Seismicity

Spurr

September-October:
There were a total of 20 earthquakes located in the Spurr region during September-October 1999 (figs. 8a, 29a and 30a). The largest of these events had a magnitude of M_L=1.5 and was located 28 km south of Spurr. Seven earthquakes were located within 10 km of the summit. The largest of the "proximal" events had a magnitude of M_L=0.7 and was located 1 km north of the summit. It had a hypocentral depth of 1 km. The number of proximal events located during this two-month period was about half the number of such events located during July-August. This value was also much lower than the number of proximal earthquakes (16) events predicted from the 5-year Spurr mean seismicity rate. The relatively low number of located earthquakes in the Spurr region was probably due to a number of short-term station outages that plagued the Spurr network during this two-month period. Because of their relatively large distance from Spurr and/or Crater Peak, the remaining 13 more distally located earthquakes were probably regional tectonic events and were not related to volcanic activity at Spurr.

November-December:
Fifteen earthquakes were located in the Spurr area during November-December 1999 (figs. 8b, 29b and 30b) . The largest earthquake had a magnitude of M_L=1.5 and was located 18 km south-southwest of Spurr. Three earthquakes were located within 10 km of the summit. The largest of these proximal events had a magnitude of M_L=0.7 and was located 1 km north-northeast of the summit and had a hypocentral depth of 4 km. The number of located proximal events in November-December was considerably lower than that of September-October as well as the number of such events predicted from the mean seismicity rate. Short-term station and circuit outages also occurred during November-December. Once again this is probably the reason for the much lower number of located proximal events than one would expect based upon the 5-year mean seismicity rate. The remaining 12 located earthquakes were, for the most part, located relatively far away from the Spurr and Crater Peak volcanic centers; these events were probably tectonic earthquakes unrelated to volcanic activity in this area.

Strandline Lake Region

September-October:
During September-October 1999 there were a total of 22 earthquakes, the largest of which had a magnitude of M_L=1.9, located in the Strandline Lake region (fig. 9a). This event was located about 9 km west of station STLK. Twenty-two Strandline Lake events were also located in this region during the previous two-month period. This persistent swarm of seismicity has continued to remain active since it was first observed during the Autumn of 1996.

November-December:
A total of 13 earthquakes were located in the Strandline Lake region during November-December 1999 (fig. 9b). The largest of these events had a magnitude of M_L=1.5 and was located 12 km west-southwest of station STLK. The number of located Strandline Lake events was lower than that of the previous two-month period and could also be a reflection of the station/circuit outages of the Spurr seismic network.

Redoubt

September-October:
During September-October 1999 there were a total of 13 earthquakes located in the Redoubt region (figs. 10a, 29a and 30a). The largest such event had a magnitude of M_L=1.6 and was located 15 km north of the summit of Redoubt. A total of eight earthquakes were located within 10 km of the summit of Redoubt. The largest of these events had a magnitude of M_L=0.9 and was 7 km northwest of the summit at a hypocentral depth of 3 km. The number of proximal events located during September-October was much greater than that for July-August (i.e. 8 vs. 2). Several of the Redoubt stations were out for much of July (i.e. July 1-22) following a lightning strike of the repeater site at Sterling on June 19. This may account for much of the apparent increase in activity between July-August and September-October. The number of proximal events located during September-October was, however, about half the number predicted from the mean seismicity rate. The lower than expected value may have been the result of the rather intermittent operation of station RED during this two-month period. The five more distally located earthquakes plotted on the seismicity map were probably regional tectonic events and not related to volcanic activity at Redoubt.

November-December:
Four earthquakes were located in the Redoubt area during November-December 1999 (figs. 10b, 29b and 30b) . The largest Redoubt event had a magnitude of M_L=1.0 and was located about 15 km east-northeast of Redoubt. The remaining three events were located within 10 km of the summit of Redoubt. The largest of these events had a magnitude of M_L=0.7 and was located about 8 km northwest of the summit at a hypocentral depth of about 5 km. The number of proximal events located during November-December was much lower than both that of the previous two-month period and the number of such events predicted from the mean seismicity rate. As was the case during September-October, there were also station outages during November-December. These station outages probably accounted for the relatively low number of events located in the Redoubt area during this two-month period.

Iliamna

September-October:
During September-October 1999 there were 10 earthquakes located in the Iliamna region (figs. 11a, 29a and 30a). The largest had a magnitude of M_L=1.4. There were two events of this size. One was located 17 km south of Iliamna and the other was located nearly 27 km northeast of Iliamna. Due to their relatively great distances from Iliamna, these earthquakes are almost certainly regional tectonic events and not related to volcanic activity at Iliamna. The remaining eight earthquakes were all located within 2 km of the summit of Iliamna and thus may reflect volcanic activity there. The largest of these Iliamna events had a magnitude of M_L=1.1, was located 1 km northeast of the summit and had a shallow hypocentral depth. The number of local Iliamna events located during this two-month period was nearly the same as that for July-August in which seven such events were located. The number of Iliamna events located during September-October was, however, half the number predicted from the mean seismicity rate.

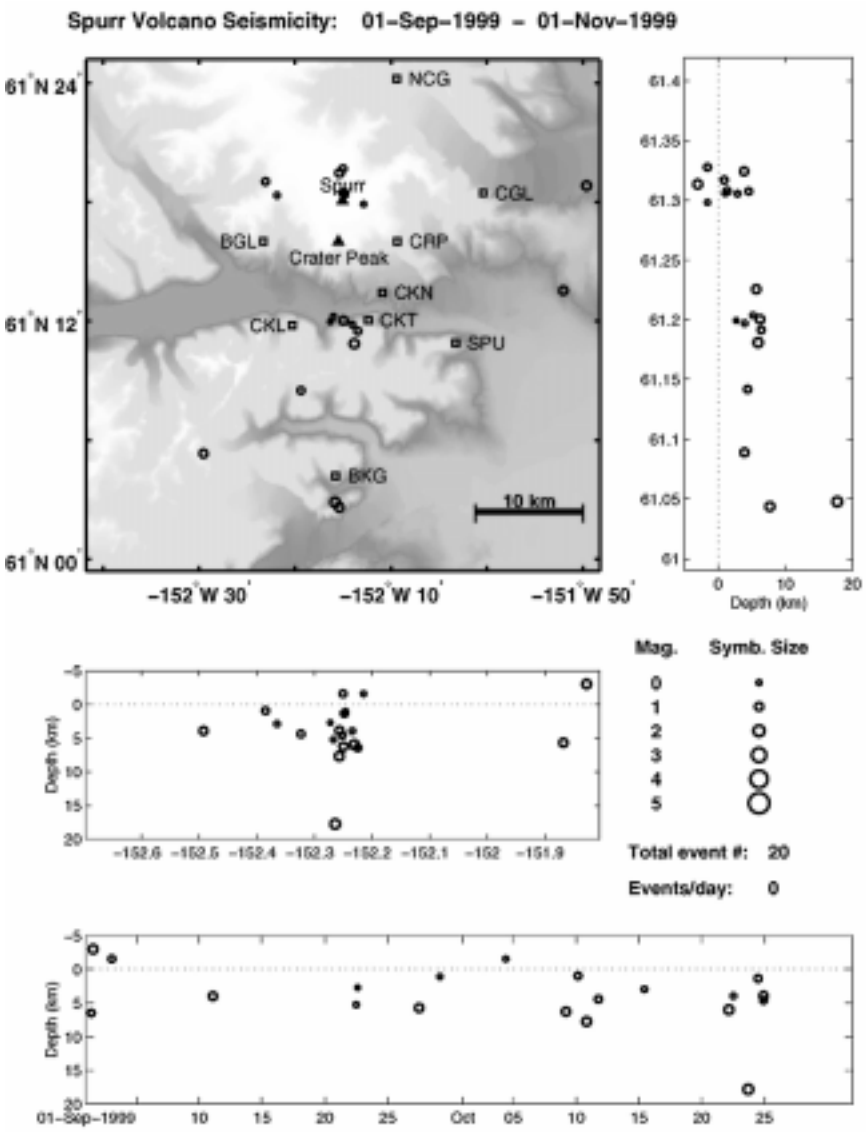

Figure 8a: Locatable Spurr seismic events in space and time for September through October.

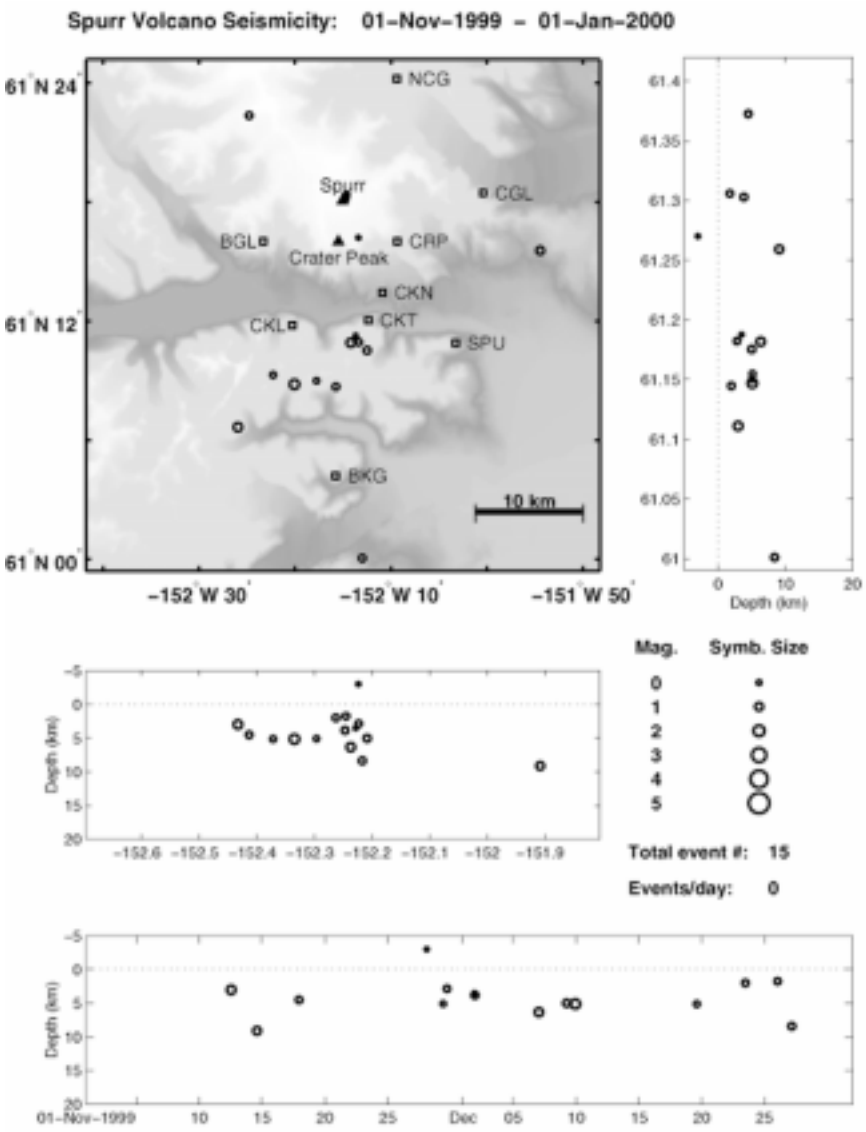

Figure 8b: Locatable Spurr seismic events in space and time for November through December.

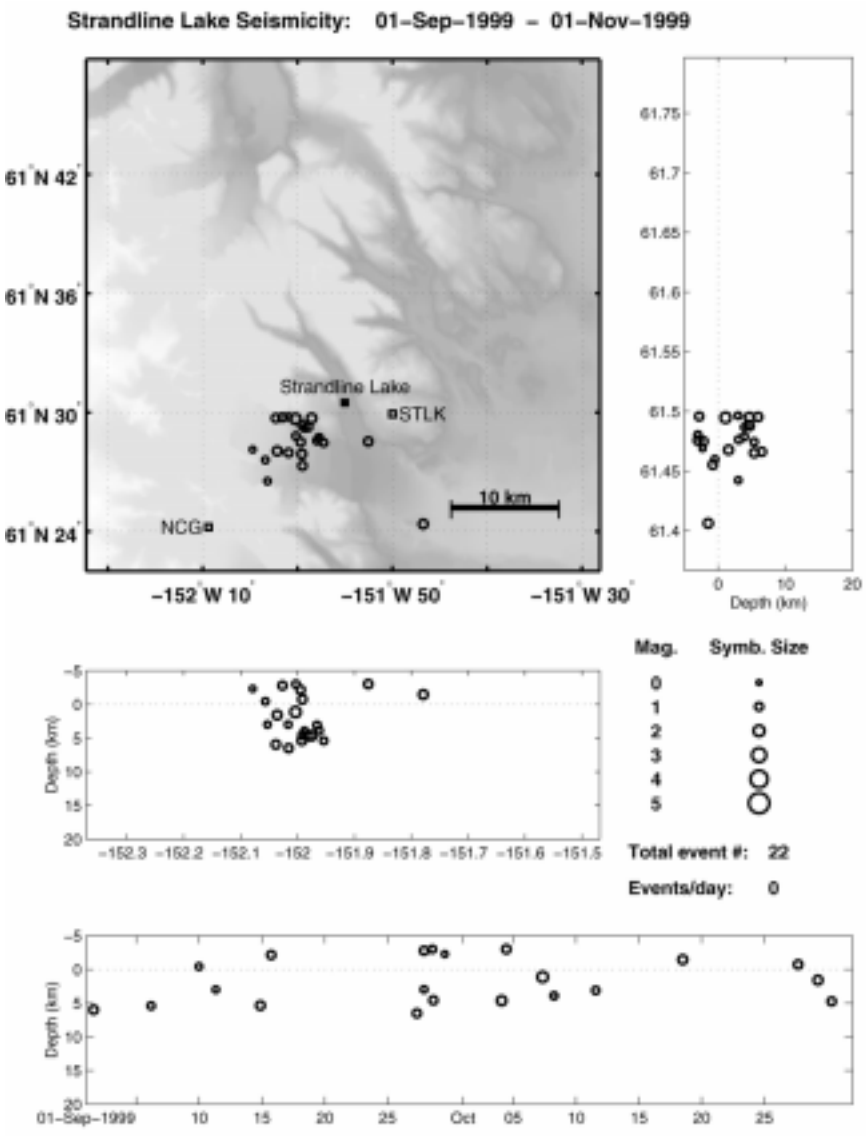

Figure 9a: Locatable Strandline Lake seismic events in space and time for September through October.

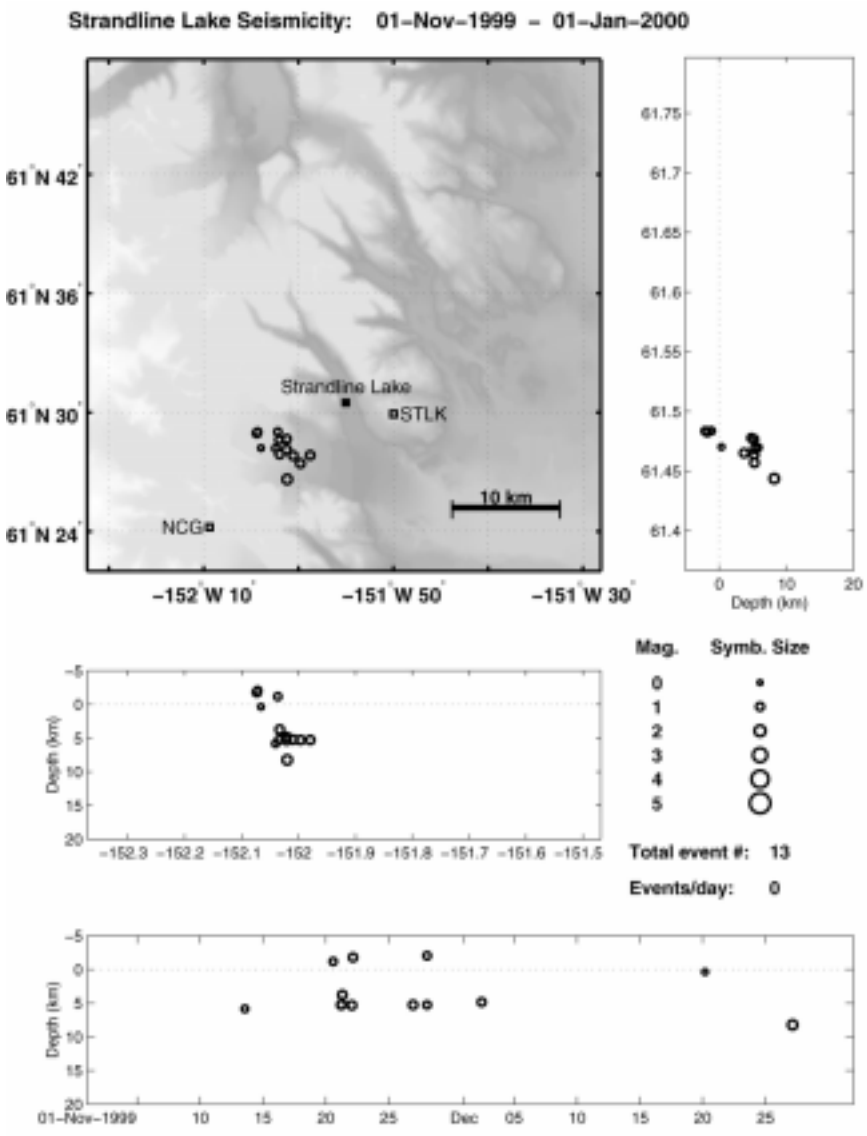

Figure 9b: Locatable Strandline Lake seismic events in space and time for November through December.

