 2009, earthquakes did not trigger SMAs located within INL facilities. Also, in 2009, two SMAs were removed as a result of building demolition activities at INTEC in building CPP-601.

INL SMAs are DAQSystems NetDAS digital accelerographs that have Applied MEMS SiFlex SF2500 tri-axial accelerometers contained within the unit. Each SMA is set to trigger and record to compact flash when ground motions exceed 2500 counts, which is equivalent to about 0.005 g. The record lengths are set for 30 s of pre- and post-trigger thresholds. The tri-axial accelerometers have two horizontal components oriented in an orthogonal manner, generally aligned in the north-south and east-west directions. Appendix B lists the accelerometer orientation and instrument response for the horizontal and vertical components of each SMA. SMAs at free-field sites have GPS clocks to synchronize the internal clocks to an absolute time system. For some SMAs at free-field sites and locations within buildings, acceleration data are transmitted to the IRC via digital radios or the Internet. Other SMAs record data on compact flash disks that are retrieved by INL seismic personnel using a laptop PC computer.

2.3 Continuous GPS Stations

The INL Seismic Monitoring Program has a geodetic network for the purpose of monitoring crustal deformation in support of INL seismic hazards assessments. GPS data are used to investigate active crustal deformation that is on the order of millimeters of movement per year within the ESRP, the surrounding Basin and Range, and Yellowstone Plateau. GPS data define regions of high velocity gradients (or strain rates) having more frequent damaging earthquakes (e.g., Yellowstone – Hebgen Lake, Montana) than regions of low velocity gradients (e.g., eastern Snake River Plain). The regional spatial patterns of GPS data also help constrain the fundamental geodynamic processes that drive active continental deformation in the western United States.

During 2009, INL collected additional GPS phase data and teamed with Dr. Robert King at the Massachusetts Institute of Technology to process INL GPS phase data. Also in 2009, INL personnel installed GPS receivers at two INL seismic stations (NPRI and LLRI) bringing the total number of INL continuous GPS sites to 15 (Table 4). As part of the Plate Boundary Observatory (PBO) under the EarthScope Science Program, there are currently 19 other continuous GPS sites near the Snake River Plain (Figure 4). One of these GPS receivers is co-located at INL's Great Rift, Idaho (GTRI) seismic station. In addition to continuously operating GPS sites, INL personnel collected GPS phase data at several campaign GPS sites. Dr. King processed all of INL's GPS phase data acquired up to 2009 and located within the ESRP and surrounding Basin and Range. He combined the INL GPS data with other data in the region to produce a horizontal GPS velocity field that encompasses the Pacific Northwest. Locally, the horizontal GPS velocities indicate the Basin and Range is extending at a rate that is an order of magnitude greater than the Snake River Plain, which is thought to explain its relative low seismicity (Payne et al. 2008a; Payne et al. 2008b; Payne et al. 2008c).

An INL continuous GPS station consists of a Trimble NetRS GPS receiver connected to a Trimble L1/L2 dual frequency choke ring antenna. The antenna is attached to a 2.4 m steel rod that is drilled into a rock outcrop to a depth of about 1 m. Above ground the antenna is stabilized using a much larger PVC

pipe filled with sand. This reduces the amount of wind noise within the GPS data, improving the accuracy. The NetRS receivers continuously collect GPS phase data. The phase data are relayed along with the seismic station data to DSL links, which are then accessed from the Internet at the IRC. Also, the phase data are downloaded daily from the Internet and archived by University NAVSTAR Consortium (UNAVCO).

2.4 Seismic Data Acquisition and Analysis System

The INL records earthquake data on a computer Data Acquisition/Analysis System (DAAS) at the IRC. INL began recording earthquake data on the DAAS June 8, 1991 using the U. S. Geological Survey (USGS) CUSP processing software. Since 2001, significant upgrades have been made to the DAAS as a result of computer hardware and software advances. The USGS CUSP data acquisition and analysis software that supported use of the TIMIT program were replaced with the earthquake analysis program SEISAN (developed by the University of Bergen, Norway) in 2002 and the USGS EARTHWORM processing software in 2003. From June 1991 to November 2002, earthquake data were analyzed using the USGS TIMIT program. As of December 2002, earthquake data are now being analyzed using the SEISAN program. Use of the SEISAN and EARTHWORM programs facilitated the upgrades of seismic stations and SMAs to the NetDAS digital units, allowing concurrent waveform analyses of both velocity and acceleration data. Instrument responses of the NetDAS units at seismic stations and SMAs are now routinely determined and are integrated into the SEISAN database (see Appendices B and C). All digital earthquake data are also routinely archived to removable media after analysis.

The EARTHWORM program constantly monitors the ratios of the short-term average divided by the long-term average (STA/LTA) of incoming data. This involves comparing the short-term average (1-s window) of the seismic data to a longer-term average, which is the background noise or voltage level determined over a time interval of 20 s. The program determines that an earthquake has occurred when the STA/LTA ratios for several stations exceed a threshold value. When an earthquake is detected, seismograms are saved in a file on a disk. This file is labeled with a sequential number based on the date and time of the trigger for later reference to the earthquake in the SEISAN database. Each seismogram has 30 s of pre-event data and 20 s of post-event data stored within the file. This is because, in some instances, earthquakes have low-amplitude emergent P-waves with larger amplitude S-waves. When this occurs the DAAS may trigger on the S-waves instead of the P-waves, thus, saving 30 s of pre-event time allows recording of the P-waves also.

The earthquake detection software is configured to trigger on earthquakes detected by several stations within a subnet. Subnets contain several stations that are likely to detect the same local earthquake. All INL seismic stations usually detect local earthquakes of magnitude 1.5. Subnets are specified for stations in close proximity to each other and their relationship to known seismic sources. For the ESRP though, a subnet was created for detection of small magnitude ($M < 0.5$) microearthquakes.

The EARTHWORM software also enables data sharing with other seismic networks in near real time over the Internet. The INL provides data from various seismic stations to the University of Utah, Montana Bureau of Mines and Geology, and National Earthquake Information Center (NEIC), which in return provide data to INL (Table 2). EARTHWORM records seismic data from INL and these other agencies, which are analyzed using the SEISAN program. In 2007, data from NEIC's Intermountain West seismic network were added to the data shares. From 2007 to 2009, data from EarthScope's TA stations were also part of the data shares. These data enhanced the azimuth coverage and magnitude determinations of earthquakes within the 161-km radius of INL, particularly for earthquakes in the southern part of the ESRP.

Table 1. Seismic stations operated by INL.

Code	Station Name	Types of Sensors	Latitude North (º)	Longitude West (º)	Elevation (m)	Date Installed (Month/Year)
ARNI	Argonne North, Idaho	Borehole Vertical Seismometer; GPS Receiver	43.6667	112.6235	1533	09/1990
BCYI	Bear Canyon, Idaho	Vertical Seismometer; Three-component Accelerometers; GPS Receiver	44.3108	113.4052	2194	05/1992
CBTI	Cedar Butte, Idaho	Borehole Vertical Seismometer	43.3875	112.9115	1734	07/1986
COMI	Craters of the Moon, Idaho	Three-component Seismometers; Strong-Motion Accelerograph	43.4618	113.5938	1890	03/1992
CNCI	Crows Nest Canyon, Idaho	Vertical (Short-period) Seismometer; Three-component Broadband Seismometers	43.9283	113.4522	1914	05/1992
CRBI	Circular Butte, Idaho	Borehole Vertical Seismometer; GPS Receiver	43.8303	112.6345	1520	11/1987
ECRI	Eagle Creek, Idaho	Vertical Seismometer	43.0535	111.3705	2086	08/1994
EMI	Eightmile Canyon, Idaho	Vertical Seismometer; GPS Receiver	44.0742	112.9262	1963	04/1992
GBI	Big Grassy Butte, Idaho	Borehole Vertical Seismometer; GPS Receiver	43.9875	112.0633	1541	10/1981
GRRI	Grays Range, Idaho	Vertical Seismometer; Three-component Accelerometers; GPS Receiver	42.9380	111.4217	2207	08/1994
GTRI	Great Rift, Idaho	Borehole Vertical Seismometer; GPS Receiver*	43.2440	113.2410	1522	05/1992

Table 1. Continued.

Code	Station Name	Types of Sensors	Latitude North (º)	Longitude West (º)	Elevation (m)	Date Installed (Month/Year)
HHAI	Hell's Half Acre, Idaho	Borehole Vertical Seismometer	43.2950	112.3795	1371	06/1992
HPI	Howe Peak, Idaho	Vertical Seismometer; GPS Receiver	43.7113	113.0983	2597	10/1972
HWFI	Howe Fault, Idaho	Three-component Seismometers; Three-component Accelerometers; GPS Receiver	43.9257	113.0973	1743	10/1999
ICI	Italian Canyon, Idaho	Vertical Seismometer; GPS Receiver	44.3293	112.9412	2463	04/1992
IRCI	INL Research Center, Idaho	Low-gain Three-component Seismometers	43.5153	112.0333	1442	11/1988
JGI	Juniper Gulch, Idaho	Three-component Seismometers	44.0927	112.6768	1657	11/1979
KBI	Kettle Butte, Idaho	Borehole Vertical Seismometer	43.5907	112.3767	1678	05/1992
LJI	Lemhi Junction, Idaho	Vertical Seismometer	43.8208	112.8440	1643	05/1990
LLRI	Little Lost River, Idaho	Three-component Seismometers	43.7230	112.9330	1476	05/1990
NPRI	New Production Reactor, Idaho	Three-component Seismometers; Three-component Accelerometers; Strong-Motion Accelerograph	43.5975	112.8272	1495	09/1990
PTI	Pocatello, Idaho	Vertical Seismometer; Three-component Accelerometers; GPS Receiver	42.8703	112.3702	1670	10/1984
PZCI	Patelzick Creek, Idaho	Vertical Seismometer; GPS Receiver	44.3410	112.3172	2073	12/1991
SMBI	Sixmile Butte, Idaho	Borehole Vertical Seismometer	43.5022	113.2677	1716	05/1992

Table 1. Continued.

Code	Station Name	Types of Sensors	Latitude North (º)	Longitude West (º)	Elevation (m)	Date Installed (Month/Year)
SPCI	Split Crater, Idaho	Three-component Seismometers; Three-component Accelerometers	43.4500	112.6370	1553	06/1992
TCSI	Telchick Spring, Idaho	Vertical Seismometer; GPS Receiver	43.6193	113.4783	1731	05/1992
TMI	Taylor Mountain, Idaho	Three-component Seismometers; GPS Receiver	43.3057	111.9182	2179	10/1972

* - GPS instrumentation is owned by the Plate Boundary Observatory under the EarthScope Science Program.

Table 2. Agencies and stations from which INL receives data shares.

Code	Station Name	Latitude North (º)	Longitude West (º)	Elevation (m)	Operating Dates (Month/Year)	
National Earthquake Information Center, Golden, Colorado						
AHID	Auburn, Idaho	42.7653	111.1003	1960	11/1997	Pres
BW06	Boulder, Wyoming	42.7667	109.5582	2224	05/1996	Pres
DCID1	Drake Creek, Idaho	43.5945	-111.1845	1871	03/2005	07/2009
DLMT	Dillon, MT	45.3625	-112.5964	1569	08/2005	Pres
FLWY	Flagg Ranch, WY	44.0827	-110.6993	2078	08/2005	Pres
FXWY	Fox Creek, WY	43.6381	-111.0268	2254	07/2009	Pres
HLID	Hailey, Idaho	43.5625	114.4063	1498	08/1988	Pres
IMW	Indian Meadows, Wyoming	43.8970	-110.9392	2646	07/1980	Pres
LOHW	Long Hollow, Wyoming	43.6123	-110.6037	2121	01/1986	Pres
MFID	Camas Ranch, Mayfield, ID	43.4151	-115.8278	1302	12/2006	Pres
PLID	Pearl Lake, ID	45.0877	-116.0002	2164	08/2009	Pres
RRI2	Red Ridge, Idaho	43.3473	-111.3202	2558	07/1986	Pres
TPAW	Teton Pass, Wyoming	43.4902	-110.9507	2512	01/1986	Pres
University of Utah, Salt Lake City, Utah						
BEI	Bear River Range, Idaho	42.1167	111.7823	1859	11/1984	Pres
BMUT	Black Mountain, Utah	41.9582	111.2342	2243	10/1979	Pres
MCID	Moose Creek, Idaho	44.1903	111.1827	2149	12/1995	Pres
MLI	Malad Range, Idaho	42.0268	112.1255	1896	10/1974	Pres
NPI	North Pocatello, Idaho	42.1473	112.5183	1640	04/1975	Pres
YMC	Maple Creek, Wyoming	44.7593	111.0062	2073	12/1983	Pres
YPP	Pitchstone Plateau, Wyoming	44.2710	110.8045	2707	08/1996	Pres
Montana Bureau of Mines and Geology, Butte, Montana						
MCMT	McKenzie Canyon, Montana	44.8277	112.8488	2323	09/1989	Pres
MOMT	Monida, Montana	44.5933	112.3943	2220	10/1995	Pres
TPMT	Teepee Creek, Montana	44.7298	111.6657	2518	10/1992	Pres

Table 3. Strong-motion accelerographs operating in 2009.

Site Location (INL Facility Abbreviation or Seismic Station Code)	Building Number	Location	SMA Code	Year Installed
MFC	ANL-767	Basement	EBR	1973
MFC	ANL-768	Basement	FCF	1973
CFA	CFA-1607	Free-field	CFAF	1996
CFA	EFS	Free-field	EFSF	1997
INTEC[a]	CPP-601	First Floor	CPP1	1973
INTEC[a]	CPP-601	Second Basement	CPP2	1973
INTEC	CPP-666	Second Floor	FAS1	1984
INTEC	CPP-666	Second Basement	FAS2	1984
COMI[b]	NA	Free-field	COMF	2008
NPRI	NA	Free-field	NPRF	2008
NRF	NRF-768	Free-field	NRFF	1996
NRF	NRF-A1W	First Floor	A1W	1983
NRF	NRF-S1W	First Floor	S1W	1983
PBF	NA	Free-field	PBFF	2005
PBF	NA	Free-field	ARAF	2005
RTC	TRA-602	Free-field	TRAF	2003
RTC	TRA-670	Basement	TRA2	1996
RTC	TRA-670	First Floor	TRA3	2008
RWMC	NA	Free-field	RWMC	1997
RWMC	NA	Free-field	RWME	2005
STC	IRC-602	First Floor	IRC	1983
TAN	NA	Free-field	TANA	2007
TAN	TAN-601	First Floor	TANH	2008
TAN	SMC	First Floor	SMC	2007

NA – Not within a building.

[a] - Removed due to building demolition in August, 2009.

[b]- Located at seismic station COMI, see Table 1.

Table 4. Continuous GPS sites co-located with INL seismic stations.

Code	Station Name	Latitude North (º)	Longitude West (º)	Elevation (m)	Year Installed
ARNG	Argonne North, Idaho	43.6667	112.6235	1533	2005
BCYI	Bear Canyon, Idaho	44.3108	113.4052	2194	2003
CRBG	Circular Butte, Idaho	43.8303	112.6345	1520	2007[a]
EMIG	Eightmile Canyon, Idaho	44.0742	112.9262	1963	2005
GBIG	Big Grassy Butte, Idaho	43.9875	112.0633	1541	2007 [a]
GRRG	Grays Range, Idaho	42.9380	111.4217	2207	2007 [a]
GTRG	Great Rift, Idaho	43.2440	113.2410	1522	1998[b]
HPIG	Howe Peak, Idaho	43.7113	113.0983	2597	2005
HWFG	Howe Fault, Idaho	43.9257	113.0973	1743	2007 [a]
ICIG	Italian Canyon, Idaho	44.3293	112.9412	2463	2007
LLRG	Little Lost River, Idaho	43.7230	112.9330	1476	2009
NPRG	New Production Reactor, Idaho	43.5975	112.8272	1495	2009
PTIG	Pocatello, Idaho	42.8703	112.3702	1670	2007 [a]
PZCG	Patelzick Creek, Idaho	44.3410	112.3172	2073	2007 [a]
TCSG	Telchick Spring, Idaho	43.6193	113.4783	1731	2005
TMIG	Taylor Mountain, Idaho	43.3057	111.9182	2179	2007 [a]

a - Although hardware was installed for the GPS receiver in 2007, the receiver began acquiring phase data in 2008.

b - Co-located at INL's seismic station GTRI, but operated by the Plate Boundary Observatory under the EarthScope Science Program.

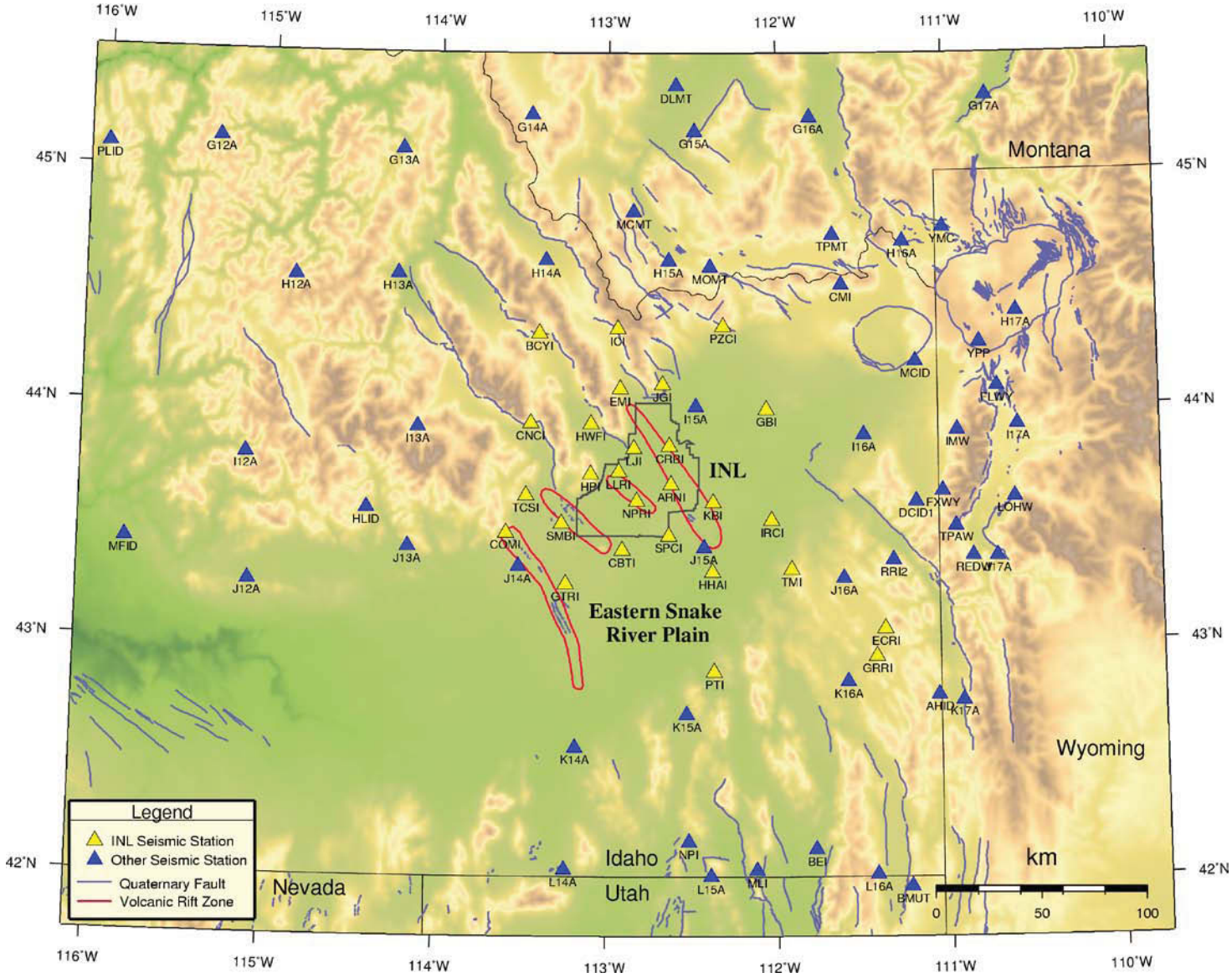

Figure 2. Locations of INL seismic stations and stations monitored by INL that are operated by other institutions. See Figure 1 for names of normal faults and volcanic rift zones.

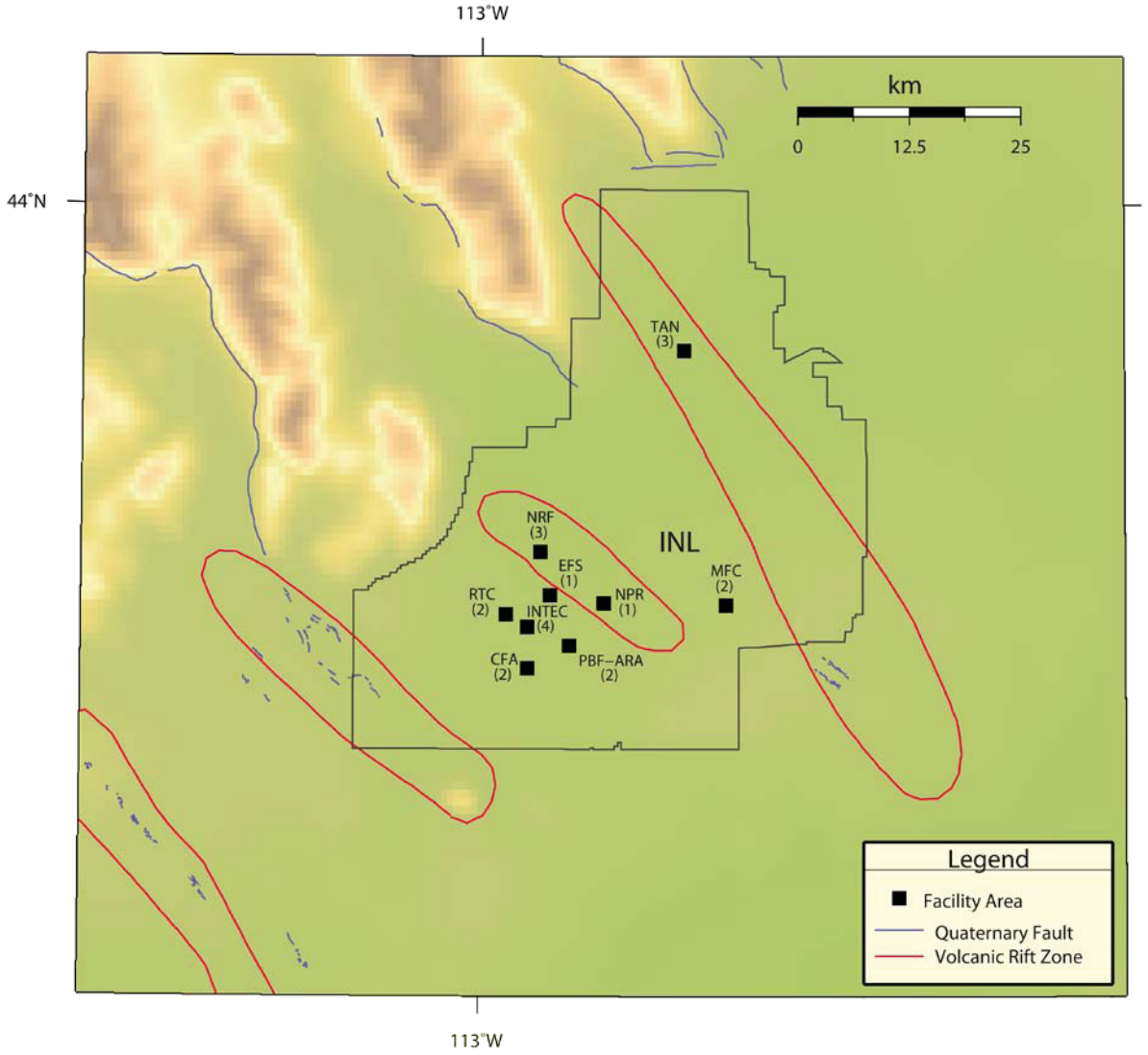

Figure 3. Numbers (in parentheses) of SMAs located at INL. See Figure 1 for names of normal faults and volcanic rift zones.

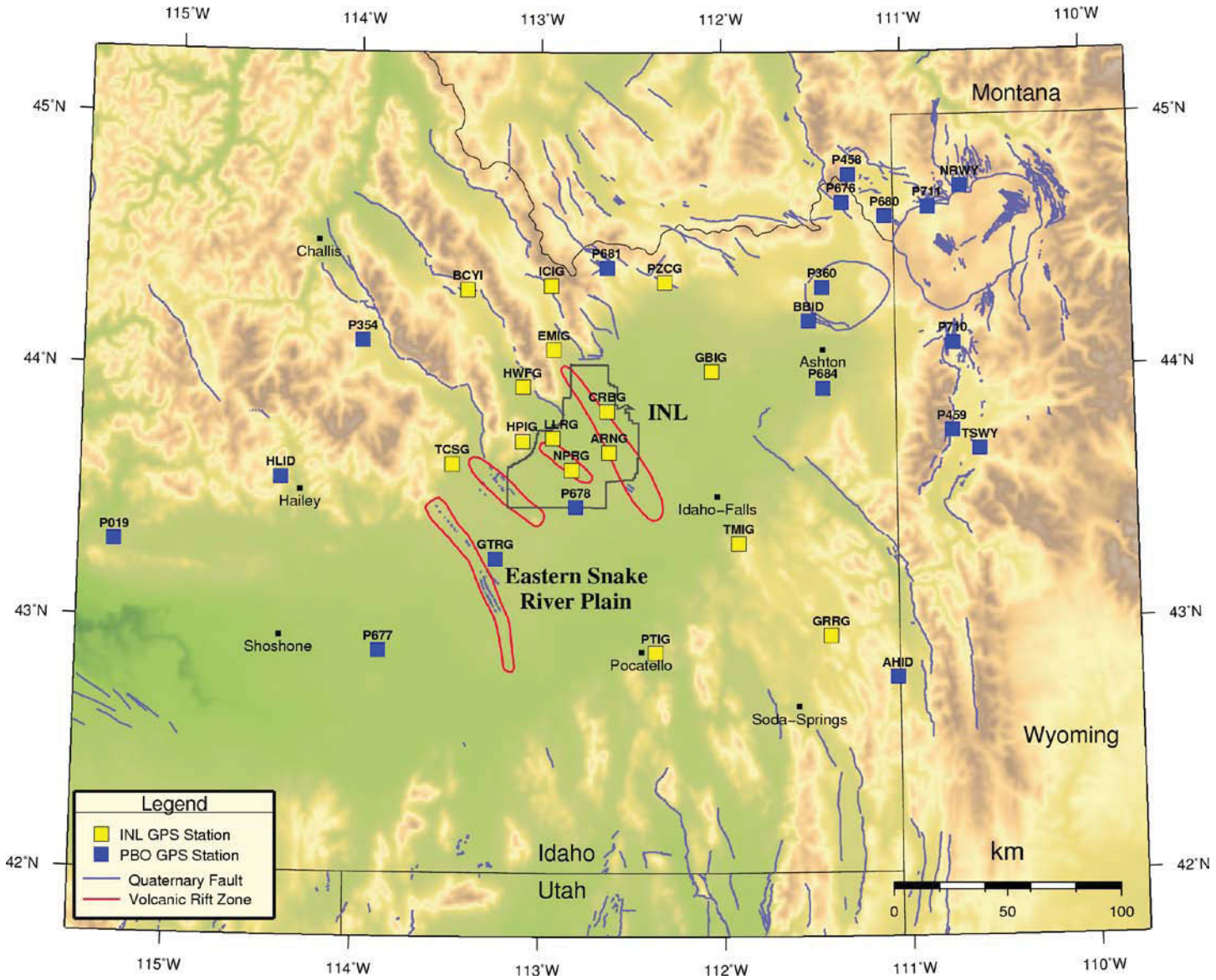

Figure 4. Locations of the continuous GPS stations co-located at INL seismic stations and operated by the Plate Boundary Observatory (PBO) under the EarthScope Science Program. See Figure 1 for names of normal faults and volcanic rift zones.

