SKYLAB SHORT-LIVED EVENT ALERT PROGRAM

Contract NAS 9-13474

Final Report

Principal Investigator
Mr. Robert A. Citron

February 1974

Prepared for
National Aeronautics and Space Administration
Johnson Space Center
Houston, Texas 77058

Smithsonian Institution
Astrophysical Observatory
Cambridge, Massachusetts 02138

The Smithsonian Astrophysical Observatory
and the Harvard College Observatory
are members of the
Center for Astrophysics

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1. INTRODUCTION

During the three manned Skylab missions, the Center for Short-Lived Phenomena (CSLP) reported a total of 39 significant events to the Johnson Space Center (JSC) as part of the Skylab Short-Lived Event Alert Program.

Information pertaining to these events was telegraphed to JSC daily, and the data were updated as frequently as new information was received from the Center's network of correspondents.

The telegraphed daily status reports were made as comprehensive as possible and included the names and locations of the events, the track number and revolution number during which the event could be observed, the time (GMT) to within ± 2 sec when Skylab was closest to the event area, and the light condition (daylight or darkness) at that time and place. The messages sent to JSC during the Skylab 4 mission also included information pertaining to ground-truth studies and observations being conducted on the events. Photographic priorities were assigned for each event.

During the Skylab 2 and Skylab 3 missions, the daily status reports were telegraphed to JSC at 0900 Central Time 2 days in advance of the predicted sighting opportunities, in order to give personnel at JSC time to evaluate the reports and pass them to the Skylab crew if appropriate. For the Skylab 4 mission, the daily status reports were sent 3 days ahead of the predicted sighting opportunities to increase the time available for evaluation and transmission to Skylab.

Throughout all three manned missions, provisions were made so that CSLP could contact the JSC after normal working hours, or vice versa, if necessary.
The accuracy and thoroughness of the sighting opportunities for the short-lived events that the CSLP forwarded to JSC were contingent on the accuracy of the data in the original and updated Table 2-2 in Section 7, Field Data Pack, EREP Console Operations Handbook. Where no data were available for particular revolutions, interpolation of statistics was necessary. It is felt that the accuracy of these interpolated figures was reasonable.
2. SKYLAB 2

As part of CSLP's Short-Lived Event Alert Program, a communications test was conducted on 19 April 1973 between the Smithsonian Astrophysical Observatory's (SAO) Communications Center and JSC. During the test, the time interval between the sending of the message by Robert Citron and its receipt by John Kaltenbach was determined to be 25 min.

Mission-simulation status reports, sent on 23, 24, and 25 April, were received without problems.

Regular daily status reports were sent via teletype to JSC beginning on 4 May; the new format as agreed on by Mr. Citron and JSC was employed. Actual event reports were sent in order to familiarize CSLP with the preparation of such messages and to secure response from JSC regarding any faults in the reporting system.

With the launch of Skylab 1 on 14 May, routine daily messages were begun. However, because of problems aboard the spacecraft, messages were not sent from 15 to 24 May. After resuming on 25 May, messages continued until 20 June.

No data were available regarding times and positions of the ascending nodes for the period 13 to 22 June. This required interpolation of figures, and the accuracies of the predicted visibility opportunities of the events for the last few days of the mission were probably rather inaccurate.

The following 15 events were reported to JSC during the Skylab 2 mission:

<table>
<thead>
<tr>
<th>CSLP Event Number</th>
<th>Name of Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-73</td>
<td>Asama Volcanic Eruption</td>
<td>Honshu, Japan</td>
</tr>
<tr>
<td>34-73</td>
<td>Montevallo Sinkhole</td>
<td>Alabama, USA</td>
</tr>
<tr>
<td>42-73</td>
<td>Mississippi River Floods</td>
<td>Midwest and South USA</td>
</tr>
<tr>
<td>Event Number</td>
<td>Name of Event</td>
<td>Location</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>55-73</td>
<td>Williamsburg Natural Gas Escape</td>
<td>Michigan, USA</td>
</tr>
<tr>
<td>57-73</td>
<td>Casper Oil Pipeline Break and Bird Kill</td>
<td>Wyoming, USA</td>
</tr>
<tr>
<td>59-73</td>
<td>Kilauea Volcanic Eruption – 1973</td>
<td>Hawaii, USA</td>
</tr>
<tr>
<td>62-73</td>
<td>Murray Oil Pipeline Rupture</td>
<td>Idaho, USA</td>
</tr>
<tr>
<td>65-73</td>
<td>Windward Passage Oil Slick</td>
<td>Caribbean Sea</td>
</tr>
<tr>
<td>67-73</td>
<td>Chelsea Landslip</td>
<td>Quebec, Canada</td>
</tr>
<tr>
<td>74-74</td>
<td>Bear Glacier Surge</td>
<td>Tadzhik, USSR</td>
</tr>
<tr>
<td>77-73</td>
<td>ESSO Brussels Oil Spill</td>
<td>New York, USA</td>
</tr>
<tr>
<td>79-73</td>
<td>Santa Barbara Oil Slick</td>
<td>California, USA</td>
</tr>
<tr>
<td>156-73</td>
<td>Erta'Ale Volcano</td>
<td>Ethiopia</td>
</tr>
<tr>
<td>–</td>
<td>Nyiragongo Volcano</td>
<td>Republic of Zaire</td>
</tr>
<tr>
<td>–</td>
<td>Big Cypress Swamp Fire</td>
<td>Florida, USA</td>
</tr>
</tbody>
</table>

Thirty-two daily status reports were telegraphed to JSC during the mission, and these contained statistics for 152 sighting opportunities for the 15 events.
3. SKYLAB 3

On 31 July, David Squires of CSLP met with Mr. Kaltenbach of JSC and several team members of the Earth Resources Experiment Package to plan communications procedures to be followed during the Skylab 3 mission. It was agreed that the CSLP would increase the types and numbers of events reported and would expand descriptions of all events to make them as complete and informative as possible.

CSLP began transmitting Skylab daily status reports to JSC on 7 August. The messages were sent every day through 22 September.