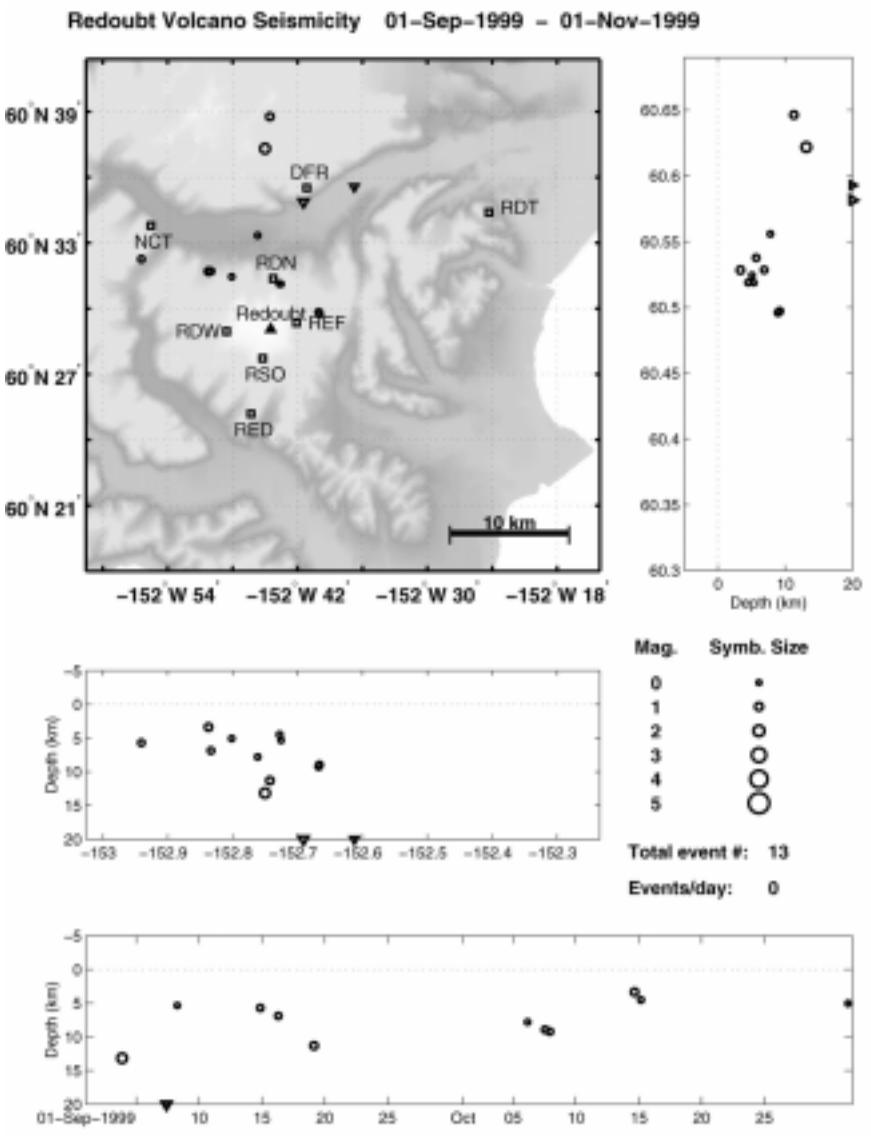

Figure 10a: Locatable Redoubt seismic events in space and time for September through October.

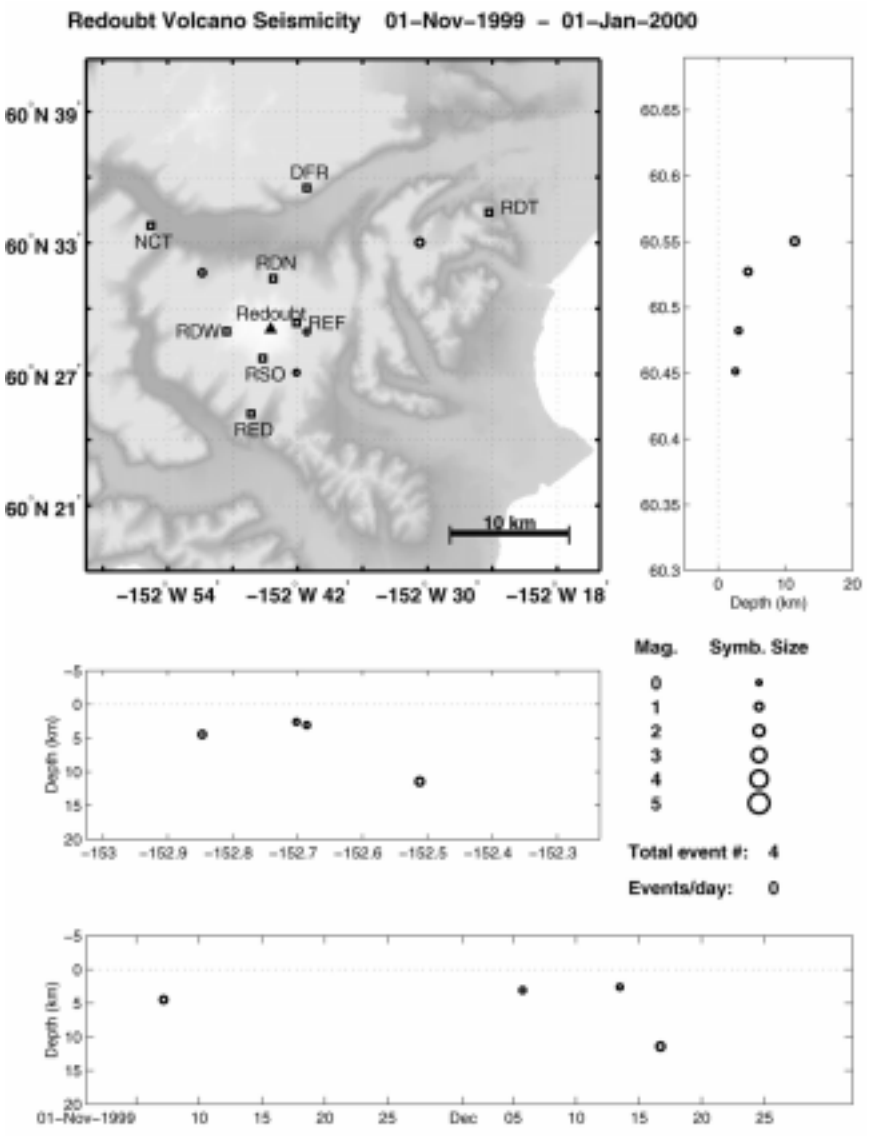

Figure 10b: Locatable Redoubt seismic events in space and time for November through December.

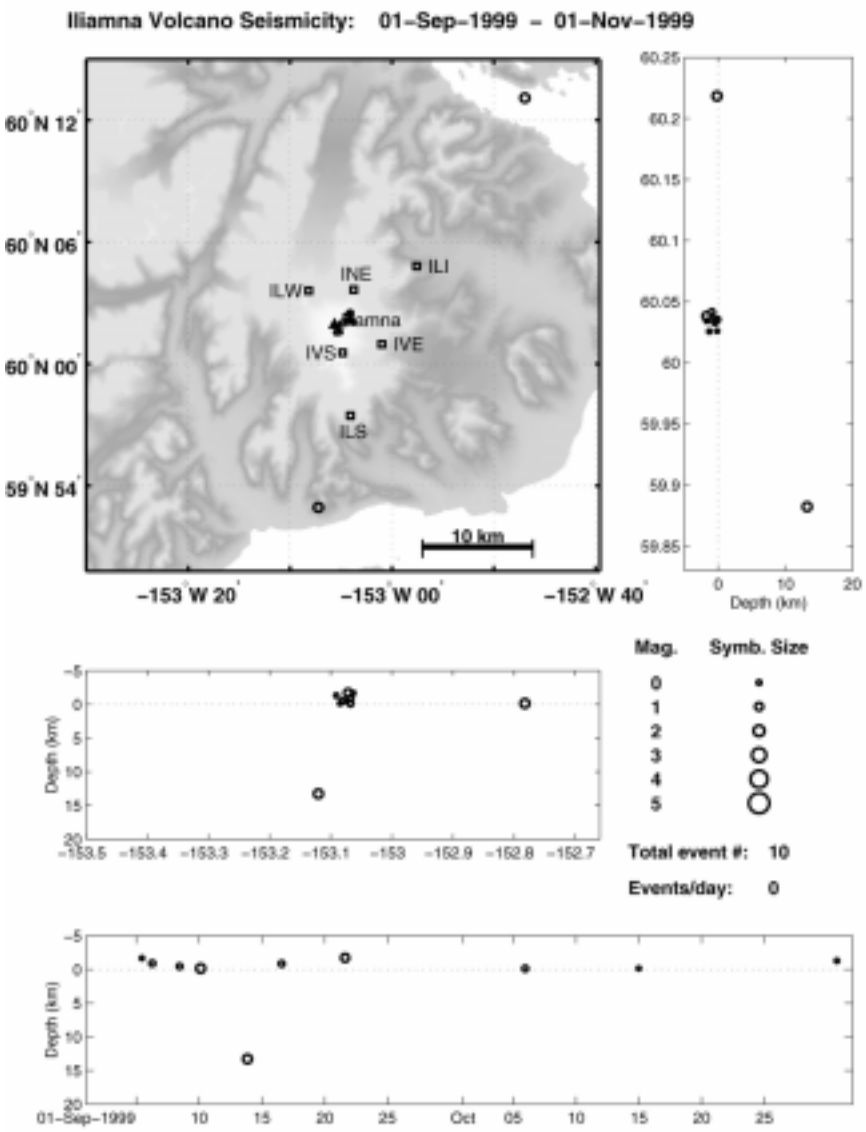

Figure 11a: Locatable Iliamna seismic events in space and time for September through October.

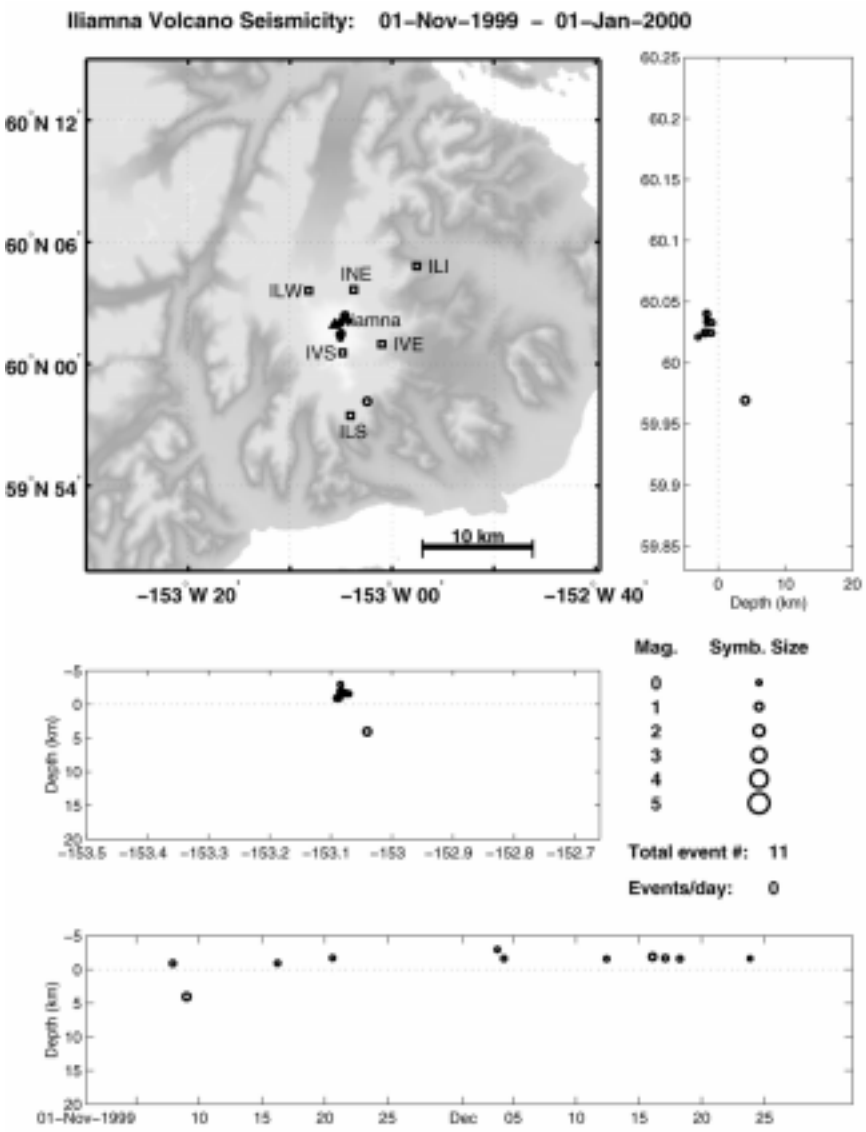

Figure 11b: Locatable Iliamna seismic events in space and time for November through December.

November-December:

A total of 11 earthquakes, the largest of which had a magnitude of M_L=0.9, were located in the Iliamna region during November-December 1999 (figs. 11b, 29b and 30b) . The magnitude M_L=0.9 event was located 8 km south-southeast of the summit of Iliamna and had a hypocentral depth of 4 km. This is an area which has been fairly active in the past although such activity has also been a bit sporadic. The remaining events were all located within 1 km of the summit and had shallow hypocentral depths. The number of Iliamna events located during this two-month period was greater than that for September-October and was also a little lower than the 14 located events one would expect from the Iliamna mean seismicity rate.

Augustine

September-October:

During September-October 1999, a total of 46 earthquakes were located in the Augustine region (figs. 12a, 29a and 30a). The largest Augustine earthquake located during this two-month period had a magnitude of M_L=1.1, was located 6 km west-southwest of the summit and had a shallow hypocentral depth. The location of this event is somewhat puzzling; it is very uncommon for Augustine seismicity to be located in this area. The waveform of this event was also different from that of typical Augustine events in that the S-wave appeared to be more distinct and with a much larger S-P time than is usually the case. The same can also be said of the second event. This was located just off the southern shore of Augustine Island ~4 km south of the summit. The occurrence of seismicity along the coast of Augustine Island, particularly the southern coast, has been observed several times in the past. However, in such cases these occurrences have always been in conjunction of periods extreme cold (for Cook Inlet) and are believed to be the result of the formation and/or movement of shore-ice. Such weather conditions did not exist in the Cook Inlet region during this two-month period. The exact nature of these two anomalous events remains unclear. The remaining 44 earthquakes were more typical of Augustine events and were all located in the summit region and had shallow hypocentral depths. The number of events located in the Augustine region during September-October was twice the number of such events located during July-August. The number of located events for September-October is , however, only half the number predicted from the mean seismicity rate.

November-December:

Thirty-four earthquakes were located in the Augustine region during November-December 1999 (figs. 12b, 29b and 30b) . As was usually the case, all of these earthquakes had shallow hypocentral depths. The largest event had a magnitude of M_L=1.1 and was located slightly south close to station AUI, 3 km south of the summit. Three other events were located along the southern shore of Augustine Island. All four of these events had waveforms characteristic of events suspected as being associated with the formation or movement of shore-ice. Late November and mid-December 1999 were periods of relatively cold weather in the Cook Inlet region. The epicentral locations and waveforms of these events plus the concurrent cold weather make a reasonable case for these four earthquakes being related to shore-ice processes. The remaining 30 Augustine events were located in the summit region. The largest such event had a magnitude of M_L=1.0 and was located beneath the summit of Augustine. The number of Augustine events located during this two-month period was much lower than that for September-October. This value is also less than half the 75 such events predicted from the Augustine mean seismicity rate.

Katmai/Valley of Ten Thousand Smokes Region

September-October:

A total of 188 earthquakes were located in the Katmai/Valley of Ten Thousand Smokes region during September-October 1999 (figs. 16a, 17a, 18a, 19a, 20a, 21a, 29a, and 30a). The largest of these events had a magnitude of M_L=2.5 and was located 2 km southeast of Novarupta at a hypocentral depth of 4 km. On the basis of epicentral distances the earthquakes were designated as being associated with a particular volcano if these distances were $\leq$ 5.0 km. In those cases in which two volcanoes are within 5 km of a volcano the earthquake is assigned to the closer of the two. A total of 111 earthquakes were assigned in this way. The number of events associated with each of the volcanoes is summarized in Table 1.

Table 1

Volcano/Region	July-August '99	September-October '99	November-December '99	Predicted from the Mean Seismicity Rate
Entire Map Area	211	188	133	168
Griggs	0	0	0	0
Katmai	11	17	10	18
Mageik	57	17	17	31
Martin	81	45	44	62
Martin/Mageik	138	62	61	93
Novarupta	32	21	20	26
Snowy Mountain	1	3	0	1
Stellar	0	0	2	——+
Trident	14	8	3	7
Not Assigned*	15	77	37	23x

\+ *There were insufficient data to estimate the Stellar mean seismicity rate.*

* *Events located > 5.0 km from any of the eight volcanoes listed in Table 1.*

x *This value was based upon the mean number of events within the map area and the mean rates of the various volcanoes. The mean rate of unassigned events is thus 11.4 events per month.*

The number of September-October events assigned to Martin and Mageik was much lower than that for July-August. This value was also lower than the number of such events predicted from the mean seismicity rate. The apparent lull in activity at Martin/Mageik during September-October appears to be real; it does not seem to be merely the result of station outages and/or telemetry problems. The number of events located near Novarupta was also lower than both the predicted and the July-August values. The number of events associated with Trident Volcano was nearly half that of July-August. This value was, however, quite close to the number of Trident events predicted from the mean seismicity rate. The number of located events in proximity to Katmai during September-

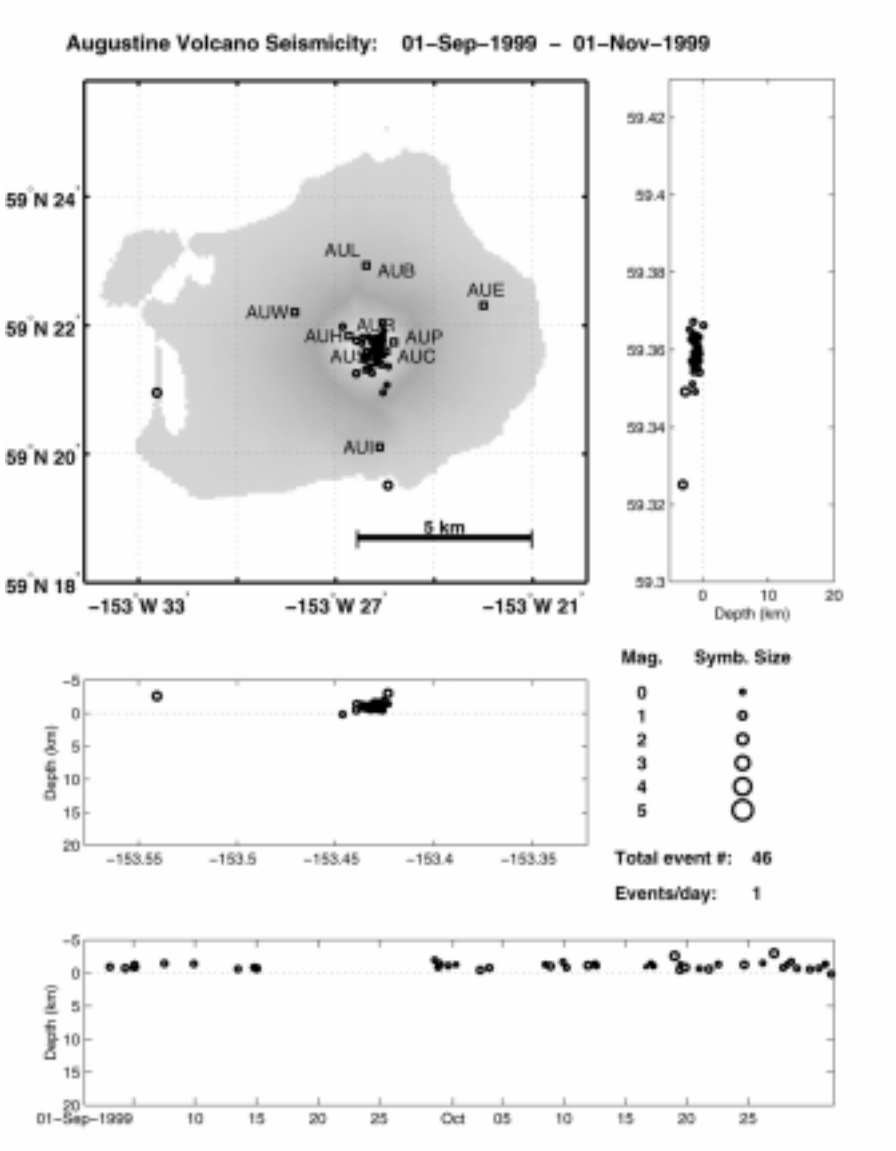

Figure 12a: Locatable Augustine seismic events in space and time for September through October.