3. Data Analysis

Digital seismograms are analyzed using the SEISAN program to determine the earthquake's location, magnitude, and peak ground accelerations. SEISAN displays multiple seismograms on a computer screen with corresponding time codes having accuracy of ± 0.001 s. P- and S- wave arrival times in the seismograms are selected at an accuracy of up to ± 0.01 s. Durations and amplitudes of seismic signals are selected and then used to calculate earthquake magnitudes. The arrival times, durations, and amplitudes measured for an earthquake are saved in a computer file directly from the SEISAN program. The HYPOINVERSE-2000 program is used to compute the location. Two methods may be used to calculate the final magnitude of an earthquake depending on its size. The locations and magnitudes of the earthquakes are plotted on maps to assess seismically active regions near the INL. Amplitudes of the accelerograms are also measured using the SEISAN program, and can be processed using a separate program to determine peak horizontal and vertical accelerations.

3.1 Location Method

The HYPOINVERSE-2000 computer program (Klein, 2002) is used to determine locations for all local earthquakes recorded. Phase data files (arrival times of the earthquake) from the output of SEISAN are input into the HYPOINVERSE-2000 location program. According to Zollweg and Sprenke (1995), stable locations are usually obtained from about seven to ten arrival times (P- and S-waves combined) for recorded events that are not surrounded by INL seismic stations. Within the INL network, stable locations can be obtained with a minimum of six arrival times. Because of the density and sensitivity of the INL seismic network, the majority (usually more than 90%) of earthquakes located within the 161-km radius have a minimum of six arrival times. However, some earthquakes are located with fewer than six arrival times and, thus, their locations have larger errors. Seismic stations from other agencies monitored by the INL provide coverage outside the INL network and phase arrivals from these stations supplement phase data from INL stations in an attempt to reduce location errors.

Four P-wave velocity models are used in the HYPOINVERSE-2000 location program depending on the location of the earthquakes (Table 5). The "ESRP" velocity model is used for locating earthquakes that occur within the ESRP including the mountainous terrain on the northern and eastern edge of the Plain (Olsen et al., 1979; Sparlin et al., 1979; Braile and Smith, 1979; and Ackerman, 1979). The "INL ESRP" velocity model is used to locate earthquakes that occur on the ESRP and are near or within the INL Site boundaries. This model was developed from Sparlin et al. (1982) and Braile et al. (1982) and checked with respect to a few microearthquakes located within the ESRP (Jackson et al., 1989). The "BPEAK" velocity model is used for locating earthquakes that occur in the Borah Peak aftershock area and the mountainous terrain northwest of the Plain (Richins et al., 1987). Finally, the "SMT" velocity model is used to locate earthquake in southwestern Montana (Stickney, 1997). For all velocity models, a P-wave velocity to S-wave velocity ratio of 1.75 is used (Bones, 1978; Greensfelder and Kovach, 1982; and Richins et al., 1987).

Other notable parameters used in the HYPOINVERSE-2000 location program are the starting focal depth, set to 5 km, and the distance cutoff for arrival weighting, set to 50 km. Zollweg and Sprenke (1995) evaluated the parameters chosen for the HYPOINVERSE-2000 program used by INL. They determined that the parameters chosen yield good location results despite the poor coverage in azimuth of earthquakes outside the network. An evaluation of the difference between actual and computed locations showed that HYPOINVERSE-2000 location error was less than 0.25 km for test events located by the INL seismic stations.

3.2 Magnitude Calculations

Magnitudes are determined using two methods 1) coda magnitudes using signal duration of digital seismograms and 2) local magnitudes using amplitudes from digital seismograms. A coda magnitude (M_c) is calculated for an earthquake using several signal durations measured from the seismograms of different seismic stations. A local magnitude (M_L) is calculated using the largest peak-to-peak trace amplitude measured from digital waveforms and the Richter magnitude equation. If a magnitude cannot be determined for a local earthquake, then magnitudes determined by other seismic networks may be used including, for example, the University of Utah, Montana Bureau of Mines and Geology, NEIC, Boise State University, and the U.S. Bureau of Reclamation. The summary list of earthquakes in Appendix D lists the type of magnitude calculated and what institution reported the magnitude.

For the signal duration method, the following expression is used to calculate the coda magnitude at a station (Arabasz et al., 1979):

$$M_c = -3.13 + 2.74 \log \tau + 0.0012 \Delta \quad [1]$$

Where:

τ = Total signal duration recorded at the station in seconds;

Δ = Epicentral distance from the station in km.

The duration is measured at the start of the earthquake signature (P-wave arrival) to the end of the coda, where the signal fades into the background noise of the trace. The final magnitude is determined from the mean of the coda magnitude calculated for each seismogram. When the P-wave arrival time is selected the signal duration of the earthquake can be automatically selected by the SEISAN program for manually selected by a seismologist at INL. Equation (1) is usually used to estimate magnitudes for events located by the HYPOINVERSE-2000 location program.

Local magnitudes calculated from the digital seismograms are based on the Richter magnitude scale. Richter (1958) defined the local magnitude scale from the following equation:

$$M_L = \text{Log } A - \text{Log } A_o \quad [2]$$

Where:

A = Recorded maximum trace amplitude from the zero-line measured in millimeters on a standard, Wood-Anderson seismogram;

A_o = Maximum trace amplitude from the zero-line in millimeters for a selected standard earthquake.

The Richter magnitude scale was developed for a standard earthquake of magnitude 3.0 at 100 km for A_o = 0.001 mm and amplitude of 1.0 mm measured on the standard seismogram. He constructed a table of magnitudes based on distance and -Log A_o for maximum trace amplitudes recorded on the standard Wood-Anderson seismogram.

SEISAN has a program that uses equation [2] with amplitudes measured on a synthetic Wood-Anderson digital seismogram. The program allows the user to convert waveforms recorded on the horizontal channels of accelerometers and seismometers at INL seismic stations to synthetic Wood-

Anderson seismograms. The SEISAN program uses the instrument response information contained in Appendix B for accelerograms and Appendix C for seismograms to calculate synthetic Wood-Anderson seismograms at a magnification of 2800. The user then selects the largest peak-to-peak amplitude (or A) in millimeters from the digital display of the synthetic Wood-Anderson seismogram. The SEISAN program then uses the distance of the simulated Wood-Anderson station to the earthquake's epicenter and one-half the peak-to-peak amplitude to determine local magnitude using Richter's table. The program determines the local magnitude for the amplitude selected.

3.3 Peak Accelerations

Peak horizontal and vertical accelerations are determined from accelerograms (or acceleration time histories) using the SEISAN program (Section 2.4). SEISAN displays the horizontal and vertical accelerograms for some free-field SMAs located at the INL and accelerometers co-located with the seismic stations. The SEISAN program allows the user to correct the accelerograms by removing the instrument responses listed in Appendices B and C. A separate program is used to measure the largest zero-to-peak acceleration amplitude from the corrected acceleration time history.

3.4 Location Quality

Comparisons between earthquake locations determined by the INL and locations determined by other temporary networks or NEIC have been used to approximate locations errors of earthquake epicenters (Jackson et al., 1993a). This method was very general and yielded an approximation of the quality of the INL earthquake locations. In 1995, the State of Idaho requested Zollweg and Sprenke (1995) to perform an independent assessment of the INL Seismic Monitoring Program. Zollweg and Sprenke (1995) evaluated the location accuracy of the INL seismic network by two methods: 1) directly comparing INL locations to well-located earthquakes; and 2) indirectly by evaluating the network bias or non-random error through varying independent permutations (or combinations) of recording stations.

For the first method, twenty-two earthquakes having high-quality locations determined from a temporary seismic network installed near Challis, Idaho from July 1, 1992 to July 12, 1992 (by Boise State University) were compared to INL locations for these earthquakes. The earthquakes were located about 120 km from the center of INL, had varying magnitudes ranging from 1.9 to 4.5, and had absolute errors less than 1 km. The epicenters determined by INL seismic stations for these events differed by 1.6 to 11.5 km with an average of 7.1 km. The differences in locations were dependent on magnitude, with the smaller magnitude earthquakes tending to have greater differences in locations (Zollweg and Sprenke, 1995). These results are similar to the earlier estimates of an error radius of 5 km for a comparison to high-quality locations of the aftershocks from the M_s 7.3 October 28, 1983 earthquake (Jackson et al., 1993a). However it is noted that this estimate for an error radius was based on having five stations in the INL seismic network at that time. The closest station to the aftershocks was at a distance of 50 km or more.

The second method used by Zollweg and Sprenke (1995) evaluates the network bias. Unless all earthquakes are located using exactly the same groups of stations and phases (P- and S-waves), the relative locations will be affected by a non-random error or network bias. The network bias is important for the smaller earthquakes that make up the majority of the events in a catalog since fewer stations usually record smaller earthquakes. Five earthquakes located northwest of the INL seismic network and ranging in magnitude from 1.8 to 3.8 were used in the analysis. Because INL operated 26 seismic stations at the time of the assessment, there were millions of possible combinations of recording stations. Zollweg and Sprenke (1995) chose to vary the combination of the ten most influential phase arrivals for the permutation analysis. The locations for most of the permutations clustered about radii ranging from 6.5 to

11 km. For the magnitude 3.8 earthquake, 8% of the permutations resulted in a linear band extending 100 km. Zollweg and Sprenke (1995) suggested that earthquakes located with fewer S-wave arrival times have less well-constrained locations. Some of the larger earthquakes, like the magnitude 3.8 earthquake, have fewer S-wave arrival times because the signals saturate the instrumentation and onset of the S- wave is indistinguishable from the P-waves. Earthquakes with more than three S-wave-arrival times resulted in better-constrained locations.

3.5 Depth Quality

The HYPOINVERSE-2000 location program also calculates depth to the hypocenter. Focal depths calculated by this program are not accurate for many of the earthquakes recorded by the INL seismic network for two reasons: 1) the station spacing is usually greater than twice the focal depth of the earthquake recorded; and 2) the earthquake usually occurs outside of the network. To calculate accurate focal depths, the earthquake ideally should occur within the seismic network and at a distance equal to or less than its focal depth, and/or have S-arrivals from one or more stations within a distance of 1.4 focal depths of the epicenter (Gomberg et al., 1990). Although focal depths are listed in Appendix D, they should be interpreted within the context of the limitations discussed in this section unless otherwise indicated.

3.6 Data Completeness

Local earthquakes are easily discriminated from other seismic data such as local mine blasts, air blasts (or sonic booms), and distant (worldwide) and regional earthquakes occurring far outside of the INL seismic network. For example, man-made blasts are easily discriminated from earthquakes on the basis of waveform characteristics, the time the event occurred, and the location of the event. The NEIC earthquake website listing is regularly inspected to confirm consistency with the INL earthquake catalog for magnitudes 2.5 and greater (the cutoff magnitude for NEIC earthquake locations).

Detection threshold can provide a measure of completeness for the INL earthquake catalog. It is defined as the magnitude level at which the seismic network will nearly always detect and locate an earthquake. Zollweg and Sprenke (1995) evaluated the detection threshold by plotting the cumulative number of earthquakes as a function of magnitude to determine the lowest magnitude point that the curve begins to flatten. Zollweg and Sprenke (1995) determined the detection threshold to be a magnitude 1.3 anywhere within a 161-km (100-mile) radius around INL. Their conclusion was based on a plot of 1360 earthquakes for an 18-month period. Since the seismic stations are all located within 90 km of the center of INL, they suggested that the detection threshold is magnitude 0.8 within the network on the ESRP. The analysis of Zollweg and Sprenke (1995) suggests that the INL earthquake catalog is complete for magnitudes above 1.3 within a 161-km (100-mile) radius of INL and may be complete for magnitudes as low as 0.8 within the network. Hardware and software upgrades for the current DAAS have increased detection sensitivities on the order of magnitude 0.0 which allow recording of small magnitude microearthquakes within ESRP.

Table 5. P-wave velocity models used in location programs.

Velocity Model Code	Velocity (km/sec)	Depth to Top of Layer (km)	Layer Thickness (km)	References
ESRP	4.90	0.00	2.00	Olsen et al., 1979; Sparlin et al., 1979; Braile & Smith, 1979; Ackerman, 1979.
	6.00	2.00	15.00	
	6.70	17.00	23.00	
	7.90	40.00	Half-space	
INL ESRP	3.30	0.00	1.00	Sparlin et al., 1982; Braile et al., 1982; Jackson et al., 1989.
	4.90	1.00	2.00	
	5.30	3.00	2.00	
	6.15	5.00	2.00	
	6.53	7.00	10.00	
	6.80	17.00	23.00	
	8.00	40.00	Half-space	
BPEAK	4.75	0.00	1.64	Richins et al., 1987.
	5.59	1.64	5.31	
	6.16	6.95	11.05	
	6.80	18.00	22.00	
	8.00	40.00	Half-space	
SMT	5.52	0.00	5.86	Stickney, 1997.
	6.12	5.86	12.78	
	6.74	18.64	20.05	
	8.00	38.69	Half-space	

4. 2009 Earthquake Activity

During 2009, INL recorded 7,509 independent triggers from earthquakes that occurred worldwide, in the western United States, and in the local region of the ESRP. Within the local region, INL located 2,061 earthquakes and man-made blasts outside and within a 161-km (or 100-mile) radius of INL. Of these, 25 were small to moderate size earthquakes ranging in magnitude (M) from 3.0 to 4.8 and 865 earthquakes occurred within the 161-km radius of INL.

4.1 Regional Earthquake Activity

Twenty-five earthquakes of magnitudes from 3.0 to 4.2 occurred in the local region around the INL, four of which occurred within the 161-km radius (Figure 5). Outside of the 161 km radius, on 31 January a M 3.1 event occurred 10 km east of Montpelier, ID which was reported felt by local residents. There were three M3+ events in central Idaho: The first occurred on 10 April, 13 km south-southeast of McCall, ID, having magnitude 3.2. The second occurred on 13 May, 29 km southeast of Cascade, ID, having magnitude 3.7. The third occurred on 16 May, 61 km north-northwest of Stanley, ID having a magnitude of 3.0. In western Wyoming, an earthquake of M 3.4 occurred 19 km south of Jackson, WY on 21 March and was reported felt by local residents. This event was the largest in a distinct cluster of more than 100 events that occurred during the first quarter of 2010 (two more earthquakes within this cluster - M 2.5 and M 2.2 - were also reported felt). Also, The Yellowstone Lake swarm that initiated in December, 2008, which consisted of about 900 earthquakes, continued into this quarter through 8 January. Seven events of M 3.0 to 3.5 occurred as part of this sequence. None of these earthquakes was reported felt. On 30 June, a M 3.3 event occurred 26 km east-northweast of West Yellowstone, MT. Also, on 9 November, a magnitude 3.1 earthquake occurred 72 km east-northeast of West Yellowstone, MT. In southern Montana, three events were located roughly 48 km southeast of Butte: on 6 March, a M 4.2 event occurred and was reported felt. A M 3.4 earthquake followed this initial event by four minutes and was also reported felt. Also, on 14 March, a M 3.3 event occurred in the same region, but was not reported felt. Additionally, two events occurred north of Dillon, MT: The first, of magnitude 3.1, occurred on 18 April, 11 km north of Dillon and was reported felt by local residents. The second, of magnitude 3.1, occurred 19 km north of Dillon on 13 May and was not reported felt. Two events felt by local residents occurred in northern Utah: The first, of magnitude 4.0, occurred on 3 June, 10 km north-northwest of Tremonton, UT, and the second, of magnitude 3.0, occurred on 6 June, 24 km north of Tremonton, UT.

4.2 Local Earthquake Activity

There were 865 earthquakes located within the 161-km radius of INL, which occurred within the ESRP and in the surrounding Basin and Range Province (Figure 6). Of these, four had magnitudes of at least 3.0 (Figure 5). On 16 January a magnitude 3.8 earthquake, the largest of a sequence of more than 35 events that occurred around the Palisades area, occurred 6 km north of Alpine, WY. It was reported felt by local residents and as far away as Idaho Falls. Also, on 8 August an earthquake occurred 39 km northwest of Island Park, ID. This earthquake was also reported felt by local residents. Additionally, on 17 October, an earthquake occurred 14 km southeast of Challis, ID with a magnitude of 3.3, the largest event in a sequence of at least 25 earthquakes. Finally, an earthquake of magnitude 3.4 occurred on 4 December 24 km north of Monida, MT. Neither of these events was reported felt by local residents. Earthquakes of smaller magnitudes occurred outside the Snake River Plain in the surrounding Basin and Range is southeastern Idaho, southwestern Montana, and central Idaho.

In addition to the typical Basin and Range Province seismicity, there were seven microearthquakes within the Eastern Snake River Plain during 2009. Six of these were well-located earthquakes within the

161 km radius that had uncharacteristic depths (15 to >35 km), four of which, with M_c 1.0 (on 31 January), 1.8 (on 29 May), 1.5 (on 27 June), and 0.8 (on 18 November), are a continuation of the on-going, low-rate micro-seismicity within and nearby Craters of the Moon National Monument (Carpenter and Payne, 2009) and are plotted in Figure 7. The other two deep ESRP microearthquakes (M_c 1.6 on 16 September and M_c 2.1 on 17 September) were located 16 km northeast of Idaho Falls. Three additional anomalously deep earthquakes occurred during 2009. Two microearthquakes occurred at lower-crust depths 40 km north-northeast of Ashton, ID, within the Yellowstone National Park boundary. The first event, on 29 November, was of M_c 0.8 and occurred at a depth of 30 km. On 9 December, another earthquake of M_c 1.1 nucleated in the same area at a depth of 35 km. Also, on 21 February, a M_c 1.8 microearthquake occurred at a depth of 27 km and 13 km northwest of Soda Springs, ID.

5. 1972 – 2009 Earthquake Activity

Earthquakes in 2009 were located in areas around the ESRP that have been active in the past. Figure 8 also shows that the 2009 earthquakes occurred in active regions of the Basin and Range Province surrounding the ESRP. Even though microearthquakes ($M_L \leq 2.0$) have occurred within the ESRP, earthquake monitoring by the INL seismic network for the last 35 years indicates that the ESRP has been seismically inactive relative to the surrounding Basin and Range Province (Jackson et al., 1993b).

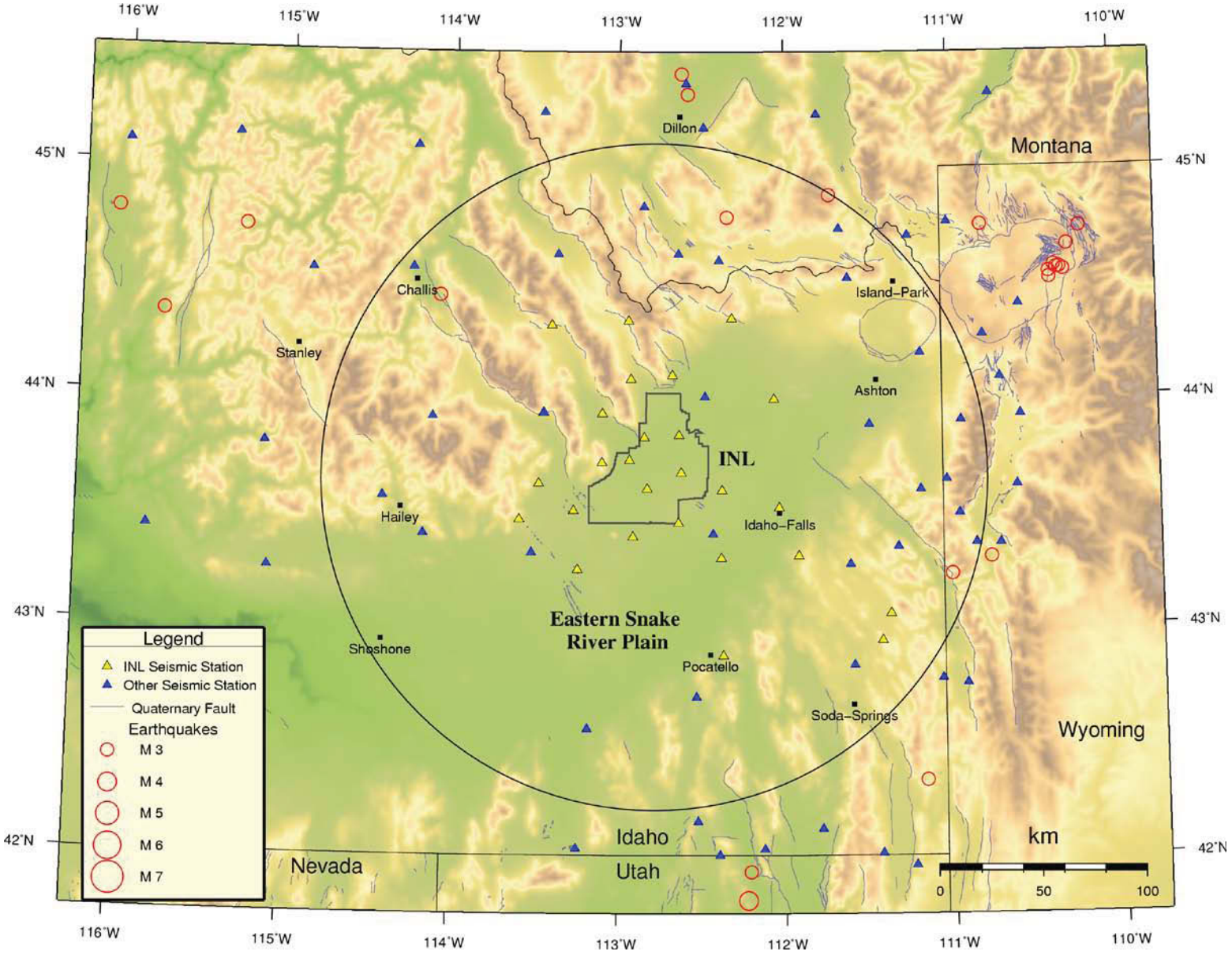

Figure 5. Map of epicenters of earthquakes for magnitudes greater than 3.0 during 2009.

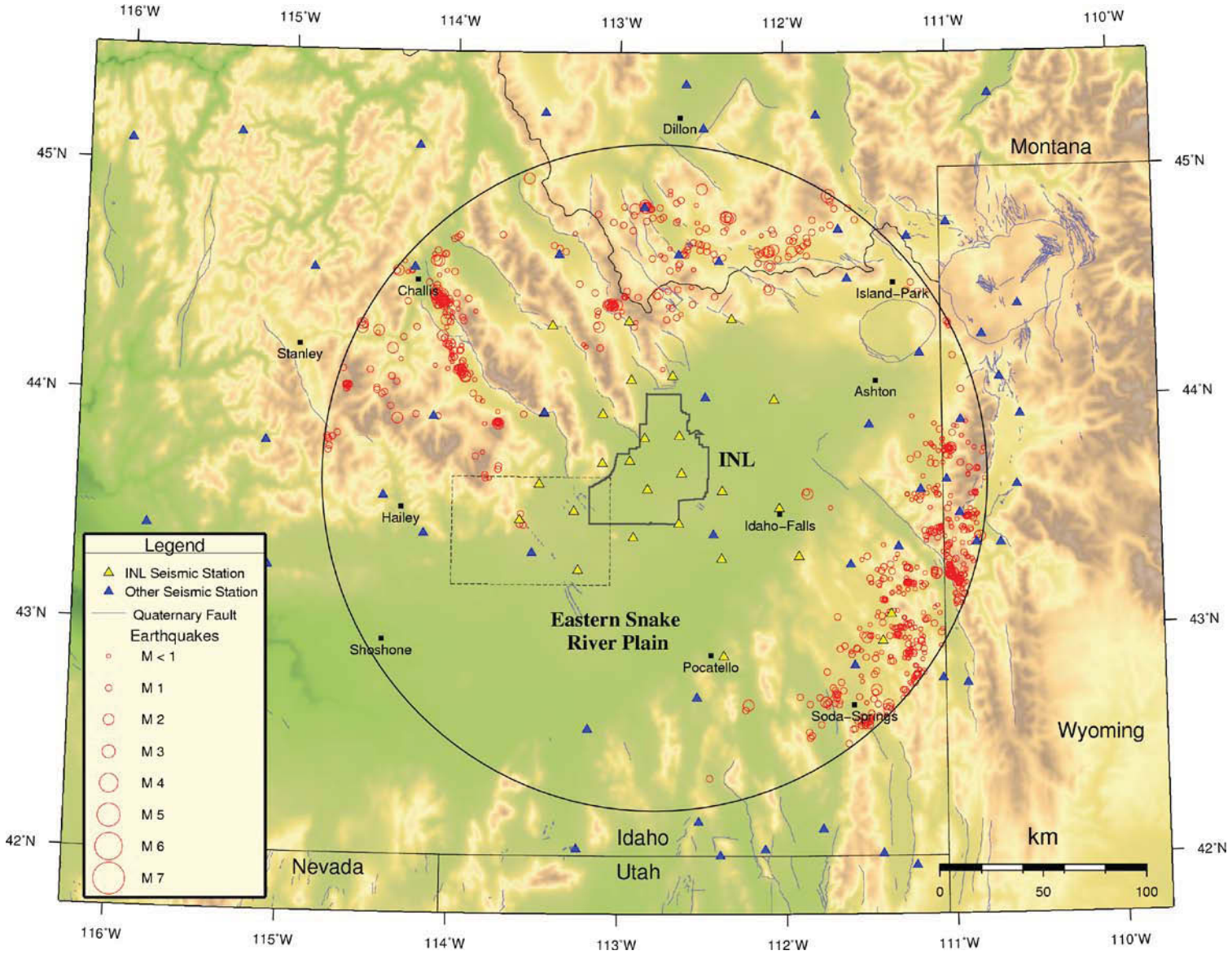

Figure 6. Map of epicenters of earthquakes within the 161-km radius around the INL from January 1, 2009 to December 31, 2009. Dashed box shows the region of the plot in Figure 7 for seismicity associated with Craters of the Moon National Monument.