The following 11 events were reported to JSC by teletype during Skylab 3:

<table>
<thead>
<tr>
<th>CSLP Event Number</th>
<th>Name of Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>84-73</td>
<td>Japanese Seaweed Introduction to England</td>
<td>Isle of Wight, England</td>
</tr>
<tr>
<td>92-73</td>
<td>Tiatia Volcanic Eruption</td>
<td>Kuril Islands, USSR</td>
</tr>
<tr>
<td>93-73</td>
<td>Nishino-shima Submarine Volcanic Eruption</td>
<td>Bonin Islands, Japan</td>
</tr>
<tr>
<td>94-73</td>
<td>Curacoa Reef Submarine Volcanic Activity</td>
<td>Northern Tonga Islands, South Pacific Ocean</td>
</tr>
<tr>
<td>96-73</td>
<td>Mount Langila Volcanic Eruption</td>
<td>New Britain, Territory of New Guinea</td>
</tr>
<tr>
<td>97-73</td>
<td>Lagoa Rodrigo de Freitas Fish Kill</td>
<td>Rio de Janeiro, Brazil</td>
</tr>
<tr>
<td>99-73</td>
<td>Hemlock Looper Infestation</td>
<td>Massachusetts, USA</td>
</tr>
<tr>
<td>106-73</td>
<td>Western USA Forest Fires</td>
<td>Western USA</td>
</tr>
<tr>
<td>109-73</td>
<td>Puebla Earthquake</td>
<td>Puebla, Mexico</td>
</tr>
<tr>
<td>112-73</td>
<td>Indus River Floods</td>
<td>Punjab, Pakistan</td>
</tr>
<tr>
<td>117-73</td>
<td>Santiaguito Volcanic Eruption</td>
<td>Guatemala, Central America</td>
</tr>
</tbody>
</table>

Forty-four daily status reports were telegraphed to JSC during the mission, containing statistics for 154 sighting opportunities for the 11 events.
4. SKYLAB 4

On 30 November 1973, cables were sent to five overseas correspondents requesting information on ground-truth data currently being obtained on six active volcanos, as follows:

Nivoragongo Volcano – Dr. A. Pouclet, Bukavu, Zaïre, and Dr. H. Tazieff, Paris, France;
Erta’Ale Volcano – Dr. Tazieff and Dr. J. Varet, Addis Ababa, Ethiopia;
Mt. Etna Volcano – Dr. Tazieff;
Nishino-shima Submarine Volcano – Dr. Y. Sawada, Tokyo, Japan;
Sakurazima Volcano – Dr. Sawada;
Kilauea Volcano – Dr. D. Peterson, Island of Hawaii, Hawaii.

Replies were received by mail from all five correspondents, and copies of the correspondence were forwarded to Mr. Kaltenbach.

From 21 November 1973 to 2 February 1974, CSLP telegraphed daily status reports on short-lived events to JSC. The following 17 events were reported by teletype to JSC during the Skylab 4 mission:

<table>
<thead>
<tr>
<th>CSLP Event Number</th>
<th>Name of Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>59-73</td>
<td>Kilauea Volcanic Eruption – 1973</td>
<td>Hawaii, USA</td>
</tr>
<tr>
<td>93-73</td>
<td>Nishino-shima Submarine Volcanic Eruption</td>
<td>Bonin Islands, Japan</td>
</tr>
<tr>
<td>130-73</td>
<td>Choristoneura Population Increase</td>
<td>Maine, USA</td>
</tr>
<tr>
<td>131-73</td>
<td>Douglas Fir Tussock Moth Outbreak</td>
<td>Washington, Idaho, Oregon, USA</td>
</tr>
<tr>
<td>134-73</td>
<td>Massachusetts Pine Looper Outbreak</td>
<td>Massachusetts, USA</td>
</tr>
<tr>
<td>139-73</td>
<td>Sakurazima Volcanic Activity</td>
<td>Kyusyu, Japan</td>
</tr>
<tr>
<td>145-73</td>
<td>Bodrog River Oil Slick</td>
<td>Hungary</td>
</tr>
<tr>
<td>147-73</td>
<td>Probable Volcan Wolf Eruption</td>
<td>Galapagos Islands, Ecuador</td>
</tr>
<tr>
<td>150-73</td>
<td>Galapagos Islands Eruptions</td>
<td>Galapagos Islands, Ecuador</td>
</tr>
<tr>
<td>156-73</td>
<td>Erta’Ale Volcanic Activity</td>
<td>Ethiopia</td>
</tr>
<tr>
<td>Event Number</td>
<td>Name of Event</td>
<td>Location</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>3-74</td>
<td>Chile-Bolivia Border Earthquake</td>
<td>Potosi State, Bolivia</td>
</tr>
<tr>
<td>5-74</td>
<td>Duck Island Oil Spill</td>
<td>New Jersey, USA</td>
</tr>
<tr>
<td>7-74</td>
<td>La Pampa Province Forest Fires</td>
<td>Argentina</td>
</tr>
<tr>
<td>9-74</td>
<td>Reventador Volcanic Activity</td>
<td>Ecuador</td>
</tr>
<tr>
<td>11-74</td>
<td>Pacific Submarine Volcanic Eruption</td>
<td>Volcano Islands, Mariana Islands area, Pacific Ocean</td>
</tr>
<tr>
<td></td>
<td>Nyiragongo Volcano</td>
<td>Zaïre</td>
</tr>
<tr>
<td></td>
<td>South Vietnam Forest Defoliation</td>
<td>South Vietnam</td>
</tr>
</tbody>
</table>

Seventy-four daily status reports were telegraphed to JSC during Skylab 4, in which statistics were included for 380 sighting opportunities for the 17 events.

In addition to teletyping information on current short-lived events to JSC, event notification and information cards were routinely mailed to Mr. Kaltenbach, Dr. Robin Brett, Dr. Everett Gibson, and Dr. Michael Reynolds. This mailing included 179 event cards during the contract period (23 April 1973 to 8 February 1974).

The event notification cards issued by CSLP on the 39 events reported to JSC are reproduced in Appendix A, except for Nyiragongo Volcano, Big Cypress Swamp Fire, and South Vietnam Forest Defoliation. These last three events were not issued numbers and were not sent to the Center's network of correspondents.

Sample cable message sent to JSC are included in Appendix B.
APPENDIX A

EVENT NOTIFICATION CARDS
On February 1, 1971, at 20h 26 sec (GMT) a volcanic eruption occurred in Japan. The volcano, known as Asama, is located in the central part of Honshu Island, 41 km northeast of Tokyo.

The earth's crust of the area is composed of the Tertiary volcanic rocks of a composite cone. The top of the volcano is a shallow crater which has a diameter of approximately 500 m. The crater rim is about 100 m high. The southern flanks of the volcano are steep and escarpments are cut into the older strata.

The maximum amplitude of the explosion was recorded as 1.6 millibars as measured on the barograph of the meteorological observatory of Karuizawa. The detonation wave reached the Asama volcano (2542 m) before any explosions were detected by the sensors. The maximum amplitude recorded was 1.6 millibars. The explosion was detectable for about 7 hours after it occurred. Fragments of volcanic ash were carried by the west-northwest wind, reaching the area of 4 km from the crater.

The maximum amplitude of the earthquake was recorded as 1.6 millibars. The maximum amplitude of the explosion was 1.6 millibars. The explosion was detectable for about 7 hours after it occurred. Fragments of volcanic ash were carried by the west-northwest wind, reaching the area of 4 km from the crater.