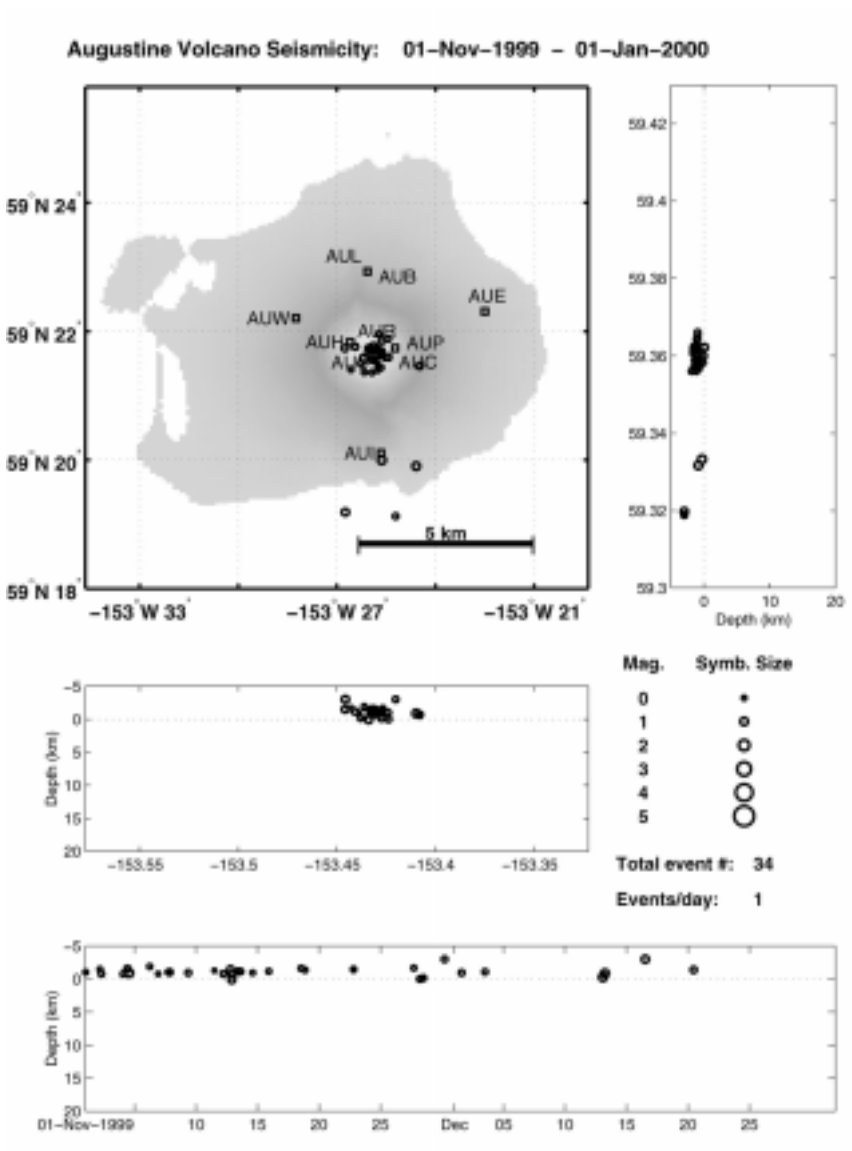

Figure 12b: Locatable Augustine seismic events in space and time for November through December.

October was a bit greater than the July-August value but was in agreement with the expected number of events based upon the mean seismicity rate. The three events located near Snowy Mountain during this two-month period also exceeded the corresponding July-August and predicted values (i.e. 1 event). A total of 77 earthquakes were not assigned to a volcano. Of the 77 unassigned events, 54 earthquakes were part of a swarm of events located ~20-24 km south of Snowy Mountain.

November-December:

One-hundred and thirty-three earthquakes, the largest of which had a magnitude of M_L=2.5, were located in the Katmai/Valley of Ten Thousand Smokes region during November-December 1999 (figs. 16b,17b, 18b, 19b, 20b, 21b, 29b, and 30b) . The M_L=2.5 event was located 25 km southwest of Kejulik (~47 km southwest of Martin) and had a hypocentral depth of 8 km. Because of its relatively great distance from known volcanic centers this event is probably not related to volcanic activity in the region and is simply a regional tectonic earthquake. The largest event located in proximity to one of the region's volcanoes had a magnitude of M_L=2.3 and was located ~2 km northeast of Martin and had a hypocentral depth of 8 km. As was the case with the data from the previous two-month period, the November-December earthquakes were assigned to the various volcanoes on the basis of epicentral distances and the results are summarized in Table 1. The number of earthquakes located in the Martin/Mageik area were virtually identical to that of September-October and thus was also much lower than the predicted values. The number of events assigned to Novarupta was also similar for these two time periods and was a bit lower than that predicted from the mean seismicity rate. The number of Katmai events for this two-month period was lower than the corresponding value for September-October as well as the predicted value. The same can also be said of the Trident earthquakes. No earthquakes were located in the Snowy Mountain area, less than both the number of such events located during September-October and the predicted number. Two earthquakes were located within 5 km of Stellar during November-December; these are the first events to have been assigned to Stellar thus far. A total of 37 events were not assigned to any of the volcanoes. In most cases these events were located well away from volcanoes and are, therefore, probably regional tectonic events not directly related to volcanic activity in this region. The swarm of regional events ~20-24 km south of Snowy Mountain that began during the previous two-month period continued, albeit at a much lower level. Six such events were located during this two-month period as opposed to the 77 earthquakes which occurred in the area during September-October.

During this time period there was a possible case of remotely triggered earthquakes within the Katmai/Valley of Ten Thousand Smokes region caused by the M_w=7.0 Kodiak Island earthquake of December 6, 1999. The epicentral location of this earthquake , its associated aftershock zone, and the NEIC moment tensor solution are shown in figure 13.

While the coda of this large event was still being recorded, small local earthquakes started showing up on the Katmai network. The signal from these local events were superimposed on the much larger signals of the mainshock as well as its aftershocks. Since the Katmai stations were only 90 km from the epicenter of the mainshock, these short-period stations were clipped for several minutes following the M_w=7.0 event. As such, clear arrivals were not present on a sufficient number of stations to allow many of these smaller Katmai events to be located. A total of 19 events were located in the Katmai/Valley of Ten Thousand Smokes region during December 6-7, 1999. The first such located event occurred 10 minutes after the onset of the mainshock. These events were located in the Martin/Mageik, the Novarupta and the Mount Katmai regions. Three events were also located ~4-6 km west of Mount Dennison (figure 14).

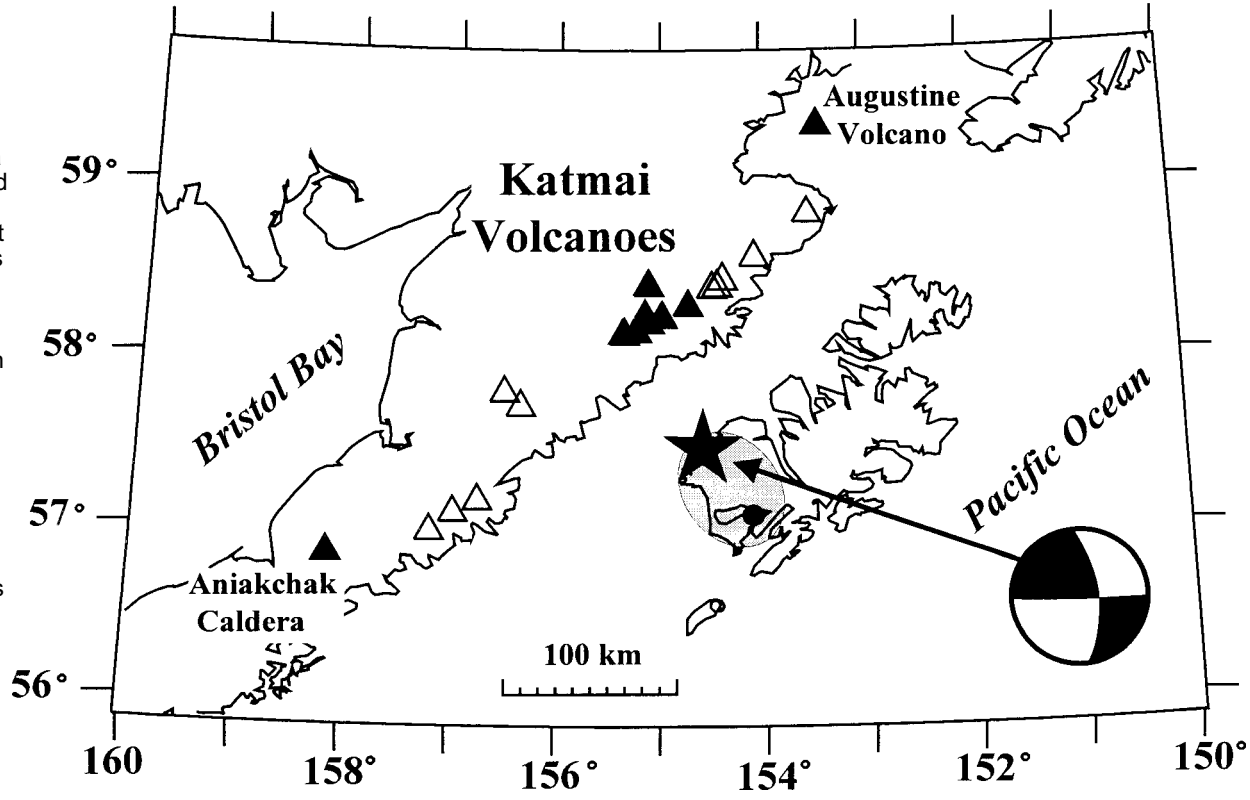

Figure 13: Map of eastern Alaska Peninsula showing location of M=7.0 December 6, 1999 Kodiak Island Earthquake and the Katmai Volcanoes. The shaded area indicates the approximate zone of located aftershocks (courtesy of AEIC) and the dot represents the location of the largest aftershock (6.5). The locations of individual volcanoes are shown as triangles in which the solid triangles indicate those volcanoes seismically monitored by the Alaska Volcano Observatory. The moment tensor solution as determined by the NEIC is shown in lower right.

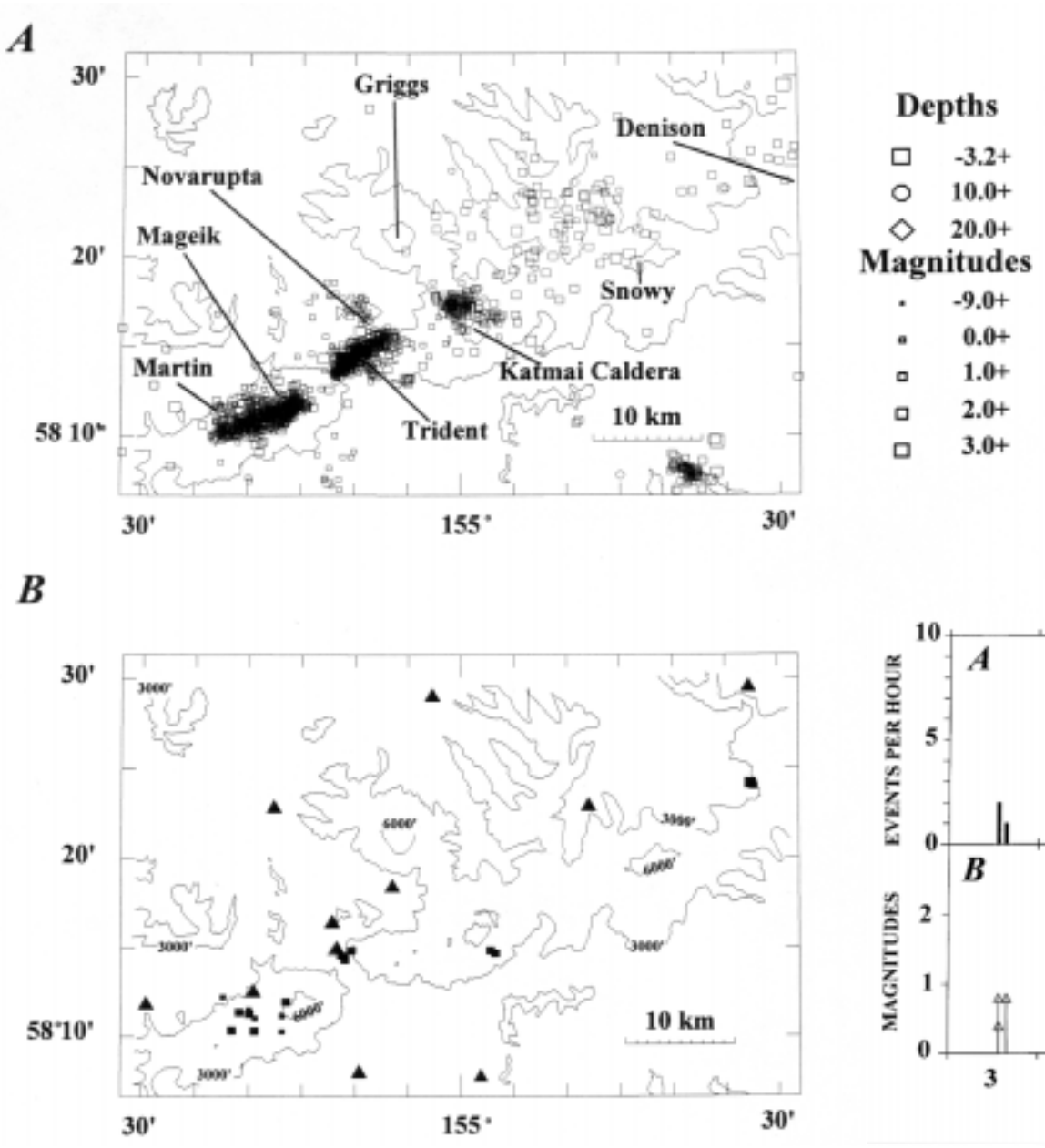

Figure 14a: Earthquake epicenters in the Katmai area from 1995 – 1999, only high quality solutions are shown. 14b: Remotely triggered epicenters observed on December 6 and 7, 1999 are shown as solid squares for visibility. Solid triangles show the locations of seismic stations in the Katmai area.

The magnitudes of these earthquakes were all within the normal range seen at the Katmai volcanoes and hypocenters were in areas that are normally seismically active. Nearly all were large enough to have triggered the acquisition system by themselves; our location of these events was not simply a case of the coincidental presence of local events within regional event triggers. The observed increased seismicity returned to background levels 8-13 hours after the mainshock (figure 15).

The fact that the onset of the increase in Katmai seismicity was within the coda of the mainshock and simultaneous increase in seismic activity beneath five separate volcanic centers strongly suggests that the observed increase in seismicity in the Katmai/Valley of Ten Thousand Smokes region was a case of remotely triggered seismicity. Similar cases of triggered seismicity have been noted elsewhere, most notably in numerous volcanic and geothermal areas throughout the western United States following the 1993 M_w=7.3 Landers earthquake. There was no increase in seismic activity observed at the more distant volcanoes monitored by AVO following or coincident with the M_w=7.0 Kodiak earthquake of December 6, 1999.

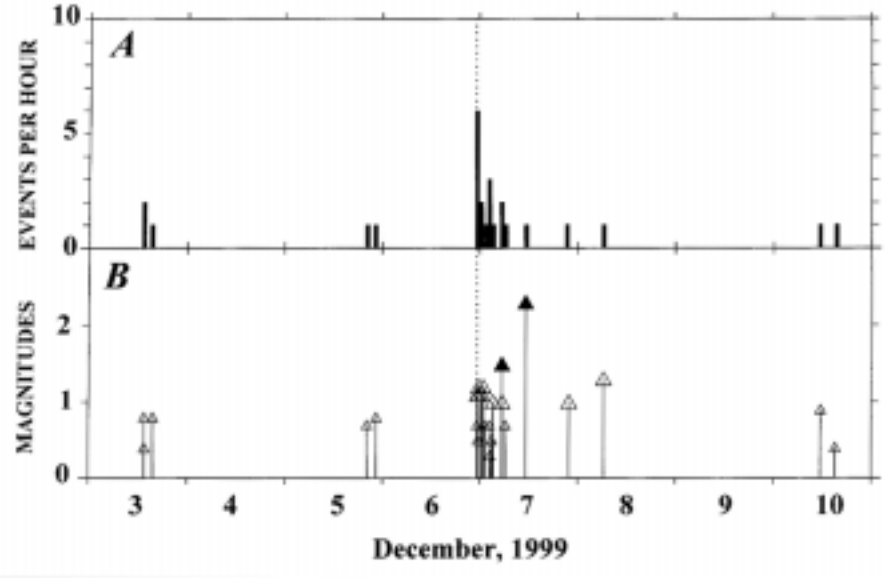

Figure 15: The number of earthquakes located per hour and 14b: magnitudes of located events triggered by Kodiak Island Earthquake. Solid symbols refer to the two events located near Mount Denison. The dotted line represents the approximate time of main shock (23:12 UT).