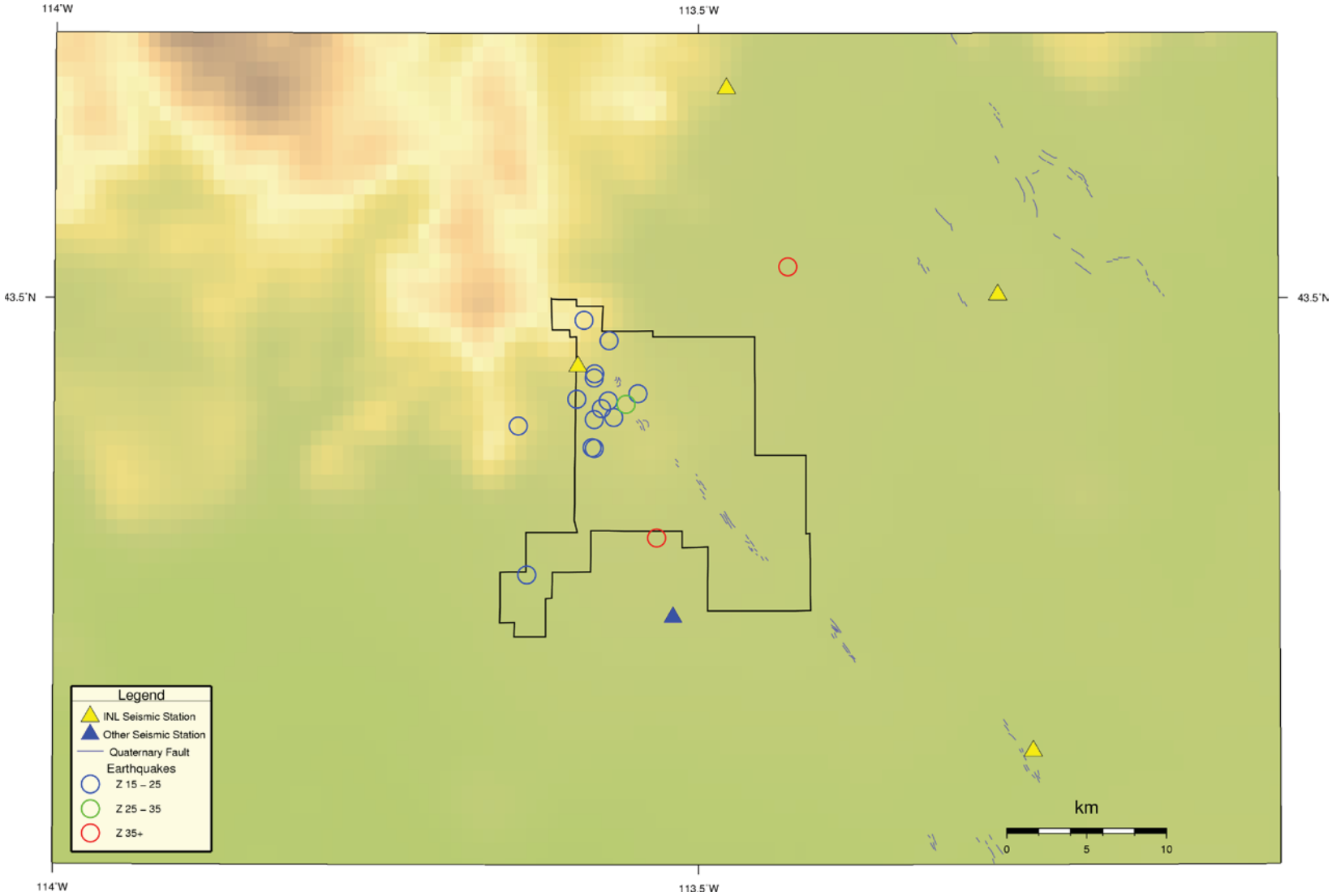

Figure 7. Map shows epicenters of earthquakes (colored by focal depth) at Craters of the Moon National Monument (black polygon) from 1999-2009 (Carpenter and Payne 2009).

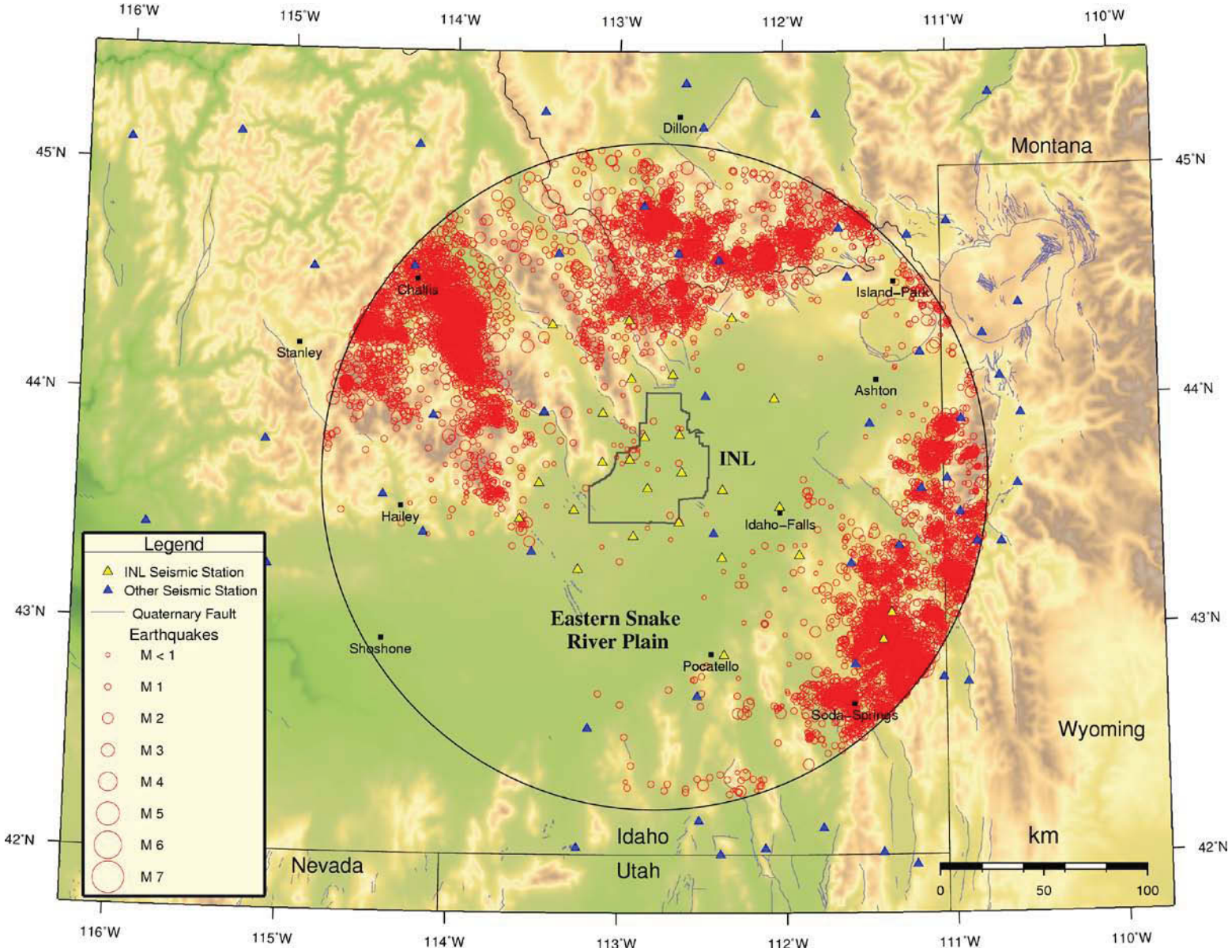

Figure 8. Map of epicenters of earthquakes from 1972 to 2009 within the 161-km radius around the INL.

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Appendix A

Seismic Network Information

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Appendix A

Seismic Network Information

EarthScope Science Program

USArray is a component of the EarthScope Science Program to capture high-resolution images of structure of the continental lithosphere and deeper mantle using passive seismic events such as earthquakes that occur worldwide. Broadband seismometers are being deployed in N-S transects across the United States for 18-24 months. While installed in Idaho from 2007 to 2009, the USArray's Transportable Array (TA) stations enhanced detection and coverage of local earthquakes for the INL Seismic Monitoring Program. The TA stations that were recorded by the INL and used to compute earthquake locations during part of 2009 are listed in Table A-1.

Table A-1. EarthScope Science Program Transportable Array seismic stations monitored by INL from 2007 to 2009.

Code	Longitude West (º)	Latitude North (º)	Elevation (m)
G12A	-115.3257	45.1285	1780
G13A	-114.2329	45.0931	1538
G14A	-113.4604	45.2432	2140
G15A	-112.4887	45.1660	1857
G16A	-111.8046	45.2285	1769
G17A	-110.7398	45.3212	1574
H12A	-114.8554	44.5494	1777
H13A	-114.2545	44.5642	1563
H14A	-113.3674	44.6165	1933
H15A	-112.6439	44.6173	1957
H16A	-111.2478	44.7038	2080
H17A	-110.5762	44.3951	2400
I12A	-115.1328	43.7945	1849
I13A	-114.1169	43.9146	2104
I14A	-113.4518	43.9286	1897
I15A	-112.4850	43.9997	1470
I16A	-111.4868	43.8756	1744
I17A	-110.5759	43.9200	2134
J12A	-115.0980	43.2500	1587
J13A	-114.1742	43.3979	1552
J14A	-113.5178	43.3234	1649
J15A	-112.4334	43.3998	1497
J16A	-111.6119	43.2741	2004
J17A	-110.7118	43.3629	1975
K14A	-113.1760	42.5452	1387
K15A	-112.5305	42.6852	1566
K16A	-111.5884	42.8321	1885
K17A	-110.9201	42.7507	1922
L14A	-113.2398	42.0343	1528
L15A	-112.3860	42.0041	1645
L16A	-111.4319	42.0149	2013

INL Seismic Network Telemetry

Digital radios, Internet, or DSL links transmit seismic data from INL seismic stations and free-field SMAs to the IRC. Some seismic stations are used as relay links to transmit several seismic stations to a DSL drop point or directly to the IRC. Figure A-1 shows the telemetry configuration during 2009.

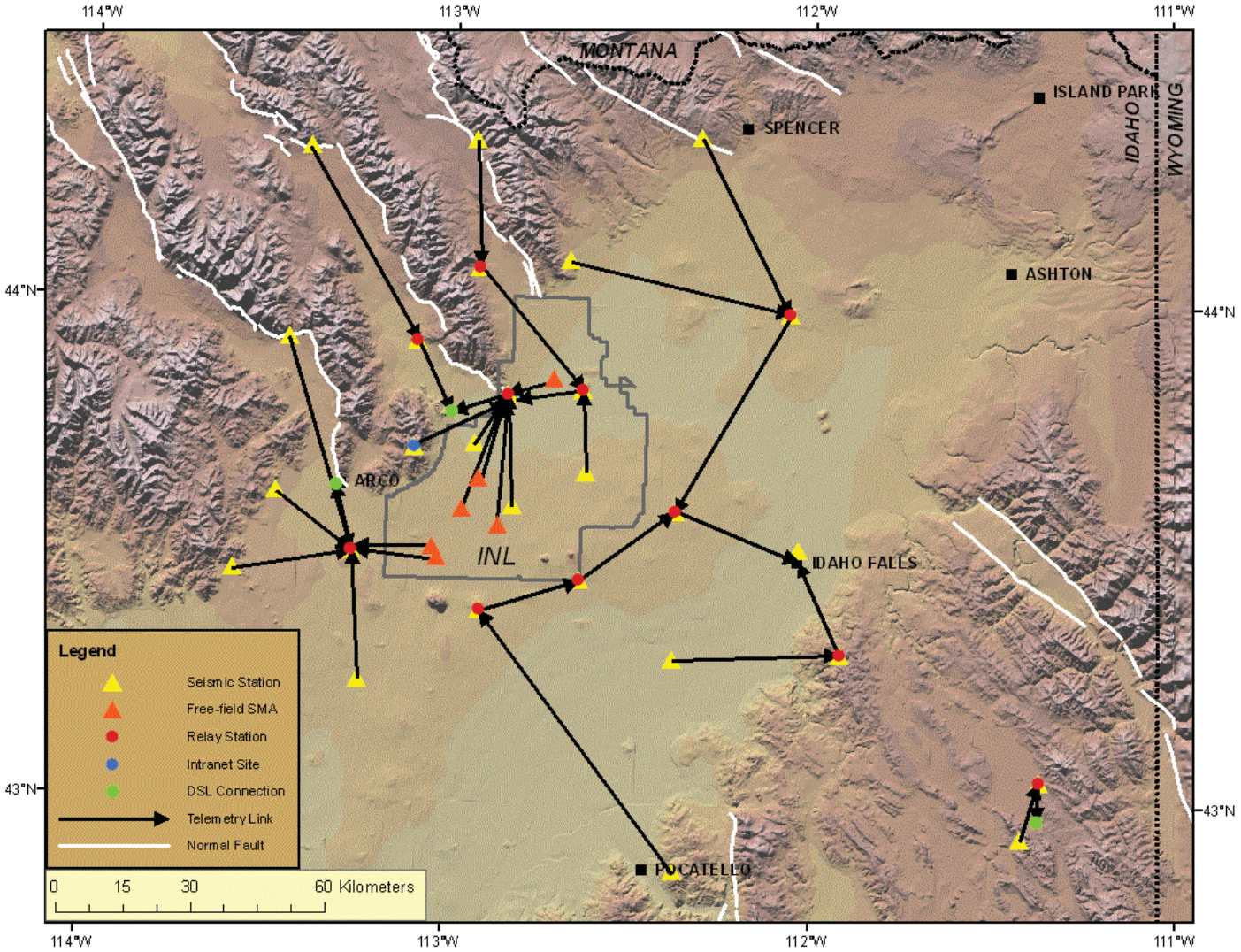

Figure A-1. Telemetry configuration of INL seismic stations and free-field SMAs during 2009.

Appendix B

Instrument Response of NetDAS SMAs

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Appendix B

Instrument Response of NetDAS SMAs

B.1 Method for Determining Amplitude Response

The instrument response (otherwise known as sensitivity) of the NetDAS-SMA is used to convert the measured counts of ground motion amplitude to units of g. Instrument responses for NetDAS units that have accelerometers mounted within the unit are determined by conducting 1-g (acceleration of gravity) tilt tests. These tests are done on a leveled pad at the IRC seismic lab or on the actual leveled pad at their physical location listed in Table 3. These 1-g tilt tests provide a relationship between the number of digitizer counts and the 1-g offset. Equation B-1 provides the conversion from the measured count level to actual g level for the recorded motion. Trigger threshold accelerations and counts/g are listed for NetDAS units with SMAs in Table B-1 using equation:

$$\text{Acceleration (g)} = \text{Counts}_{\text{(Measured or target)}} / \text{(Counts/g)} \qquad \text{[B-1]}$$

For accelerographs without internally installed accelerometers within the NetDAS units, Equation B-1 does not apply due to an inability to perform analogous tilt tests. For all systems, however, there is a frequency dependent amplitude response, which is discussed further in Appendix C. Table B-2 lists the instrument response for these accelerometers using the methods discussed in Appendix C.

Tables B-1 and B-2 list the beginning and ending dates for the time periods that the instrument responses are applicable. If changes occurred to SMA or seismic station instrumentation (such as accelerometer or NetDAS unit) during the year, then more than one range of dates are listed for a location. Also, note that the building numbers and locations for the SMA codes are listed in Table 3.

Table B-1. Instrument responses for strong-motion accelerographs.

Location / INL Site Facility Area	Instrument Response			Accelerometer					
	SMA Code	Begin Date	End Date	NetDAS Serial #	Model	Serial #	Orientation	Counts/g	Trigger Level (g)
COMI	COMF*	8/20/2008	12/31/2009	1080	SF2500A	NA	Vertical	549804	0.0045
							North	567877	0.0044
							East	553058	0.0045
MFC	EBR	2/8/2006	12/31/2009	1095	SF2500A	46	Vertical	533228	0.0046
							North	555864	0.0045
							East	543393	0.0046
	FCF	6/2/2003	12/31/2009	1079	SF2500A	61	Vertical	549212	0.0046
							North	559404	0.0045
							East	558307	0.0045
CFA	CFAF	10/21/2008	12/31/2009	1097	SF2500A	37	Vertical	553558	0.0046
							North	544446	0.0045
							East	558342	0.0045
	EFSF	5/6/2004	12/31/2009	1096	SF2500A	49	Vertical	553390	0.0045
							North	526189	0.0048
							East	549747	0.0045
INTEC	CPP1	5/19/2004	08/05/2009	1099	SF2500A	NA	Vertical	522025	0.0048
							North	563402	0.0044
							East	569090	0.0044

Table B-1. Continued.

Location / INL Site Facility Area	SMA Code	Instrument Response		NetDAS Serial #	Accelerometer				Trigger Level (g)
		Begin Date	End Date		Model	Serial #	Orientation	Counts/g	
	CPP2	5/19/2004	08/05/2009	1078	SF2500A	NA	Vertical	615499	0.0041
							North	647203	0.0039
							East	628378	0.0040
INTEC	FAS1	2/2/2006	12/31/2009	1084	SF2500A	48	Vertical	573249	0.0044
							North	573389	0.0044
							East	546041	0.0045
	FAS2	2/2/2006	12/31/2009	1083	SF2500A	52	Vertical	544357	0.0046
							North	549370	0.0045
							East	565218	0.0044
NPR	NPR1*	7/28/2008	12/31/2009	2000	SF2500A	34	Vertical	544357	0.0046
							North	549370	0.0045
							East	565218	0.0044
NRF	NRFF	1/31/2005	12/31/2009	1098	SF2500A	55	Vertical	540182	0.0046
							North	553738	0.0045
							East	551745	0.0045
	A1W	1/31/2005	12/31/2009	1091	SF2500A	53	Vertical	541217	0.0045
							North	570002	0.0044
							East	564995	0.0044
	S1W	1/31/2005	12/31/2009	1088	SF2500A	45	Vertical	561125	0.0044
							North	558488	0.0045
							East	558473	0.0045

Table B-1. Continued.

Location / INL Site Facility Area	SMA Code	Instrument Response		NetDAS Serial #	Accelerometer				Trigger Level (g)
		Begin Date	End Date		Model	Serial #	Orientation	Counts/g	
PBF	PBFF	11/12/2008	12/31/2008	1089	SF2500A	NA	Vertical	559649	0.0047
							North	550303	0.0045
							East	559707	0.0045
	ARAF	12/04/2008	12/31/2009	1086	SF2500A	56	Vertical	526920	0.0045
							North	562795	0.0044
							East	550302	0.0042
RTC	TRAF	9/1/2005	12/31/2009	1094	SF2500A	41	Vertical	526114	0.0048
							North	574035	0.0043
							East	549477	0.0045
	TRA2	5/6/2004	12/31/2009	1085	SF2500A	38	Vertical	543172	0.0046
							North	556212	0.0045
							East	568860	0.0044
RWMC	RWMC	9/21/2007	12/31/2009	1081	SF2500A	42	Vertical	552610	0.0045
							North	554529	0.0043
							East	572590	0.0048
	RWME	9/21/2007	12/31/2009	1077	SF2500A	NA	Vertical	552358	0.0045
							North	540927	0.0043
							East	556424	0.0048
STC	IRC	9/25/2008	12/31/2009	1093	SF2500A	NA	Vertical	NIR	NA
							North	NIR	NA
							East	NIR	NA

Table B-1. Continued.

Location / INL Site Facility Area	SMA Code	Instrument Response		NetDAS	Accelerometer				
		Begin Date	End Date	Serial #	Model	Serial #	Orientation	Counts/g	Trigger Level (g)
TAN	TANA	10/31/2008	12/31/2009	1090	SF2500A	40	Vertical	558999	0.0044
							North	557465	0.0044
							East	531326	0.0045
	TAN4	7/28/2008	12/31/2009	1085	SF2500A	38	Vertical	631860	0.0040
							North	514585	0.0049
							East	655111	0.0038
	SMC	NA	12/31/2009	1087	SF2500A	39	Vertical	NIR	NA
							North	NIR	NA
							East	NIR	NA

NIR – No instrument response due to problems with the SMA.

NA – Not available.

* - SMA co-located at an INL seismic station

Table B-2. Instrument responses of accelerometers located at seismic stations.

Instrument Response				Accelerometer					
Seismic Station	Begin Date	End Date	NetDAS Serial #	Model #	Serial #	Orientation	Datalogger Counts/Volt	Sensor Volt/g	Station Counts/g
BCYI	9/10/2008	5/06/2009	1068	SF3000L	185	Vertical	841008	1.220	1026030
						North	848147	1.200	1017776
						East	845503	1.220	1031514
BCYI	5/06/2009	12/31/2009	1068	SF3000L	185	Vertical	2841402	1.220	3466510
						North	2834135	1.200	3400962
						East	2838854	1.220	3463402
GRRI	11/04/2008	12/31/2009	1013	SF2500A	57	Vertical	3932869	1.396	5490285
						North	4014708	1.345	5399782
						East	3980407	1.412	5620335
HWFI	9/09/2008	12/31/2009	1069	SF2500A	62	Vertical	1757768	1.378	2422204
						North	1173136	1.371	1608369
						East	19243242	1.352	26016863
NPRI	10/21/2005	12/31/2009	1065	SF2500A	36	Vertical	810927	1.427	1157193
						North	802533	1.376	1104286
						East	808520	1.371	1108481
PTI	10/22/2008	12/31/2009	1071	SF3000L	188	Vertical	835018	1.230	1027072
						North	835559	1.194	1263299
						East	835957	1.244	1039931
SPCI	8/28/2007	12/31/2009	1070	SF3000L	186	Vertical	834485	1.216	1014734
						North	834508	1.237	1032286
						East	835579	1.215	1015228

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Appendix C

Instrument Response of Seismic Stations

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Appendix C

Instrument Response of Seismic Stations

C.1 Method for Determining Amplitude Response

The INL determines instrument responses (otherwise known as sensitivity) for both the four (4CH) and eight channel (8CH) NetDAS units. The INL establishes a DC counts/volt level by measuring a known voltage level for a specified duration of time for each channel on the NetDAS units and recording the mean and standard deviation in counts for this duration. The input voltage polarity is often reversed in order to obtain a greater measurement range. The mean provides the method to produce the DC counts/volt level (Equation C-1a and C-1b) and the standard deviation quantifies the measurement uncertainty and system noise.

Single ended:

$$\text{Counts/Volt} = \mu / v_i \qquad \text{[C-1a]}$$

Reversed Polarity:

$$\text{Counts/Volt} = (\mu+ - \mu^-) / (v_i+ - v_i^-) \qquad \text{[C-1b]}$$

Where:

μ is mean counts

v_i is input voltage

Subscript "+" is positive polarity

Subscript "– " is negative polarity

C.2 NetDAS-4CH Frequency Response

The response of the Symmetric Research PAR4CH (4CH) digitizer used in the NetDAS-4CH was calculated at the INL to establish the instrument response of NetDAS units and the methods incorporated vendor information. The DAQSystems, Inc., manufacturer of the NetDAS units, reviewed INL's frequency response results and methods, which is discussed in the following steps.

The NetDAS-4CH frequency response was determined empirically by measuring the output counts resulting from a known input signal. Trials were conducted using a constant-amplitude sine wave with frequencies varying between 0.1, 5, 10, 15, 20, 25, 30, and 35 Hz. The frequency sweep was performed twice for representative frequencies of 0.1, 5, 10, 15, 20, 25, 30, and 35 Hz. The averages of the measured counts at each frequency were then converted into decibel responses relative to the average response at 0.1 Hz, because the vendor data sheets list a gain of 1 at this frequency. A 2nd order polynomial was then fit to the data creating a simple amplitude response in frequency. The perfectly matched response (R-squared of one) is shown here as described by Equations C-2 and C-3 (conversion to decibels).

$$Y_{dB} = -0.0045f^2 + 0.0074f - 0.014 \qquad \text{[C-2]}$$

$$dB = 20 \log (E_2/E_1) \quad [C\text{-}3]$$

Where:

f – frequency (Hz)

E_1 – original signal level

E_2 - modified signal level

E_2/E_1 – commonly referred to as gain

This relationship was then used to calculate the gains out to the Nyquist frequency (1/2 the sample rate). The INL samples all data at 100 samples per second or 0.01 Hz. The information was then entered into MATLAB, which has a function to determine poles and zeros. Poles and zeros notations are the form that many seismic applications use to remove the instrument response. The NetDAS-4CH frequency response in dB and poles and zeros are shown in Figure C-1.

Equations C-2 and C-3 can be used in conjunction with the DC counts/volt measurement to generate a count based frequency response for short hand calculations or spectral deconvolution to remove the frequency response.

$$Ycounts = Counts/Volt \times 10\text{^}((-0.0045f^2 + 0.0074f - 0.014)/20) \quad [C\text{-}4]$$

Where:

^ - Indicates 10 to the power of the number calculated in parentheses.

However, the preferred method for removing the frequency response from a recorded waveform is to use a seismic analysis package, such as SEISAN. This program recognizes the poles and zeros representation of instrument response, which quickly and accurately corrects recorded waveforms to actual ground motions.

C.3 NetDAS-8CH Frequency Response

The response of the Symmetric Research PAR24B (8CH) digitizer used in the NetDAS-8CH was based on vendor provided information, and calculated in the same method as described above for the PAR4CH. A 2nd order polynomial was fit to the data creating a simple amplitude response in frequency that matched the amplitude response (R-squared of 0.999). Equation C-5, listed below, is similar to Equation C-3 used for the response of the NetDAS-4CH. The NetDAS-8CH frequency response in dB and poles and zeros are shown in Figure C-2.

$$Y_{dB} = -0.0045f^2 + 0.0071f - 0.0158 \quad [C\text{-}5]$$

C.4 Short-period seismic station frequency response data

In the fall of 2002, INL seismic personnel began tracking instrument response of the seismic stations. These response values, in combination with the instrument frequency responses (see C.2 and C.3), are used to create site- and date-specific system response files for the INL seismic stations. These response files are used in SEISAN to correct waveforms for further analyses such as calculating magnitudes by measuring amplitudes. Table C-1 lists the measured responses (including any system amplification) for the seismic stations that have been measured for instrument responses (in counts/volt).