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**EVENT 55-73 WILLIAMSBURG NATURAL GAS ESCAPE 25 APRIL 1973**

**EVENT NOTIFICATION REPORT: A**

**TYPE OF EVENT** GEOLOGICAL

**DATE OF OCCURRENCE** 18 APRIL 1973

**LOCATION OF EVENT** WILLIAMSBURG, MICHIGAN, U.S.A.

**REPORTING SOURCE** MICHIGAN DEPT. OF NATURAL RESOURCES

**SOURCE CONTACT** DR. DAVID H. DIXON

**DEPUTY DIRECTOR, MICHIGAN DEPARTMENT OF NATURAL RESOURCES, LANSING, MICH.**

**SMITHSONIAN INSTITUTION CENTER FOR PREHISTORIC RESEARCH INTIMATE RELATIONSHIPS**

A geologist with the Michigan Dept. of Natural Resources believes that the escaping gas is being pressured into an extremely porous limestone, which results in the surface eruptions in the Williamsburg area. Mud from the eruptions has been flowing into Aces Creek, which drains into Grand Traverse Bay. The gills have become a threat to fish and shellfish, which supplies Traverse City with its drinking water. The gas itself presents no apparent danger to the water life.

The event is being investigated by the Michigan Dept. of Natural Resources and by the Amoco Production Co. At the request of the G.N.H. is in charge of the geologist in this area.

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**EVENT 57-73 CASCAPOL OIL PIPELINE BREAK AND BIRD KILL 4 MAY 1973**

**EVENT NOTIFICATION REPORT: A**

**TYPE OF EVENT** BIOLOGICAL

**DATE OF OCCURRENCE** 29 APRIL 1973

**LOCATION OF EVENT** CASPER, WYOMING, U.S.A.

**REPORTING SOURCE** PHILIP STARKSON, OR. WILDLIFE HUMANIZATION CENTER, 701 GEORGE ST., CASPER, WYOMING, U.S.A.

**SOURCE CONTACT** DR. DAVID SCOTT

**FED. LOCAL CHAPTER, AUDUBON SOCIETY, CASPER, WYOMING, U.S.A.**

**SMITHSONIAN INSTITUTION CENTER FOR PREHISTORIC RESEARCH**

A pipeline under the control of Standard Oil Co. of Indiana ruptured adjacent to an industrial swamp, and man-made lake, in Casper, Wyoming. The water that entered the lake first passes through some filter beds and, in spite of the fact that it comes out with a lot of sludge from the refinery salts and a little oil, is fairly clean.

The lake, which covers several square miles, harbors a large number of waterfowl. Many species of ducks breed there as well as many wading birds. The area, owned by the refinery, has become an important breeding area and migration stop.

The amount of oil that spilled out of the pipeline was only a small sample of what was expected to spill. It was first detected on 24 April. Between 2,000-10,000 waterfowl were thought to have been killed as a result of the spill. A biologist was sent to the area to study the effects of the spill. His determination was that the area would recover, and the oil would be dispersed.

Some of the ducks affected by the oil included large numbers of mallard, redhead, pintail, blue-winged, bufflehead, Wilson's, and other species. Most of the affected ducks were killed immediately. The effects on the ecosystem were severe, and the area will take many years to recover.
EVENT 62-73  MURRAY OIL PIPELINE RUPTURE

At about 8:30 p.m. on 2 May, an estimated 175,000-200,000 gallons of No. 2 diesel fuel oil spilled from a pipeline rupture near Murray, Idaho. The pipeline, operated by the Yellow Pipeline Co. at Spokane, extends from Billings, Montana to Spokane, Washington. The fuel oil line was shut down within 5 miles of the rupture, but oil continued to drain from the pipe until a valve 9 miles away was shut off more than 3 hours later.

Efforts were made to keep the fuel from seeping into Prichard Creek, 6,000 feet southeast of the rupture. Prichard Creek drains the north fork of the Coeur d’Alene River and into Coeur d’Alene Lake. Officials at the scene reported that they were building a trench lower than the water table in an attempt to catch the oil before it entered the creek. It was determined that the oil was seeping through the ground to the west, parallel to Prichard Creek, at a rate of about 1,000 feet per day. Because the creek canyon narrows to about 30 feet in width about a mile from where the leak occurred, the oil would be forced into the creek unless precautions were taken to stop it. The oil was to be skimmed off the top of the water that flowed into the creek. A skimming device was also set up over the creek next to the trench to divert any oil seeping into it.

MURRAY OIL PIPELINE RUPTURE

15 MAY 1973  1631.

DATE OCCURRENCE  2 MAY 1973
LOCATION OF EVENT  MURRAY, IDAHO, U.S.A.
REPORTING SOURCE  C. R. K. REID
SOURCE CONTACT  BILL DEER
SANITARY ENGINEER, OIL-AND GAS-WASTE DIVISION, IDAHO DEPARTMENT OF PUBLIC HEALTH,
BOISE, IDAHO, U.S.A.

SMITHSONIAN INSTITUTION CENTER FOR ENVIRONMENTAL PROTECTION
C. H. HAWKINS, DIRECTOR
E. H. SMITH, ATTORNEY
S. T. GORDON, RESEARCH

EVENT 65-73  WINNIBAO PASSAGE OIL SLICK

The following is an Ecology Spot Report from the U.S. Navy Ecology Network:

1. TYPE OF OBSERVATION: oil spill
2. DATE: 10-12 MAY 1973
3. LOCATION: WINNIBAO PASSAGE
4. REPORTING SOURCE: J. W. COCHRAN
5. CAUSE: unknown
6. AREA: 800,000-6,000,000 square miles
7. CONDITION: oil slick intermittent and oriented along 300-210° true east
8. WEATHER: clear, true wind 075°, 12 knots, air temperature 67°F
9. APPLICABLE OCEANOGRAPHIC CONDITIONS: none
10. OBSERVATIONS: unknown
11. OTHER OBSERVATIONS: units of task group 22.

Winnibao Passage Oil Spill

16 MAY 1973  1635.

DATE OCCURRENCE  14 MAY 1973
LOCATION OF EVENT  WINNIBAO PASSAGE
LOCATION OF REPORTING SOURCE: BOSTON, MASSACHUSETTS, U.S.A.

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C. H. HAWKINS, DIRECTOR
E. H. SMITH, ATTORNEY
S. T. GORDON, RESEARCH

EVENT 67-73  CHELSEA LANDSLIP

A large landslip occurred near Chelsea in the Province of Quebec, just north of Ottawa, Ontario, on 1 May 1973. The slide started at 2:30 p.m. when a 1,000-foot section of Quebec’s new Highway 6 suddenly caved in, dropping nearly 30 feet.

Thousands of tons of mud and rock shifted, leaving a path of destruction nearly a mile long and temporarily closing Highway 11. (No basement had yet been poured on Highway 11, which runs one-half mile west of Highway 11. Work crews were still leveling and filling the route.)