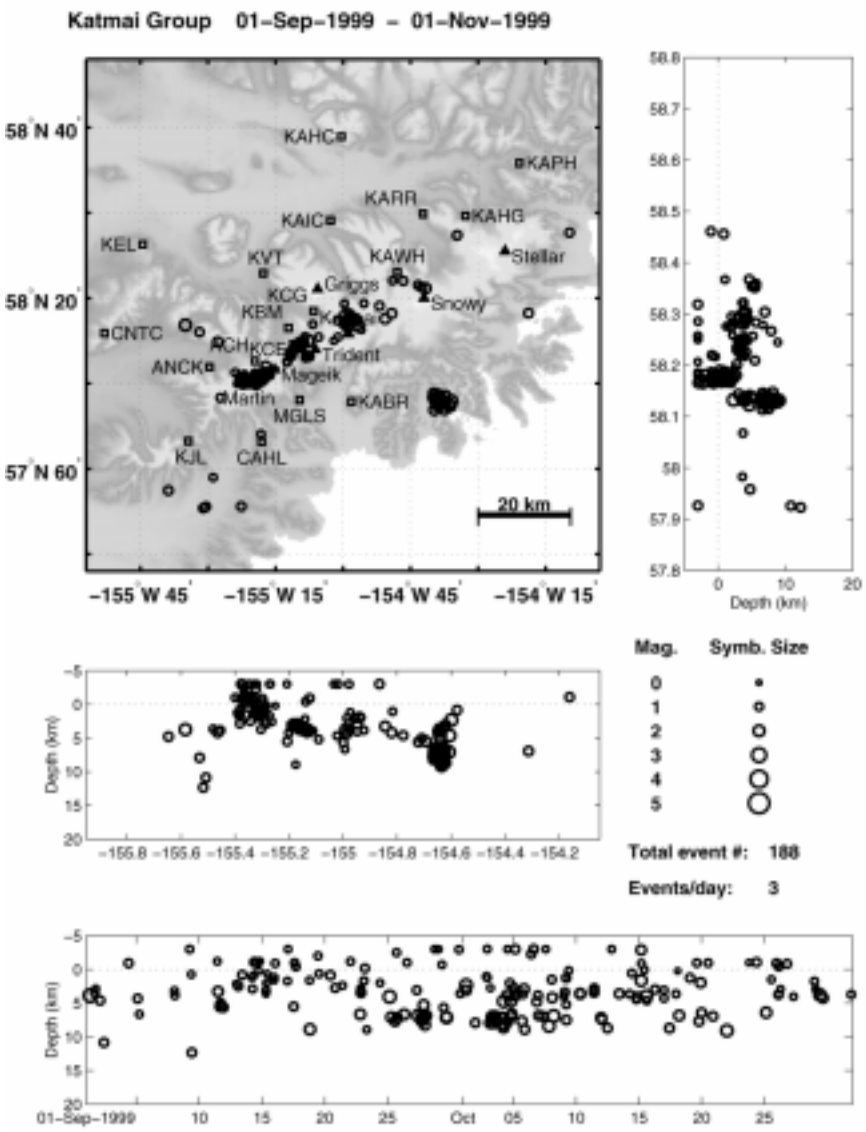

Figure 16a: Locatable Katmai Region seismic events in space and time for September through October.

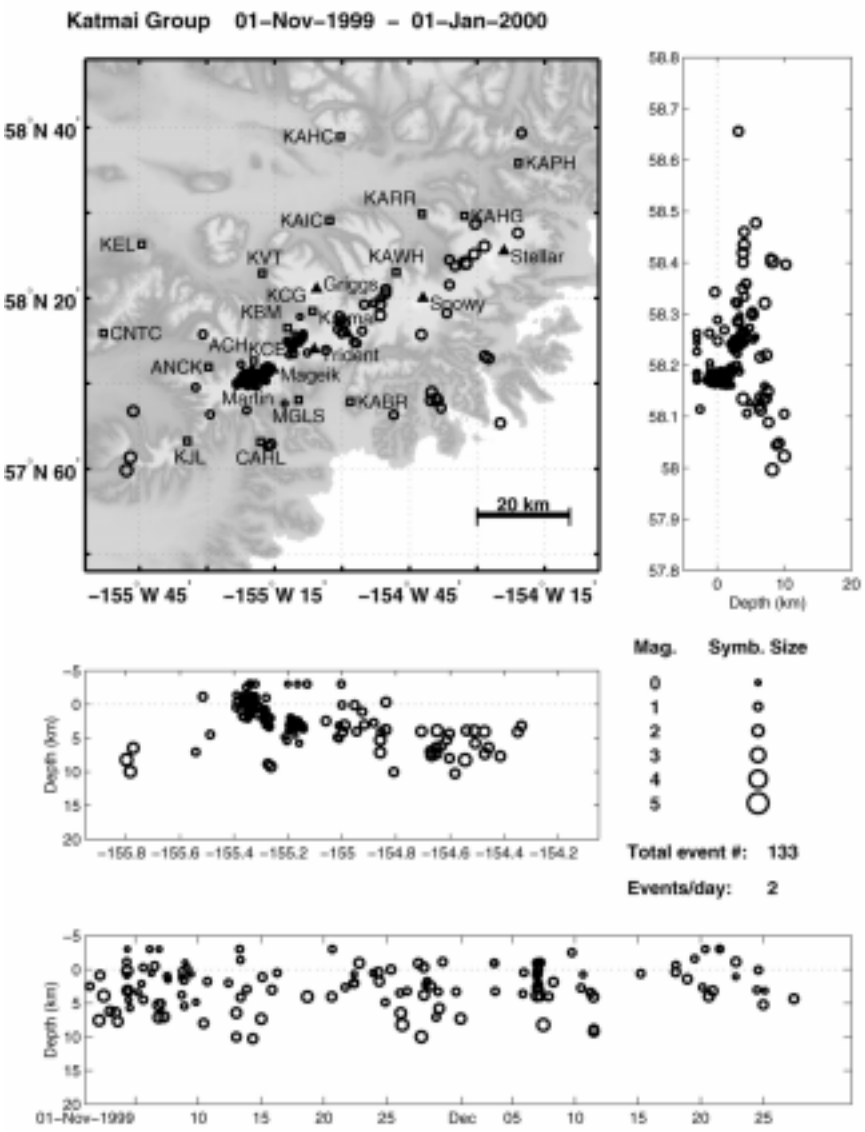

Figure 16b: Locatable Katmai Region seismic events in space and time for November through December.

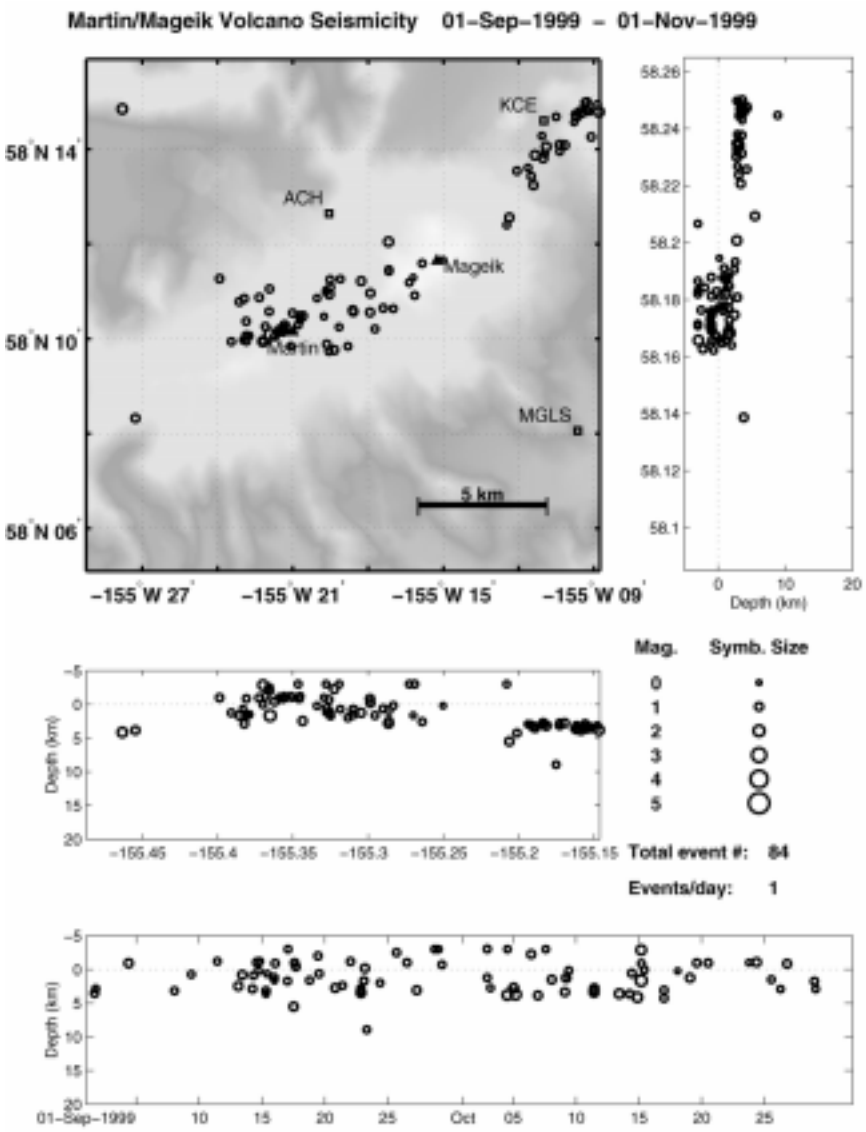

Figure 17a: Locatable Martin/Mageik seismic events in space and time for September through October.

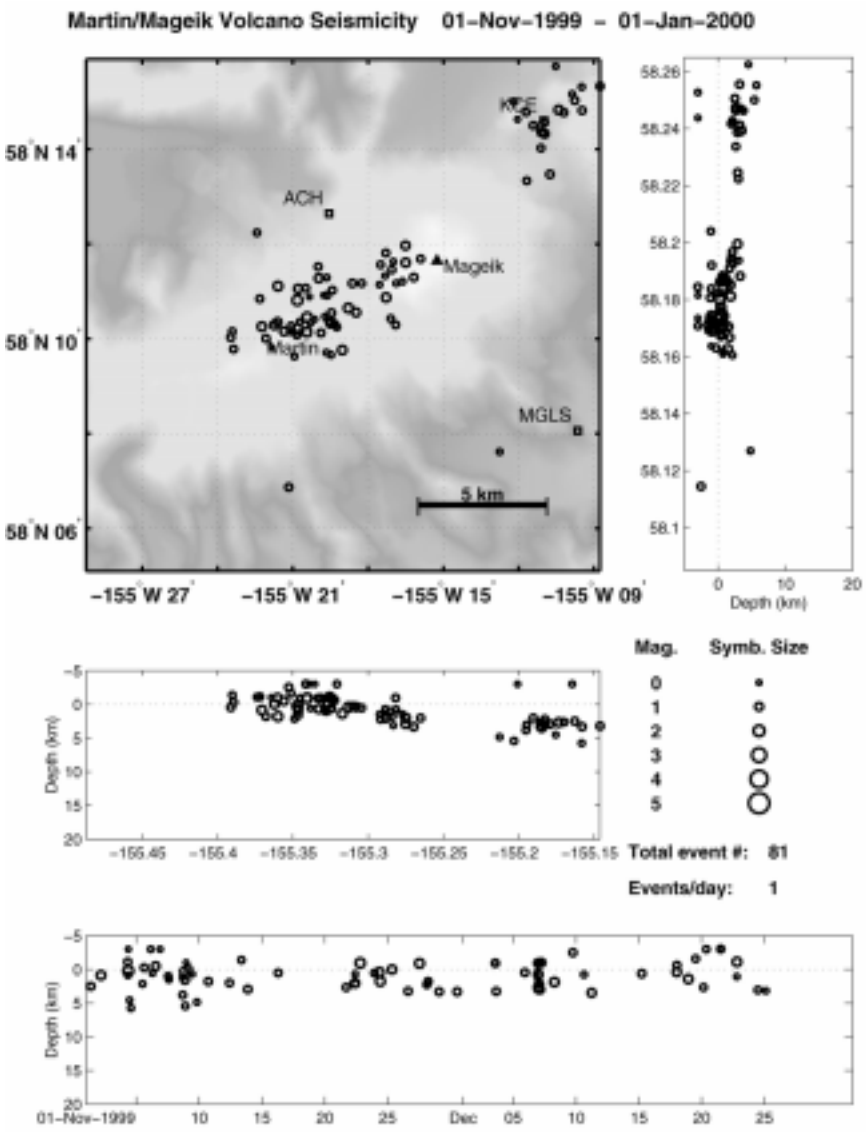

Figure 17b: Locatable Martin/Mageik seismic events in space and time for November through December.

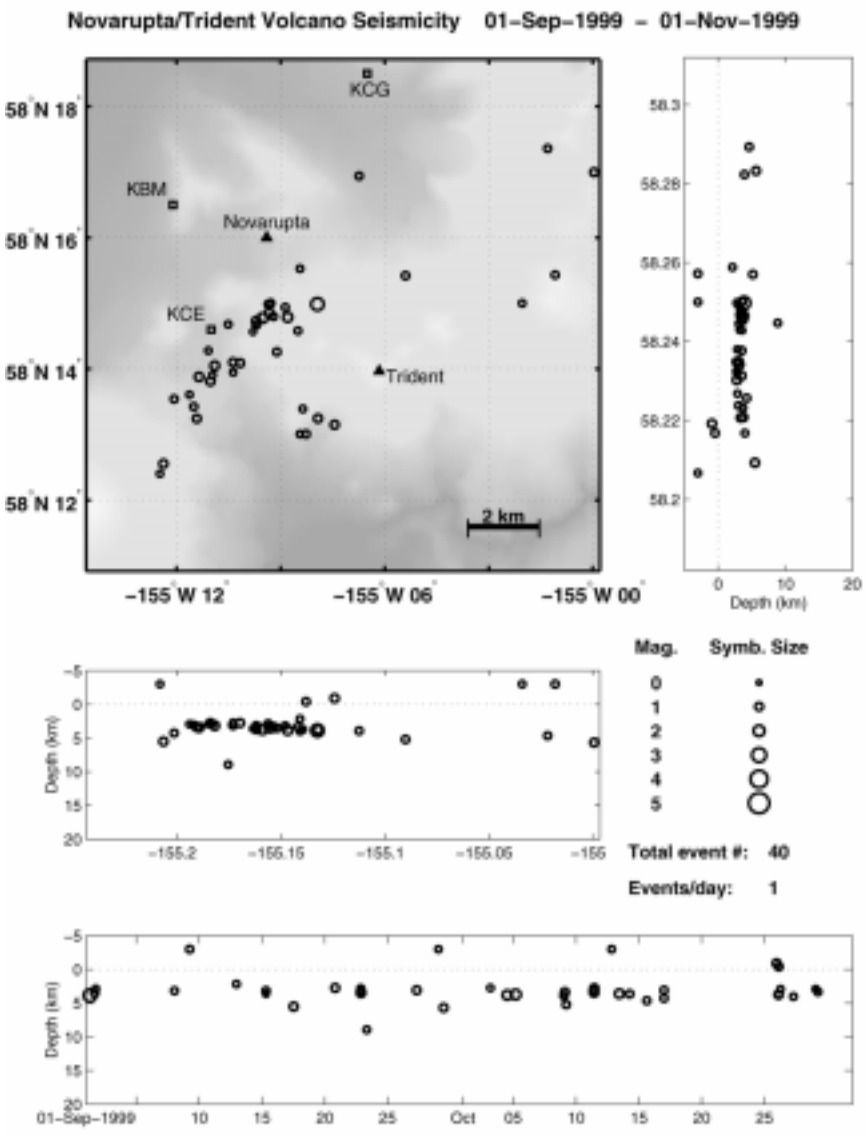

Figure 18a: Locatable Novarupta/Trident seismic events in space and time for September through October.

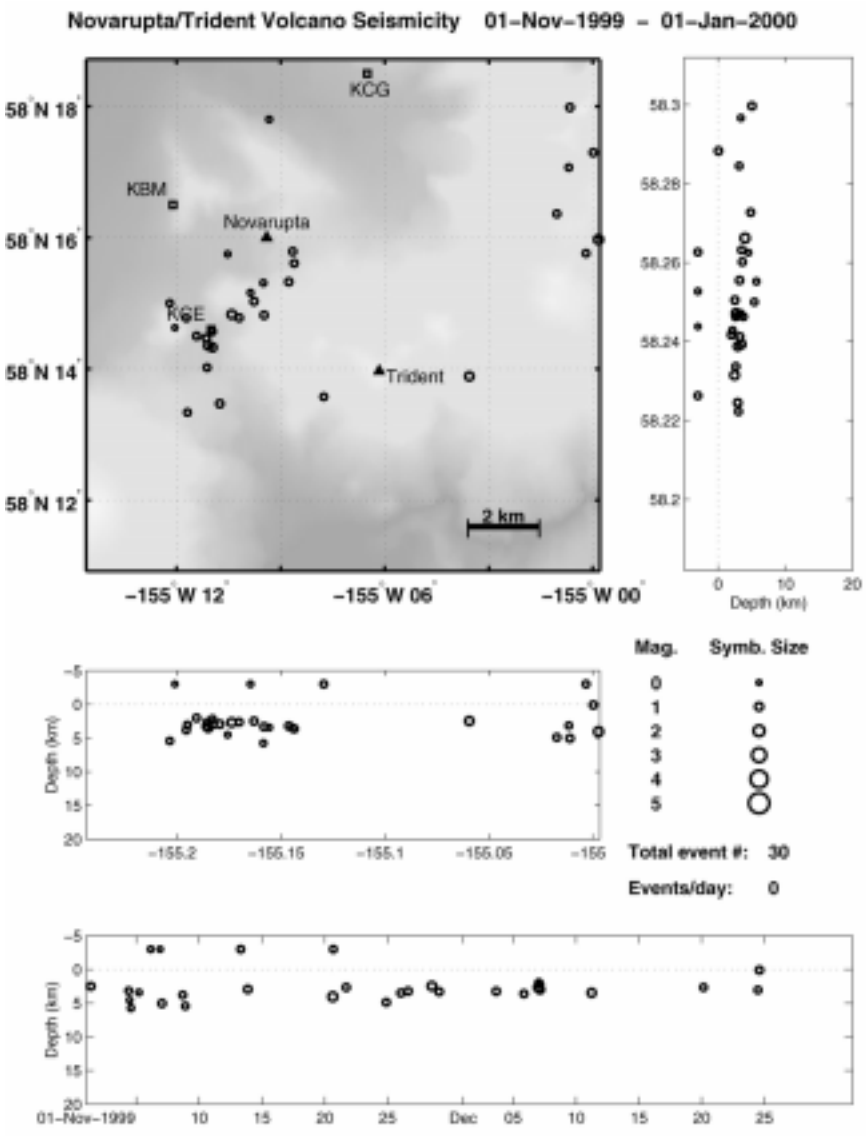

Figure 18b: Locatable Novarupta/Trident seismic events in space and time for November through December.