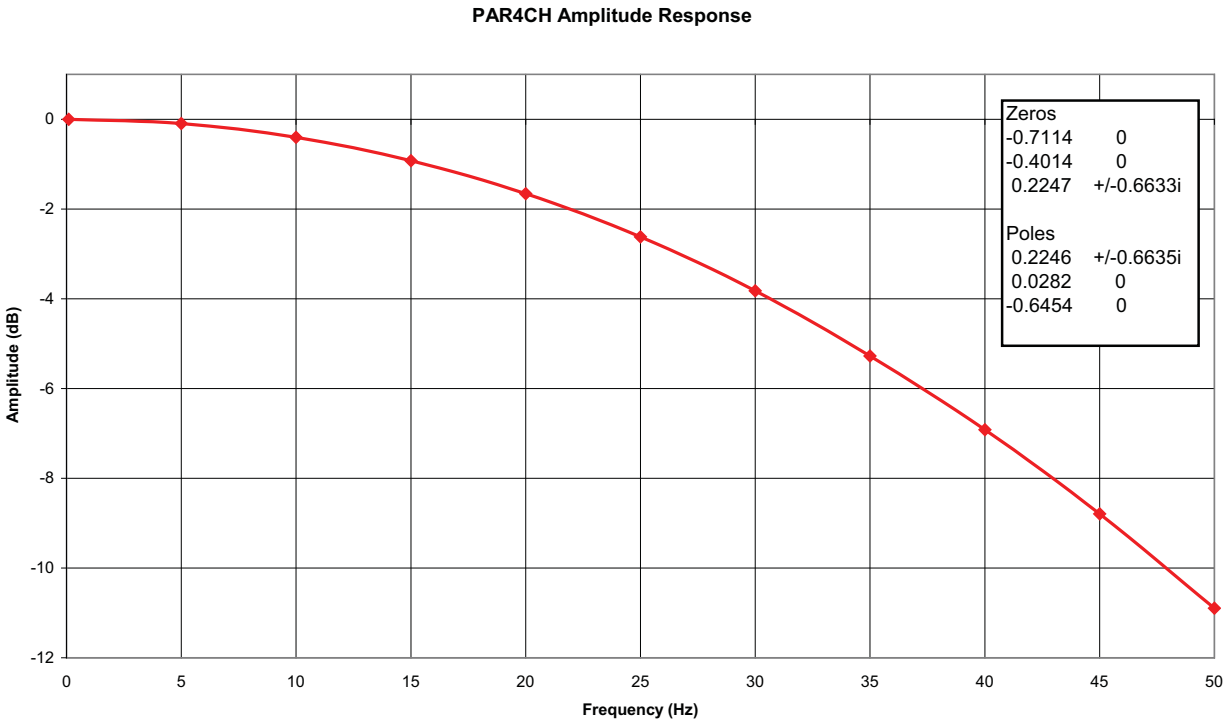

Figure C-1. Amplitude verses frequency system response of the Symmetric Research PAR4CH digitizer used in the NetDAS-4CH.

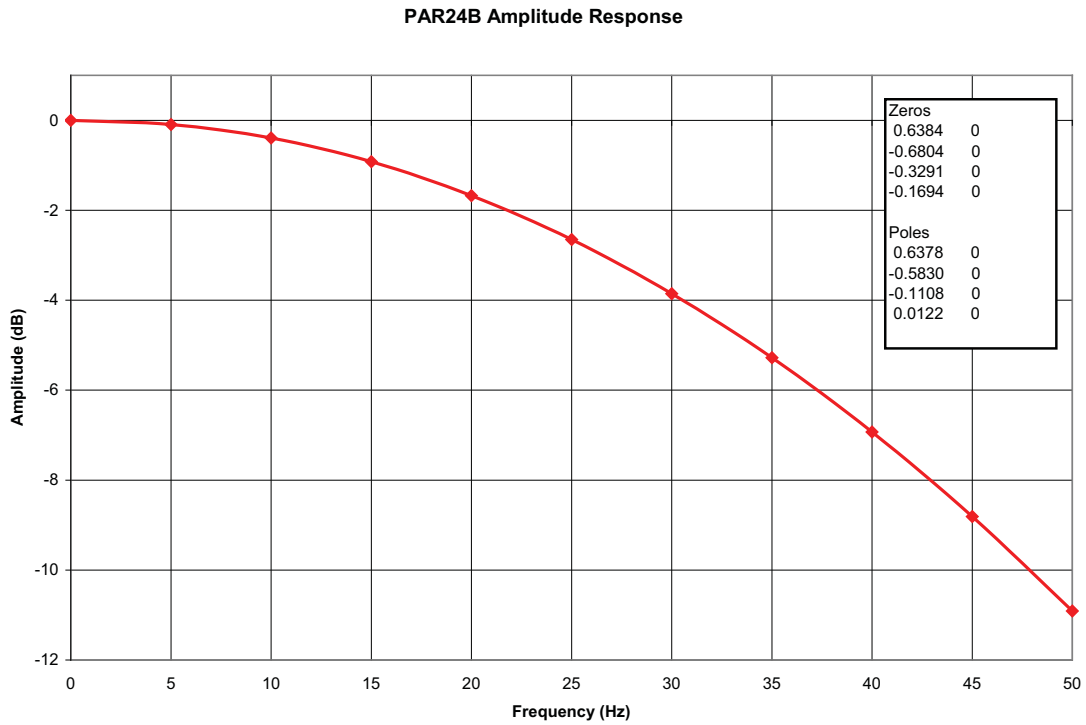

Figure C-2. Amplitude verses frequency system response of the Symmetric Research PAR24B digitizer used in the NetDAS-8CH.

Table C-1. Instrument responses of seismometers located at seismic stations.

Seismic Station	Instrument Response Begin Date	End Date	NetDAS Serial #	Digitizer Model	Orientation	Datalogger Counts/Volt	Seismometer Model
Single-component seismic stations							
ARNI	8/28/2007	12/31/2009	1017	4CH	Vertical	47977741	S13J
BCYI	9/10/2008	5/06/2009	1068	8CH	Vertical	87561743	S13J
	5/06/2009	12/31/2009	1068	24USB5V	Vertical	2840730	S13J
CBTI	8/29/2007	12/31/2009	1024	4CH	Vertical	48948934	S13J
CNCI	9/10/2008	9/29/2009	1066	24USB5V	Vertical	2838706	L4C
	9/29/2009	12/31/2009	1066	24USB5V	Vertical	2851620	L4C
COMI	9/21/2007	12/31/2009	2005	4CH	Vertical	36022837	S13
CRBI	8/28/2006	12/31/2009	1027	4CH	Vertical	401458	S13J
COMI	12/03/2008	12/31/2009	1025	24USB5V	Vertical	2834323	S13
ECRI	10/23/2009	12/31/2009	1051	4CH	Vertical	46797192	S13
EMI	9/13/2007	12/31/2009	1019	4CH	Vertical	48487157	L4C
GBI	9/11/2008	12/01/2009	30802	24USB5V	Vertical	2844458	S13J
	12/01/2009	12/31/2009	30802	24USB5V	Vertical	2838478	S13J
GRRI	11/04/2008	12/31/2009	1013	24USB5V	Vertical	2831677	L4C
GTRI	11/24/2008	12/31/2009	9001	24USB5V	Vertical - borehole	2776147	L4C
	11/24/2008	12/31/2009	9001	24USB5V	Vertical - surface	2949858	L4C

Table C-1. Continued.

Seismic Station	Instrument Response Begin Date	End Date	NetDAS Serial #	Digitizer Model	Orientation	Datalogger Counts/Volt	Seismometer Model
HHAI	10/22/2008	12/31/2009	1014	4CH	Vertical	458174	L4C
HPI	9/13/2007	12/31/2009	1015	4CH	Vertical	47682925	L4C
ICI	9/13/2007	12/31/2009	1020	4CH	Vertical	48888117	L4C
KBI	8/28/2007	12/31/2009	1018	4CH	Vertical	45839400	S13J
LJI	9/09/2008	12/31/2009	1052	4CH	Vertical	48429387	S13J
PTI	10/22/2008	12/31/2009	1071	8CH	Vertical	86459806	S13
PZCI	9/11/2008	12/31/2009	1023	4CH	Vertical	47216457	S13J
SMBI	9/10/2008	12/31/2009	1064	24USB5V	Vertical	2835711	S13J
TCSI	9/10/2008	12/31/2009	1010	24USB5V	Vertical	2873122	L4C
Three-component seismic stations							
HWFI	9/09/2008	12/31/2009	1069	8CH	Vertical	86375959	S13
					North	86381403	S13
					East	84982876	S13
IRCI	6/3/2005	12/31/2009	1012	4CH	Vertical	469890	S13
					North	461125	S13
					East	467680	S13
JGI	9/11/2008	12/31/2008	30801	24USB5V	Vertical	2856927	S13
					North	2887634	S13
					East	2867169	S13

Table C-1. Continued.

Seismic Station	Instrument Response Begin Date	End Date	NetDAS Serial #	Digitizer Model	Orientation	Datalogger Counts/Volt	Seismometer Model
LLRI	9/20/2007	12/31/2009	1029	4CH	Vertical	48337000	S13J
					North	48888449	S13
					East	48725117	S13
NPRI	10/21/2005	12/31/2009	1065	8CH	Vertical	836486	S13J
					North	837155	S13
					East	839175	S13
SPCI	8/28/2007	12/31/2009	1070	8CH	Vertical	83330000	S13J
					North	83376700	S13
					East	83485300	S13
TCSI	9/10/2008	12/03/2009	1010	24USB5V	Vertical	2873122	L4C
					North	2887077	S13
					East	2868820	S13
TMI	11/6/2007	9/22/2009	2004	24USB5V	Vertical	2837736	S13
					North	2843957	S13
					East	2839995	S13
	9/22/2009	12/31/2009	2004	24USB5V	Vertical	2849495	S13
					North	2848510	S13
					East	2844713	S13

C.4 Broadband seismic seismometer frequency response

In the fall of 2009, the INL became the owner of the broadband seismograph previously owned by the EarthScope project (see Section 1.1.2). This seismograph is co-located with the INL seismic station CNCI, but has retained its original name, I14A. The three-component broadband seismometer is a Guralp CMG-3T (serial #T3413) with a power consumption of 60 mA at 12 V input and a calibration resistor of 51,000 Ω. Table C-2 lists the seismometer sensitivity data and Table C-3 lists the seismometer frequency response data (in poles and ceros) for each component as determined on 12/20/2006 by EarthScope. The data acquisition system is a Quanterra Q330 (ID tag # 1554), the frequency is unity within the sampling rates employed at this station.

Table C-2. EarthScope-determined seismometer sensitivity data for I14A

Component	Velocity Output (V/m/s) (Differential)	Mass Position Output ($V/m/s^2$) (Acceleration output)	Feedback Coil Constant($Amp/m/s^2$)
Vertical	2 x 741	1887	0.02516
North/South	2 x 750	2023	0.02697
East/West	2 x 745	2010	0.0268

Note: A factor of 2 x must be used when the sensor outputs are used differentially (also known as push-pull or balanced output).

Table C-3. EarthScope-determined seismometer frequency response data for I14A

Component	Poles (Hz)	Zeros (Hz)	Normalizing factor at 1 Hz
Vertical	$-5.89 \times 10^{-3} \pm j5.89 \times 10^{-3}$	0	2304000
	-180	0	
	-160		
	-80		
HORIZONTAL (N-S and E-W)	$-5.89 \times 10^{-3} \pm j5.89 \times 10^{-3}$	0	2304000
	-180	0	
	-160		
	-80		

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Appendix D

2009 Earthquake List

The summary list of earthquakes includes those located within a 161-km (100-mile) radius of the INL centered at 43.0° 39.00' N, 112° 47.00' W. Table D-1 provides an explanation of the headings listed in Table D-2 for the earthquake list. The format for this table has been modified from previous years. The earthquake identification number is no longer reported since the SEISAN analysis package identification number is simply the origin data and time. The listing also includes the distance of the earthquake epicenter from the center of INL.

Table D-1. Explanation of the earthquake summary table headings.

Heading	Example	Explanation
ORIGIN	12/11/2009 6:45	Date of the earthquake: month/day/year (12/11/2009); origin time of the earthquake: hour and minute in UTC (6:45)
LAT N	44.091	Latitude of epicenter in degrees North
LONG W	-113.952	Longitude of epicenter in degrees West
MAG	1.4	Magnitude of the earthquake. NM signifies that no magnitude was determined for this earthquake.
TYPE	Mc IE	Type of magnitude reported and reporting agency. Magnitude types: Coda magnitude (Mc); Local magnitude (ML); Moment magnitude (Mw); and Body wave magnitude (mb). Reporting agencies include: Idaho National Laboratory (IE); NEIC (US); University of Utah (UU); and Montana Bureau of Mines and Geology (MB). NM with a magnitude of 0.00 indicates that no magnitude was calculated as a result of multiple earthquakes, which obscures the coda of the first event or the record length was insufficient to include the full coda of the earthquake.
DIST	105.96	Distance in km from center of INL at: 43° 39.00' N, 112° 47.00' W.
Z	7.21	Calculated focal depth in km. Not all earthquakes have appropriate seismic station geometry for calculating a reliable focal depth, thus the errors (ERZ) are typically large.
NO	5	Number of station readings used in locating the earthquake with weights above 0.1. P- and S-wave arrival times for the same station are regarded as two readings.
GAP	207	Largest azimuthal separation in degrees between stations.
DMIN	50.1	Distance in km from the epicenter to the nearest station.
RMS	0.18	Root mean square error of arrival time residuals in second using all weights as calculated by: $RMS=SQRT(\Sigma W_i*R_i^2/N)$ Where: SQRT is the square root; ΣW_i*R_i is the sum of the time residuals for the i^{th} arrival times the weight assigned to that arrival time; and N is the number of residuals.
ERH	3.14	Standard horizontal error of the epicenter in km.
ERZ	19.23	Standard vertical error of the focal depth in km.

Table D-2. Earthquakes located within 161-km radius of INL in 2009.

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
1/1/2009 8:24	44.0338	-114.654	0.5	ML IE	156.33	8.26	6	230	45.1	0.16	1.27	16.2
1/1/2009 8:29	44.0343	-114.644	0.5	Mc IE	155.57	8.45	6	150	44.3	0.15	1.04	15.93
1/2/2009 18:10	44.36	-114.063	0.9	ML IE	129.48	3.99	11	143	27.3	0.41	1.38	2.13
1/3/2009 2:08	44.7653	-112.656	1.7	Mc IE	124.5	6.52	11	160	16.5	0.02	1.68	2.24
1/3/2009 13:23	44.9005	-112.693	0.8	Mc IE	139.31	1.84	8	151	14.7	0.19	0.84	4.54
1/4/2009 11:23	43.3932	-110.846	1.4	Mc IE	159.09	5.05	7	156	11.4	0.12	2.48	12.75
1/5/2009 4:27	44.3198	-111.005	1.6	Mc WY	160.9	1.89	12	111	16.9	0.08	0.43	13.42
1/5/2009 17:17	44.4932	-114.159	1.2	Mc IE	144.68	5.09	8	126	11	0.05	1.36	1.57
1/6/2009 5:21	43.747	-111.2	1.0	Mc IE	128.02	3.26	9	109	17	0.09	0.67	12.48
1/6/2009 13:43	42.339	-112.455	1.0	Mc IE	148.27	5.08	6	301	37.6	0.11	1.81	15.32
1/6/2009 17:30	44.1323	-114.118	0.8	Mc IE	119.91	3.47	6	191	24.2	0.1	11.81	8.05
1/6/2009 18:35	44.1267	-113.966	0.8	Mc IE	108.83	7.09	10	142	26.5	0.03	0.41	12.67
1/6/2009 21:53	42.6713	-111.747	1.1	ML IE	137.66	9.24	9	153	22.1	0.07	0.77	2.24
1/7/2009 1:15	44.041	-114.633	1.6	Mc IE	154.94	7	13	215	43.8	0.16	0.88	11.12
1/7/2009 2:25	44.0382	-114.635	0.7	Mc IE	155.01	7.47	7	150	43.8	0.12	0.72	15.21
1/7/2009 4:36	44.04	-114.646	1.4	Mc IE	155.89	6.94	12	108	44.7	0.15	0.55	9.21
1/7/2009 4:47	44.0418	-114.656	1.5	Mc IE	156.72	6.83	12	110	45.5	0.13	0.48	2.46
1/8/2009 4:44	44.4525	-112.768	2.4	Mc IE	89.29	4.74	29	60	20.8	0.23	0.6	1.38
1/8/2009 14:53	42.6852	-111.718	1.3	ML IE	137.89	11.1	7	175	19.5	0.19	1.54	4.29
1/8/2009 22:48	44.0373	-114.649	1.1	Mc IE	156.07	7.34	9	108	44.9	0.1	0.66	13.29
1/9/2009 10:03	44.412	-114.037	0.9	Mc IE	131.46	0.1	7	95	24.2	0.07	0.9	1.96
1/9/2009 10:22	44.3872	-114.11	0.7	Mc IE	134.28	1.25	6	164	22.8	0.23	2.23	3.84
1/9/2009 10:45	44.4162	-114.026	0.7	Mc IE	131.1	3.34	9	95	24.5	0.15	1.03	3.28
1/9/2009 15:45	44.0588	-114.349	1.0	Mc IE	133.81	1.73	7	182	24.6	0.06	1.19	2.22
1/10/2009 8:20	44.3982	-114.035	0.5	ML IE	130.35	5.1	9	119	25.4	0.13	1.14	3.3
1/10/2009 12:32	44.7138	-113.273	0.8	Mc IE	124.66	8.77	5	214	13.2	0.04	1.8	2.85
1/11/2009 1:59	44.0207	-114.467	1.1	Mc IE	141.51	5	6	226	30.5	0.14	8.37	13.79
1/11/2009 5:37	44.4025	-114.039	1.2	Mc IE	130.9	5.86	15	108	24.8	0.26	0.83	1.92
1/11/2009 18:26	44.5835	-114.312	0.9	Mc IE	160.43	11.64	7	109	5	0.18	1.28	1.05
1/12/2009 4:47	44.4217	-114.039	1.3	Mc IE	132.27	6.57	10	94	23.3	0.04	0.46	2.19
1/14/2009 1:56	44.2158	-113.118	1.1	Mc IE	68.45	6.92	9	200	32.3	0.15	1.27	17.9
1/14/2009 14:56	43.1118	-110.963	2.3	Mc IE	159.11	13.42	26	139	34.5	0.05	0.64	2.58
1/14/2009 15:02	43.1373	-110.981	1.0	Mc IE	156.65	3.78	11	117	33.3	0.02	1.22	9.15
1/15/2009 20:23	44.401	-113.994	1.5	Mc IE	128.07	1.72	15	84	27.5	0.2	1.12	3.3
1/16/2009 0:20	44.3778	-113.982	0.5	ML IE	125.63	7.07	9	220	52.6	0.12	1.11	15.77
1/16/2009 4:15	43.2267	-111	3.8	mb US	151.75	9.57	46	59	27.9	0.1	0.24	1.31
1/16/2009 4:20	43.2323	-111.011	1.1	ML IE	150.72	7.96	12	113	28.1	0.04	0.39	3.01
1/16/2009 4:21	43.2298	-111.015	1.3	ML IE	150.54	14.88	11	130	28	0.15	0.55	2.12
1/16/2009 4:25	43.2222	-111.017	1.5	Mc IE	150.61	1	15	114	28.3	0.06	0.33	1.25
1/16/2009 4:27	43.2418	-111.015	0.6	ML IE	150.12	10.34	6	235	27.4	0.06	1.66	2.88
1/16/2009 4:32	43.2192	-111.019	1.8	Mc IE	150.56	2.3	21	114	28.3	0.1	0.38	13.48
1/16/2009 4:36	43.291	-111.021	1.0	ML IE	147.98	0.2	7	213	25.1	0.13	1.98	1.87
1/16/2009 4:40	43.2398	-111.009	0.9	Mc IE	150.64	7.46	8	236	27.7	0.04	1.57	3.09
1/16/2009 4:42	43.2263	-111.016	1.1	Mc IE	150.58	10.93	8	128	28.1	0.06	0.77	2.12
1/16/2009 4:43	43.224	-111.016	1.4	Mc IE	150.66	10.83	11	114	28.3	0.05	0.35	1.96
1/16/2009 5:23	43.2262	-111.023	1.4	Mc IE	150.03	3.14	15	112	27.6	0.1	0.44	10.62
1/16/2009 5:42	43.2388	-111.013	0.6	ML IE	150.33	10.22	6	236	27.7	0.02	1.42	3.66
1/16/2009 6:58	43.2268	-111.016	1.9	Mc IE	150.52	0.75	22	59	28.1	0.12	0.3	1.14
1/16/2009 7:02	43.2482	-111.012	0.7	ML IE	150.13	10.14	6	232	27.4	0.07	1.66	3.21
1/16/2009 7:34	43.2577	-111.013	1.2	Mc IE	149.68	10.31	7	228	26.8	0.07	1.11	2.36

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
1/16/2009 7:42	43.2533	-111.016	1.0	Mc IE	149.61	11.37	9	216	26.8	0.13	1.49	2.22
1/16/2009 8:21	43.2535	-111.015	0.6	ML IE	149.66	12.58	9	230	26.8	0.07	1.06	2.14
1/16/2009 8:27	43.226	-111.012	2.1	Mc IE	150.85	9.64	31	114	28.4	0.08	0.31	1.78
1/16/2009 9:10	43.252	-111.017	0.8	Mc IE	149.6	4.77	7	231	26.8	0.08	1.12	10.97
1/16/2009 9:40	43.2577	-111.017	0.9	ML IE	149.36	10.62	10	229	26.5	0.1	1.54	2.7
1/16/2009 9:43	43.2425	-111.024	1.0	Mc IE	149.39	7.59	7	125	26.7	0	1.22	4.22
1/16/2009 10:02	43.2187	-111.016	1.4	Mc IE	150.87	12.43	15	132	28.6	0.03	0.39	2.09
1/17/2009 4:02	44.4453	-112.771	1.4	Mc IE	88.48	1.9	12	108	21.6	0.07	1.03	3.01
1/17/2009 13:00	44.8393	-112.534	0.9	Mc IE	133.79	3.91	6	144	24.9	0.01	3.98	9.44
1/18/2009 4:11	43.2268	-111.009	1.2	Mc IE	151.09	11.29	11	220	28.4	0.12	1.7	2.44
1/18/2009 7:31	43.225	-111.01	0.5	Mc IE	151.05	9	8	220	28.6	0.06	1.79	3.7
1/18/2009 15:32	43.2567	-111.013	1.1	Mc IE	149.7	13.58	10	209	26.9	0.06	1.2	2.06
1/18/2009 16:51	43.2663	-111.019	1.1	ML IE	148.93	11	8	206	26	0.09	1.38	2.91
1/18/2009 17:35	43.242	-111.018	0.9	Mc IE	149.83	9.08	9	214	27.2	0.09	1.24	2.88
1/18/2009 17:41	43.259	-111.014	1.8	Mc IE	149.59	13.09	25	108	26.7	0.08	0.51	1.94
1/18/2009 19:33	43.2263	-111.003	2.2	Mc IE	151.55	12.29	24	115	28.1	0.14	0.41	2.32
1/18/2009 21:36	44.6443	-112.587	1.5	Mc IE	111.73	6.62	18	127	5.4	0.08	1.58	1.75
1/18/2009 22:17	43.2695	-111.023	0.3	Mc IE	148.5	7.57	6	204	25.6	0.09	2.05	4.74
1/19/2009 1:13	44.6407	-112.604	0.6	Mc IE	111.14	8.56	8	137	4.1	0.04	1.24	1.81
1/19/2009 6:17	44.8607	-112.628	1.3	Mc IE	135.26	1.98	9	126	17.8	0.09	0.57	3.44
1/19/2009 9:39	43.2348	-111.004	0.6	Mc IE	151.19	7	9	218	27.6	0.06	1.15	4.86
1/19/2009 11:24	43.2385	-111.013	0.7	Mc IE	150.37	4.86	6	215	27.7	0.08	2.46	12.56
1/19/2009 11:56	44.7382	-112.473	1.0	Mc IE	123.57	3.35	6	135	19.1	0.11	1.89	5.31
1/19/2009 13:43	43.2897	-110.981	1.7	Mc IE	151.17	2.43	11	156	23.3	0.14	1.78	16.37
1/19/2009 19:36	43.575	-111.223	0.5	Mc IE	126.12	4.74	6	221	26.5	0.07	2.03	13.56
1/19/2009 21:30	43.242	-111.013	1.5	Mc IE	150.27	11.72	19	214	27.6	0.12	1.07	2.03
1/20/2009 2:32	43.2657	-111.024	0.3	ML IE	148.59	5.05	7	231	25.7	0.12	1.51	11.58
1/20/2009 7:19	44.3872	-114.061	0.7	Mc IE	131.18	4.92	7	121	25	0.43	4.01	11.11
1/21/2009 0:21	44.3032	-114.547	1.5	Mc IE	159.05	0.02	20	178	37.2	0.24	0.62	1.27
1/21/2009 3:38	44.6263	-112.607	1.4	Mc IE	109.52	6.57	8	142	3.1	0.07	0.8	0.41
1/22/2009 1:39	43.2257	-111.006	1.1	Mc IE	151.36	10.6	17	132	28.3	0.13	0.41	2.65
1/22/2009 4:56	43.4147	-111.162	1.1	Mc IE	133.53	2.5	14	142	14.8	0.24	0.73	17.28
1/23/2009 13:50	44.5607	-112.644	0.3	Mc IE	101.93	10.72	4	253	6.3	0.07	2.31	1.09
1/24/2009 1:12	43.4613	-110.971	0.7	Mc IE	147.86	3.25	9	130	3.6	0.07	0.56	1.92
1/25/2009 16:47	42.9025	-111.676	1.1	Mc IE	122.43	2.09	11	115	10.6	0.1	0.42	15
1/26/2009 18:52	44.4138	-114.126	1.2	Mc IE	137.12	6.59	16	96	19.6	0.06	0.57	0.81
1/27/2009 0:01	42.7528	-111.236	1.6	Mc IE	160.46	16.13	10	100	11.2	0.18	1.06	1.33
1/28/2009 9:13	44.012	-113.884	1.1	Mc IE	97.26	4.85	11	217	21.6	0.11	6.12	11.92
1/31/2009 6:58	44.164	-114.017	1.8	Mc IE	114.37	6.96	21	102	28.9	0.19	0.43	7.8
1/31/2009 7:38	43.488	-113.589	1.0	ML IE	67.55	15.52	12	76	2.9	0.45	0.97	1.66
2/2/2009 4:34	43.4445	-110.85	0.6	Mc IE	157.78	7.6	9	174	9.6	0.1	0.79	1.81
2/2/2009 10:09	44.0977	-113.906	1.5	Mc IE	103.07	3.85	18	84	26.4	0.23	0.48	1.34
2/3/2009 17:08	42.8662	-111.377	0.8	Mc IE	143.61	2.25	7	142	8.8	0.07	0.48	10.7
2/3/2009 23:02	44.796	-112.915	1.4	Mc IE	127.93	9.04	18	79	6.3	0.09	0.46	0.81
2/4/2009 2:16	43.431	-110.927	0.5	Mc IE	151.9	5.11	12	141	6.8	0.12	0.53	2.07
2/4/2009 8:24	42.9988	-111.369	NM		135.59	7.59	8	135	6.1	0.06	0.6	1.47
2/7/2009 13:26	42.8973	-111.255	NM		149.59	2.16	16	117	14.3	0.14	0.41	17.05
2/8/2009 9:41	44.3952	-113.024	1.1	Mc IE	85.12	7.4	10	162	39	0.27	1.21	23.84
2/9/2009 16:37	44.7055	-112.136	0.7	Mc IE	128.32	6.51	5	161	37.3	0.05	1.39	12.51
2/10/2009 5:48	43.2958	-110.91	0.5	Mc IE	156.52	7.23	8	270	21.8	0.08	1.29	3.77
2/10/2009 14:13	43.0147	-111.286	0.7	Mc IE	140.46	9.5	13	181	8.2	0.09	0.57	1.03