The mass of clay and mud damaged a channel 200 yards wide, uprooting trees and structures and blocking the banks of the rivine more than 30 feet. The slide stopped at the Canadian Pacific Railway embankment, east of Highway 11 and just west of the Gatineau River.

The landslip occurred in an area where terrain instability, especially after heavy rain, is well known due to the uncertain properties of the Plaisance Leda Clay.

CHELSEA LANDSLIP

17 MAY 1973  1637.

DATE OCCURRENCE  8 MAY 1973
LOCATION OF EVENT  CHELSEA, QUEBEC,
CANADA
REPORTING SOURCE  P. H. KENNEDY
SOURCE CONTACT  J. W. COCHRAN
SMITHSONIAN INSTITUTION CENTER FOR ENVIRONMENTAL PROTECTION
C. H. HAWKINS, DIRECTOR
E. H. SMITH, ATTORNEY
S. T. GORDON, RESEARCH

EVENT 68-73  BEAR GLACIER SURGE

The Bear Glacier at the head of the 57-mile-long Vanch Valley, is part of a huge ice field in the heart of the Arctic Highlands. Among the glaciers that rise in the ice field is the 64-mile-long Fedchenko Glacier, longest in the Soviet Union. The Bear Glacier is rapidly advancing, and this has caused a serious flood threat to the Vanch Valley. The threat to the valley derives not from the glacier itself, but from huge temporary mountain lakes that have been building up inside valleys as the rapidly surging stream of ice plugged up valley mouths. As temperatures rise over the next few weeks, the dammed lakes are expected to wash out the ice barriers, unleashing the expected flood into the valleys. The Bear Glacier, as the Medway in Kuwait, is one of the world’s pulsating glaciers, which surge forward at unusually high rates at regular intervals, then retreat and advance suddenly again. The phenomenon has been attributed to the accumulation of ice at the head of the glacier, causing tremendous pressures to set the glacier periodically into rapid motion. The advancing glacier front is 500 feet high and 1,000 feet wide. The advance was first detected on 17 April 1973. The normal rate of the Bear Glacier has been about 500 feet a year. During the surge it has reached rates of 30 feet a day. In 1963 it took two months before a dammed-up lake in a tributary valley broke through the ice barrier to release the Vanch Valley. The flood was of such magnitude that it rose the level of the Vanch River by 10 feet at the town of Vanch 160 miles downstream from the glacier. According to the latest progress report, 350 million cubic feet of water have already accumulated, compared with about 300 million in 1963.

BEAR GLACIER SURGE

24 MAY 1973  1647.

DATE OCCURRENCE  31 MAY 1973
LOCATION OF EVENT  BEAR GLACIER, CANADA
REPORTING SOURCE: E. H. SMITH, ATTORNEY
SOURCE CONTACT  D. L. K. COCHRAN
SMITHSONIAN INSTITUTION CENTER FOR ENVIRONMENTAL PROTECTION
C. H. HAWKINS, DIRECTOR
E. H. SMITH, ATTORNEY
S. T. GORDON, RESEARCH

EVENT 69-73  BELINGEN GLACIER DISAPPEARANCE

The Belingen Glacier is located in the Southern Alps of New South Wales, Australia. It was first described in 1893 and was recorded as being 270 feet thick and 3,000 feet long. By 1928, it had disappeared entirely. Further research has shown that the glacier was never actually present, and that the description of the glacier was based on a misinterpretation of the topography. The phenomenon has been attributed to the accumulation of ice at the head of the glacier, causing tremendous pressures to set the glacier periodically into rapid motion. The advancing glacier front is 500 feet high and 1,000 feet wide. The advance was first detected on 17 April 1973. The normal rate of the Bear Glacier has been about 500 feet a year. During the surge it has reached rates of 30 feet a day. In 1963 it took two months before a dammed-up lake in a tributary valley broke through the ice barrier to release the Vanch Valley. The flood was of such magnitude that it rose the level of the Vanch River by 10 feet at the town of Vanch 160 miles downstream from the glacier. According to the latest progress report, 350 million cubic feet of water have already accumulated, compared with about 300 million in 1963.

BELINGEN GLACIER DISAPPEARANCE

31 MAY 1973  1647.

DATE OCCURRENCE  31 MAY 1973
LOCATION OF EVENT  BELINGEN GLACIER, AUSTRALIA
REPORTING SOURCE: E. H. SMITH, ATTORNEY
SOURCE CONTACT  D. L. K. COCHRAN
SMITHSONIAN INSTITUTION CENTER FOR ENVIRONMENTAL PROTECTION
C. H. HAWKINS, DIRECTOR
E. H. SMITH, ATTORNEY
S. T. GORDON, RESEARCH

EVENT 70-73  GLACIER SURGE

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GLACIER SURGE

31 MAY 1973  1647.

DATE OCCURRENCE  31 MAY 1973
LOCATION OF EVENT  GLACIER SURGE, CANADA
REPORTING SOURCE: E. H. SMITH, ATTORNEY
SOURCE CONTACT  D. L. K. COCHRAN
SMITHSONIAN INSTITUTION CENTER FOR ENVIRONMENTAL PROTECTION
C. H. HAWKINS, DIRECTOR
E. H. SMITH, ATTORNEY
S. T. GORDON, RESEARCH
**EVENT 77-73***

**ESSO BRUSSELS OIL SPILL**

<table>
<thead>
<tr>
<th>DATE</th>
<th>5 JUNE 1973</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td>1650</td>
</tr>
</tbody>
</table>

On Saturday, 2 June at 12:41 a.m., the Sea Witch, a container ship owned by American Export, splashed a cargo of oil from the ESSO Brussels oil tanker. The ESSO Brussels was moored at a federal anchorage in New York Harbor and had completed loading 6000 barrels of Nigerian crude oil at the time of the accident. She carried a total of 9,218,000 gallons of oil. The Sea Witch was outbound for Antwerp and carried a general cargo. The amount of oil spilled is not known. Some of the oil was burned off in the violent explosion which followed the crash. The oil which did not spill will be recovered from the ESSO Brussels as soon as the seas cool sufficiently. A northwesterly wind and outgoing tides pushed much of the oil involved in the spill out to sea. Some of the viscous, tar-like oil has come up on the beaches of Staten Island and Cary Island. Three companies, Coastal Services, Inc. of Elizabeth, New Jersey; Clean Sea, Inc. of Tom's River, New Jersey; and Metropolitan Petroleum Co. of New York City, New York, were contracted to help with the clean-up, which is under the control of the Coast Guard and the federal Environmental Protection Agency. The oil is being raked up with pitchforks. The clean-up is expected to be completed by the end of this week.