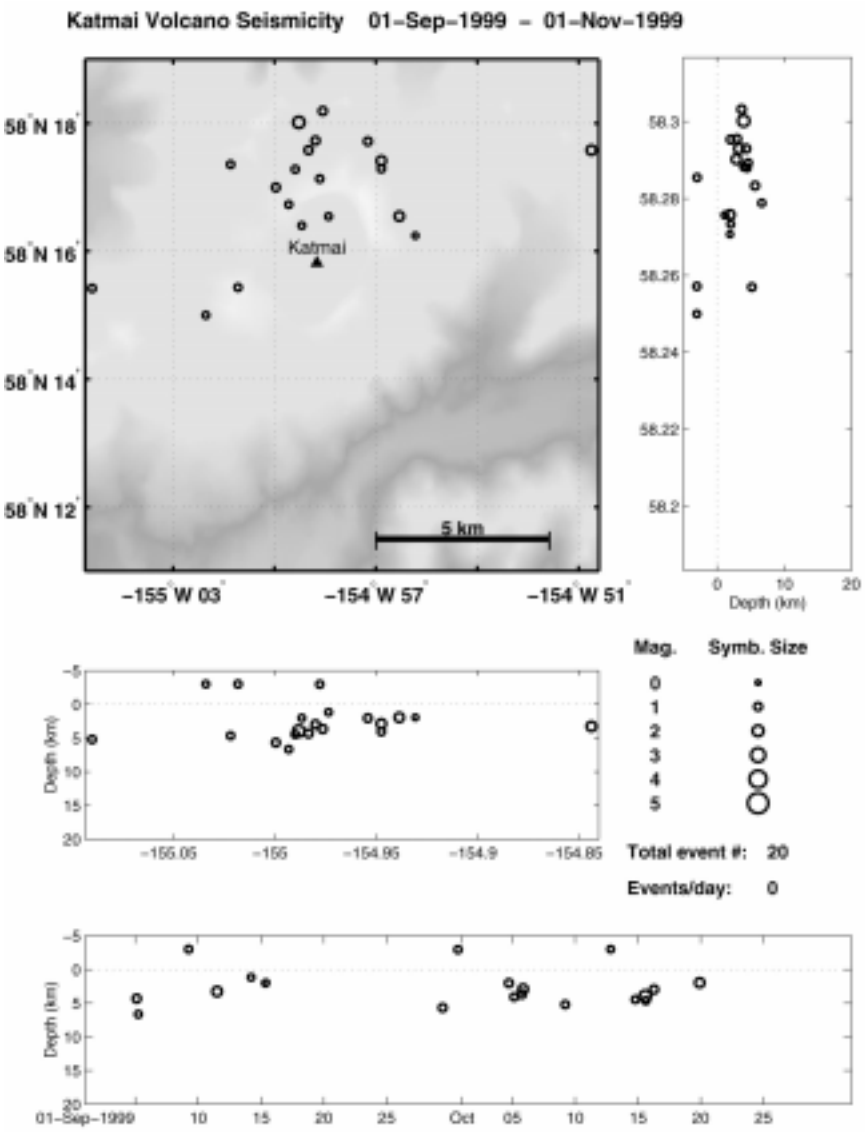

Figure 19a: Locatable Katmai Volcano seismic events in space and time for September through October.

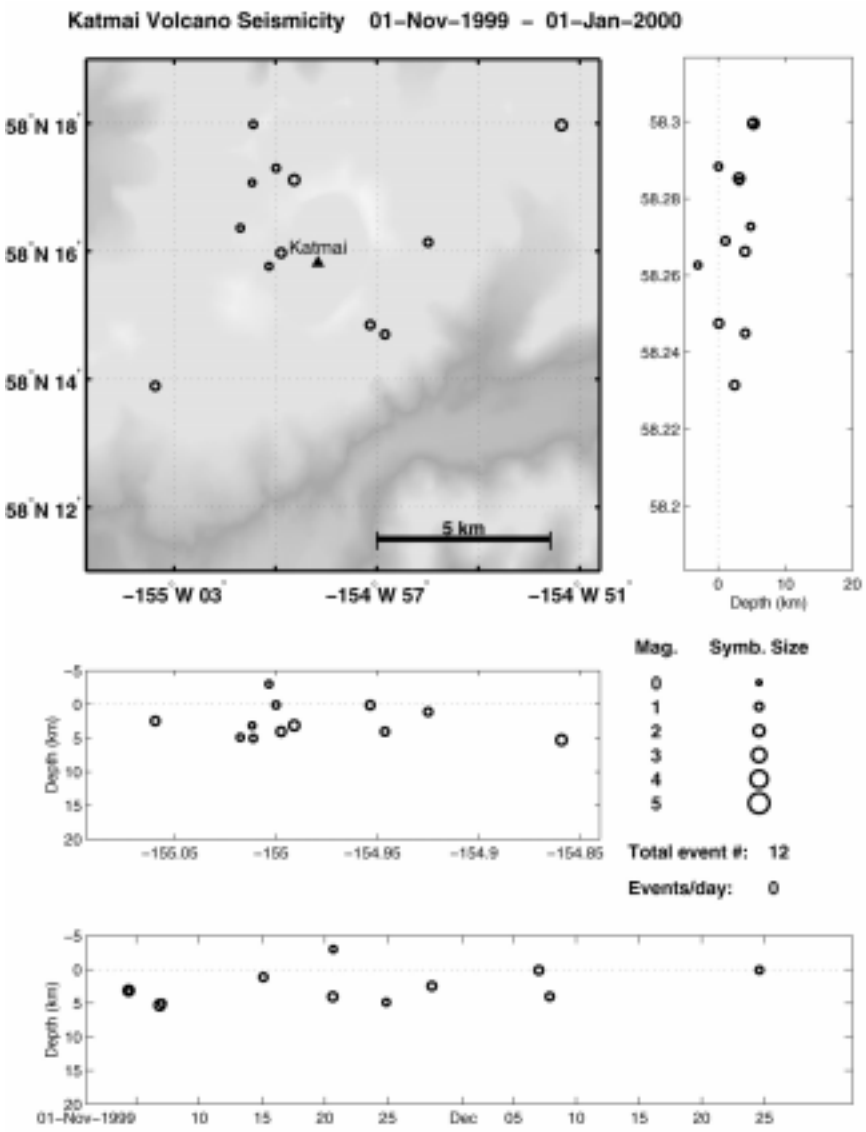

Figure 19b: Locatable Katmai Volcano seismic events in space and time for November through December.

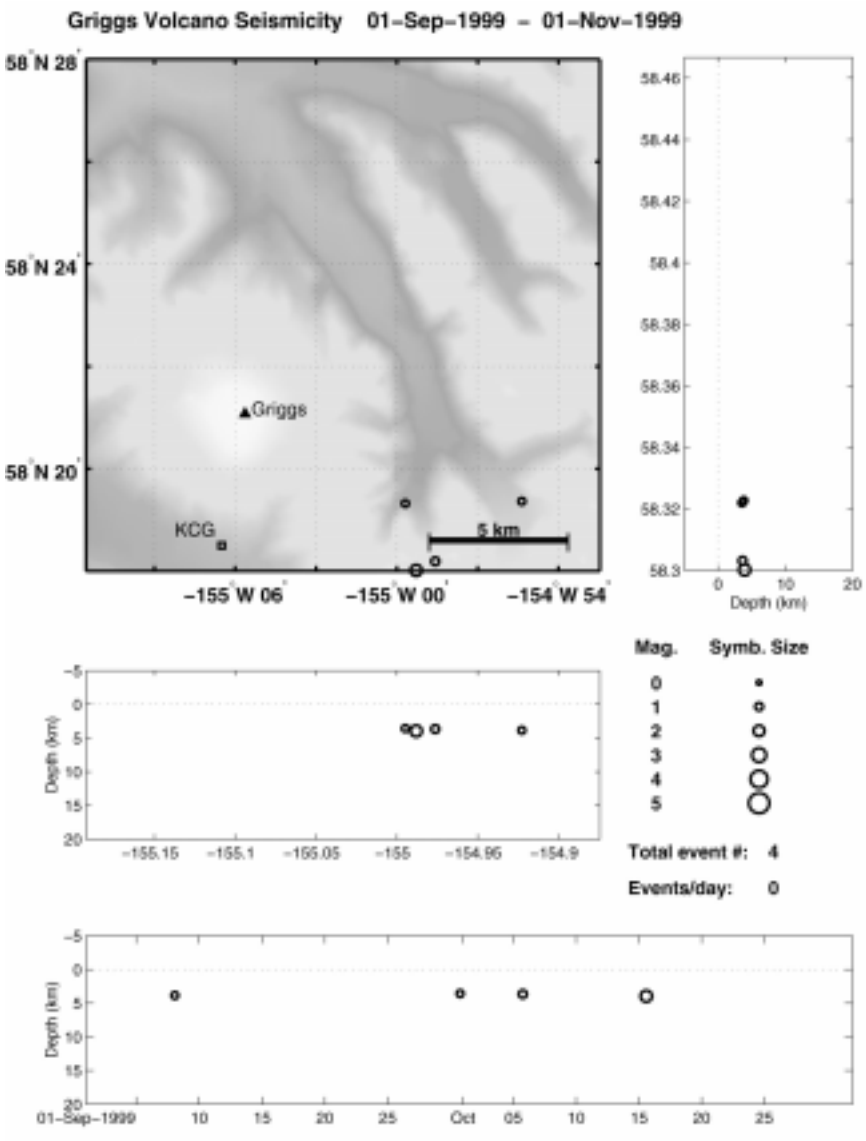

Figure 20a: Locatable Griggs seismic events in space and time for September through October.

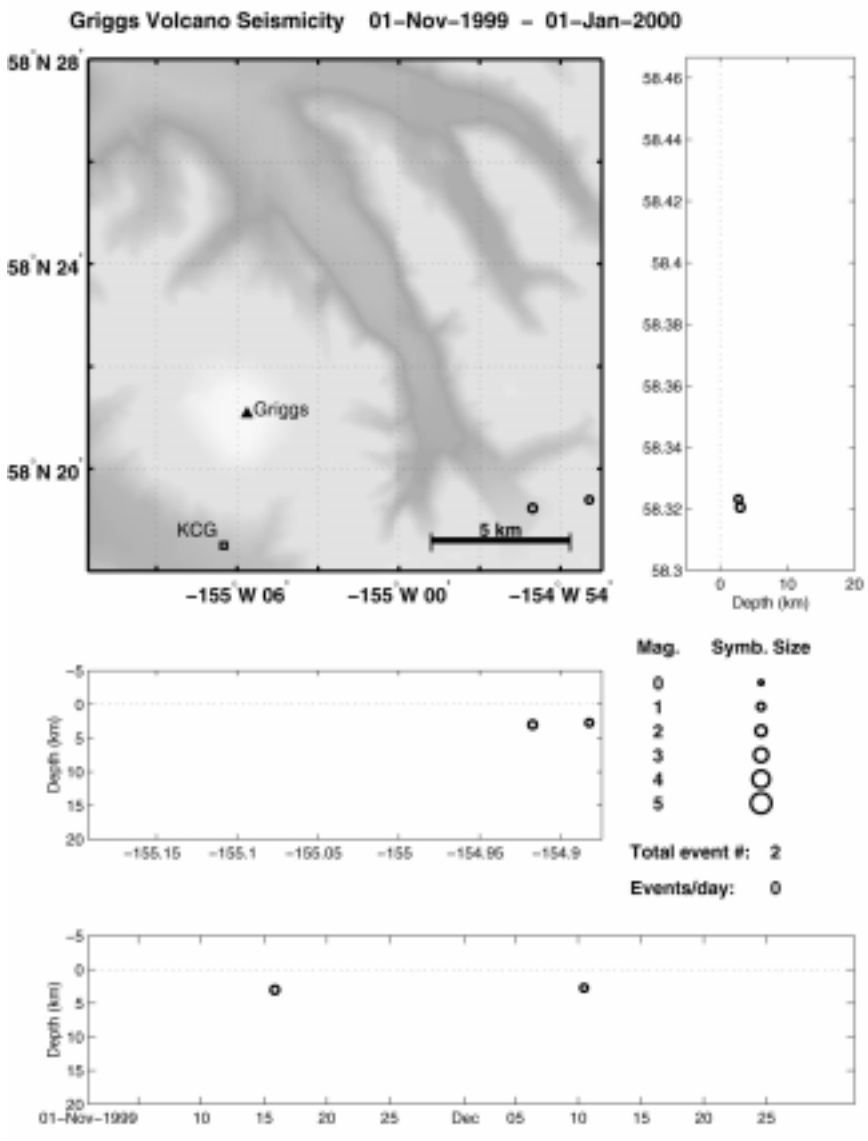

Figure 20b: Locatable Griggs seismic events in space and time for November through December.

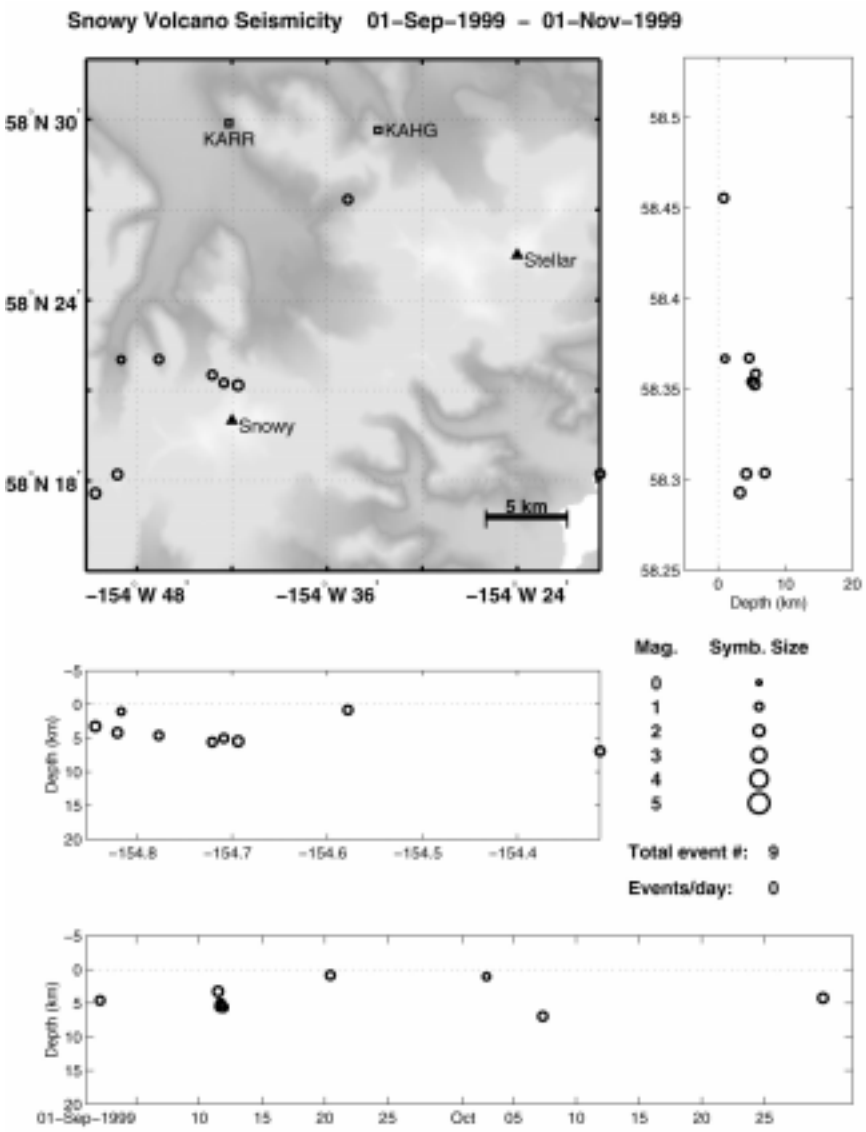

Figure 21a: Locatable Snowy seismic events in space and time for September through October.

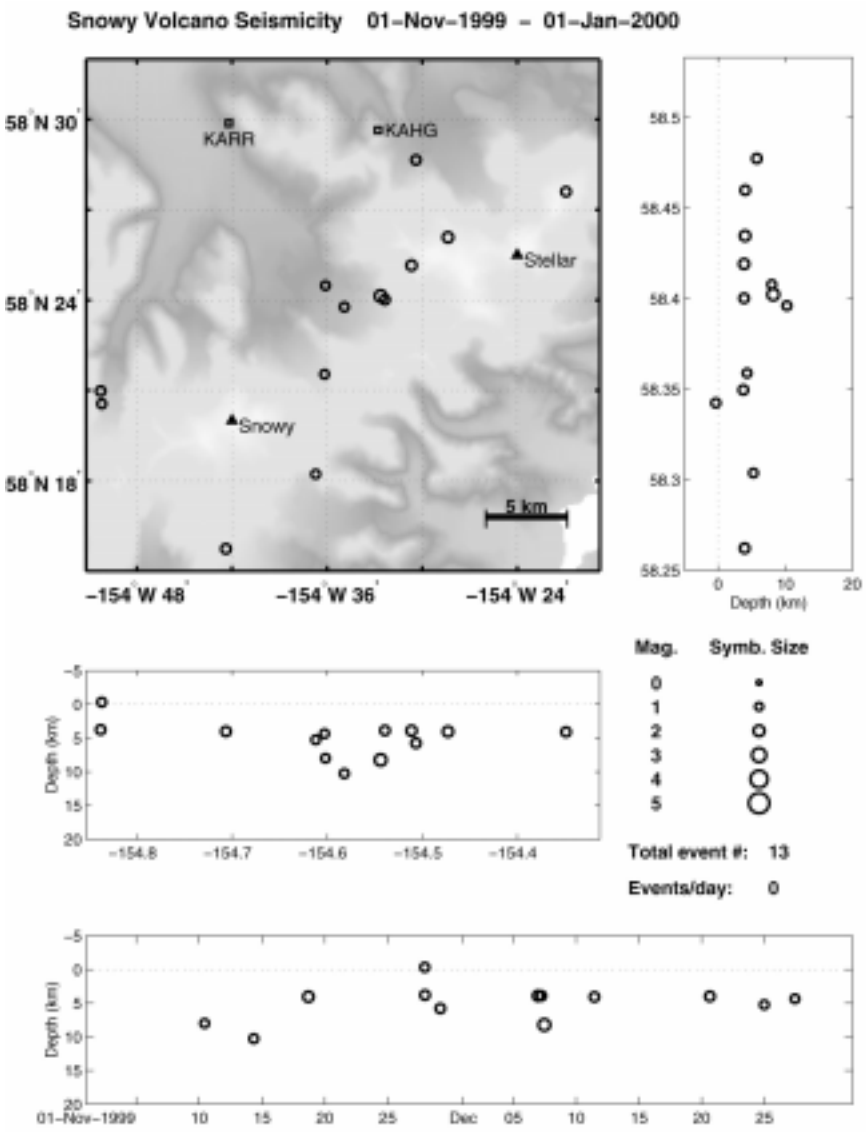

Figure 21b: Locatable Snowy seismic events in space and time for November through December.