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
2/10/2009 14:28	42.9933	-111.229	0.9	Mc IE	145.62	7.7	7	204	13.3	0.08	0.96	3.38
2/10/2009 14:51	44.7207	-112.245	0.5	Mc IE	126.63	0.21	5	163	18.4	0.09	1.06	14.56
2/10/2009 17:00	42.8462	-111.363	1.5	Mc IE	145.89	13.38	6	154	11.3	0.04	0.65	1.5
2/11/2009 4:06	43.2253	-111.003	1.0	Mc IE	151.6	9.34	12	172	28.1	0.08	0.6	2.8
2/11/2009 9:52	44.4095	-113.044	0.7	Mc IE	87.05	1.35	8	187	39.3	0.11	1.06	1.62
2/11/2009 11:42	43.8713	-110.978	0.6	Mc IE	147.39	10.7	7	138	4.2	0.05	0.52	0.9
2/12/2009 2:48	43.1122	-111.404	0.8	Mc IE	126.69	7.67	6	143	7.1	0.11	1.12	2.07
2/12/2009 3:38	42.984	-111.197	0.5	Mc IE	148.4	3.24	5	268	16.1	0.1	1.54	11.27
2/12/2009 6:46	43.0023	-111.263	0.8	Mc IE	142.76	7.94	8	159	10.5	0.1	0.71	2.03
2/12/2009 19:09	44.4022	-113.016	2.3	Mc MB	85.74	5.02	9	148	36.7	0.02	1.14	12.59
2/12/2009 19:12	44.4027	-113.055	1.5	Mc IE	86.53	7.04	20	76	34.4	0.18	0.41	5.72
2/12/2009 19:15	44.3898	-113.034	1.4	Mc IE	84.73	7.41	10	162	40	0.19	1.34	19.47
2/12/2009 19:21	44.3073	-113.127	2.0	ML IE	78.14	16.17	9	165	39.3	1.06	3.5	8.95
2/12/2009 19:26	44.4018	-113.068	2.0	ML IE	86.71	4.83	24	78	33.7	0.15	0.49	1.51
2/12/2009 19:27	44.418	-113.051	1.3	Mc MB	88.09	7.83	12	103	33.5	0.1	0.4	13.65
2/12/2009 19:32	44.4073	-113.029	1.0	Mc IE	86.52	4.58	8	185	38.5	0.03	1.06	2
2/12/2009 20:16	44.3955	-113.062	1.3	Mc IE	85.89	7	13	104	34.5	0.22	0.69	12.67
2/12/2009 20:55	44.39	-113.054	1.0	Mc IE	85.14	2.48	10	113	35.4	0.06	0.37	0.99
2/12/2009 21:37	44.4035	-113.055	2.1	Mc IE	86.61	7.24	26	72	34.3	0.12	0.28	4.59
2/12/2009 22:25	44.3735	-112.985	0.7	Mc IE	82.1	6.33	8	154	38.4	0.07	0.95	2.03
2/12/2009 22:38	44.405	-113.075	1.7	Mc IE	87.2	0.08	17	178	50.3	0.1	0.67	1.36
2/12/2009 22:38	44.4017	-113.056	1.8	Mc IE	86.44	6.85	28	94	34.4	0.13	0.27	1.38
2/13/2009 0:02	44.2525	-114.312	1.2	Mc IE	139.8	4.41	9	139	34.9	0.06	1.63	2.79
2/13/2009 4:33	44.3952	-113.034	1.4	Mc IE	85.3	0.5	12	115	36.2	0.09	0.34	1.1
2/13/2009 21:44	44.6143	-114.077	0.7	Mc IE	149.05	6.98	9	115	15.2	0.05	0.52	12.93
2/14/2009 7:20	44.404	-113.028	NM		86.14	2.41	8	172	38.6	0.09	1.62	2.24
2/14/2009 15:31	44.695	-111.861	1.7	Mc IE	137.64	12.21	12	85	16	0.1	0.42	1.15
2/15/2009 13:42	44.6383	-112.47	1.5	Mc IE	112.76	3.49	7	183	7.8	0.04	0.6	0.66
2/15/2009 18:55	44.1475	-113.957	0.9	Mc IE	109.34	7.17	8	146	28.9	0.03	0.54	12.69
2/15/2009 18:59	44.0712	-113.875	0.9	Mc IE	99.44	7.05	8	171	37.4	0.1	1.4	15.08
2/16/2009 22:42	44.2255	-114.037	1.2	Mc IE	119.25	9.08	14	74	35.1	0.26	0.62	4.09
2/17/2009 6:59	43.0357	-111.292	NM		138.8	10.59	16	96	6.7	0.14	0.52	1.59
2/17/2009 16:49	44.4032	-113.035	1.4	Mc IE	86.19	6.57	14	122	35.5	0.07	0.43	1.99
2/18/2009 5:29	44.2298	-113.219	0.3	ML IE	73.38	7.19	9	161	35.2	0.16	0.71	18.38
2/18/2009 10:56	42.938	-111.226	0.7	Mc IE	149.07	8.66	6	168	16	0.06	0.83	2.83
2/18/2009 10:58	42.9232	-111.182	0.4	Mc IE	152.97	14.44	5	267	19.6	0.03	1.7	2.55
2/18/2009 13:51	43.88	-113.81	0.9	Mc IE	86.5	1.68	12	160	25	0.09	1.19	2.22
2/19/2009 4:44	43.1843	-110.938	1.9	ML IE	158.1	5.57	24	192	27	0.15	0.45	5.43
2/19/2009 6:32	42.9888	-111.25	0.9	Mc IE	144.43	8.86	10	104	12.2	0.04	0.6	1.74
2/19/2009 7:17	43.2078	-110.946	0.5	ML IE	156.62	10.85	8	231	25.6	0.07	1.39	2.83
2/20/2009 19:29	42.6898	-111.799	1.1	ML IE	133.42	4.62	9	153	23.4	0.12	1.53	10.25
2/21/2009 1:25	42.7557	-111.671	1.8	Mc IE	134.39	27.48	28	121	10.9	0.1	0.41	0.67
2/21/2009 8:06	43.0097	-111.269	1.2	Mc IE	141.9	5.58	14	98	9.6	0.09	0.51	2.3
2/21/2009 9:58	43.3087	-111.035	0.9	Mc IE	146.38	15.82	9	190	21.3	0.04	0.71	1.28
2/21/2009 10:04	43.5725	-111.073	0.5	ML IE	138.27	13	10	90	9.4	0.07	0.67	1.31
2/21/2009 20:16	44.024	-114.65	1.2	Mc IE	155.71	7.64	8	150	44.5	0.07	0.67	13.36
2/21/2009 21:51	42.885	-111.431	0.5	ML IE	138.83	2.39	4	237	5.9	0.08	5.38	12.27
2/21/2009 22:36	44.0492	-114.639	0.6	ML IE	155.62	8.28	8	108	44.5	0.1	0.62	13.68
2/22/2009 0:20	44.0287	-114.641	0.8	Mc IE	155.19	6.91	7	228	43.9	0.1	0.89	15.18
2/22/2009 0:51	43.051	-111.391	0.8	Mc IE	131	10.26	9	115	1.7	0.03	1.55	1.39
2/22/2009 1:31	43.044	-111.424	1.3	Mc IE	129.13	6.45	11	103	4.5	0.04	0.68	1.57

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
2/22/2009 13:54	43.0107	-111.255	1.6	Mc IE	142.82	5.48	17	99	10.5	0.08	0.45	2.3
2/22/2009 16:46	44.0435	-114.65	1.2	Mc IE	156.28	7.19	12	153	45.1	0.21	0.56	21.38
2/23/2009 18:38	44.0028	-114.436	1.2	Mc IE	138.6	6.94	7	196	27.4	0.07	0.69	13.77
2/24/2009 17:57	44.668	-111.858	1.5	Mc IE	135.28	11.88	8	175	16.7	0.07	3	2.96
2/25/2009 7:30	43.737	-113.864	1.0	Mc IE	87.67	6.17	9	145	28.3	0.11	0.96	2.46
2/26/2009 4:47	44.1128	-113.964	1.0	Mc IE	107.95	7.31	12	150	25.2	0.12	0.76	12.74
2/28/2009 11:38	44.6775	-111.854	1.5	Mc IE	136.34	12.66	11	172	16	0.05	0.6	1.36
2/28/2009 15:11	43.5788	-111.181	0.6	ML IE	129.51	9.38	6	147	1.8	0.07	0.71	2.55
3/1/2009 1:48	44.7725	-111.824	1.3	Mc IE	146.49	7.97	7	146	13.4	0.03	0.8	1.82
3/1/2009 6:01	44.4642	-112.704	1.6	Mc IE	90.8	7.3	19	119	17.7	0.07	0.48	4.77
3/1/2009 18:18	44.5442	-114.269	1.1	Mc IE	155.05	4.23	10	97	2.5	0.05	1.14	0.9
3/1/2009 19:09	44.5442	-114.266	0.9	Mc IE	154.85	4.28	10	111	2.4	0.08	2.95	2.39
3/2/2009 2:15	43.5643	-111.007	0.6	ML IE	143.65	11.79	7	213	9.4	0.15	12.42	9.86
3/2/2009 23:31	44.1503	-114.015	0.5	ML IE	113.49	4.08	8	140	27.4	0.02	1.17	2.08
3/3/2009 8:39	44.1965	-114.001	1.1	Mc IE	115.12	7.04	11	202	32.7	0.42	2.56	21.33
3/4/2009 2:26	43.342	-111.032	1.4	Mc IE	145.63	15.06	25	101	17.7	0.13	0.53	0.69
3/4/2009 2:29	43.3477	-111.024	1.1	Mc IE	146.13	2.52	12	175	16.9	0.13	0.74	13.06
3/4/2009 2:30	44.0308	-110.935	1.1	Mc IE	154.48	8.46	10	178	14.9	0.05	0.71	2.14
3/4/2009 2:33	43.3528	-111.03	1.9	Mc IE	145.53	7.6	24	128	16.5	0.24	0.64	3.28
3/4/2009 9:07	43.287	-110.987	0.2	ML IE	150.74	5.01	5	278	22.8	0.03	1.92	11.45
3/4/2009 9:53	44.4992	-111.227	1.8	Mc IE	156.38	5.23	5	196	22.8	0.04	1.44	12.81
3/6/2009 9:34	43.9518	-114.383	1.1	Mc IE	132.98	7.12	9	185	21.8	0.06	0.66	13.33
3/6/2009 13:16	42.6595	-111.456	1.0	ML IE	154.19	0	10	255	22	0.15	2.11	3.39
3/6/2009 21:23	44.3972	-114.075	0.4	ML IE	132.77	5.03	6	118	53.7	0.11	0.81	15.64
3/7/2009 5:40	44.3877	-114.07	1.8	Mc IE	131.77	2.43	18	90	24.5	0.06	0.37	1.09
3/8/2009 11:45	44.1695	-114.002	1.1	Mc IE	113.64	1.44	12	80	29.8	0.1	0.52	1.65
3/9/2009 12:29	44.8855	-112.692	0.9	Mc IE	137.64	5.16	5	145	14	0.04	4.46	11
3/9/2009 12:29	42.8095	-111.209	0.8	ML IE	158.37	2.5	8	157	10.1	0.1	1.27	13.21
3/9/2009 12:42	42.7452	-111.254	0.9	ML IE	159.91	2.49	5	255	12.7	0.38	24.47	25.63
3/10/2009 4:20	44.6768	-112.55	1.0	Mc IE	115.74	9.62	8	103	9.9	0.07	1.2	2.6
3/11/2009 3:39	42.9007	-111.178	1.3	Mc IE	154.6	9.28	9	101	16.3	0.05	0.85	2.61
3/11/2009 7:18	44.61	-112.371	1.0	Mc MB	111.78	4.79	6	234	2.6	0.03	2.56	2.72
3/11/2009 7:50	44.7362	-112.347	0.5	Mc IE	125.77	14.49	7	157	16.3	0.07	0.94	2.89
3/11/2009 8:04	42.4888	-111.631	1.8	Mc IE	159.65	3.11	20	87	38.3	0.19	0.51	18.26
3/11/2009 19:36	44.6168	-114.133	0.7	Mc IE	152.42	6.64	7	150	11.3	0.09	7.25	11.79
3/12/2009 6:49	44.6253	-112.615	1.1	Mc MB	109.33	12.58	8	154	2.4	0.05	1.88	0.88
3/12/2009 10:22	43.2638	-110.934	0.4	Mc IE	155.66	4.92	5	214	21.1	0.08	1.73	12.71
3/13/2009 1:00	44.4078	-112.556	1.3	Mc IE	86.24	8.66	9	165	24.3	0.06	0.88	9.11
3/13/2009 17:13	44.0292	-114.468	1.7	Mc IE	141.86	3.16	10	172	30.9	0.16	1.12	3.15
3/15/2009 2:27	42.9142	-111.074	0.5	ML IE	160.98	5.96	5	210	16.7	0.07	1.02	7.97
3/16/2009 9:19	44.6198	-114.063	1.7	Mc IE	148.73	4.25	13	90	16.4	0.08	0.81	2.1
3/16/2009 9:40	44.6167	-114.064	1.1	Mc IE	148.51	4.93	14	89	16.2	0.1	0.74	1.12
3/16/2009 9:47	44.634	-114.11	1.0	Mc IE	152.45	5.97	7	191	13.9	0	2.5	4.53
3/17/2009 13:25	43.1882	-110.964	1.8	ML IE	155.98	11.14	28	129	28.2	0.13	0.49	3.07
3/17/2009 15:29	43.1992	-110.973	1.5	ML IE	154.82	2.5	23	120	28	0.1	0.5	11.72
3/17/2009 15:31	43.1853	-110.959	1.2	ML IE	156.46	2.5	18	131	28.1	0.11	0.46	13.93
3/17/2009 15:58	43.1995	-110.964	1.2	ML IE	155.54	2.81	11	197	27.3	0.06	0.82	13.22
3/17/2009 18:24	43.1822	-110.963	2.0	ML IE	156.23	0.02	28	130	28.6	0.17	0.42	1.46
3/17/2009 18:50	43.1903	-110.967	1.0	ML IE	155.63	11.27	10	186	28.2	0.06	0.72	2.64
3/17/2009 23:56	43.19	-110.964	1.0	ML IE	155.89	14.22	16	187	28.1	0.12	0.66	1.75
3/18/2009 1:34	43.1992	-110.965	0.7	ML IE	155.45	13.74	9	185	27.4	0.1	0.97	2.18

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
3/18/2009 7:58	43.519	-111.728	0.8	Mc IE	86.4	4.97	6	202	44.1	0.11	2.92	15.41
3/18/2009 12:08	43.1785	-110.969	0.7	ML IE	155.95	13.68	11	237	29.2	0.08	0.74	2
3/18/2009 23:34	43.2095	-110.983	0.8	ML IE	153.73	10.41	12	179	27.8	0.09	0.73	2.53
3/18/2009 23:36	43.1977	-110.969	0.9	ML IE	155.22	12.24	12	185	27.8	0.12	1.11	2.73
3/19/2009 1:11	43.1832	-110.964	1.7	Mc IE	156.15	10.33	27	130	28.6	0.13	0.32	2.25
3/19/2009 1:21	43.2115	-110.972	0.4	Mc IE	154.44	12.92	8	180	27	0.04	0.98	2.06
3/19/2009 2:54	43.5082	-110.89	0.4	Mc IE	153.61	9.31	8	110	5.3	0.08	0.74	1.36
3/19/2009 8:37	43.004	-111.271	1.0	Mc IE	142.1	8.46	14	104	9.8	0.11	0.59	1.78
3/19/2009 13:31	43.1598	-110.947	0.3	Mc IE	158.31	12.83	8	244	29.6	0.08	0.83	3.1
3/19/2009 15:39	43.7373	-111.004	0.1	ML IE	143.65	7.48	4	205	18.5	0.01	2.25	3.34
3/19/2009 18:04	43.4285	-111.091	0.5	Mc IE	138.91	12.09	9	187	13.3	0.06	1.45	1.07
3/20/2009 6:30	42.8792	-111.464	0.1	ML IE	137.15	9.79	5	216	7.4	0.01	4.61	1.71
3/20/2009 17:33	43.2373	-111.106	1.1	Mc IE	143.28	7.69	15	113	21.3	0.07	0.62	3.69
3/20/2009 19:27	43.2293	-111.097	2.1	ML IE	144.23	9.5	36	100	22.4	0.14	0.27	1.57
3/20/2009 19:29	43.2135	-111.091	0.4	ML IE	145.26	4.99	7	202	23.8	0.1	1.29	11.43
3/21/2009 11:36	43.5772	-111.148	0.6	Mc IE	132.14	8.06	7	140	3.5	0.1	1.02	1.94
3/21/2009 17:08	43.2442	-111.111	1.6	Mc IE	142.6	11.24	21	150	20.5	0.07	0.38	1.45
3/22/2009 0:05	42.9148	-111.649	1.0	Mc IE	123.13	7.58	7	160	10.4	0.14	1.82	5.57
3/22/2009 6:10	42.8263	-111.228	0.8	ML IE	156.01	3.19	7	187	12.4	0.06	1.54	11.33
3/22/2009 6:11	42.8263	-111.233	0.7	ML IE	155.7	4.83	5	187	12.8	0.07	1.7	11.75
3/22/2009 16:33	44.4548	-113.151	1.7	Mc IE	94.25	6.71	15	110	24.9	0.12	0.41	2.65
3/22/2009 18:22	44.392	-114.106	1.1	Mc IE	134.35	7.49	7	221	22.5	0.06	1.14	10.41
3/22/2009 22:40	43.2037	-110.969	0.7	Mc IE	154.97	14.87	8	183	27.4	0.09	0.8	2.71
3/23/2009 7:12	43.282	-110.993	0.8	Mc IE	150.48	15.19	10	202	23.4	0.09	0.75	0.78
3/24/2009 5:04	44.1117	-114.674	1.1	Mc IE	160.33	7.38	8	166	49.7	0.08	0.53	14.1
3/24/2009 12:37	43.2007	-110.973	1.5	Mc IE	154.8	13	18	183	27.8	0.08	0.61	1.38
3/24/2009 22:30	44.023	-114.642	0.7	Mc IE	155.09	7.06	5	227	43.8	0.05	0.67	13.19
3/25/2009 4:52	43.5745	-111.263	0.7	Mc IE	122.93	6.44	11	204	6.7	0.01	0.94	2.75
3/25/2009 5:54	44.649	-113.367	1.9	Mc IE	120.54	6.34	12	137	3.6	0.07	0.61	0.57
3/25/2009 6:13	42.9542	-111.18	0.6	ML IE	151.3	8.27	8	150	19.1	0.08	0.77	3.91
3/26/2009 1:11	44.227	-114.028	2.0	Mc IE	118.74	7.25	14	96	35.4	0.15	0.7	17.15
3/26/2009 1:14	44.2267	-114.054	1.0	Mc IE	120.48	7.63	7	148	35	0.15	0.83	16.66
3/26/2009 6:58	44.2368	-114.013	0.4	ML IE	118.32	8.09	10	129	36.7	0.29	0.77	20.92
3/26/2009 23:24	43.1922	-110.968	1.7	Mc IE	155.51	11.67	21	128	28.1	0.14	0.45	2.64
3/26/2009 23:26	43.2068	-110.975	1.0	ML IE	154.45	13.53	16	181	27.5	0.07	0.57	0.82
3/27/2009 0:19	43.1992	-110.963	1.1	ML IE	155.62	16.21	15	185	27.3	0.12	0.6	0.45
3/27/2009 7:11	43.5788	-110.852	0.0	Mc IE	155.98	8.9	6	140	12.7	0.05	1	2.12
3/27/2009 7:22	43.5723	-110.854	0.8	ML IE	155.9	8.64	9	144	12	0.1	0.53	2.53
3/27/2009 7:48	43.578	-110.861	0.2	ML IE	155.28	10.32	5	163	12.2	0.02	0.66	1.58
3/27/2009 7:54	43.5775	-110.857	1.1	Mc IE	155.62	9.69	16	89	12.3	0.05	0.28	0.99
3/27/2009 13:35	43.5747	-110.855	0.8	Mc IE	155.79	8.41	13	113	12.2	0.07	0.36	1.61
3/27/2009 21:36	44.6342	-113.331	1.5	Mc IE	117.92	6.46	12	97	3.5	0.08	0.42	0.32
3/28/2009 10:25	43.1888	-111.487	0.8	ML IE	116.79	8.28	13	145	13.9	0.09	0.52	1.84
3/28/2009 10:33	43.1903	-111.485	0.9	ML IE	116.85	8.13	6	144	13.9	0.08	0.53	2.58
3/28/2009 10:34	43.2075	-111.493	1.2	Mc IE	115.4	12.33	13	140	12.1	0.09	0.68	1.93
3/28/2009 19:00	44.682	-111.942	1.3	Mc MB	133.05	4.96	5	179	22.5	0.02	3.79	10.8
3/29/2009 0:36	42.5387	-111.863	1.8	Mc IE	144.55	5.19	6	162	57.2	0.12	1.53	6.54
3/29/2009 1:01	42.5247	-111.848	1.6	ML IE	146.5	7.63	9	159	57.7	0.12	0.74	5.99
3/29/2009 1:09	42.5152	-111.856	1.4	ML IE	147.07	5	7	159	58.6	0.1	1.08	14.81
3/29/2009 5:14	43.312	-111.33	0.8	Mc IE	123.36	10.54	9	180	4	0.08	2.61	2.19
3/30/2009 4:50	44.6415	-112.509	1.7	Mc MB	112.46	15.59	13	172	10.5	0.06	1.33	2.11

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
4/1/2009 12:31	44.3642	-114.016	0.9	Mc IE	126.8	7.06	7	201	29.2	0.05	2.27	13.05
4/2/2009 16:06	44.6607	-113.402	1.6	Mc IE	122.86	6.6	12	84	5.6	0.16	0.76	0.78
4/3/2009 3:12	43.811	-111.051	0.7	Mc IE	140.64	2.55	5	236	13.1	0.04	3.28	11.85
4/3/2009 4:33	43.7703	-111.002	0.4	ML IE	144.08	2.46	11	115	15	0.12	0.49	14.13
4/3/2009 5:34	43.7732	-111.011	1.0	Mc IE	143.42	2.48	13	79	14.9	0.21	0.59	16.4
4/3/2009 6:14	43.7608	-111.076	0.2	ML IE	138.11	3.32	6	234	18.7	0.03	1.83	11.89
4/3/2009 18:26	43.4653	-110.872	1.1	ML IE	155.69	11.29	12	120	6.9	0.1	0.53	0.92
4/3/2009 22:35	43.579	-111.091	0.8	ML IE	136.77	14.75	9	96	7.8	0.05	0.61	1.71
4/3/2009 22:38	43.3572	-111.018	1.3	Mc IE	146.32	12.46	12	180	15.7	0.07	0.73	1.46
4/3/2009 23:59	43.5795	-111.091	0.7	ML IE	136.74	15.92	7	112	7.7	0.03	0.77	1.98
4/4/2009 11:10	44.7627	-112.527	0.5	Mc IE	125.47	2.52	5	153	18.6	0.17	1.02	17.28
4/6/2009 6:15	43.1575	-110.946	0.7	Mc IE	158.48	6.02	10	199	29.7	0.07	1.32	8.66
4/6/2009 8:53	42.8845	-111.269	0.5	Mc IE	149.5	2.48	6	156	13.8	0.07	1.09	12.64
4/7/2009 16:38	42.9903	-111.561	0.6	ML IE	123.28	10.41	7	133	12.8	0.04	0.67	4.11
4/8/2009 10:08	42.895	-111.551	0.9	Mc IE	130.6	12.55	5	150	7.6	0.03	0.79	1.74
4/9/2009 16:44	43.565	-111.184	1.9	Mc IE	129.39	7.42	20	80	3.3	0.25	0.55	3.04
4/9/2009 16:50	43.5485	-111.191	1.1	ML IE	128.99	0.08	14	119	5.1	0.28	0.84	2.67
4/10/2009 0:24	43.239	-111.363	1.2	Mc IE	123.63	2.43	7	187	12.5	0.06	1.73	12.32
4/10/2009 20:46	43.1877	-111.442	1.0	Mc IE	120.13	9.29	10	104	16	0.06	0.56	2.92
4/10/2009 23:07	42.9585	-111.501	0.5	ML IE	129.32	9.26	5	171	15	0.04	0.82	2.82
4/10/2009 23:08	42.9597	-111.494	1.0	Mc IE	129.72	11.35	4	169	14.5	0.12	1	1.51
4/10/2009 23:10	42.9577	-111.488	0.9	Mc IE	130.27	13.57	7	166	14.3	0.13	1.11	1.82
4/11/2009 2:09	42.7972	-111.192	0.5	Mc IE	160.27	11.2	7	195	8.3	0.01	1.16	1.89
4/11/2009 17:12	42.954	-111.452	0.3	Mc IE	132.82	12.08	3	144	3.1	0	2.13	2.82
4/11/2009 22:54	43.9172	-114.229	1.2	Mc IE	120.05	6.41	8	247	9	0.09	1.79	0.9
4/12/2009 8:54	44.62	-112.598	1.6	Mc MB	108.93	9.02	19	72	3.7	0.15	0.47	0.68
4/12/2009 11:37	43.4133	-110.929	1.0	Mc IE	152.13	9.39	10	206	8.7	0.13	1.35	0.87
4/12/2009 15:30	43.7695	-111.006	2.1	Mc IE	143.74	2.25	24	92	15.2	0.11	0.26	13.26
4/12/2009 15:38	43.767	-111.019	1.7	Mc IE	142.71	2	21	57	15.8	0.32	0.55	29.69
4/12/2009 15:56	43.815	-111.051	0.8	Mc IE	140.65	2.39	7	210	12.8	0.16	2.49	17.98
4/12/2009 16:13	43.4272	-110.938	1.4	Mc IE	151.07	9.03	20	165	7.1	0.15	0.59	0.72
4/12/2009 18:33	44.5395	-114.359	1.2	Mc IE	160.29	6.19	10	97	8.7	0.07	1.03	1.23
4/12/2009 22:50	43.3052	-111.509	1.3	Mc IE	109.91	7.88	8	161	9	0.13	0.86	1.83
4/13/2009 3:21	42.9625	-111.326	0.9	ML IE	140.77	7	10	112	8.3	0.05	0.43	1.41
4/13/2009 10:58	43.0638	-111.382	0.6	ML IE	130.93	0.04	5	132	1.5	0.31	3.43	6.88
4/13/2009 10:58	43.147	-111.325	0.7	ML IE	130.63	6.34	5	257	11	0	3.03	4.26
4/13/2009 11:01	43.1175	-111.419	1.5	ML IE	125.35	0.04	25	70	8.1	0.11	0.33	0.76
4/13/2009 11:01	43.1147	-111.407	NM		126.34	2.19	5	141	7.4	0.12	1.59	14.92
4/13/2009 11:03	43.1182	-111.407	0.6	ML IE	126.16	2.75	8	142	7.8	0.12	0.87	8.84
4/13/2009 11:05	43.1175	-111.414	0.8	Mc IE	125.7	0.1	14	87	8	0.09	0.46	0.98
4/13/2009 11:10	43.115	-111.406	1.6	Mc IE	126.39	5.06	24	98	7.4	0.1	0.37	1.45
4/13/2009 11:30	43.7778	-111.1	0.2	ML IE	136.33	2.5	6	245	18.5	0.29	3.47	24.42
4/13/2009 11:34	43.7893	-111.05	0.4	ML IE	140.42	12.1	5	230	14.9	0.05	1.86	3.97
4/13/2009 20:06	44.6698	-112.518	1.8	Mc IE	115.41	6.04	11	128	11.6	0.12	0.64	1.09
4/13/2009 20:44	44.7745	-112.644	0.6	ML IE	125.6	4.99	5	166	17.3	0.07	5.88	10.86
4/13/2009 22:12	44.6607	-112.471	1.0	Mc MB	115.18	3.69	5	141	9.6	0.06	3.35	6.23
4/14/2009 6:12	43.7957	-111.121	0.4	ML IE	134.87	2.46	9	255	18.4	0.23	2.1	20.24
4/14/2009 12:20	44.635	-112.098	2.2	Mc IE	122.52	13.88	35	73	24	0.14	0.38	1.14
4/14/2009 13:29	44.4138	-113.048	0.7	Mc IE	87.59	14.26	7	102	12.7	0.07	0.46	1.58
4/14/2009 23:02	43.2415	-110.934	1.8	Mc IE	156.35	9.62	21	142	22.5	0.14	0.62	2.49
4/15/2009 0:25	43.2717	-111.288	0.8	ML IE	128.08	4.82	5	148	8.8	0.01	3.38	10.66