**EVENT 79-73***

**SANTA BARBARA OIL SLICK**

<table>
<thead>
<tr>
<th>DATE</th>
<th>7 JUNE 1973</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td>1652</td>
</tr>
</tbody>
</table>

On 4 June 1973, the natural seepage of oil near Coal Oil Point began to increase causing a large oil slick off the Santa Barbara coast in California. Coast Guard helicopters estimated the slick to be 5 miles long and 50-75 yards wide by Tuesday, 5 June. The quantity of oil involved is not known.

**EVENT 84-73***

**JAPANESE SEAWEED INTRODUCTION TO ENGLAND**

<table>
<thead>
<tr>
<th>DATE</th>
<th>19 JUNE 1973</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td>1650</td>
</tr>
</tbody>
</table>

A species of Japanese seaweed, Sargassum muticum, has been introduced to England's south coast along the shores of Portland and the Isle of Wight. The seaweed has been growing in this region for at least two years and is threatening local seaweed species. The manner of introduction of Sargassum muticum to Great Britain is unknown.

Sargassum muticum grows to a height of about 2 meters. The rate of growth is 1 to 2 centimeters per day. It grows on rocky shores and its range extends from the beach to a mile out from shore.

The foreign seaweed is being removed by hand from the beaches. It is hoped that it will be eliminated.

**EVENT 82-73***

**TIATIA VOLCANIC ERUPTION**

<table>
<thead>
<tr>
<th>DATE</th>
<th>16 JULY 1973</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td>1657</td>
</tr>
</tbody>
</table>

The Tiatia volcano began erupting several months ago after a 161-year period of inactivity. (In August 1812 there were normal eruptions, and in the middle of the 19th century several eruptions were reported.) During the current activity a crater has formed at the summit of the eastern slope and is ejecting ash at one-second intervals. The eruption cloud reaches a height of 5 kilometers above the summit, and flames can be observed at night.

The explosions are audible up to a distance of 1.5 kilometers from the volcano, and the depth of ash near the volcano measures up to 60 cm thick.

Tiatia is a stratovolcano of the cone type, located at the northeastern extremity of the Kamchatka Peninsula. The geographical position of the central crater is latitude 44°10'N., longitude 144°10'E., the height above sea level is 1822 meters.

**EVENT 91-73***

**SANTA BARBARA OIL SPILL**

<table>
<thead>
<tr>
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<th>9 JUNE 1973</th>
</tr>
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<tr>
<td>TIME</td>
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**EVENT 92-73***

**TIATIA VOLCANIC ERUPTION**

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EVENT 93-73  NISHINOSHIMA SUBMARINE VOLCANIC ERUPTION

A small submarine volcanic eruption near Nishinoshima Island was reported to have occurred at about 11:00 a.m. on 30 May 1973. The crew of the fishing boat Boga-11 turned away this morning at a time of concern by the Japan Maritime Safety Agency on 31 May, the period of eruption was determined to be about 400 meters east of the island at intervals of a few minutes. During an aerial inspection by the Japan Maritime Safety Agency on 31 May, the site of eruption was determined to be about 400 meters east of Nishinoshima. A white plume was noticed around the crater and yellowish-green sea water and floating objects were seen about five kilometers north of the site. According to Dr. Tatsumi, who was fishing at the site, the eruption was observed as a large plume of smoke rising from the surface of the ocean, accompanied by a loud rumbling. The plume was seen at intervals of a few minutes, and yellowish-green sea water and floating objects were seen about five kilometers north of the site. The eruption was observed for about two hours and was accompanied by a loud rumbling. The plume was seen at intervals of a few minutes, and yellowish-green sea water and floating objects were seen about five kilometers north of the site. The eruption was observed for about two hours and was accompanied by a loud rumbling. The plume was seen at intervals of a few minutes, and yellowish-green sea water and floating objects were seen about five kilometers north of the site. The eruption was observed for about two hours and was accompanied by a loud rumbling. The plume was seen at intervals of a few minutes, and yellowish-green sea water and floating objects were seen about five kilometers north of the site. The eruption was observed for about two hours and was accompanied by a loud rumbling.

Nishinoshima Island is located at latitude 27°14.6′, longitude 148°25′00″. It is 650 m long by 800 m wide, and the highest point of land is 105 m above sea level. There is no historical record of an eruption on the island, nor of a submarine eruption around it.

EVENT 94-73  CURACAO REEF SUBMARINE VOLCANIC ACTIVITY

Mr. Graf has notified the Center by cable that: "American Airlines Flight No. 202, from Nandi, Fiji, to Pago Pago, reports what appears to be a volcanic action in the area 15 degrees 20 minutes South, 173 degrees 55 minutes West, approximately 240 kilometers southwest of American Samoa, on a direct line from Nandi to Pago Pago. "The activity is centered around Curacao Reef. The aircraft reports that it appears to be a 'gigantic oil spill', with water boiling up at a rate of 3 knots."

EVENT 96-73  MOUNT LANGILA VOLCANIC ERUPTION

The eruption of lava from the No. 3 crater of Mount Langila in western New Britain commenced on 12 July 1973. There had been increased ash and steam emission during the preceding month.

The lava flow was approximately one kilometer long and 200 meters wide by 19 July with lava still being extruded accompanied by loud rumblings.

Only two other flows have been recorded this century, in 1963 and 1967. Both of these were small.

Mount Langila is a stratovolcano located 11 kilometers south of Cape Gloucester, which is on the northern coast of the western end of New Britain. The geographical coordinates are lat. 9°31′30″, long. 148°25′00″. The volcano rises 1,109 meters above sea level.

EVENT 97-73  LAGOA RODRIGO DE FREITAS FISH KILL

On 11-15 June 1973 a fish kill occurred in Lagoa Rodrigo de Freitas, a lagoon of brackish water in the south zone of Rio de Janeiro bordering the districts of Ipanema and Leblon, and connected by a canal to the ocean. The area affected was about 2,500 sq. km, and the average depth was 2.8 m. Several tons of dead fish were removed. Three main species were killed: mullet (Mugil spp.), mullet (Mugil spp.), and snook (Centropomus undecialis). Fish kills have been recorded in Lagoa Rodrigo de Freitas since 1921. Twenty-six kills have been recorded since 1953. These kills occurred at various times throughout all months of the year. Reported damages removed from the lagoon vary from 2-450 T, the latter being the largest in 1971 (November). The last large kill occurred in mid-November 1972 when an estimated 55 T of fish were removed. Lagoa has been increasingly polluted with sewage over the last century. Exchange of water from the sea is normally low. Diffusion on the bottom supports anaerobic bacteria and produces H2S. Periodic disturbances of layering in the water, which are produced by meteorological factors (solar heating, evaporation, surface winds, etc.) bring lower layers of water up to the surface. Fish kills are thought to be caused by H2S poisoning and oxygen depletion.