Aniakchak

September-December:
Two earthquakes were located in the Aniakchak region during September-October 1999 (figs. 21a, 29a and 30a). The largest of the two events had a magnitude of M_L=2.7 and was located 4 km northwest of the 1931 vent and had a hypocentral depth of nearly 24 km. The second event was located 10 km south-southeast of Vent Mountain and also had a relatively deep hypocentral depth of ~19 km. Due to their low frequency contents these earthquakes were designated as being b-type events. The low frequency of the waveforms was probably due to the relatively deep hypocentral depths and the natural filtering out of higher frequencies during seismic wave propagation. The number of earthquakes located in the Aniakchak region during this two-month period was half that for July-August. This value was, however, twice the number of earthquakes predicted based upon the mean seismicity rate. No earthquakes were located in the Aniakchak area during November-December 1999. Plots of the Helicorder and detected event counts also indicate that the level of activity in the Aniakchak region was low (figs. 39 and 41) .

Pavlof

September-December:
During September-October 1999, two earthquakes were located in the Pavlof region (figs. 22a, 29a and 30a). The largest earthquake had a magnitude of M_L=1.6, was located 7 km north-northeast of Pavlof Sister and had a hypocentral depth of 7 km. The other earthquake was located 8 km east of Pavlof Sister at a depth of 9 km. The number of Pavlof earthquakes located during September-October was lower than the three such events located during the previous two-month period. This was, however, in agreement with the number predicted from the Pavlof 2-year mean seismicity rate. No earthquakes were located in the Pavlof region during November-December 1999. Both the Helicorder and detected event counts also indicate that the level of activity in the Pavlof region was low during this two-month period.

Dutton

September-December:
No earthquakes were located in the Dutton region during the September-October 1999 and the November-December 1999 periods. The plots of the Helicorder and detected event count (figs. 29a/b-30a/b) show the level of activity in this region to have been quite low during these two two-month periods.

Unimak Island Region

September-October:
Sixteen earthquakes were located in the Unimak Island region during September-October 1999 (figs. 23a, 29a and 30a). The largest of these events had a magnitude of M_L=2.5 and was located ~6 km east of Cape Lazaref and had a hypocentral depth of 9 km. There were a total of five earthquakes located in the Cape Lazaref region during this two-month period. The remaining nine earthquakes were located in the aftershock zone (i.e. ~12-15 km west of Shishaldin) of the March 4, 1999 M_L=5.0 event. The hypocenters of these events were in the depth range of ~1-4 km. The number of earthquakes located in this region during this two-month period was a little larger than the 12 such events located in July-August 1999. The number of located events in this region, however, was twice the number predicted from the 1-year mean seismicity rate.

The discrepancy between the number of predicted events and the actual number of located earthquakes was probably, for the most part, due to the continued occurrence of aftershocks in this area.

November-December:
During November-December 1999 there were a total of 15 earthquakes located in the Unimak Island region (figs. 23b, 29b and 30b) . The largest earthquake was located 11 km east-southeast of Cape Lazaref at a hypocentral depth of ~8 km and had a magnitude of M_L=3.1. A total of seven earthquakes were located in this area. Another seven events were located in the aftershock zone of the M_L=5.0 earthquake. The final event occurred in an unusual location, ~18 km north-northwest of Fisher Caldera and at a depth of nearly 13 km. This area was devoid of seismicity prior to this earthquake. The number of located events for November-December was virtually the same as was the case with the previous two-month period. The aftershocks once again appear to have been responsible for there being more located events than one would expect based upon the mean seismicity rate.

Akutan

September-October:
No earthquakes were located in the Akutan region during September-October 1999. The Helicorder and detected event count plots also showed the activity to be quite low during this time period (figs. 29a and 30a).

November-December:
One earthquake was located in the Akutan area during November-December 1999 (figs. 24b, 29b and 30b). This earthquake had a magnitude of M_L=1.9 and was located 2 km north of the summit of Akutan at a depth of 3 km. The number of Akutan events located during this two-month period is greater than that of September-October but it is much lower than the seven such events predicted from the 2-year mean seismicity rate.

Makushin

September-October:
A total of seven earthquakes were located in the Makushin region during September-October 1999 (figs. 25a, 29a and 30a). The largest event located during this time had a magnitude of M_L=2.5 and was located 26 km east-northeast of the Makushin and had a hypocentral depth of 11 km. Because of its fairly large distance from the summit this event is very likely a regional tectonic earthquake. Similarly there was an event located 22 km south-southeast of the summit, which, because of its great distance, was also probably a tectonic earthquake unrelated to volcanic activity in this region. The remaining five events were located much closer to Makushin, and thus, more likely reflect actual activity at Makushin. The largest of these events had a magnitude of M_L=1.9 and was located 7 km southeast of the summit at a depth of 6 km. The number of events located in the Makushin region during September-October was the same as that for July-August. This value was, however, a bit lower than the 11 Makushin events predicted from the mean seismicity rate.

November-December:
One earthquake was located in the Makushin region during September-October 1999 (figs. 25b, 29b and 30b). This earthquake had a magnitude of M_L=1.9 and was located ~9 km east-southeast of the summit and had a hypocentral depth of 7 km. The number of events located in the Makushin region during November-December was much lower than that of September-October as well as the number of events predicted from the Makushin mean seismicity rate.

continued

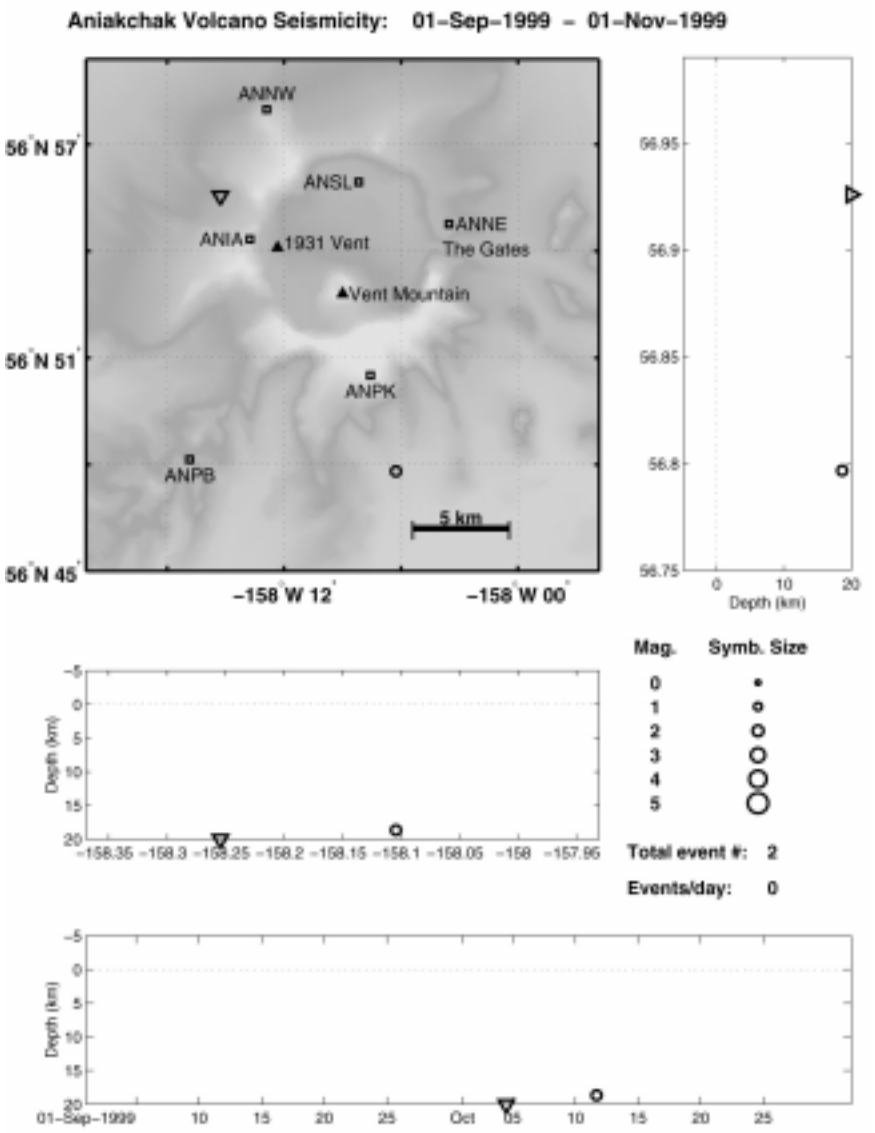

Figure 21a: Locatable Aniakchak seismic events in space and time for September through October. There were no locatable events for the months of November and December.

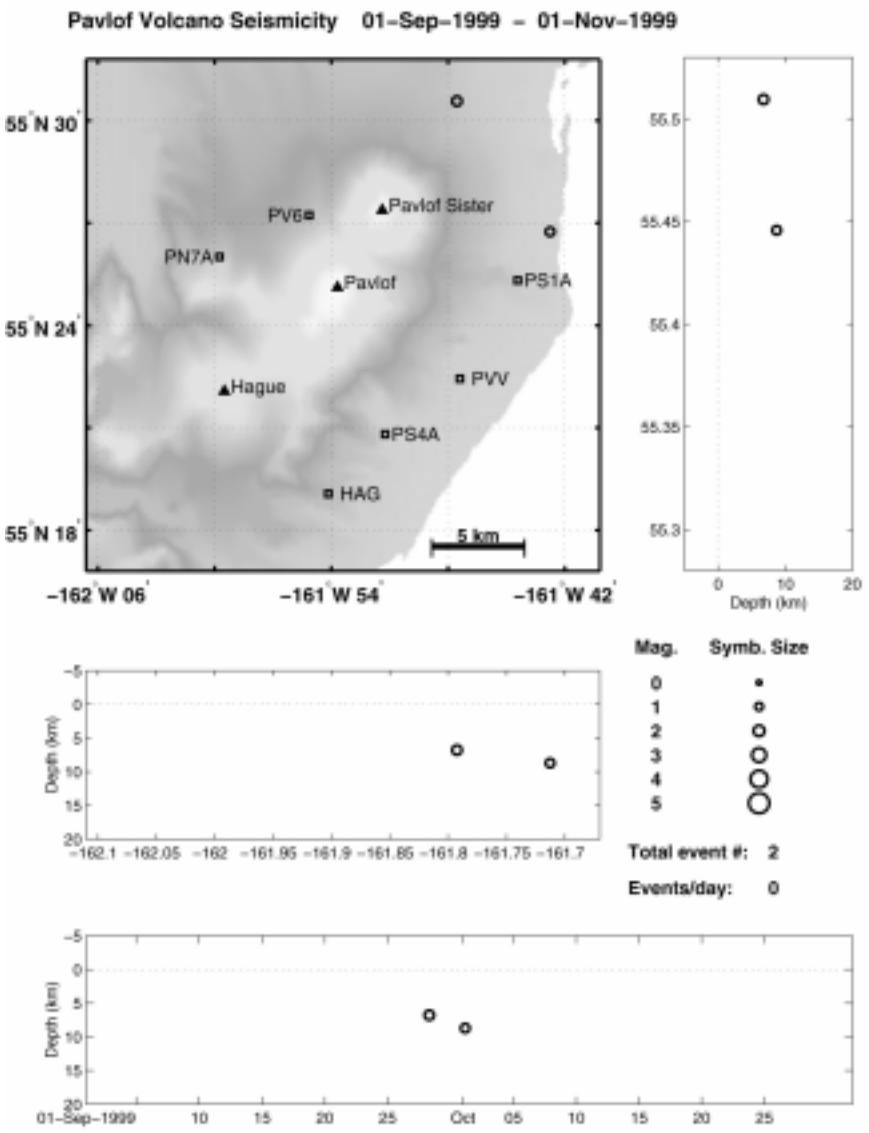

Figure 22a: Locatable Pavlof seismic events in space and time for September through October. There were no locatable events for the months of November through December.

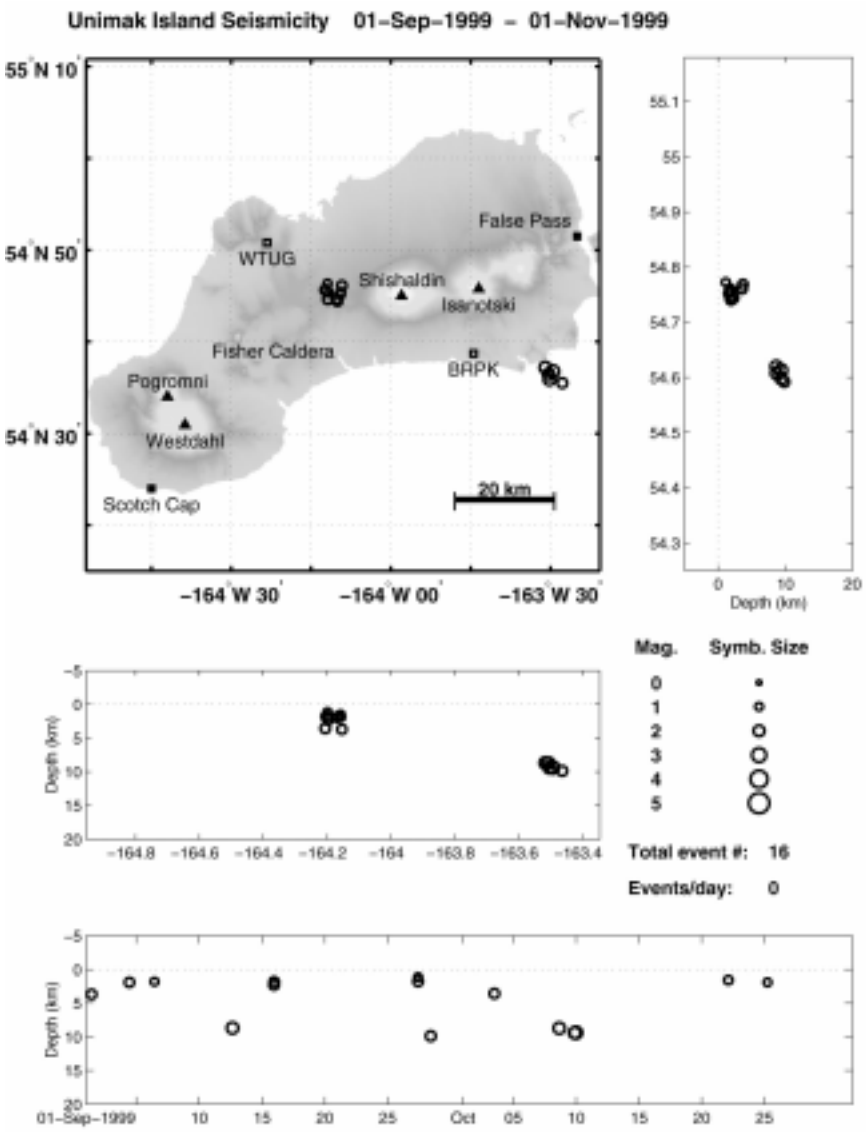

Figure 23a: Locatable Unimak Island seismic events in space and time for September through October.

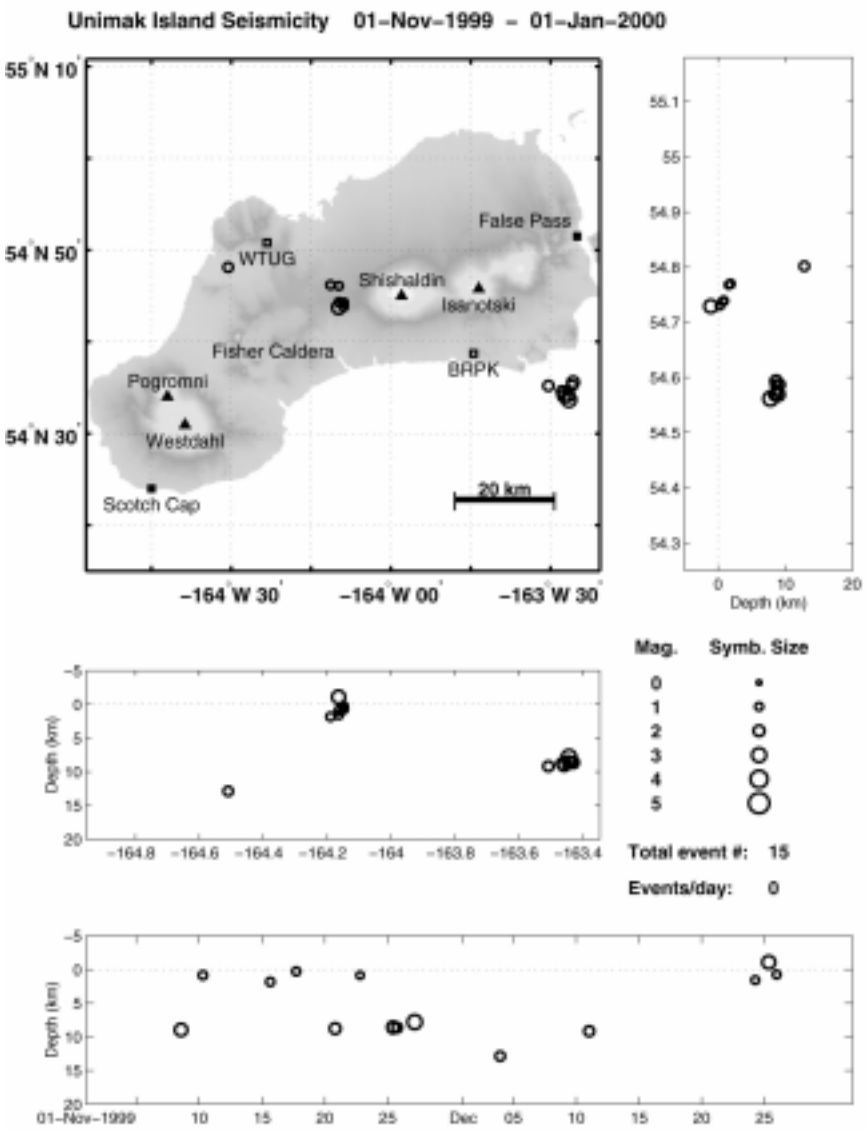

Figure 23b: Locatable Unimak Island seismic events in space and time for November through December.