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
4/15/2009 3:50	44.4713	-112.648	1.2	Mc MB	92	6.96	7	137	16.2	0.07	0.57	13.46
4/15/2009 10:22	43.7893	-111.114	0.9	Mc IE	135.29	2.4	8	251	18.5	0.14	1.71	16.42
4/15/2009 10:37	43.192	-110.957	0.4	Mc IE	156.31	4.99	6	203	33.1	0.04	1.43	11.89
4/15/2009 20:00	44.494	-113.243	1.1	Mc MB	100.85	10.65	11	97	16.8	0.1	0.53	2.25
4/18/2009 5:13	43.4038	-111.105	1.5	Mc IE	138.35	9.39	13	153	15.7	0.09	0.58	1.29
4/18/2009 8:58	43.3838	-111.088	1.2	Mc IE	140.17	11.21	13	202	16.2	0.04	1.29	1.02
4/18/2009 17:08	42.7225	-111.464	2.1	Mc IE	148.76	9.76	34	82	15.9	0.13	0.28	0.56
4/19/2009 4:53	43.4272	-111.071	1.4	ML IE	140.51	10.35	15	147	12	0.07	1.14	0.84
4/19/2009 8:03	44.4077	-113.038	1.5	Mc IE	86.74	12.3	22	100	11.7	0.16	0.4	0.89
4/19/2009 23:26	44.2503	-114.069	0.3	ML IE	122.92	7.21	8	138	37.5	0.3	1.26	27.78
4/20/2009 0:24	44.8312	-112.973	1.7	Mc IE	132.28	8.09	9	150	9.8	0.11	0.56	1.23
4/20/2009 4:32	43.7745	-110.998	2.1	Mc IE	144.43	2.13	24	70	14.4	0.19	0.42	20
4/20/2009 18:29	43.7707	-111.003	1.2	Mc IE	144.04	2.47	10	115	14.9	0.11	0.55	11.8
4/21/2009 7:52	42.966	-111.322	2.1	ML IE	140.79	9.13	36	77	8.7	0.12	0.28	0.44
4/21/2009 8:00	42.9655	-111.329	1.2	ML IE	140.39	9.66	20	77	8.2	0.05	0.28	0.86
4/21/2009 8:17	43.0562	-111.082	0.7	Mc IE	152.86	11.08	11	127	23.5	0.05	0.39	1.91
4/21/2009 10:17	42.9663	-111.333	0.7	Mc IE	140.05	8.42	11	98	7.9	0.09	0.43	1.64
4/21/2009 10:18	42.9595	-111.342	1.2	ML IE	139.86	10.93	21	98	6.9	0.09	0.3	0.72
4/21/2009 10:22	42.9555	-111.334	0.8	Mc IE	140.67	8.09	13	100	7.5	0.1	0.39	1.3
4/21/2009 10:40	42.9628	-111.333	1.3	ML IE	140.25	8.34	18	76	7.7	0.06	0.29	0.78
4/21/2009 10:48	42.9493	-111.265	0.5	ML IE	145.73	0.03	4	249	12.9	0.09	10.98	3.43
4/22/2009 8:17	44.4087	-114.29	1.8	Mc IE	147.32	3.87	17	73	17.5	0.08	0.37	1.52
4/22/2009 16:43	42.8775	-111.609	1.2	ML IE	128.32	9.13	5	199	5.3	0.18	2.99	5.83
4/23/2009 4:33	42.9877	-111.346	1.0	ML IE	137.87	5.64	6	200	7.6	0.03	1.13	1.61
4/23/2009 4:33	42.9912	-111.36	0.8	ML IE	136.68	4.7	11	96	7	0.03	0.4	1.38
4/24/2009 10:15	43.2292	-111.108	1.0	Mc IE	143.41	3.33	15	154	21.7	0.07	0.58	10.14
4/24/2009 14:28	44.2088	-114.028	0.9	Mc IE	117.68	7.23	14	73	33.5	0.06	0.4	13.19
4/24/2009 15:19	43.2573	-111.269	1.0	ML IE	130.05	6.45	10	156	10.8	0.07	0.48	1.95
4/24/2009 15:30	43.2575	-111.272	1.0	ML IE	129.8	5.91	10	147	10.7	0.07	0.55	2.55
4/24/2009 16:43	43.252	-111.273	1.1	ML IE	129.94	3.72	8	156	11.3	0.13	0.68	6.77
4/25/2009 2:13	43.7698	-111.004	0.8	Mc IE	143.95	2.5	9	116	15.1	0.08	0.62	12.69
4/25/2009 13:47	42.9962	-111.316	0.6	ML IE	139.44	7.12	5	206	7.8	0.02	1.41	2.71
4/25/2009 13:48	42.9938	-111.309	1.1	ML IE	140.01	6.16	9	106	8.3	0.06	0.36	1.99
4/25/2009 13:50	44.7687	-112.838	1.1	Mc MB	124.53	12.72	14	106	6.6	0.06	0.45	0.52
4/25/2009 13:51	42.9948	-111.317	1.0	ML IE	139.4	9.23	10	105	7.8	0.06	0.47	1.66
4/25/2009 13:54	42.9955	-111.316	0.9	ML IE	139.46	7.8	12	101	7.8	0.05	0.38	1.66
4/25/2009 14:37	42.993	-111.301	0.4	ML IE	140.64	7.66	3	277	8.8	0.01	2.6	3.97
4/25/2009 14:38	42.9953	-111.318	0.7	ML IE	139.31	7.44	8	104	7.7	0.05	0.7	2.33
4/25/2009 14:39	42.9885	-111.291	NM		141.57	3.1	3	282	9.7	0.01	2.55	9.45
4/25/2009 15:18	42.9943	-111.316	0.9	ML IE	139.54	7.47	7	179	7.9	0.07	0.92	1.58
4/26/2009 5:55	43.411	-111.077	1.3	Mc IE	140.36	8.11	12	151	13.5	0.04	0.46	1.2
4/26/2009 6:18	44.6302	-112.137	1.1	Mc MB	120.67	6.07	16	65	20.8	0.13	0.48	12.78
4/26/2009 16:08	43.8393	-110.99	1.3	Mc IE	145.92	1.47	13	116	7.6	0.13	0.38	1.32
4/26/2009 20:10	43.8683	-110.964	0.8	Mc IE	148.43	8.89	6	138	3.8	0.05	3.32	2.78
4/27/2009 1:39	44.7128	-112.062	1.5	Mc MB	131.54	14.35	17	67	29.5	0.07	0.46	0.97
4/27/2009 10:00	44.621	-112.753	0.9	Mc IE	108.05	14.06	8	137	8.6	0.02	0.86	1.21
4/27/2009 15:38	43.0692	-111.354	0.9	ML IE	132.61	3.02	6	167	2.2	0.05	1.3	1.15
4/27/2009 15:41	43.0673	-111.334	0.9	ML IE	134.15	2.78	8	149	3.4	0.06	0.81	2.28
4/27/2009 18:32	43.0418	-111.456	0.9	Mc IE	127.04	8.53	13	92	7.1	0.02	0.62	1.69
4/28/2009 5:38	44.4365	-112.889	1.0	Mc MB	87.91	10.57	10	132	12.6	0.11	0.57	1.94
4/28/2009 6:38	42.9705	-111.074	1.5	Mc IE	157.88	12.79	24	119	22.9	0.11	0.39	1.13

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
4/29/2009 12:15	44.4088	-113.04	1.4	Mc IE	86.9	10.11	17	82	11.9	0.28	0.53	2.06
5/1/2009 3:47	44.824	-111.605	1.2	Mc IE	160.94	7.18	9	117	11.5	0.03	1.6	5.45
5/1/2009 5:17	42.6118	-111.407	0.8	Mc IE	160.8	2.92	11	155	28.6	0.08	0.54	13.19
5/1/2009 12:17	42.6828	-111.481	1.4	Mc IE	150.95	2.42	11	137	18.8	0.19	0.85	19.34
5/2/2009 1:16	43.5743	-111.266	0.5	Mc IE	122.67	13.11	10	175	25.6	0.03	1.17	4.28
5/2/2009 6:26	43.2988	-110.904	0.6	Mc IE	156.9	15.56	8	203	17.1	0.08	0.95	1.3
5/2/2009 21:02	44.0105	-114.419	1.7	ML IE	137.48	7.18	20	125	26.5	0.11	0.58	6.65
5/4/2009 23:01	43.1353	-110.931	1.0	Mc IE	160.56	6.88	11	204	26	0.09	0.85	5.71
5/5/2009 4:14	42.8895	-111.245	0.3	Mc IE	150.75	2.5	6	168	15.4	0.11	0.89	13.94
5/7/2009 10:51	43.7085	-110.944	1.1	Mc IE	148.34	3.06	7	230	21	0.09	1.03	11.6
5/8/2009 10:06	43.611	-111.08	0.9	Mc IE	137.45	5.69	15	116	8.6	0.15	0.7	4.67
5/8/2009 12:19	43.5982	-111.094	0.4	Mc IE	136.42	15.87	8	166	16.6	0.07	0.99	2.48
5/8/2009 12:41	43.5923	-111.097	1.4	ML IE	136.19	11.09	17	81	7.1	0.14	0.43	2.57
5/8/2009 23:20	42.7227	-111.305	1.6	Mc IE	158.35	2.12	15	92	17.4	0.12	0.59	13.38
5/8/2009 23:30	44.7857	-112.737	1.6	Mc IE	126.4	2.3	10	134	20.1	0.05	0.67	2.3
5/9/2009 18:17	44.649	-112.696	0.9	Mc IE	111.36	3.85	5	137	5.4	0.01	0.8	1.4
5/10/2009 0:01	43.1477	-111.361	0.7	Mc IE	127.99	2.39	9	144	10.5	0.1	0.82	12.77
5/10/2009 0:06	43.1437	-111.368	0.6	Mc IE	127.65	2.25	6	173	10	0.06	1.06	12.04
5/10/2009 2:55	43.604	-111.134	0.7	Mc IE	133.12	9.81	8	177	19.5	0.08	1.04	4.43
5/10/2009 15:02	42.8618	-111.294	0.6	Mc IE	149.31	8.81	8	139	13.4	0.09	0.68	2.14
5/10/2009 16:43	43.6395	-110.799	0.5	Mc IE	160.04	8.02	7	121	16	0.04	0.42	3.14
5/11/2009 15:20	44.5527	-112.695	1.2	Mc MB	100.68	5.09	8	120	8.2	0.16	0.86	1.36
5/12/2009 5:54	44.4635	-112.955	1.1	Mc IE	91.54	1.97	4	196	14.9	0.11	2.03	15
5/14/2009 19:24	44.3112	-114.566	1.8	Mc IE	160.78	0.02	13	108	73.2	0.24	0.68	2.49
5/16/2009 20:29	42.6653	-111.712	1.6	Mc IE	139.93	2.87	12	117	38.5	0.18	0.59	17.89
5/18/2009 21:27	42.8037	-111.461	1.4	Mc IE	142.78	6.84	6	157	15.3	0.07	1.65	3.78
5/19/2009 10:06	44.6842	-114.012	1.2	Mc IE	151.28	5.8	16	99	23.4	0.1	0.68	1.77
5/19/2009 11:36	44.6933	-113.993	1.4	Mc IE	151.06	1.52	14	103	25.3	0.06	0.28	1.34
5/20/2009 9:44	42.6082	-111.449	1.0	Mc IE	158.77	3.22	7	108	33.5	0.2	0.67	19.01
5/23/2009 17:39	44.7842	-112.8	1.8	Mc IE	126.19	9.89	22	74	6.2	0.17	0.4	0.93
5/23/2009 21:45	42.7223	-111.294	1.9	Mc IE	159.04	7.11	11	103	16.5	0.14	0.55	2.96
5/24/2009 4:58	44.3282	-113.947	1.1	Mc IE	119.99	6.97	8	248	43.2	0.02	0.81	12.59
5/24/2009 5:13	44.73	-112.071	1.2	Mc MB	132.94	3.43	9	151	29.8	0.09	0.95	1.64
5/24/2009 7:55	43.2387	-110.999	0.6	Mc IE	151.4	3.33	9	189	28.2	0.06	0.73	11.98
5/24/2009 10:10	43.9338	-113.733	0.7	Mc IE	82.67	6.08	10	124	22.5	0.12	0.47	1.01
5/24/2009 15:26	44.7228	-112.363	1.1	Mc IE	123.98	2.94	5	262	14.6	0.27	2.19	3.5
5/25/2009 8:08	43.4848	-110.851	0.4	Mc IE	157.12	10.5	7	195	8.1	0.06	0.86	1.15
5/26/2009 9:58	44.6657	-112.503	1.6	Mc MB	115.19	13.89	18	82	11.8	0.15	0.42	0.71
5/27/2009 5:44	44.586	-112.156	1.3	Mc MB	115.59	13.58	8	151	19	0.08	0.52	1.37
5/28/2009 17:43	42.7207	-111.66	1.3	Mc IE	137.91	9	8	136	31	0.28	0.87	9.09
5/29/2009 8:55	43.1425	-110.923	0.8	Mc IE	160.83	2.11	8	203	37.7	0.24	1.69	23.27
5/29/2009 13:18	43.4422	-113.57	1.8	Mc IE	67.67	19.16	21	136	2.9	0.22	0.63	0.76
5/29/2009 14:06	44.3405	-112.714	1.5	Mc IE	77.02	14.14	8	131	18.2	0.11	0.77	2.42
5/29/2009 15:42	42.661	-111.686	1.0	Mc IE	141.64	5.08	7	270	37.6	0.18	1.6	17.21
5/29/2009 21:16	44.4197	-114.085	1.4	Mc IE	134.96	4.19	18	121	56.2	0.19	0.57	2.45
6/3/2009 0:50	42.7212	-111.707	1.3	ML IE	135.38	4.99	6	141	33.5	0.18	1.48	18.19
6/3/2009 10:52	42.7018	-111.695	1.7	ML IE	137.65	8.9	12	139	34.5	0.15	0.76	5.48
6/3/2009 10:57	42.7045	-111.694	1.4	ML IE	137.45	5	7	195	34.2	0.04	0.77	11.35
6/3/2009 13:30	42.7015	-111.707	1.5	ML IE	137.02	5.02	10	160	35.2	0.12	0.7	11.3
6/3/2009 13:35	42.7328	-111.72	1.0	ML IE	133.66	4.98	3	300	33.4	0.08	2.61	13.42
6/3/2009 18:03	42.5725	-111.791	1.5	ML IE	144.52	3.03	7	314	50.6	0.1	2.63	14.47

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
6/5/2009 16:53	44.3093	-114.565	2.1	ML IE	160.59	0.04	12	149	35.3	0.23	2.33	1.27
6/6/2009 16:52	43.113	-110.952	1.1	ML IE	159.86	2.49	9	198	34.7	0.15	0.98	17.33
6/7/2009 1:44	43.1155	-110.945	0.6	ML IE	160.32	4.99	6	244	35.3	0.05	0.76	12.58
6/7/2009 16:46	44.7327	-111.764	0.9	Mc MB	145.41	5.92	7	217	7.8	0.04	0.97	2.01
6/8/2009 8:28	43.2522	-111.258	1.4	Mc IE	131.07	2.09	11	123	11.7	0.13	0.79	16.49
6/8/2009 21:31	43.7943	-110.896	0.7	ML IE	152.86	4.98	7	275	31	0.05	1.53	13.04
6/8/2009 21:40	43.7743	-110.86	0.7	ML IE	155.5	4.95	5	271	27.4	0.23	3.04	22.96
6/9/2009 6:03	44.2973	-114.051	0.8	ML IE	124.59	5.02	11	196	63.1	0.06	1.54	13.43
6/9/2009 8:43	44.6363	-112.089	2.0	Mc IE	122.98	11.79	23	90	24.7	0.1	0.44	2.05
6/9/2009 11:53	43.09	-111.093	0.6	ML IE	150.44	3.62	7	206	23	0.07	1.05	12.09
6/10/2009 12:27	43.9877	-113.849	1.4	Mc IE	93.61	7.3	14	198	32.6	0.11	0.88	14.08
6/10/2009 23:08	44.3265	-112.901	0.9	Mc MB	75.86	7.15	5	229	3.2	0.1	7.33	8.79
6/11/2009 3:40	44.1778	-114.013	0.5	ML IE	114.9	3.41	5	224	52.8	0.15	7.16	9.64
6/11/2009 9:51	44.2697	-114.467	0.4	ML IE	151.66	8.82	8	158	43.8	0.13	1.18	5.09
6/12/2009 13:54	43.2422	-111.424	1.0	ML IE	118.92	9.33	10	107	14.4	0.06	0.56	1.62
6/12/2009 14:06	43.2577	-111.412	1.1	Mc IE	119.21	13.91	5	146	12.4	0.07	1.33	2.55
6/14/2009 21:11	44.3708	-113.877	0.9	ML IE	118.79	7.84	6	132	59.7	0.03	1	12.58
6/15/2009 16:05	44.798	-113.135	1.2	Mc MB	130.77	4.72	5	246	22.8	0	6.25	10.57
6/16/2009 15:05	43.009	-111.113	1.1	ML IE	152.99	14.46	7	222	26.4	0.13	1.06	1.16
6/17/2009 11:11	43.733	-111.123	0.6	ML IE	134.08	5	7	246	23.5	0.03	0.64	10.27
6/19/2009 3:09	42.9043	-111.578	1.8	ML IE	128.22	1.82	15	113	13.3	0.15	0.73	1.92
6/19/2009 3:10	42.9028	-111.576	1.9	ML IE	128.48	5.67	17	120	13.2	0.15	0.87	2.99
6/20/2009 13:50	44.262	-114.074	2.3	Mc MB	123.91	0.35	10	118	62.1	0.08	0.79	2.75
6/23/2009 4:41	43.7732	-111.005	1.0	Mc IE	143.89	2.5	10	115	14.7	0.15	0.75	14.68
6/23/2009 10:14	43.7727	-110.978	0.5	Mc IE	146.01	8.25	7	155	14.2	0.08	1.46	3.01
6/23/2009 11:32	44.8228	-111.69	1.4	Mc IE	156.96	12.58	10	199	10.5	0.12	1.46	0.97
6/24/2009 6:10	44.4428	-112.951	0.1	ML IE	89.22	14.7	6	178	12.6	0.03	0.94	1.46
6/25/2009 0:40	44.3498	-112.653	1.2	Mc MB	78.54	5.8	8	200	23.1	0.02	2.23	4.1
6/25/2009 15:59	44.2978	-114.231	1.1	Mc IE	136.67	7.66	6	183	57	0.26	11.35	24.6
6/26/2009 1:22	44.5998	-114.12	1.4	ML IE	150.35	6.99	10	170	58.7	0.45	3.2	6.61
6/26/2009 6:22	43.2085	-111.412	1.0	ML IE	121.33	2.45	9	203	17.1	0.13	0.86	15.02
6/26/2009 7:37	44.6168	-111.862	1.3	Mc IE	130.37	6.42	5	182	20	0.05	1.43	12.62
6/26/2009 11:55	44.5365	-114.291	0.9	ML IE	155.88	5.42	5	201	44.9	0.02	8.45	6.07
6/27/2009 2:45	43.4432	-113.595	1.5	Mc IE	69.48	20.34	17	234	2.1	0.09	0.7	0.95
6/27/2009 3:03	43.177	-111.44	0.8	ML IE	120.78	9.98	7	211	14.8	0.09	0.78	2.77
6/27/2009 3:11	42.6722	-111.677	0.9	ML IE	141.13	4.83	4	350	36.2	0.09	6.33	14.48
6/27/2009 22:58	43.411	-111.124	1.0	ML IE	136.69	9.84	10	144	16.5	0.09	0.6	2.02
6/28/2009 16:03	43.373	-110.989	0.8	Mc IE	148.23	2.47	5	169	11.2	0.13	1.02	15.22
6/28/2009 16:57	43.2085	-110.974	0.8	ML IE	154.4	14.16	11	198	19.8	0.08	0.83	1.19
6/29/2009 10:45	43.98	-113.827	0.7	ML IE	91.59	6.08	6	299	30.6	0.04	5.05	9.56
6/29/2009 16:21	44.356	-113.012	1.6	Mc MB	80.65	5	9	156	39.6	0.09	0.62	14.38
6/29/2009 23:12	42.6485	-111.751	0.0	Mc IE	139.46	4.92	4	179	42	0.1	4.69	15.02
6/30/2009 2:33	44.1572	-114.326	0.7	ML IE	136.14	6.44	6	135	60.7	0.03	0.51	2.09
6/30/2009 19:51	42.6365	-112.239	1.8	ML IE	121.12	5.02	12	131	59	0.05	0.78	2.31
7/2/2009 10:42	43.572	-111.084	1.2	Mc IE	137.38	12.72	13	89	8.5	0.04	0.69	1.4
7/3/2009 9:20	43.9147	-111.231	0.9	Mc IE	128.32	8.9	6	108	21	0.08	1.21	3.42
7/3/2009 17:53	43.1883	-111.191	0.8	ML IE	138.72	12.76	7	161	20.5	0.12	0.69	2.83
7/4/2009 8:44	44.376	-113.132	1.0	Mc IE	85.48	16.03	10	176	16.1	0.07	0.87	2.97
7/6/2009 8:10	43.8145	-114.763	1.5	Mc IE	160.45	7.39	9	154	29.9	0.04	0.9	12.81
7/6/2009 8:16	43.805	-114.76	1.9	Mc IE	160.1	7.14	14	157	30.1	0.03	0.6	11.81
7/6/2009 10:10	44.546	-114.056	0.9	ML IE	142.53	1.57	6	203	63.5	0.76	14.78	18.93