The state of Guanabara's agency SUSEAN (Superintendencia de Urbanisacao e Saneamento) is investigating the kills in an attempt to find a solution to the problem.

EVENT 98-73  LAGOA RODRIGO DE FREITAS FISH KILL

On 23 July 1973...

EVENT 99-73  LAGOA RODRIGO DE FREITAS FISH KILL

On 23 July 1973...

EVENT 100-73  LAGOA RODRIGO DE FREITAS FISH KILL

On 23 July 1973...
There has been an infestation of hemlock looper, a caterpillar, in Essex County, Massachusetts. This insect primarily attacks hemlock trees. The infestation actually began two years ago. It was not serious the first year, but was fairly heavy in 1972. This year reports indicate that the infestation is even heavier and more widespread. Outbreaks such as this normally collapse after 2-3 years. The last hemlock looper outbreak in Essex County occurred 20 years ago. There is no record before that.

An aerial survey has not yet been conducted this year. Last year's survey showed damage in the towns of Essex, Manchester and West Gloucester. It was thought that there was damage in all six towns, but this did not show from the air.

After the moths mate, the eggs are laid on the twigs and needles of the hemlock. When the caterpillars hatch, they are very small and develop slowly. The feeding during the infestation 20 years ago, has just begun.

During the infestation 20 years ago, DDT was used for control. Since DDT can no longer be used, there is no totally effective means of controlling the insects. Sevin is a compound which is being used to fight the current infestation. The caterpillars are presently in their most vulnerable stage.
The Douglas fir tussock moth (Choristoneura fumiferana), an insect native to the western half of North America, has been building up since 1971 when it defoliated 32,500 acres in outbreak proportions in Plymouth County, Massachusetts. It is attacking the pitch pine (Pinus rigida), a major species of pine in those areas, and is causing considerable damage.

The population numbers of this insect have been building up since 1971 when it defoliated 32,500 acres. In 1972 the amount of defoliated acreage nearly quadrupled to 42,700 acres were visibly damaged.

Aerial treatment with malathion was used for control.

The tussock moth is native to the western half of North America. When weather conditions and other factors are favorable, there is a population explosion. According to entomologists, the explosion follows several years of inconspicuous build-up and is not usually noticed until the trees begin to die in the second year of the three-year cycle. Normally a virus appears in the moth population and kills off the infestation in the third year. Foresters and pest control specialists, however, say that may not happen this time because levels have increased in the area, and as one dies off, others may replace it.
1 NOVEMBER 1973

**EVENT NOTIFICATION REPORT**

**TYPE OF EVENT**

**DATE OF OCCURRENCE** November 1973

**LOCATION OF EVENT** SOUTHERN PART OF THE ISLAND OF ISABELA, ECUADOR

**REPORTING SOURCE** GEOLOGICAL SURVEY, WASHINGTON, D.C.

**SOURCE CONTACT** REBECCA W. MCKAY, SU 203

---

**EVENT 139-73 SAKURAZIMA VOLCANIC ACTIVITY**

Galapagos National Park wardens on west flank of Volcan Wolf two weeks ago heard strange and constant rumbling from caldera. The rumble could be heard at the coast 6 km from the caldera rim and continued through the night. No reports of unusual cloud, but clouds frequently obscure summit and volcano cannot be seen from inhabited parts of archipelago. Darwin Station seismographs report no unusual seismicity but earthquake swarm earlier this year (Event Card 159-73) appeared centered on the southeast flank of Wolf, the site of the last eruption (10/23-24), and best-located on March 19, 1973. Darwin Station party is on route to investigate and SKYLAB will photograph. The last recorded eruption of this, the northernmost shield volcano on the largest Galapagos Is., occurred on the southeast flank in 1968 and 1969. The equator crosses the south end of the caldera at 150 km. and the rim is 6 km in diameter, 1710 meters above the sea, and 670 meters above the caldera floor. Reports of Galapagos volcano in early August of this year appear to have been influenced by NASA press release on successful SKYLAB photography of "Galapagos Eruptive Centers." No significant eruption was sighted by SKYLAB but shortly after the press release emerged from Ecuadorian newspapers cloud and S.H.M. were reported from the volcano at Cape Breton, N.W. Ireland. These reports have been investigated on the volcano by Darwin Station personnel and no evidence of an August eruption has been found. The only other Galapagos volcano known since the 1968 Fernandina caldera collapse is the 1972 Fernandina eruption reported in June of this year (Event Card 159-73). We now have more accurate data for this eruption which had not taken place on April 22. During telephone notification of the Wolf activity to Dr. Bert Nordlie we learned that the eruption was prior to his visit to Fernandina in mid-July of 1972, but it was not reported to the Darwin Station or other Galapagos workers. *
**EVENT 156-73**

**ERTA’ALE VOLCANIC ACTIVITY**

We are presently observing Erta’Ale from both air and land. A new track has been built by H. M. Ras Mengsha Seyoum, governor Tigre Province, reaching the crater. I was personally at the crater for the last two nights, and both craters are still active with permanent lava-lake activity and fountaining.

Eruptions are frequently observed from both craters, filling the mist elliptic sink and even overflowing the sink towards the south.

An eruption also recently occurred on the northern flank, some 100 m. long, in a northerly direction. The center of eruption of this flow is located on the northern edge of the crater and is still active (fumaroles).

"I intend to return to Erta’Ale within a few days and also during the first days of January."

---

**EVENT 3-74**

**CHILE-BOLIVIA BORDER EARTHQUAKE**

A strong earthquake shook southern Bolivia, northern Argentina, and northeastern Chile on 2 January 1974, according to the Seismological Institute of the University of Chile, the tremor lasted for one minute and 45 seconds. Maximum intensity was felt in Calama, Antofagasta Province, Chile. Many buildings were cracked in Calama, but none collapsed. Three people were injured at Chupolamata, a large copper mine near Calama.

On 2 January 1974 an oil tank at the Mobil Oil facility on Duck Island just south of Trenton, New Jersey ruptured and 600,000 gallons of No. 2 fuel oil spilled out: 370,000 gallons were contained within the dike system surrounding the tank, 10,000 gallons were trapped in a swamp and about 23,000 gallons entered the Delaware River. Approximately five miles of the river were affected (the river is a mile wide in the area of the spill).

The oil trapped by the dikes is being returned to the tank through a separator system. Oil is being removed from the swamp and the Exxon Clean-up Company has been contracted to clean up the water.