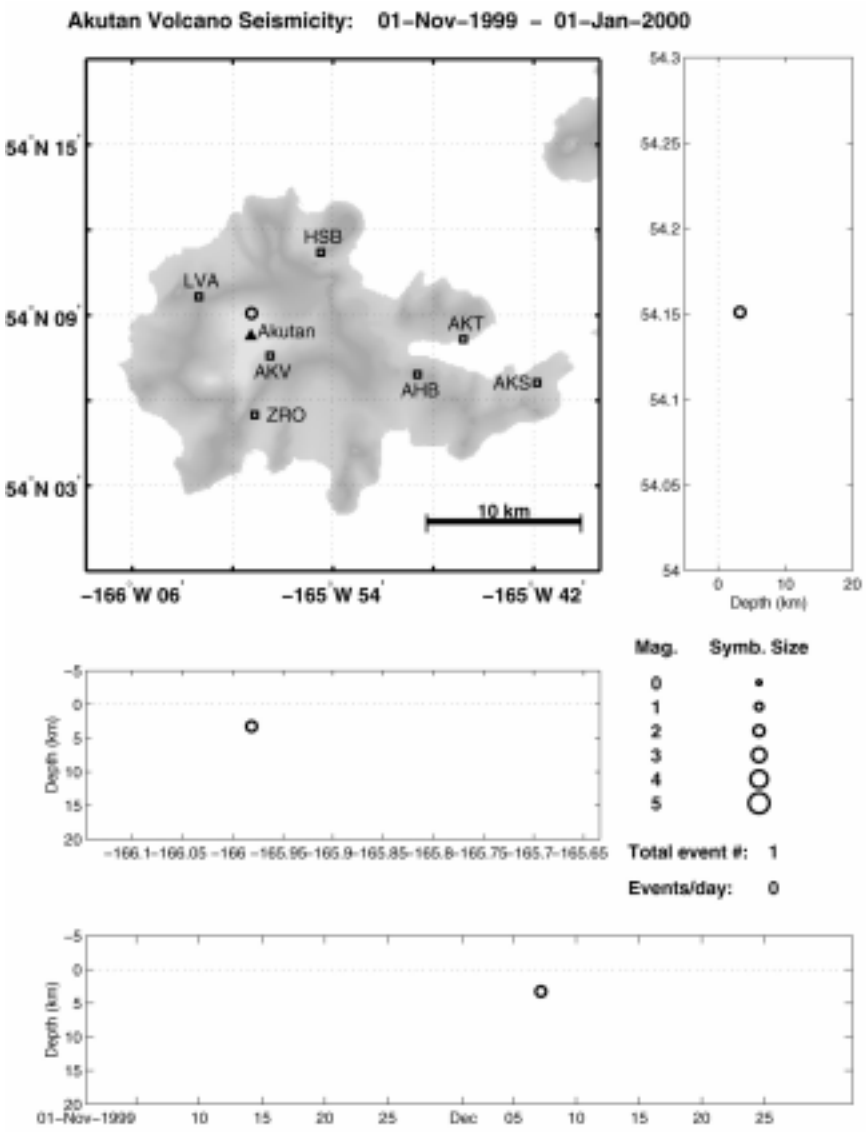

Figure 24b: Locatable Akutan seismic events in space and time for November through December. There were no locatable events for the months of September through October.

Adak Region

September-October:

A 14 station (17 component) seismic network was deployed in the Adak region during the summer of 1999. Data started being recorded from this network in early September. Guy Tytgat generated a set of three maps for this region, a map showing the entire Adak region and two more detailed maps focusing on Kanaga and Great Sitkin Islands (figs. 26a, 29a and 30a). Unfortunately, most of the stations on Kanaga Island ceased to function shortly after the stations were installed. Figure 27a was included to show the location of the stations in this area. It is very unlikely that any earthquakes will be located in the Kanaga area prior to the summer station maintenance.

Thirty-two earthquakes were located in the entire Adak region during September-October 1999. The largest of these events had a magnitude of M_L=1.7 and was located 45 km south of Kanaga. Three other events were located off-shore of Kanaga Island. Due to their great distances from Kanaga or other nearby volcanoes these events are probably regional tectonic earthquakes not related to volcanic activity. One event was located 3 km east-southeast of Moffett (~9 km west-southwest of Adagdak).

Because this event was located relatively close to Moffett it cannot simply be dismissed as being a tectonic earthquake. The remaining 27 earthquakes were located within 20 km of Great Sitkin.

November-December:

During November-December 1999 a total of 55 earthquakes were located in the Adak region (fig. 26b). The largest of these events had a magnitude of m_b=3.9 and was located 54 km south of Kanaga and had a hypocentral depth of ~36 km. Because of its location this earthquake is probably a regional tectonic event not directly related to volcanic activity in this region. An additional eight earthquakes were located relatively far away from volcanoes and are likely also tectonic events.

Great Sitkin

September-October:

Twenty-three earthquakes were located in the Great Sitkin region during September-October 1999 (figs. 28a, and 30a). The other four events were either mislocated and/or were probably regional tectonic earthquakes. The largest Great Sitkin earthquake had a magnitude of M_L=1.6 and was located 7 km southeast of the summit and had a hypocentral depth of ~9 km. At present, very little can be said about the distribution of seismicity at Great Sitkin. The seismicity in this area appears to be rather diffuse. The summit region appears to be fairly active; a total of eight earthquakes were located within 2 km of the summit during September-October. There may possibly be a north-south trending linear zone of seismicity ~6 km southeast of the summit. With such a small dataset it is difficult to say whether any apparent features seen in current seismicity plots are real or not. Consistent patterns in the distribution of the seismicity may emerge as additional data are accumulated for this region.

November-December:

There were a total of 46 earthquakes located in proximity to Great Sitkin (figs. 28b and 30b). The largest Great Sitkin earthquake had a magnitude of M_L=1.0 and was located just off the northeastern shore of Great Sitkin, 8 km east-northeast of

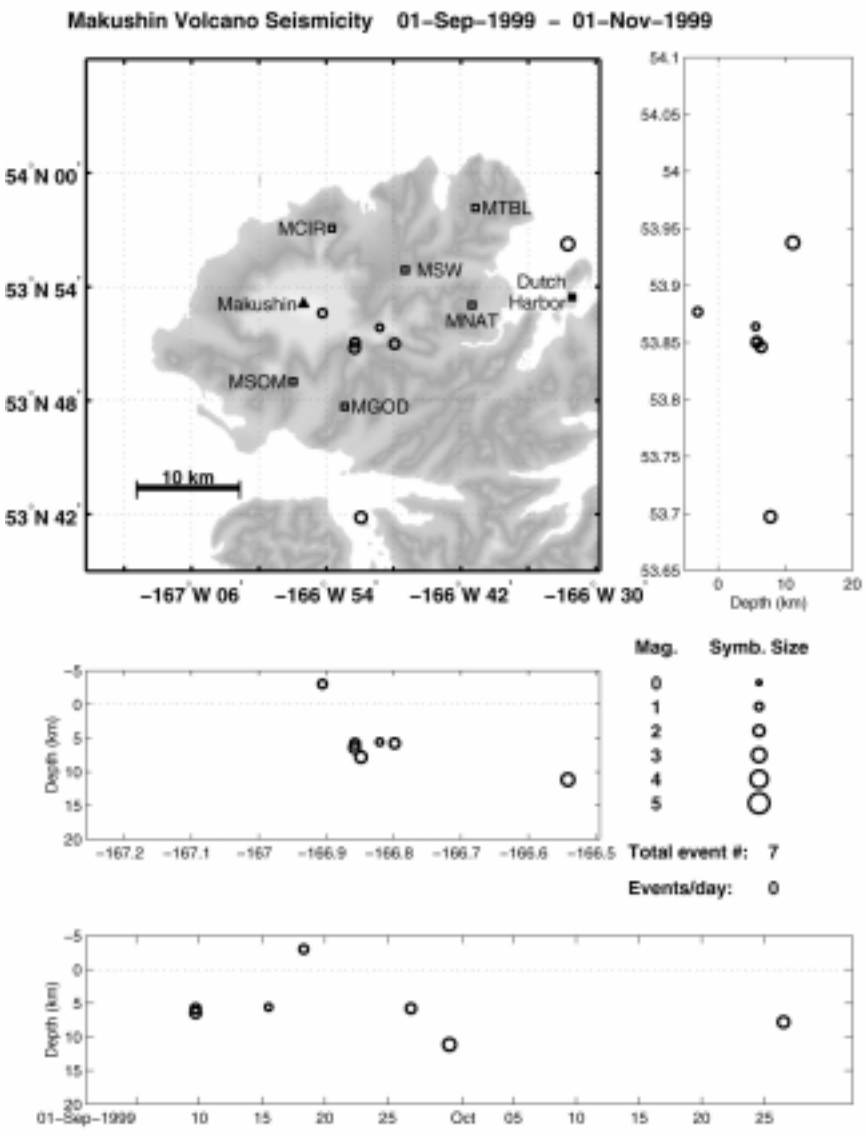

Figure 25a: Locatable Makushin eismic events in space and time for September through October.

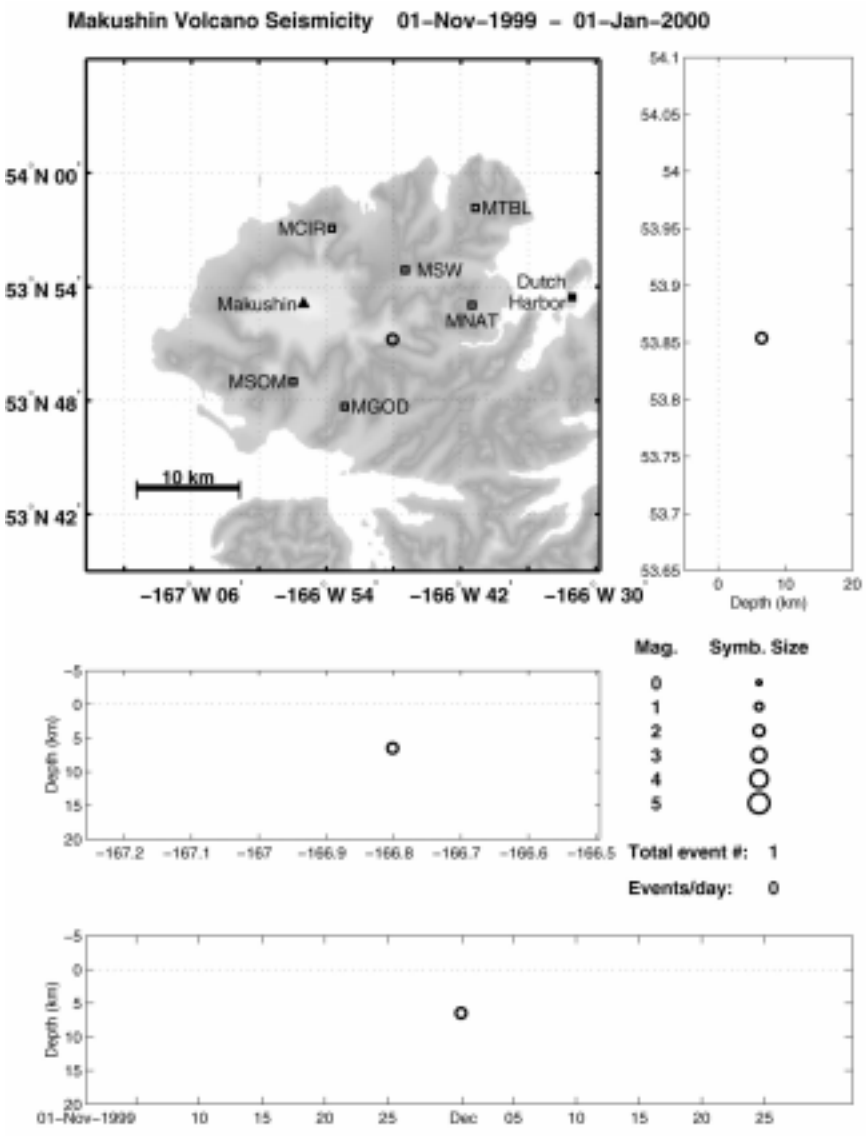

Figure 25b: Locatable Makushin seismic events in space and time for November through December.

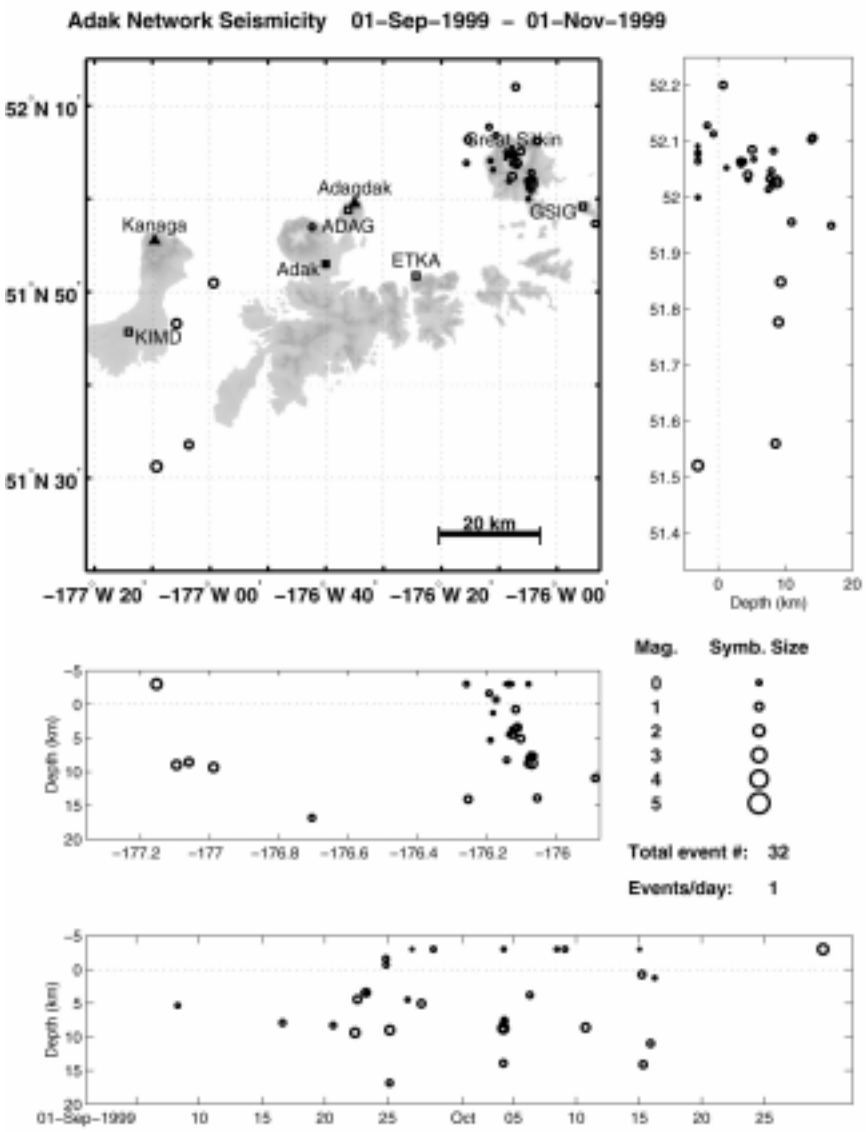

Figure 26a: Locatable Adak seismic events in space and time for September through October.

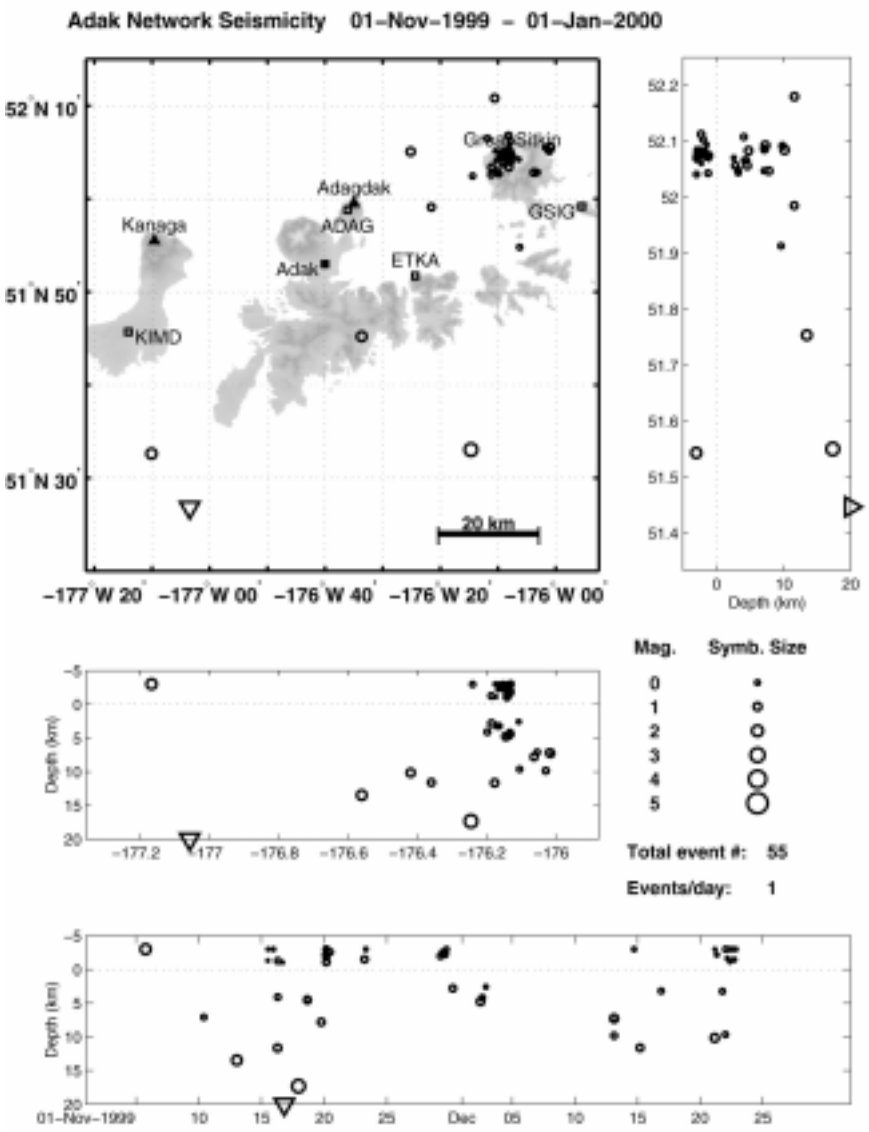

Figure 26b: Locatable Adak seismic events in space and time for November through December.

the summit and had a hypocentral depth of 7 km. As was the case with the September-October data the summit region appears to be quite active; a total of 25 events located with 2 km of the summit.