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
7/6/2009 10:47	43.8005	-114.751	1.1	ML IE	159.33	5.21	9	158	30.8	0.06	3.93	9.65
7/6/2009 11:39	43.8132	-114.728	1.9	ML IE	157.7	1.24	11	231	82.4	0.2	3.15	2.91
7/7/2009 12:17	43.8315	-114.699	1.5	ML IE	155.6	2.63	10	234	80.7	0.04	1.41	3.09
7/8/2009 8:24	44.635	-111.951	2.1	Mc IE	128.21	16.97	20	136	24.9	0.09	1.56	0.87
7/8/2009 10:38	43.9247	-113.575	1.1	Mc IE	70.69	4.3	10	253	9.9	0.04	2.09	0.84
7/8/2009 23:34	43.7063	-111.094	1.2	ML IE	136.3	3.7	9	185	24.6	0.04	0.75	9.43
7/9/2009 9:22	43.7087	-111.122	1.1	Mc IE	134.03	2.49	14	101	13.7	0.1	0.5	12.54
7/9/2009 20:46	42.6472	-111.405	1.3	Mc IE	158.09	2.23	9	200	32.3	0.04	1.81	12.97
7/10/2009 9:59	42.662	-111.762	1.5	ML IE	137.73	5.01	14	108	41.4	0.14	0.58	13.16
7/10/2009 10:00	42.6698	-111.764	2.7	ML IE	136.92	10.46	21	107	40.9	0.13	0.52	1.18
7/10/2009 10:47	42.5742	-111.552	0.9	ML IE	156.03	5.08	5	265	41.8	0.05	4.63	11.91
7/10/2009 15:06	43.3488	-111.012	0.1	ML IE	147.07	16.96	4	187	13	0.06	1.13	2.51
7/12/2009 9:38	43.8817	-111.1	0.7	ML IE	137.9	1.53	4	278	13	0.05	8.66	9.6
7/12/2009 9:56	43.8542	-111.066	1.1	Mc IE	140.09	0.43	7	257	11.2	0.17	3.52	5.8
7/12/2009 14:37	44.5262	-114.101	0.9	ML IE	143.62	5.01	6	157	60	0.04	1.59	12.76
7/13/2009 20:13	42.879	-111.285	1.5	ML IE	148.81	11.79	6	172	13	0.01	1.6	3.6
7/15/2009 8:07	43.7545	-114.752	1.9	Mc IE	159.08	7.88	16	152	31	0.05	0.71	11.14
7/15/2009 15:43	43.772	-114.745	1.9	Mc IE	158.64	7.92	14	145	31.3	0.09	1.09	13.23
7/16/2009 4:03	43.1397	-111.295	0.5	ML IE	133.2	3.26	7	142	11.4	0.06	0.87	8.82
7/17/2009 0:18	44.7737	-111.566	1.5	Mc IE	158.37	5.08	4	212	9.3	0.05	6.04	10.94
7/17/2009 23:50	44.7017	-113.974	1.1	ML IE	150.82	0.08	10	183	72	0.21	1.46	8.57
7/18/2009 21:21	42.8658	-111.524	1.1	Mc IE	134.34	3.06	7	270	11.6	0.08	1.74	9.68
7/19/2009 4:56	43.2067	-110.999	0.9	Mc IE	152.6	6.37	6	267	21	0.05	2.07	4.66
7/20/2009 12:10	42.888	-111.262	0.9	ML IE	149.75	4.88	7	159	14.2	0.05	1.82	11.32
7/22/2009 6:32	42.6923	-111.916	1.4	Mc IE	127.76	2.51	15	88	42.1	0.07	0.33	13.76
7/22/2009 10:20	44.403	-113.057	0.0	Mc IE	86.6	12.1	6	167	12.3	0.05	0.99	1.24
7/23/2009 5:36	43.3882	-110.834	2.1	Mc IE	160.15	8.65	18	162	3.2	0.09	0.51	0.84
7/23/2009 10:31	43.1412	-110.987	0.8	ML IE	156.08	10.79	9	208	26.9	0.09	1.05	2.98
7/23/2009 13:33	43.5502	-111.238	0.9	ML IE	125.16	11.28	9	194	23.5	0.06	0.58	3.15
7/23/2009 21:24	42.88	-111.284	1.5	ML IE	148.81	11.83	12	170	13	0.08	1.43	2.13
7/25/2009 2:17	42.6898	-111.697	1.2	Mc IE	138.58	5	9	211	35.6	0.07	1.19	12.03
7/25/2009 23:29	43.5577	-111.212	0.8	ML IE	127.23	7.99	7	189	22.4	0.09	0.7	4.13
7/26/2009 4:28	43.6873	-110.838	0.9	Mc IE	156.82	2.5	8	138	20.7	0.05	0.5	12.11
7/26/2009 18:12	43.6858	-110.891	1.2	Mc IE	152.61	5.37	11	131	22.3	0.11	0.75	5.3
7/27/2009 2:12	42.5527	-111.592	1.4	Mc IE	155.87	6.28	11	129	45	0.33	1.5	9.86
7/27/2009 4:02	43.6842	-110.846	1.1	ML IE	156.23	2.49	13	117	21.1	0.05	0.4	12.22
7/28/2009 16:26	43.6837	-110.84	0.8	Mc IE	156.69	3.01	7	130	20.6	0.07	0.55	11.75
7/29/2009 10:48	43.0922	-110.982	0.2	ML IE	158.56	5.02	6	297	31.8	0.04	1.07	10.9
7/29/2009 20:43	43.4242	-111.122	0.7	ML IE	136.53	9.11	8	136	15.7	0.11	0.78	2.66
7/30/2009 10:32	44.4808	-112.563	0.9	Mc MB	94.09	0.15	6	146	18.3	0.05	0.86	2.98
7/30/2009 20:54	43.3832	-110.846	0.6	ML IE	159.31	8.49	6	155	2.4	0.05	1.12	1.26
7/31/2009 5:08	44.3413	-114.017	0.8	ML IE	125.29	1.33	10	218	48.9	0.19	2.05	3.64
7/31/2009 7:45	43.2438	-111.251	0.8	Mc IE	131.97	8.77	9	138	12.8	0.1	0.7	2.45
8/3/2009 17:22	44.396	-112.704	0.0	Mc IE	83.24	7.07	4	220	20.3	0.34	2.72	29.63
8/4/2009 0:09	44.2195	-113.203	0.8	ML IE	71.76	5.33	9	116	19.1	0.04	0.54	1.67
8/4/2009 11:53	43.2547	-111.216	0.9	Mc IE	134.2	12.55	9	111	13.3	0.06	0.92	2.62
8/5/2009 3:12	42.9583	-111.382	1.1	ML IE	137.24	11.02	10	128	4	0.06	0.78	1.11
8/7/2009 18:12	44.327	-111.013	1.9	Mc WY	160.68	3.36	14	142	20.4	0.12	0.71	12.37
8/8/2009 2:14	44.8782	-111.725	3.7	ML MB	160.61	11.12	21	134	17.2	0.08	0.61	2.11
8/8/2009 2:31	44.8768	-111.726	1.4	Mc IE	160.43	14.74	9	97	17	0.05	0.53	1.32
8/8/2009 4:02	44.66	-112.584	1.4	Mc MB	113.49	14.11	10	105	16.8	0.01	1.16	2

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
8/12/2009 8:16	43.2345	-111.014	0.8	Mc IE	150.43	4.91	8	255	19.4	0.05	1.62	5.18
8/12/2009 16:30	43.099	-110.946	0.8	ML IE	160.95	4.99	6	232	30.2	0.22	2.66	17.58
8/12/2009 19:27	42.7097	-111.285	1.4	ML IE	160.53	3.95	5	312	27.7	0	8.08	12.04
8/12/2009 20:11	42.7093	-111.701	1.3	ML IE	136.67	4.99	7	178	34.2	0.19	2.23	14.84
8/13/2009 15:05	44.368	-113.129	0.3	ML IE	84.54	12.33	7	128	15.5	0.06	0.82	2.35
8/13/2009 15:05	44.3538	-113.135	0.8	ML IE	83.23	9.14	11	125	15.7	0.05	0.6	2.27
8/14/2009 12:03	43.0263	-111.166	0.4	ML IE	148.31	5.01	4	247	17	0.05	1.08	11.77
8/14/2009 12:30	43.0285	-111.168	1.0	ML IE	148.05	4.94	5	246	16.8	0.06	1.15	9.64
8/14/2009 20:35	43.0315	-111.155	1.1	ML IE	148.79	5.01	6	212	17.7	0.01	1.13	9.65
8/15/2009 23:44	42.5505	-111.603	1.3	ML IE	155.52	5.02	5	138	45.5	0.07	0.84	10.82
8/17/2009 3:21	42.9488	-111.292	0.7	Mc IE	143.89	9.73	7	227	10.6	0.06	1.56	3.69
8/17/2009 10:19	43.8267	-110.934	0.9	Mc IE	150.18	4	11	79	7.8	0.09	0.51	2.98
8/17/2009 10:38	44.5778	-112.642	1.2	Mc IE	103.84	3.48	8	114	19.7	0.06	4.97	11.5
8/18/2009 4:01	44.7187	-111.827	1.4	Mc IE	141.33	14.65	14	165	12.8	0.02	1.89	0.72
8/18/2009 14:06	42.9068	-111.211	1.1	ML IE	151.97	12.34	9	251	17.5	0.08	1.37	2.94
8/19/2009 3:04	44.1235	-112.737	0.0	Mc IE	52.81	6.57	7	160	5.9	0.04	0.94	1.16
8/19/2009 7:40	44.1763	-114.018	0.2	ML IE	115.12	5	7	227	51.2	0.47	4.36	13.7
8/19/2009 22:22	44.1178	-113.958	1.3	Mc IE	107.8	5	12	212	45.7	0.15	1.23	17.71
8/20/2009 10:19	43.7552	-113.821	0.0	Mc IE	84.42	4.84	12	142	31.5	0.08	0.47	1.33
8/21/2009 1:57	43.1067	-110.977	1.6	Mc IE	158.29	15.36	15	215	30.2	0.12	0.88	1.36
8/21/2009 2:46	44.6052	-112.803	1.4	Mc IE	106.28	5.72	10	208	25	0.06	4.71	11.58
8/21/2009 12:12	43.4172	-110.887	0.1	ML IE	155.33	9.68	5	186	6.7	0.03	1.1	1.41
8/21/2009 16:36	44.8217	-112.908	2.2	Mc IE	130.74	5.03	23	226	4.7	0.07	1.54	1.1
8/22/2009 1:57	44.5403	-114.007	1.7	Mc IE	139.29	1.22	7	266	54.3	0.15	3.47	13.74
8/22/2009 7:24	43.4107	-110.903	0.9	Mc IE	154.19	8.61	8	117	6.8	0.06	0.71	1.22
8/22/2009 7:27	43.3997	-111.134	0.8	ML IE	136.11	8.17	7	149	16.2	0.02	0.82	3.15
8/22/2009 16:20	44.3198	-111.005	0.7	Mc IE	160.84	4.95	4	243	16.9	0.01	1.54	9.86
8/23/2009 7:54	44.6412	-111.902	1.6	Mc IE	130.84	14.01	14	136	21.2	0.11	0.84	2.29
8/23/2009 9:51	44.7348	-111.913	1.3	Mc IE	139.27	12.61	9	203	19.6	0.1	2.52	4.11
8/23/2009 12:58	42.588	-111.577	1.6	ML IE	153.54	4.95	18	94	40.9	0.06	0.51	10.82
8/23/2009 13:18	43.4112	-111.135	1.8	Mc IE	135.75	6.86	17	131	16.6	0.06	0.53	2.05
8/23/2009 15:12	42.568	-111.553	1.5	ML IE	156.52	6.86	12	153	43.1	0.04	0.64	6.45
8/24/2009 5:02	43.0432	-111.691	1.0	Mc IE	111.32	5	6	275	24.9	0.33	6.56	26.55
8/24/2009 12:32	44.6135	-111.971	1.7	Mc IE	125.34	6.2	8	154	27.4	0.06	1.24	12.99
8/24/2009 19:09	44.2803	-114.461	2.0	Mc IE	151.73	0.08	8	282	84.3	0.22	4.37	12.01
8/25/2009 21:47	42.6573	-112.223	2.0	ML IE	119.44	4.72	14	105	61.6	0.39	1.1	7.05
8/26/2009 2:38	43.6968	-113.723	1.1	Mc IE	75.93	3.08	12	124	21.5	0.11	0.54	1.81
8/26/2009 7:32	44.2327	-114.036	0.8	ML IE	119.64	7.35	5	238	51.1	0.01	2.4	12.55
8/26/2009 10:05	43.4938	-110.911	0.8	Mc IE	152.16	10.33	8	154	3.2	0.06	0.82	1.27
8/26/2009 12:27	43.4792	-110.911	0.4	ML IE	152.39	12.11	6	128	3.5	0.06	0.77	1.66
8/26/2009 12:49	43.4782	-110.906	1.4	Mc IE	152.79	11.56	16	103	3.9	0.06	0.5	0.85
8/26/2009 12:54	43.478	-110.906	0.8	Mc IE	152.76	12.12	9	130	3.8	0.01	0.75	1.41
8/26/2009 13:32	44.5837	-112.632	1.2	Mc IE	104.57	6.57	8	118	18.9	0.05	0.62	12.11
8/27/2009 9:04	43.4752	-110.905	1.0	ML IE	152.88	12.17	8	122	4	0.08	0.74	1.04
8/27/2009 9:04	43.476	-110.912	1.1	ML IE	152.32	12.91	6	121	3.5	0.07	0.69	1.44
8/27/2009 9:10	43.4712	-110.908	0.8	Mc IE	152.74	13.02	6	143	4.1	0.07	0.87	1.62
8/27/2009 9:11	43.4787	-110.905	0.9	Mc IE	152.86	11.83	10	103	3.9	0.09	0.66	1.1
8/28/2009 8:31	43.4777	-110.927	0.7	Mc IE	151.07	12.06	9	113	2.3	0.01	0.69	1.49
8/28/2009 18:43	43.4738	-110.917	0.5	ML IE	152	12.94	7	114	3.3	0.08	0.77	0.99
8/28/2009 19:42	43.4722	-110.91	0.5	ML IE	152.57	13.24	6	115	3.9	0.03	0.68	1.57
8/28/2009 19:42	43.478	-110.901	1.0	ML IE	153.15	12.02	9	104	4.2	0.04	0.6	1.15

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
8/29/2009 13:18	43.2478	-111.45	0.5	ML IE	116.76	10.72	6	227	15.3	0.08	1.87	2.77
8/29/2009 23:01	42.8613	-111.278	0.8	ML IE	150.41	14.68	7	180	14.5	0.06	1.4	1.76
8/31/2009 1:17	44.6263	-112.079	1.6	Mc IE	122.35	5.91	10	139	25.3	0.05	1.05	13.07
8/31/2009 5:01	44.7517	-112.979	1.4	Mc IE	123.56	5	5	188	13.3	0.25	7.67	9.67
8/31/2009 11:13	43.4717	-110.907	0.8	Mc IE	152.83	12.33	6	141	4.1	0.06	0.77	1.62
8/31/2009 12:51	43.4743	-110.914	0.5	ML IE	152.16	13.62	8	116	3.4	0.06	0.63	1.08
9/1/2009 16:25	42.8838	-111.234	0.9	ML IE	151.86	14.36	8	152	16.5	0.05	1.07	2.7
9/1/2009 18:27	44.6585	-111.879	1.4	ML IE	133.45	19.29	7	181	18.7	0.04	1.47	1.61
9/2/2009 7:51	43.4235	-110.936	0.8	Mc IE	151.33	10.61	6	143	7.5	0.03	0.86	1.8
9/2/2009 16:43	43.2992	-111.03	1.2	ML IE	147.04	13.48	10	219	16.1	0.1	0.81	1.35
9/2/2009 17:03	43.3917	-111.156	1.0	ML IE	134.58	0.05	6	166	14.2	0.13	2.03	1.74
9/4/2009 8:47	44.7632	-113.038	1.6	Mc IE	125.51	4.84	9	213	16.6	0.02	5.14	11.14
9/5/2009 2:19	44.699	-111.934	1.4	Mc IE	135	7.3	8	116	21.5	0.09	1.18	13.24
9/5/2009 5:31	44.7488	-111.715	1.3	Mc IE	149.08	8.99	9	172	4.4	0.06	2.82	0.59
9/5/2009 23:46	43.512	-111.025	1.2	Mc IE	142.75	11.28	10	136	6.5	0.08	0.58	1.22
9/6/2009 10:33	43.8898	-110.91	0.9	Mc IE	153.06	7.02	8	115	2.5	0.06	0.82	1.1
9/7/2009 4:12	44.6387	-112.163	1.6	Mc MB	120.66	12.17	11	151	19.1	0.07	0.68	1.02
9/7/2009 21:46	43.1583	-111.269	0.8	ML IE	134.21	4.12	6	173	14.3	0.01	1.22	8.96
9/7/2009 21:46	43.1643	-111.32	0.9	ML IE	130.22	3.88	5	161	13	0.01	0.76	9.01
9/7/2009 21:49	43.1692	-111.324	0.4	Mc IE	129.64	1.97	4	197	13.4	0.02	12.17	3.48
9/8/2009 0:50	42.807	-111.204	0.8	ML IE	158.87	4.48	7	192	9.6	0.09	1.54	7.83
9/8/2009 22:38	42.961	-111.194	0.5	ML IE	149.97	5.02	5	232	17.7	0.09	1.63	11.81
9/9/2009 7:24	43.763	-111.037	0.8	Mc IE	141.2	4.56	8	180	16.8	0.06	1.04	6.58
9/10/2009 3:13	43.7622	-111.04	0.9	Mc IE	140.99	2.01	8	181	17	0.08	0.83	14.26
9/10/2009 17:20	42.9927	-111.339	0.7	ML IE	138.03	8.56	6	162	7.2	0.01	0.85	3.03
9/11/2009 7:22	44.6848	-111.965	1.7	Mc IE	132.42	12.17	14	98	24.2	0.07	0.47	1.13
9/12/2009 4:20	43.3248	-111.03	0.8	Mc IE	146.32	10.34	9	204	15	0.04	0.75	2.21
9/12/2009 9:10	43.9002	-114.339	2.0	Mc IE	128.28	7.02	14	229	37.9	0.08	1.19	14.25
9/13/2009 12:45	43.1877	-110.918	0.9	ML IE	159.5	11.63	10	170	20.1	0.07	0.67	2.44
9/16/2009 7:05	43.574	-110.884	0.2	ML IE	153.44	4.02	5	131	10.8	0.01	0.94	7.5
9/16/2009 15:38	43.5852	-111.872	1.6	Mc IE	73.83	20.28	24	88	44.8	0.06	0.32	2.73
9/17/2009 0:54	43.3072	-110.92	0.4	ML IE	155.42	9.69	7	237	8.3	0.06	0.88	1.21
9/17/2009 0:54	43.359	-110.938	0.4	ML IE	152.65	5.79	6	182	7	0.03	2.05	4.17
9/17/2009 3:54	43.015	-111.424	1.0	ML IE	130.9	10.76	10	194	6.1	0.03	0.91	1.1
9/17/2009 7:49	43.578	-111.866	2.1	Mc IE	74.4	17.31	36	86	45	0.08	0.31	10.57
9/17/2009 11:27	44.6078	-112.727	1.3	Mc IE	106.65	4.9	7	114	26.3	0.06	4.29	11.13
9/17/2009 15:47	43.7522	-110.814	0.5	Mc IE	159.07	9.07	6	164	19	0.05	0.85	4.04
9/18/2009 21:18	43.182	-111.166	1.3	Mc IE	140.91	5.03	8	167	22	0.13	1.1	14.83
9/19/2009 18:32	43.0607	-111.449	0.1	ML IE	126.44	4.96	4	208	6.4	0.04	6.72	11.09
9/20/2009 9:47	43.529	-111.014	0.7	ML IE	143.46	11.87	8	136	6.7	0.03	0.41	0.99
9/21/2009 6:44	43.0352	-111.294	0.3	Mc IE	138.7	8.14	6	108	6.6	0.07	0.95	1.91
9/21/2009 12:24	42.712	-111.472	1.8	Mc IE	149.14	8.88	20	88	25.4	0.1	0.47	1.71
9/21/2009 12:26	42.6655	-111.524	0.6	ML IE	149.93	5.24	7	300	31.4	0.07	1.99	11.56
9/22/2009 8:31	44.7285	-112.92	1.3	Mc IE	120.48	5.23	6	167	12.4	0.02	4.71	11.11
9/22/2009 18:04	44.4395	-112.97	1.6	Mc IE	89.1	13.7	17	124	12.5	0.05	0.38	0.8
9/22/2009 18:16	44.437	-112.971	0.5	ML IE	88.84	14.17	8	123	12.2	0.06	0.83	2.04
9/22/2009 21:01	44.4348	-112.97	0.8	Mc IE	88.59	12.53	8	136	11.9	0.01	1.04	1.64
9/23/2009 3:43	42.8785	-111.239	1.0	ML IE	151.89	13.27	12	157	16.3	0.08	0.6	1.7
9/23/2009 18:03	43.3723	-110.867	0.9	Mc IE	157.93	6.19	9	134	1.6	0.1	0.97	1.1
9/23/2009 21:06	44.7272	-112.516	1.5	Mc IE	121.73	16.72	10	155	17.7	0.02	0.78	0.41
9/24/2009 1:45	43.1597	-111.226	0.8	ML IE	137.39	14.85	5	173	16.7	0.03	0.8	2.22

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
9/24/2009 5:20	43.006	-111.497	0.0	Mc IE	126.53	6.55	3	239	9.7	0.23	11.98	17.8
9/24/2009 5:50	44.1903	-114.017	0.8	Mc IE	115.85	7.95	8	229	50.7	0.4	4.09	9.28
9/25/2009 2:13	43.7408	-111.024	1.1	Mc IE	142.11	2.47	12	137	18.6	0.05	0.71	11.33
9/25/2009 2:25	44.7052	-113.715	1.9	Mc IE	139.02	9.62	8	234	50.3	0.01	2.41	3.46
9/26/2009 21:09	43.4695	-110.877	0.7	ML IE	155.23	9.37	6	122	6.4	0.02	0.86	2.27
9/27/2009 4:33	44.1088	-114.51	1.5	Mc IE	147.84	6.88	6	246	61.3	0.19	3.94	6.18
9/27/2009 23:20	43.6523	-111.168	0.7	ML IE	130.2	10.63	7	194	25.2	0.05	0.82	3.29
9/28/2009 7:52	44.126	-113.954	1.6	Mc IE	107.91	9.62	10	197	48.4	0.09	1.25	2.63
9/30/2009 10:05	43.7102	-111.051	0.9	ML IE	139.78	2.5	12	188	22.6	0.12	0.81	13.63
9/30/2009 13:39	43.1877	-111.263	1.0	ML IE	133.35	3.17	9	147	17.3	0.09	0.59	12
9/30/2009 13:49	43.1882	-111.281	0.9	ML IE	131.97	14.79	12	144	16.6	0.07	0.78	1.82
10/2/2009 17:29	44.435	-114.122	2.2	Mc IE	138.3	0.31	13	232	58.8	0.16	1.89	4.24
10/2/2009 20:18	44.5588	-112.549	0.7	ML IE	102.82	2.26	4	138	12.9	0.01	4.6	11.18
10/3/2009 21:50	43.0557	-111.181	0.8	ML IE	145.69	5.03	4	303	34.3	0.05	1.87	12.98
10/5/2009 1:50	43.1903	-111.266	1.4	Mc IE	133	9.43	13	136	17.4	0.05	0.55	2.9
10/5/2009 1:51	43.1882	-111.265	0.7	ML IE	133.17	5	5	146	17.2	0.03	0.66	9.45
10/5/2009 4:49	43.1903	-111.271	1.0	Mc IE	132.66	8.97	8	144	17.2	0.07	0.81	4.63
10/6/2009 9:54	43.189	-111.262	1.8	Mc IE	133.39	6.6	17	147	17.5	0.11	0.63	4.12
10/6/2009 21:50	42.9522	-111.516	2.0	ML IE	128.8	0.03	17	206	7.8	0.13	1.09	0.64
10/7/2009 6:54	44.2182	-114.035	1.4	Mc IE	118.71	6.82	8	235	51.3	0.09	1.18	4.95
10/7/2009 10:32	42.8023	-111.754	1.0	Mc IE	125.98	4.26	6	330	31.1	0.05	10.71	12.14
10/7/2009 10:35	43.7745	-111.02	1.1	Mc IE	142.69	2.46	11	176	15.1	0.1	0.84	12.36
10/7/2009 12:41	43.4862	-110.848	0.8	Mc IE	157.33	9.81	8	140	8.3	0.05	0.74	2.38
10/7/2009 15:04	44.4582	-111.124	0.5	Mc IE	160.43	2.16	4	186	30.1	0.04	6.63	7.82
10/8/2009 23:31	43.767	-111.024	0.7	ML IE	142.34	2.48	6	176	16	0.11	1.12	13.73
10/9/2009 0:59	43.1848	-111.248	1.4	ML IE	134.6	2.45	12	128	17.7	0.12	0.62	15.46
10/9/2009 1:33	43.1938	-111.271	0.8	ML IE	132.47	8.6	9	143	17.5	0.08	0.58	3.14
10/9/2009 1:34	43.2082	-111.28	0.7	ML IE	131.23	16.35	7	144	15.8	0.08	0.97	2.84
10/9/2009 5:22	43.1872	-111.277	1.2	ML IE	132.33	13.24	9	141	16.7	0.07	0.63	2.8
10/9/2009 6:24	43.1852	-111.272	0.8	ML IE	132.77	13.48	8	139	16.7	0.06	0.77	3.06
10/9/2009 8:56	43.1913	-111.269	1.5	ML IE	132.76	2.29	19	138	17.4	0.09	0.52	13.5
10/9/2009 9:19	43.1888	-111.268	0.7	ML IE	132.95	2.68	8	150	17.2	0.05	0.53	12.14
10/9/2009 14:54	42.8547	-111.187	0.8	ML IE	156.9	11.33	6	205	12.2	0.01	1.83	3.02
10/9/2009 20:57	43.1848	-111.236	1.2	ML IE	135.52	0.06	9	122	18.3	0.08	0.71	3.15
10/10/2009 8:23	43.1868	-111.231	0.9	Mc IE	135.77	3.73	7	151	18.7	0.09	1.13	12.59
10/10/2009 17:20	43.7942	-111.149	0.9	Mc IE	132.62	2.48	6	261	20.3	0.2	2.95	20.38
10/10/2009 18:26	43.6832	-113.729	1.2	Mc IE	76.33	7.08	9	123	26.9	0.07	0.52	13.75
10/11/2009 0:33	43.7738	-111.009	1.0	Mc IE	143.56	2.47	7	173	14.8	0.12	1	13.16
10/11/2009 0:45	43.2708	-111.372	1.2	ML IE	121.7	10.73	9	181	9.5	0.08	1.61	1.08
10/11/2009 9:04	43.1865	-111.247	0.8	Mc IE	134.6	3.59	9	127	17.9	0.14	0.91	14.04
10/11/2009 11:22	43.1925	-111.277	0.4	Mc IE	132.08	4.82	5	174	17.2	0.06	1.73	10.56
10/11/2009 12:15	43.205	-111.373	0.9	Mc IE	124.39	2.57	6	187	16.4	0.05	2.47	12.1
10/12/2009 1:16	44.4238	-114.088	1.9	Mc IE	135.43	3.21	9	229	55.9	0.15	1.87	6.62
10/12/2009 3:08	42.9022	-111.256	0.6	ML IE	149.26	4.89	5	169	14.1	0.03	1.22	11.17
10/12/2009 17:13	44.4357	-114.09	0.9	ML IE	136.4	7.42	9	230	56.3	0.12	1.93	14.8
10/13/2009 1:25	44.4365	-114.091	2.5	Mc MB	136.51	1.25	15	230	56.4	0.27	2.63	12.93
10/13/2009 3:15	43.7743	-111.015	1.2	Mc IE	143.09	2.47	11	136	14.9	0.12	0.95	13.27
10/13/2009 4:16	44.4695	-114.128	0.8	ML IE	141.1	5.01	4	235	102.2	0.21	3.73	11.98
10/13/2009 6:16	44.622	-112.154	1.0	Mc MB	119.28	5	5	139	19.4	0.18	1.98	2.69
10/13/2009 6:37	44.4407	-114.117	2.4	Mc MB	138.39	0.16	12	232	58.5	0.2	1.98	13.86
10/13/2009 13:14	42.88	-111.177	0.5	ML IE	155.97	2.67	6	233	14.2	0.1	3.65	14.77