The extent of the damage to the flora and fauna of the river and swamp is unknown at present.
Event 9-74: Reventador Volcanic Activity

Reventador is a strato volcano located at latitude 00° 05'S., longitude 77° 40'W. One of the most active volcanoes in Ecuador, it rises 1485 meters above sea level. Dr. Hall reported the following by cable:

"Visited Reventador on 15 Dec 1973 for one hour. Cone [1,000 feet high] in SW corner of caldera in eruption. Upper plume, 1 km long, heads SW. Considerable noise from crater, no explosions, no material being ejected. Small lava lake in crater. Narrow lava flow 1.5 km long leaves lake, flows due E down cone and out onto plain. Flow began Nov. 1973 and is in motion. It is a blocky flow of olivine-rich basaltic andesite. The flow is dark black in color, but grey on sides due to fresh exposure of new material by avalanching. Flow slowly heading E for main road, oil pipe line, and Rio Coca. To W, extensive mud flow (2 km long, 1 km wide), grey in color, flowed NE. Black basalt flow of July 1972 lies immediately W of labor, flowed NE from cone. S side of cone: grey and black blocky flows up to 5 km long. W side: grey blocky flows one-half km long above central caldera wall. N side: same as W side. SE side: scalded overgrown flows, green in color. From border of caldera outward, dense green jungle. Area of recent activity, and not overgrown by jungle, approximately 4 km in diameter. Plan expedition for longer stay in Feb. 1974."

Event 11-74: Pacific Submarine Volcanic Eruption

Dr. Johnson reported the following to the Center:

"Sofar hydrophone records from Wake and Midway Islands indicate a sustained submarine volcanic eruption near 25° latitude, 144° longitude. Eruption noise was first detectable about 1800 GMT, 25 September 1973 and was continuing unabated as of 14 January 1974."

The subject area is approximately 250 miles (400 km) southeast of two islands, and 580 miles (935 km) north of Guam.
APPENDIX B

SAMPLE CABLE MESSAGES
"SKYLAB - SHORT-LIVED EVENT ALERT PROGRAM DAILY STATUS REPORT."

EVENT: NISHINO-SHIMA SUBMARINE VOLCANIC ERUPTION
STATE/COUNTRY: BONIN ISLANDS, JAPAN
LOCATION: LAT: 27 DEG 15 MINS N. LONG: 140 DEG 54 MINS E.

DESCRIPTION: NISHINO-SHIMA ERUPTION HAS FORMED CHAIN OF CINDER CONES ABOVE SEA SURFACE. NEW INSULAR VOLCANO APPEARED ABOVE SEA 600 METERS SOUTHEAST NISHINO-SHIMA ON 14 SEPT. ISLAND WAS 120 METERS DIAMETER WITH 70 METER DIAMETER CRATER. SMOKE EJECTED TO 1500 METERS HEIGHT. CHAIN OF CINDER CONES RUNS SOUTHWEST TO NORTHEAST AND IS 600 METERS IN LENGTH. Eruptions NOW OCCURRING AT INTERVALS OF 1 TO 10 MINUTES WITH WATER PLUMES, VOLCANIC BLOCKS AND ASHES. CINDER COLUMN NOW REACHES MAXIMUM HEIGHT OF 300 METERS.

GROUND TRUTH: THE SEISMOLOGICAL DIVISION OF THE JAPAN METEOROLOGICAL AGENCY, TOKYO, JAPAN, IS CLOSELY MONITORING THIS VOLCANO AND HAS BEEN EVER SINCE IT BEGAN ERUPTING IN MAY 1973. PHOTOS HAVE BEEN TAKEN OF THE ERUPTION, BUT TEAMS OF INVESTIGATORS HAVE BEEN UNABLE TO LAND THEIR BOATS ON THE ISLANDS BECAUSE OF ROUGH SEAS.

PRIORITY: FIRST PHOTOGRAPHY: HIGHEST - TO ESTABLISH BASELINE DATA. SUBSEQUENT PHOTOGRAPHY: HIGHEST - VOLCANIC ACTIVITY HAS SLOWED DOWN CONSIDERABLY AND SOME OF THE CINDER CONES ARE BEING ERODED BY WAVE ACTION. ALL CINDER-CONE ISLANDS MAY BE COMPLETELY ERODED BY WAVE ACTION BY END OF DECEMBER.

EVENT: REVENTADOR VOLCANIC ACTIVITY
STATE/COUNTRY: NAPO, ECUADOR
LOCATION: LAT: 00 DEG 05 MINS S. LONG: 77 DEG 40 MINS W.

DESCRIPTION: REVENTADOR, A STRATO VOLCANO, IS ONE OF THE MOST ACTIVE VOLCANOES IN ECUADOR, AND RISES 3485 METERS ABOVE SEA LEVEL.

REVENTADOR ON 15 DEC 1973: CONE (1,000 FEET HIGH) IN SW CORNER OF CALDERA IN ERUPTION. VAPOR PLUME, 1 KM LONG, HEADS SW. CONSIDERABLE NOISE FROM CRATER, NO EXPLOSIONS, NO MATERIAL BEING EJECTED. SMALL LAVA LAKE IN CRATER. NARROW LAVA FLOW 1.5 KM LONG LEAVES LAKE, FLOWS DUE E DOWN CONE AND OUT ONTO PLAIN. FLOW BEGAN NOV. 1973 AND IS IN MOTION. IT IS A BLOCKY FLOW OF OLIVINE-RICH BASALTIC ANDESITE. THE FLOW IS DARK BLACK IN COLOR, BUT GREY ON SIDES DUE TO FRESH EXPOSURE OF NEW MATERIAL BY AVALANCING. FLOW SLOWLY HEADING E FOR MAIN ROAD, OIL PIPE LINE, AND RIO COCA. TO N. EXTENSIVE MUD FLOW (3KM LONG, 1 KM WIDE), GREY IN COLOR, FLOWED NE. BLACK BASALT FLOW OF JULY 1972 LIES IMMEDIATELY N OF LAHAR, FLOWED NE FROM CONE. AREA OF RECENT ACTIVITY, AND NOT OVERGROWN BY JUNGLE, APPROXIMATELY 4KM IN DIAMETER.


PRIORITY: HIGH. THIS VOLCANO VERY INACCESSIBLE AND IMAGERY FROM SKYLAB WOULD BE MOST USEFUL TO COMPARE WITH DECEMBER AND FEBRUARY GROUND TRUTH OBSERVATIONS.