Scott Stihler, Gordon Bower, Ellen Wilson, John Sanchez, Pete Stelling, Bob Hammond, John Power, Seth Moran, Steve McNutt, Guy Tytgat, Aaron Pearson, Scott Dreher, and Glenn Thompson

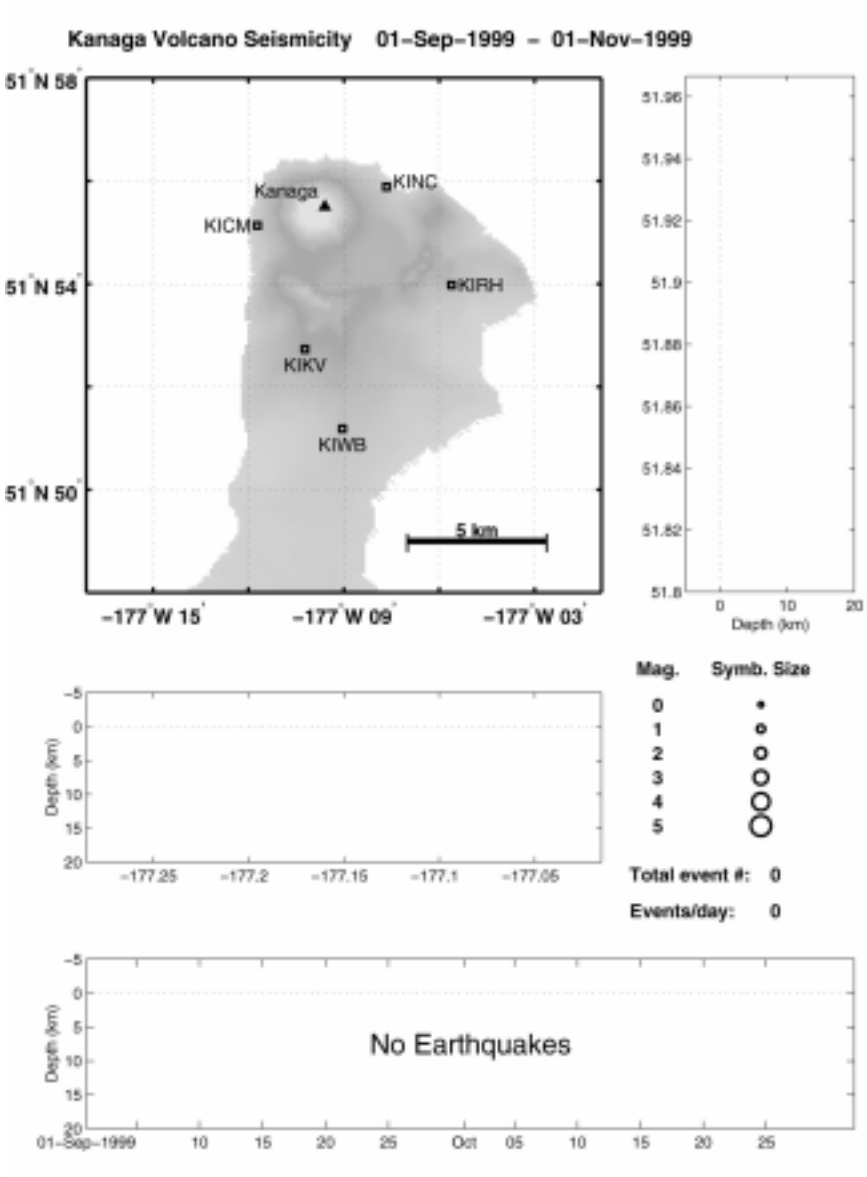

Figure 27a: Locatable Kanaga seismic events in space and time for September through October. There were no locatable events during the months of November through December.

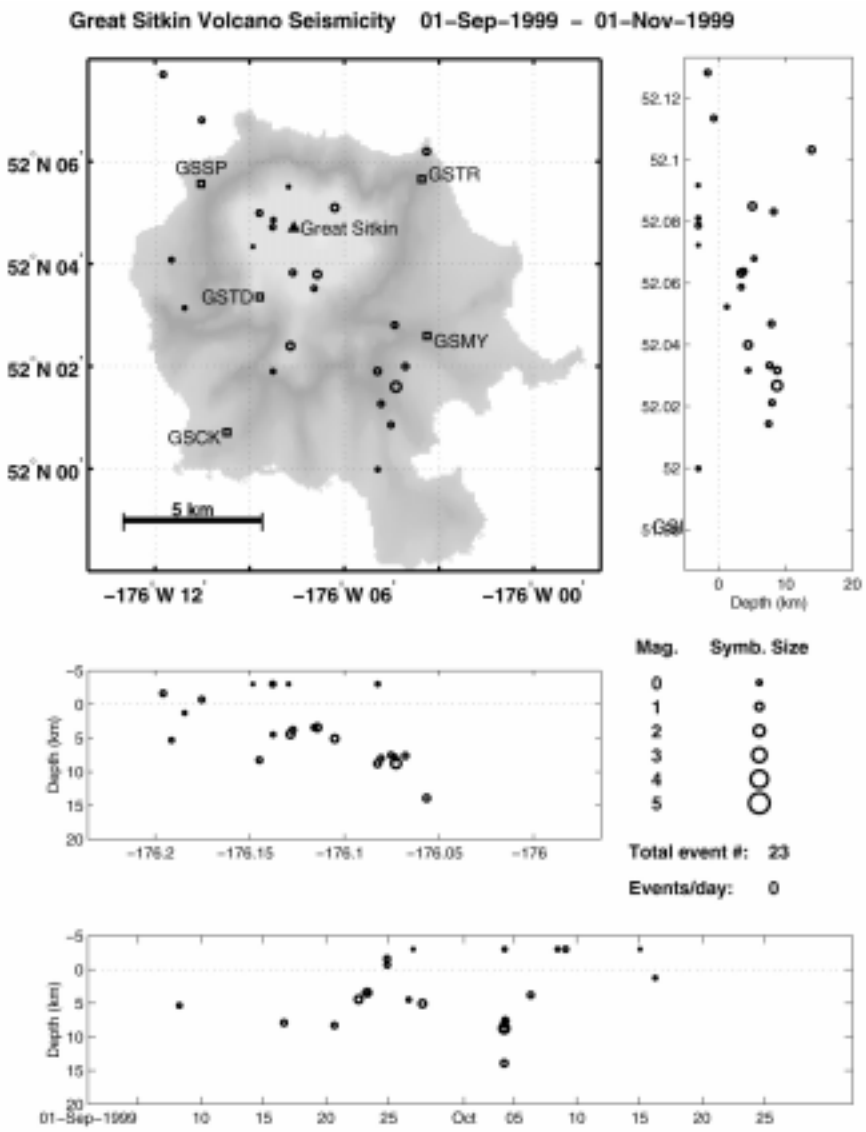

Figure 28a: Locatable Great Sitkin seismic events in space and time for September through October.

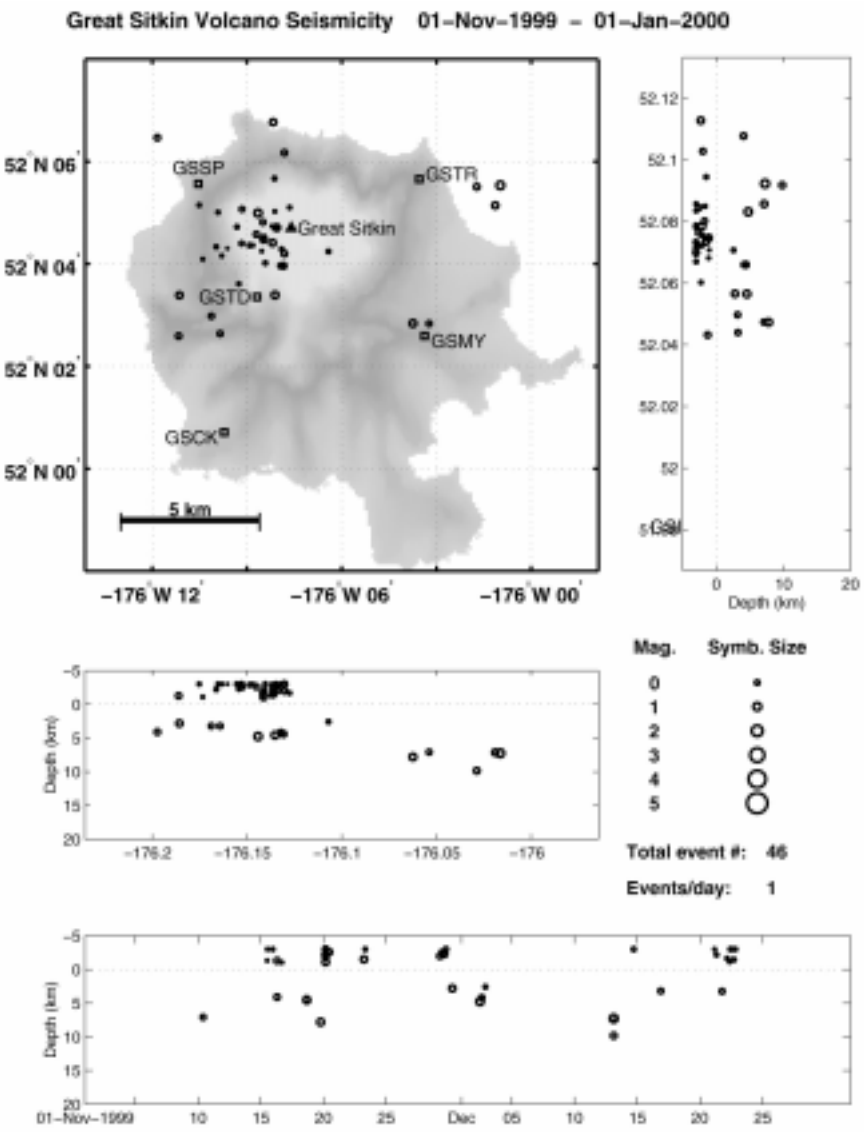

Figure 28b: Locatable Great Sitkin seismic events in space and time for November through December.

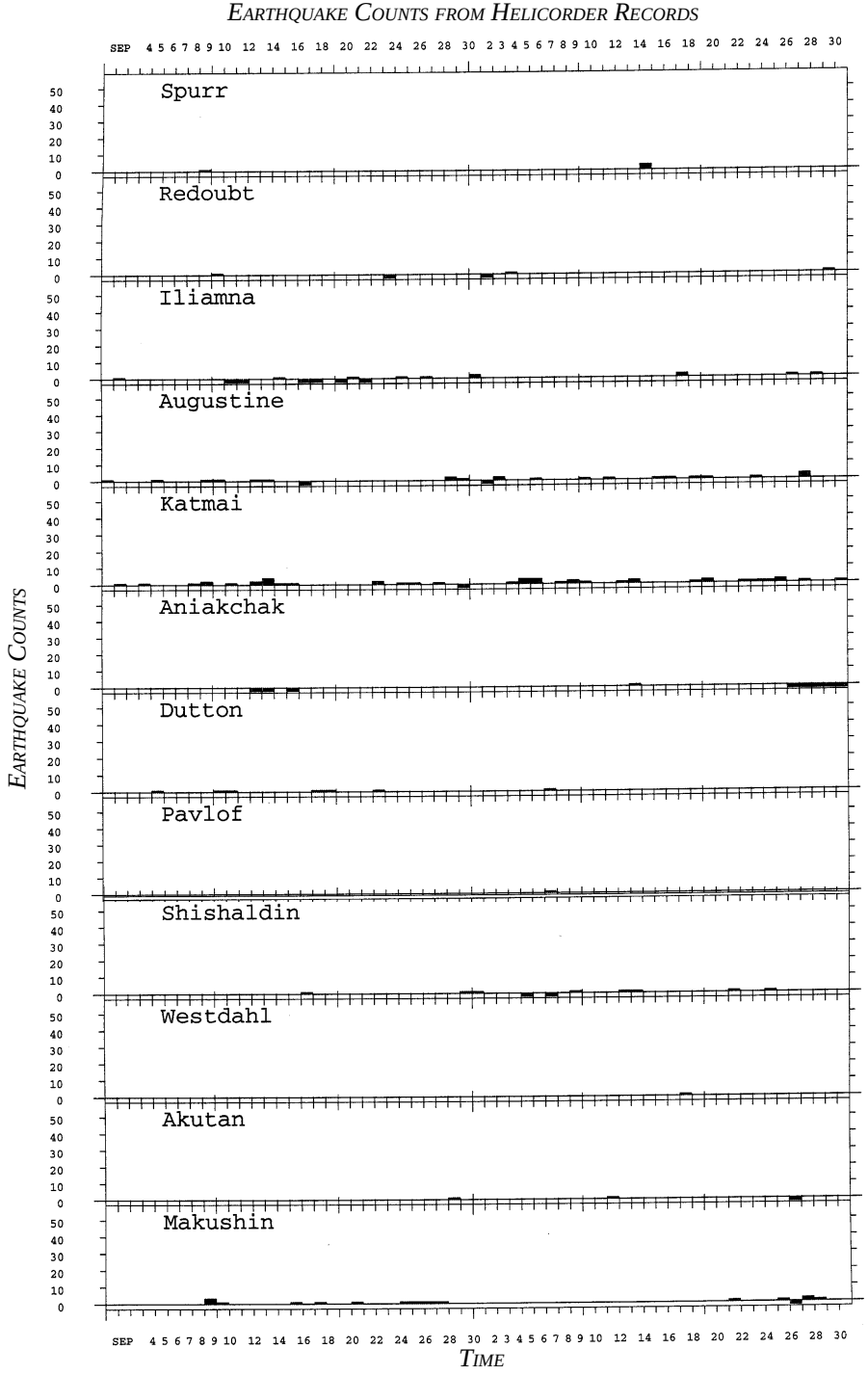

Figure 29a: Histogram of seismic events counted from HELICORDER records during September through October.

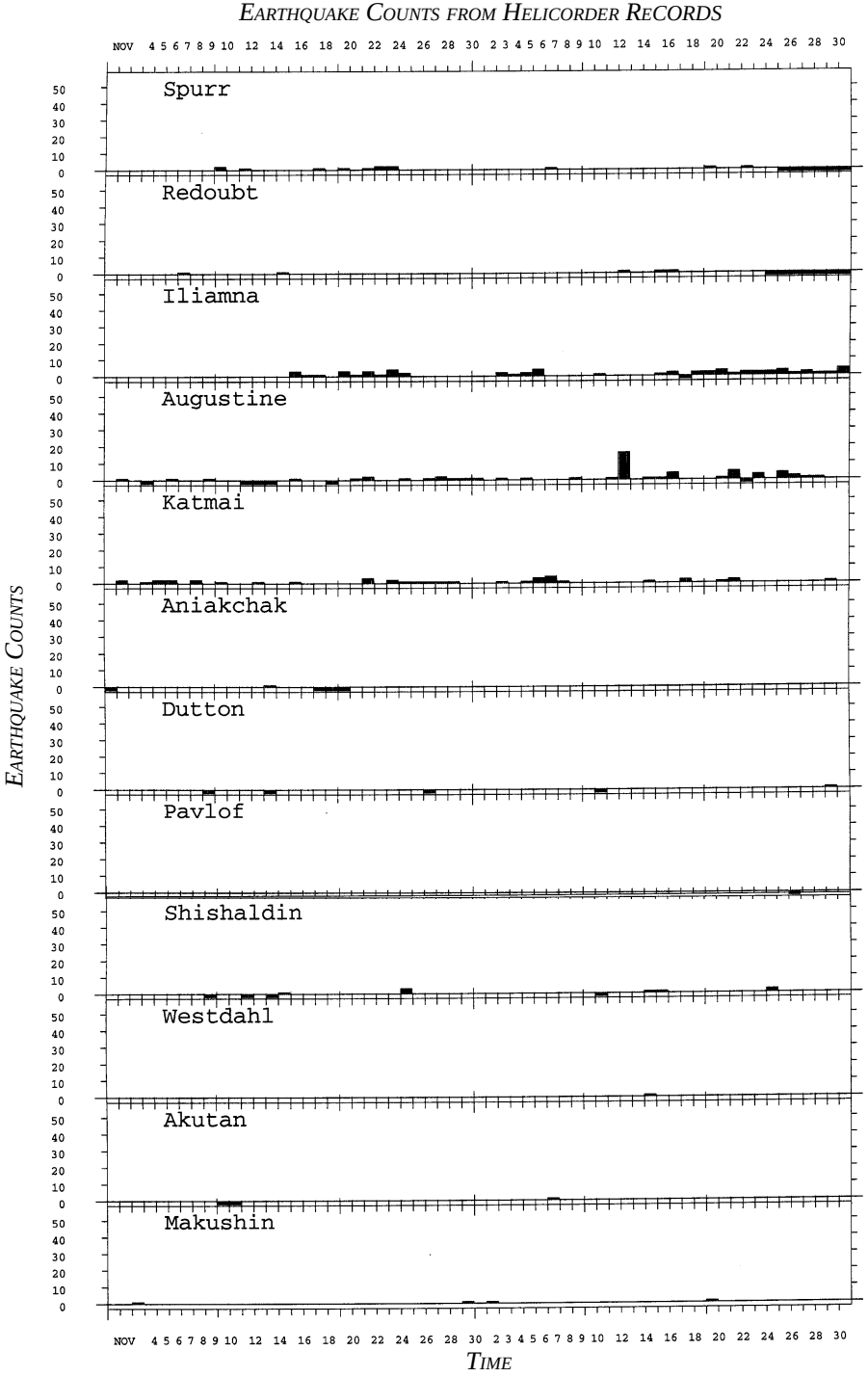

Figure 29b: Histogram of seismic events counted from HELICORDER records during November through December.