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
10/13/2009 16:06	43.3892	-111.045	0.5	ML IE	143.4	9.79	8	159	13.6	0.08	0.59	2.18
10/13/2009 17:33	44.4077	-114.066	2.3	Mc MB	132.96	5	11	226	53.8	0.07	1.9	13.75
10/14/2009 23:52	44.4273	-114.099	2.1	Mc MB	136.37	1.75	13	230	56.8	0.1	2.22	15.11
10/15/2009 2:35	42.5872	-111.501	1.5	ML IE	157.64	2.5	12	128	38.4	0.07	0.62	13.79
10/15/2009 2:36	42.62	-111.495	1.6	ML IE	155.23	4.93	9	184	36.2	0.08	1.94	12.32
10/15/2009 2:42	42.5848	-111.509	1.3	Mc IE	157.44	5.02	10	129	39	0.07	0.61	11.44
10/15/2009 2:43	42.5842	-111.517	1.8	ML IE	157.04	4.98	12	167	39.6	0.05	0.66	10.46
10/15/2009 2:56	42.5965	-111.506	1.3	Mc IE	156.59	4.96	6	166	38.2	0.07	0.93	12.15
10/16/2009 18:00	43.2913	-111.543	0.8	ML IE	107.91	0.03	6	156	19.1	0.04	1.02	1.81
10/17/2009 4:55	43.242	-110.918	0.8	Mc IE	157.59	11.25	6	200	14.4	0.04	1.08	3.07
10/17/2009 9:10	43.3538	-111.414	0.3	ML IE	115.46	7.75	6	168	7.6	0.09	4.69	1.44
10/17/2009 15:48	44.4392	-114.085	3.3	Mc MB	136.3	13.5	23	230	56	0.47	3.86	31.61
10/17/2009 17:57	44.4818	-114.112	1.1	ML IE	140.99	0.62	10	234	59.4	0.29	3.83	12.43
10/17/2009 19:47	44.4358	-114.114	2.3	Mc MB	137.86	5.89	15	232	58.2	0.05	1.75	13.07
10/17/2009 20:21	44.411	-114.081	2.8	Mc MB	134.07	10.58	18	228	55	0.08	1.3	1.42
10/18/2009 6:26	44.4203	-114.094	1.9	Mc IE	135.54	7.66	12	229	56.2	0.17	2.26	4
10/18/2009 12:20	42.8575	-111.271	0.9	ML IE	151.12	12.75	7	180	15.2	0.07	1.24	2.67
10/18/2009 12:41	43.3572	-110.896	0.8	Mc IE	155.97	6.69	6	264	3.6	0.04	1.15	1.69
10/19/2009 11:27	44.4168	-114.074	2.5	Mc MB	134.04	7.02	17	228	54.6	0.16	1.85	5.7
10/19/2009 11:30	44.4213	-114.083	2.1	Mc IE	134.94	4.28	14	228	55.4	0.17	1.54	5.33
10/19/2009 11:39	44.4172	-114.064	1.7	Mc IE	133.48	4.2	7	227	53.8	0.1	1.54	4.28
10/19/2009 14:10	44.081	-114.379	1.2	Mc IE	136.93	7.15	6	279	57.6	0.03	2.83	12.72
10/19/2009 21:32	44.4585	-114.113	2.4	Mc MB	139.41	7.18	18	264	58.7	0.08	1.89	6.23
10/20/2009 14:19	44.4153	-114.071	1.3	Mc IE	133.76	3.94	9	228	54.3	0.03	1.84	4.94
10/20/2009 14:24	44.4222	-114.085	1.9	Mc IE	135.1	3.54	16	228	55.5	0.14	1.57	5.71
10/20/2009 14:32	44.4055	-114.082	0.6	ML IE	133.76	6.96	6	227	55	0.07	1.35	7.15
10/21/2009 17:20	42.9217	-111.271	1.5	ML IE	147.02	13.45	11	138	12.5	0.06	0.71	1.64
10/21/2009 17:21	42.9178	-111.248	0.4	ML IE	148.83	5	4	248	14.4	0.01	2.77	12.49
10/22/2009 6:26	44.1993	-113.964	1.8	ML IE	112.77	4.29	17	227	46.3	0.05	0.76	2.51
10/22/2009 6:27	44.2188	-113.957	0.8	ML IE	113.51	6.76	11	276	45.3	0.14	2.25	4.99
10/22/2009 6:33	44.1957	-113.969	1.6	Mc IE	112.93	3.68	10	204	46.8	0.04	0.87	2.85
10/22/2009 14:47	44.205	-114.375	2.0	Mc IE	141.89	6.95	12	236	71.4	0.17	2.04	3.32
10/24/2009 0:34	44.4562	-111.186	1.4	ML IE	156.25	6.67	6	130	29.5	0.08	0.77	10.62
10/24/2009 9:35	44.6018	-112.034	1.5	Mc IE	121.66	6.02	12	191	28.6	0.05	0.65	10.58
10/24/2009 20:42	43.657	-110.899	0.5	ML IE	151.89	4.68	5	236	19	0.05	2.78	12.67
10/26/2009 14:13	44.9077	-112.501	2.1	Mc IE	141.72	5.01	16	204	28.9	0.11	0.89	15.53
10/27/2009 14:18	44.4642	-111.255	1.4	ML IE	152.26	5.86	7	221	31	0.12	1.28	15.93
10/27/2009 16:44	42.693	-111.565	1.5	Mc IE	145.36	4.97	7	142	29.6	0.1	1.17	12.32
10/30/2009 11:03	44.3627	-112.627	0.9	Mc IE	80.27	5.14	8	144	30.3	0.06	0.97	2.47
10/30/2009 21:59	42.9618	-111.543	1.7	Mc IE	126.42	5.04	17	179	10.2	0.06	0.49	2.73
10/31/2009 1:33	44.6333	-112.107	1.0	Mc IE	122.01	12.47	7	141	23.2	0.06	1.15	2.21
10/31/2009 5:53	44.3088	-112.911	1.0	Mc IE	74.01	8	6	229	3.3	0.07	1.66	1.49
10/31/2009 18:35	43.1715	-111.179	1.0	ML IE	140.33	21.73	9	120	20.4	0.15	0.9	2.21
11/1/2009 1:35	44.3898	-112.681	1.1	Mc IE	82.71	5.19	8	147	21.8	0.04	0.67	1.11
11/1/2009 11:03	44.9512	-113.558	2.0	Mc IE	157.4	6.93	10	293	57.7	0.12	2.06	5.75
11/1/2009 23:08	43.291	-110.881	0.6	Mc IE	158.95	9.3	5	265	8.3	0	2.11	1.27
11/2/2009 2:22	43.1942	-110.948	0.8	Mc IE	156.94	13.1	10	204	20.3	0.17	1.16	3.19
11/2/2009 20:03	44.854	-111.715	1.7	Mc IE	158.78	2.42	11	191	14.3	0.02	1.4	1.99
11/3/2009 0:52	42.8607	-111.468	1.0	ML IE	138.22	9.25	8	215	9.4	0.04	1.7	1.1
11/3/2009 11:39	43.4123	-111.062	0.3	ML IE	141.58	3.5	5	154	12.5	0.03	1.08	11.17
11/3/2009 11:39	43.4108	-111.098	0.6	ML IE	138.73	3.55	6	164	14.8	0.01	0.93	10.37

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
11/7/2009 13:56	43.3212	-111.054	0.4	Mc IE	144.53	5.08	5	289	17	0.06	2.78	12.76
11/7/2009 17:58	42.799	-111.181	1.6	ML IE	160.89	12.67	7	213	7.6	0.01	1.23	2.06
11/7/2009 17:59	42.7905	-111.224	0.9	ML IE	158.69	11.1	4	211	10.5	0.01	4.38	2.49
11/7/2009 17:59	42.7532	-111.263	0.7	ML IE	158.72	4.67	4	244	13.4	0	2.43	8.51
11/7/2009 18:02	42.7872	-111.224	1.3	ML IE	158.9	11.37	18	174	10.4	0.06	0.63	0.76
11/7/2009 18:06	42.7715	-111.238	0.7	ML IE	159.08	9.95	4	228	11.2	0.01	2.45	2.91
11/7/2009 18:06	42.7638	-111.249	0.9	ML IE	158.92	8.83	5	235	12.1	0.01	1.07	2.76
11/7/2009 18:27	42.793	-111.221	1.0	ML IE	158.71	11.08	7	208	10.3	0.03	1.02	2.4
11/7/2009 18:34	42.7662	-111.245	0.8	ML IE	159	9.86	4	233	11.8	0.03	1.51	2.87
11/7/2009 18:50	42.7832	-111.221	1.5	Mc IE	159.38	12.29	8	216	10	0.01	1.01	1.99
11/7/2009 18:50	42.7787	-111.242	0.7	ML IE	158.3	2.45	4	224	11.7	0.02	2.04	12.04
11/8/2009 7:39	42.662	-111.859	1.8	Mc IE	133.14	6.24	19	102	47.1	0.09	0.48	2.86
11/9/2009 3:28	43.2938	-111.341	0.8	Mc IE	123.19	8.06	10	185	6.2	0.08	0.9	1.05
11/9/2009 3:51	43.385	-111.153	0.6	Mc IE	134.97	7.75	6	158	14.2	0.06	1.01	5.3
11/9/2009 6:27	44.3643	-114.034	1.8	Mc IE	127.94	6.97	6	257	50.5	0.32	4.31	10.83
11/10/2009 8:21	43.4455	-111.008	0.1	Mc IE	145.19	2.79	6	230	6.8	0.06	2.69	11.15
11/10/2009 8:29	44.8488	-112.654	1.8	Mc IE	133.77	3.09	7	280	15.6	0.04	9.87	6
11/10/2009 16:57	44.5873	-114.102	2.0	Mc IE	148.35	5.06	9	143	63.4	0.11	1.14	11.73
11/10/2009 21:02	43.4255	-111.069	0.8	Mc IE	140.72	10.16	10	136	12	0.06	0.47	1.8
11/10/2009 21:08	43.4233	-111.071	0.8	ML IE	140.61	9.79	10	138	12.2	0.03	0.43	1.73
11/10/2009 21:08	43.4317	-111.066	0.3	ML IE	140.79	11.01	8	133	11.4	0.05	0.51	1.7
11/10/2009 21:36	44.3212	-114.03	1.2	ML IE	124.77	6.06	8	118	49.8	0.08	1.07	10.09
11/11/2009 1:03	44.3058	-111.001	0.9	Mc IE	160.45	4.78	4	234	16.2	0.04	2.7	12.48
11/11/2009 18:37	44.6437	-112.062	2.2	Mc IE	124.67	15.32	21	148	26.9	0.04	1.12	0.48
11/12/2009 15:44	43.4242	-111.075	1.7	ML IE	140.23	8.5	19	95	12.5	0.06	0.31	1.07
11/12/2009 16:39	43.4338	-111.063	0.5	ML IE	140.99	11.44	6	169	11.1	0.01	0.83	2.2
11/12/2009 23:53	44.2908	-114.562	2.2	Mc IE	159.46	0.08	12	116	81.9	0.27	0.7	3.56
11/13/2009 12:10	43.2218	-110.948	0.9	ML IE	155.97	10.04	14	162	17.4	0.13	0.58	1.79
11/14/2009 1:15	42.9353	-111.194	1.6	Mc IE	151.44	12.3	18	125	18.6	0.1	0.52	1.88
11/14/2009 4:26	44.3515	-114.05	1.0	ML IE	128.1	5.03	6	255	51.6	0.11	4.63	15.51
11/14/2009 6:14	44.3428	-114.043	0.9	ML IE	127.07	5.01	5	220	51	0.09	2.64	14.54
11/14/2009 7:03	44.3305	-114.055	2.1	Mc IE	127	7.43	12	119	51.9	0.29	1.66	3.41
11/14/2009 9:10	44.4025	-114.105	2.1	Mc IE	135	10	14	259	56.7	0.22	4	31.61
11/14/2009 19:29	43.6455	-113.803	1.9	Mc IE	82.24	2.36	17	123	26.3	0.09	0.5	1.53
11/14/2009 19:32	43.6572	-113.806	1.3	Mc IE	82.47	1.5	8	164	26.7	0.04	0.76	3.33
11/14/2009 21:13	43.644	-113.781	0.7	Mc IE	80.46	5	5	159	24.6	0.15	2.48	5.65
11/15/2009 0:05	42.7845	-111.553	0.6	Mc IE	138.75	3.6	3	293	20.1	0.07	2.83	13.09
11/15/2009 10:10	42.6303	-111.389	2.6	ML IE	160.35	9.29	24	113	28	0.09	0.35	1.58
11/15/2009 10:16	42.6493	-111.386	1.1	ML IE	159.03	2.49	9	149	26.7	0.23	1.1	22
11/15/2009 10:41	44.5988	-112.412	1.0	Mc IE	109.64	9.79	5	166	1.6	0.03	2.19	2.11
11/15/2009 21:32	42.9355	-111.192	1.1	Mc IE	151.55	12.12	8	128	18.7	0.06	0.67	3.51
11/18/2009 7:21	42.8658	-111.38	0.8	ML IE	143.44	9.46	9	222	8.7	0.07	1.47	1.89
11/18/2009 10:09	43.4577	-113.581	0.8	ML IE	67.91	17.36	10	151	1.1	0.13	0.62	0.34
11/18/2009 21:42	42.5667	-111.531	1.5	Mc IE	157.81	10.39	12	151	41.6	0.12	0.68	2.4
11/18/2009 22:25	42.5867	-111.558	1.5	ML IE	154.69	5	13	97	40.6	0.1	0.48	10.94
11/18/2009 22:47	42.6007	-111.506	1.3	ML IE	156.26	5	4	309	37.9	0.15	10.99	14.53
11/18/2009 22:49	42.5662	-111.505	1.1	ML IE	159.19	4.97	5	164	39.9	0.03	0.81	11.6
11/18/2009 22:50	42.5788	-111.53	1.8	ML IE	156.83	3.2	18	101	40.8	0.17	0.54	13.99
11/18/2009 23:22	42.569	-111.532	1.6	ML IE	157.53	12	15	101	41.6	0.14	0.86	3.28
11/18/2009 23:29	44.649	-111.91	1.8	Mc IE	131.24	10.13	19	139	21.3	0.08	0.43	1.56
11/18/2009 23:42	42.5722	-111.524		NM	157.69	2.35	7	151	41.5	0.09	1.21	10.18

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
11/18/2009 23:56	42.607	-111.542	1.1	ML IE	153.77	14.25	8	154	38.1	0.14	3.3	7.8
11/19/2009 20:11	44.3428	-113.954	1.7	Mc IE	121.44	4.95	8	255	43.9	0.07	3.72	13.61
11/20/2009 11:03	43.217	-110.925	0.9	Mc IE	157.87	2.26	10	265	17.2	0.03	1.16	11.94
11/22/2009 6:09	43.37	-111.156	0.6	ML IE	135.14	9.94	7	169	13.5	0.01	0.71	3.36
11/22/2009 10:58	43.2012	-111.425	0.3	ML IE	120.7	2.78	4	222	17	0.05	7.31	11.57
11/23/2009 8:19	43.4982	-110.862	0.6	Mc IE	156.05	12.45	7	217	7.3	0.09	9.56	6.14
11/23/2009 8:45	42.6385	-111.381	0.7	ML IE	160.16	4.96	6	297	27	0.06	2.48	11.4
11/23/2009 17:02	42.8465	-111.377	1.0	Mc IE	144.98	2.4	7	230	10.8	0.11	2.17	14.94
11/23/2009 19:11	44.4717	-112.091	2.0	Mc MB	106.91	13.23	19	75	23.1	0.04	0.41	0.65
11/23/2009 19:26	44.4728	-112.096	1.2	Mc IE	106.81	9.21	13	109	22.9	0.04	0.55	2.88
11/24/2009 17:37	42.7915	-111.474	1.0	Mc IE	142.89	7.74	8	276	16.8	0.1	2.45	2.78
11/24/2009 23:41	43.5158	-111.131	0.4	ML IE	134.18	9.85	8	171	14.9	0.07	0.61	1.97
11/26/2009 2:06	44.5895	-114.121	2.1	Mc IE	149.59	0.04	11	121	64.8	0.21	1.24	9.59
11/26/2009 2:39	42.8902	-111.269	1.6	Mc IE	149.14	10.14	17	159	13.6	0.11	1.23	2.63
11/26/2009 19:25	43.2298	-111.167	0.7	Mc IE	138.9	9.9	9	154	18.1	0.06	0.54	3.33
11/27/2009 6:22	42.8863	-111.272	1.2	ML IE	149.15	9.98	14	163	13.5	0.06	0.92	2.02
11/27/2009 10:03	43.4298	-111.002	0.6	Mc IE	145.92	6.39	7	130	7.9	0.01	0.68	1.93
11/27/2009 10:27	44.6252	-112.425	1.9	Mc IE	112.22	9.72	22	90	4.3	0.1	0.82	0.81
11/27/2009 20:20	43.4633	-111.027	0.4	ML IE	143.37	9.31	8	118	6.8	0.05	0.56	1.55
11/28/2009 9:57	44.4185	-114.093	2.2	Mc MB	135.35	3.32	18	127	56.1	0.13	1.78	15.18
11/28/2009 18:12	44.4347	-114.098	1.3	ML IE	136.78	7.15	6	128	56.9	0.16	1.61	6.91
11/29/2009 9:00	43.4602	-111.014	0.0	Mc IE	144.42	11.3	6	115	6.1	0.07	0.74	1.59
11/29/2009 23:02	44.574	-112.086	2.2	Mc IE	116.94	12.24	31	88	24.6	0.06	0.34	0.63
11/30/2009 3:59	42.891	-111.61	0.7	Mc IE	127.22	5	3	261	16.3	0.02	2.75	9.37
11/30/2009 8:31	42.7595	-111.547	0.5	ML IE	141.07	9.85	5	336	22.3	0.16	8.47	3.15
11/30/2009 15:38	44.5728	-112.087	1.8	Mc IE	116.78	12.77	17	88	24.5	0.06	0.56	0.9
11/30/2009 17:33	42.8978	-111.255	0.7	Mc IE	149.59	4.91	5	150	14.3	0.07	1.55	9.95
11/30/2009 17:36	42.8837	-111.271	0.9	ML IE	149.44	9.82	8	164	13.7	0.04	0.94	2.83
11/30/2009 17:36	42.8723	-111.276	0.6	ML IE	149.82	14.59	5	173	14	0.02	2.46	2.64
11/30/2009 17:37	42.8957	-111.253	0.4	ML IE	149.83	4.96	4	167	14.5	0.01	1.92	10.02
12/2/2009 13:15	42.791	-111.283	0.7	ML IE	154.81	5.2	4	247	15.2	0.03	3.54	10.5
12/2/2009 17:20	43.4808	-110.858	0.7	Mc IE	156.56	9.58	11	123	7.6	0.08	0.52	1.51
12/2/2009 17:22	43.4828	-110.872	0.0	Mc IE	155.44	13.3	6	117	6.4	0.07	0.64	2.48
12/3/2009 8:18	43.6573	-110.897	0.7	Mc IE	152.09	7.77	7	124	10.7	0.03	0.49	2.57
12/4/2009 2:37	43.2795	-110.875	0.7	Mc IE	159.73	4.57	8	271	9.4	0.06	1.65	4.3
12/4/2009 3:54	44.782	-112.347	3.4	Mc MB	130.67	15.82	37	106	21.3	0.12	0.44	0.76
12/4/2009 4:02	44.777	-112.343	1.5	Mc MB	130.22	15.75	14	171	20.8	0.06	0.64	0.55
12/4/2009 11:33	44.7958	-112.373	0.7	Mc MB	131.61	7.33	7	160	22.6	0.05	3.24	11.5
12/4/2009 11:53	42.9863	-111.068	0.7	Mc IE	157.45	4.98	7	159	24.7	0.03	0.9	11.28
12/4/2009 22:53	44.7893	-112.351	2.0	Mc IE	131.37	15.45	19	107	22	0.07	0.49	0.48
12/5/2009 8:28	43.9115	-114.095	1.9	Mc IE	109.5	10.89	7	197	46.2	0.05	0.98	11.21
12/9/2009 11:24	44.1787	-110.98	1.1	ML IE	156.27	34.61	14	117	16.3	0.07	0.66	0.92
12/10/2009 5:14	42.8717	-111.261	0.9	ML IE	150.82	16.56	6	182	17.7	0.03	4.18	4.83
12/11/2009 0:34	44.0993	-113.961	1.9	Mc IE	107.02	6.83	12	163	50.3	0.16	1.14	5.01
12/11/2009 1:11	44.114	-113.964	2.0	Mc IE	107.98	7.36	11	212	49.7	0.09	1.12	4.62
12/11/2009 1:51	44.088	-113.933	2.0	Mc IE	104.42	7.15	11	205	48.9	0.07	0.67	13.83
12/11/2009 2:25	44.1237	-113.989	0.3	ML IE	110.28	7.27	4	216	51.1	0.1	2.35	15.16
12/11/2009 2:37	44.11	-113.987	1.7	Mc IE	109.44	6.08	10	198	51.6	0.05	0.83	4.11
12/11/2009 2:43	44.1137	-113.962	0.0	Mc IE	107.83	9.96	5	212	49.6	0.03	1.87	12.72
12/11/2009 2:44	44.119	-114.039	0.0	Mc IE	113.54	9.98	5	220	54.9	0.17	2.24	18.11
12/11/2009 3:05	44.8225	-112.807	1.2	Mc MB	130.46	6.62	5	177	3.4	0	3.22	0.97

ORIGIN TIME	LAT N	LONG W	MAG	-TYPE	DIST	Z	NO	GAP	DMIN	RMS	ERH	ERZ
12/11/2009 3:53	44.101	-113.954	1.7	Mc IE	106.63	10.01	6	209	49.7	0.04	1.25	12.82
12/11/2009 4:13	44.131	-113.934	0.7	ML IE	106.78	9.81	6	212	46.7	0.02	1.36	12.54
12/11/2009 4:26	44.1012	-113.95	2.4	Mc IE	106.34	6.86	16	162	49.4	0.08	0.78	6.52
12/11/2009 5:25	44.1205	-113.975	1.8	Mc IE	109.11	3.07	10	214	50.2	0.09	1.24	4.11
12/11/2009 6:45	44.091	-113.952	1.4	Mc IE	105.96	7.21	5	207	50.1	0.18	3.14	19.23
12/11/2009 10:09	44.0822	-113.931	2.2	Mc MB	104.02	6.91	19	191	49.1	0.33	0.89	4.83
12/11/2009 13:12	44.0952	-113.955	1.2	Mc IE	106.37	6.91	4	209	50	0.16	2.74	17.99
12/12/2009 12:07	43.0803	-111.111	0.9	Mc IE	149.53	16.53	7	205	21.3	0.09	3.43	1.09
12/12/2009 22:18	42.6588	-111.394	2.0	Mc IE	157.84	7.49	16	179	31.1	0.08	1.26	3.08
12/13/2009 13:59	44.8308	-112.851	1.6	Mc IE	131.48	7.85	10	160	0.4	0.04	1.58	0.47
12/13/2009 20:50	44.8277	-112.833	1.4	Mc MB	131.08	15.11	7	109	1.3	0.08	0.99	1.2
12/14/2009 0:04	44.8222	-112.814	1.0	Mc MB	130.43	7.33	6	176	2.8	0.03	4.54	2.04
12/14/2009 0:05	44.83	-112.846	2.0	Mc MB	131.37	7.52	13	156	0.4	0.04	0.86	0.49
12/14/2009 9:02	44.838	-112.847	2.0	Mc IE	132.26	8.48	11	160	1.2	0.05	0.97	0.51
12/14/2009 19:56	44.8258	-112.755	1.3	Mc IE	130.83	2.08	7	120	7.4	0.15	1.02	1.75
12/16/2009 5:09	44.3118	-113.14	1.1	Mc IE	78.98	2.61	5	172	15.9	0.02	0.97	4.19
12/17/2009 16:01	44.4245	-113.919	1.7	Mc IE	125.31	5.79	9	254	42.8	0.08	3.83	14.04
12/17/2009 23:52	44.8267	-112.835	2.5	Mc IE	130.98	7.87	23	100	1.1	0.05	0.46	0.41
12/18/2009 21:54	44.7793	-112.752	1.2	Mc IE	125.66	11.55	4	187	9.4	0	3.6	3.27
12/19/2009 1:03	43.2187	-110.935	1.2	Mc IE	157.03	14.81	9	201	17.3	0.04	1.06	2.8
12/19/2009 3:52	43.2218	-110.956	0.9	Mc IE	155.35	8.21	7	198	17.7	0.05	1.8	3.67
12/19/2009 15:19	44.7848	-112.326	2.0	Mc IE	131.43	7.72	16	109	41.7	0.05	0.36	1.82
12/22/2009 9:31	44.1523	-113.95	1.5	Mc IE	109.13	5	6	199	47	0.02	0.9	11.92
12/26/2009 3:22	44.2512	-114.064	1.1	Mc IE	122.64	2.11	5	140	53	0.14	1.27	13.3
12/26/2009 7:26	43.8812	-113.727	2.8	Mc MB	80.21	10	13	150	35.3	0.12	0.73	12.96
12/26/2009 7:28	43.8868	-113.725	1.4	Mc IE	80.23	7.69	9	151	22.4	0.1	0.66	11.19
12/26/2009 7:33	43.8892	-113.728	1.1	Mc IE	80.59	7.56	7	151	22.6	0.14	0.99	14.86
12/26/2009 7:47	43.8807	-113.732	0.6	ML IE	80.54	7.32	7	150	23.1	0.12	0.96	14.42
12/26/2009 8:21	43.8928	-113.734	1.2	Mc IE	81.18	7.12	7	152	23	0.1	1.7	14.58
12/26/2009 9:31	43.8905	-113.733	1.2	Mc IE	81.01	6.7	7	152	23	0.11	1.22	13.82
12/26/2009 18:51	44.543	-114.349	2.0	Mc IE	159.9	0.16	13	172	79.4	0.3	1.39	11.83
12/26/2009 23:05	43.8852	-113.74	1.2	Mc IE	81.34	4.92	6	152	23.6	0.11	0.96	2.07
12/27/2009 5:50	43.887	-113.742	0.9	Mc IE	81.56	4.8	6	152	23.7	0.09	0.87	1.88
12/27/2009 16:20	43.8888	-113.729	1.1	Mc IE	80.65	7.35	7	151	22.7	0.13	0.84	13.41
12/28/2009 0:48	43.887	-113.749	1.2	Mc IE	82.11	3.7	7	154	24.3	0.07	0.87	1.45
12/28/2009 1:22	43.8812	-113.72	1.1	Mc IE	79.68	5.96	9	149	22.1	0.18	0.95	2.07
12/28/2009 1:33	43.8855	-113.724	1.2	Mc IE	80.15	6.07	8	150	22.4	0.11	0.74	1.76
12/28/2009 1:43	43.8913	-113.734	1.4	Mc IE	81.12	4.34	10	152	23	0.11	0.83	1.94
12/28/2009 6:19	43.8827	-113.733	1.6	Mc IE	80.74	5.89	12	151	23.1	0.08	0.5	1.08
12/28/2009 6:24	43.88	-113.732	0.9	Mc IE	80.56	9.28	7	150	35.5	0.09	1.39	13.36
12/28/2009 16:12	43.3178	-110.93	1.1	Mc IE	154.3	5.78	12	296	8	0.08	1.02	1.36
12/28/2009 23:55	42.6882	-111.309	0.7	ML IE	160.61	10.09	6	309	19.1	0.13	4.39	2.49
12/29/2009 1:20	44.441	-112.421	1.3	Mc MB	92.65	12.35	10	98	17.1	0.03	0.8	0.91
12/29/2009 8:22	44.8375	-112.828	1.0	Mc IE	132.16	6.81	5	140	2	0.05	1.19	0.66
12/29/2009 12:47	43.7625	-111.043	0.7	Mc IE	140.71	2.53	11	173	13.9	0.08	0.72	10.33
12/29/2009 18:08	43.772	-110.803	0.7	ML IE	160.07	13.17	9	184	17.7	0.03	1.17	2.87
12/30/2009 14:43	43.4213	-110.89	1.4	Mc IE	155.05	9.1	12	182	7.2	0.05	0.91	2.19
12/31/2009 13:05	43.7278	-111.245	1.1	Mc IE	124.22	2.5	8	224	20.2	0.26	2.52	22.5
12/31/2009 22:20	44.8335	-112.839	1.2	Mc IE	131.74	7.21	5	147	1	0.02	1.41	0.52
12/31/2009 23:44	44.4482	-113.991	1.4	Mc IE	131.32	3.44	6	225	49.1	0.05	2.4	9.73