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PRIORITY: HIGH. THIS VOLCANO VERY INACCESSIBLE AND IMAGERY FROM SKYLAB WOULD BE MOST USEFUL TO COMPARE WITH DECEMBER AND FEBRUARY GROUND TRUTH OBSERVATIONS.
TRACK: 13 REV: 3664 GMT: 23/094404 LIGHT CONDITION: DAYLIGHT
EVENT: SOUTH VIETNAM FOREST DEFOILIATION
STATE/COUNTRY: SOUTH VIETNAM
LOCATION: LAT: 11 DEG 00 MINS N. LONG: 106 DEG 40 MINS E.
11 DEG 45 MINS N. 107 DEG 20 MINS E.
DESCRIPTION: ERTS IMAGERY OBTAINED 20 JAN 1973 (PHOTO 1181-
O2A443) SHOWS MANY NORTH-SOUTH SWATHS OF DEFOILIATION WITH
HIGH REFLECTIVITY SCATTERED IN PREVIOUSLY DENSLEY FORESTED
AREA APPROXIMATELY 60 KM BY 60 KM. SWATHS ARE ABOUT 10 KM
LONG AND 200 METERS WIDE, AND ARE PARTICULARLY CONCENTRATED
IN TWO AREAS: AT LONGITUDE 106 DEG 58 MIN EAST FROM 11 DEG
18 MIN NORTH TO 11 DEG 27 MIN NORTH, AND AT LONGITUDE 107 DEG
07 MIN EAST FROM 11 DEG 10 MIN NORTH TO 11 DEG 15 MIN NORTH.
GEOGRAPHICAL CENTER OF SWATH AREA IS 107 DEG 00 MIN EAST,
11 DEG 20 MIN NORTH. DR MATTHEW MESELSON, BIOLOGICAL
LABORATORIES, HARVARD UNIVERSITY, CAMBRIDGE, MASS., BELIEVES
LONG-TERM EFFECTS OF DEFOILIATION WILL PROBABLY RESULT IN
AFFECTED AREAS TUNRING INTO SAVANNAS.
PRIORITY: HIGH. COMPARISON OF IMAGERY FROM SKYLAB WITH ERTS
PHOTO VERY DESIREABLE IN ORDER TO DETERMINE CHANGES OVER ONE
YEAR PERIOD, AND TO SEE WHAT CURRENT STATUS IS. WEATHER THIS
TIME OF YEAR FAVORABLE FOR PHOTOGRAPHY. HIGH RESOLUTION
PHOTOGRAPHY REQUESTED.

EVENT: CHORISTONEURA POPULATION INCREASE
STATE/COUNTRY: NORTHERN MAINE, U.S.A.
LOCATION: LAT: 46 DEG 30 MINS N. LONG: 68 DEG 00 MINS W.
47 DEG 30 MINS N. 70 DEG 00 MINS W.
DESCRIPTION: THERE HAS BEEN MASSIVE OUTBREAK OF SPRUCE BUD WORM
(CHORISTONEURA FUMIFERANA) IN NORTHERN MAINE. ABOUT 3 TO 4
MILLION ACRES OF FOREST HAVE BEEN AFFECTED IN REGION. POPULATION INCREASE
BEGAN 2-3 YEARS AGO BUT NUMBERS OF THESE MOTHS ESPECIALLY HIGH THIS
YEAR.
MORE

20/1405Z JAN GSAO

PAGE TWO GSAO 20/1400Z
"SKYLAB - SHORT-LIVED EVENT ALERT PROGRAM DAILY STATUS REPORT."
TRACK: 17 REV: 3667 GMT: 23/151025 LIGHT CONDITION: DARKNESS
EVENT: KILAUEA VOLCANIC ERUPTION
STATE/COUNTRY: ISLAND OF HAWAII, U.S.A.
LOCATION: LAT: 19 DEG 24 MINS N. LONG: 155 DEG 16 MINS W.
DESCRIPTION: LAVA LAKE IN MAUNA ULU CRATER FILLED TO BRIM AND OVERFLOWED 4 NOV. FOUNTAINS WITH HEIGHTS OF 40 METERS AND OVERFLOWS CONTINUED FOR 4 DAYS. ON 10 NOV. LAVA FOUNTAINS BEGAN AS FISSURE OPENED IN PAUAHI CRATER, 6 KM SOUTHEAST KILAUEA CALDERA AND 2 KM WEST OF MAUNA ULU. ADDITIONAL FISSURES OPENED EAST AND WEST OF PAUAHI IN BELT 2 KM LONG. FOUNTAINS REACHED HEIGHTS OF 75 METERS. SLUGGISH OUTFLOW WAS CONTINUING 16 NOV. AND SUMMIT INFLATION HAS RESUMED. APPROX 100 HECTARES OF LAND COVERED BY NEW LAVA DURING PAUAHI EPISODE. APPROX 3 MILLION CUBIC METERS LAVA ERUPTED DURING THE 8 HOURS OF STRONGEST ACTIVITY.

GROUND TRUTH: DR. DONALD PETERSON, U.S. GEOLOGICAL SURVEY AND TEAM OF SEISMOLOGISTS, GEOPHYSICISTS, GEOCHEMISTS, AND VOLCANOLOGISTS CONDUCT LONG-TERM, CONTINUOUS MONITORING OF VOLCANO SEISMICITY, LAVA VOLUME, LEVELS, FLOW RATES, COMPOSITION, TEMPERATURE, ETC. CONTINUOUS RESEARCH PROGRAM INCLUDING DEVELOPMENT OF ERUPTION PREDICTION TECHNIQUES IS BEING UNDERTAKEN USING DATA FROM U.S. GEOLOGICAL SURVEY'S HAWAIIAN VOLCANO OBSERVATORY LOCATED IN HAWAII VOLCANOES NATIONAL PARK, ISLAND OF HAWAII, HAWAII.

PRIORITY: FIRST PHOTOGRAPHY: HIGHEST - TO ESTABLISH BASELINE DATA. SUBSEQUENT PHOTOGRAPHY: HIGH - TO OBTAIN SYSTEMATIC OBSERVATIONS AND TIME HISTORY OF ERUPTION PHENOMENA. MAJOR ACTIVITY USUALLY LASTS ONLY A FEW DAYS OR WEEKS. EXPECT CURRENT ACTIVITY TO STOP BY MID-DECEMBER.

TRACK: 17 REV: 3667 GMT: 23/153135 TO 153159 LIGHT CONDITION: DAYLIGHT
19 3669 23/183616 TO 183638 DAYLIGHT
EVENT: DOUGLAS FIR TUSSOCK MOTH OUTBREAK
STATE/COUNTRY: WASHINGTON, IDAHO, OREGON, U.S.A.
LOCATION: LAT: 45 DEG 00 MINS N. LONG 116 DEG 00 MINS W.
TO
49 DEG 00 MINS N. 118 DEG 00 MINS W.
DESCRIPTION: DOUGLAS FIR TUSSOCK MOTH HAS BEEN IN OUTBREAK PROPORTIONS FOR PAST TWO YEARS AND IS PRESENTLY INFESTING 700,000 ACRES OF TREES IN SUBJECT AREA. TUSSOCK MOTH IS NATIVE TO WESTERN HALF NORTH AMERICA. POPULATION EXPLOSION. RESULTS WHEN WEATHER CONDITIONS AND OTHER FACTORS ARE FAVORABLE. RESULT OF INFESTATION IS DEATH OF TREES.

TRACK: 18 REV: 3668 GMT: 23/170752 LIGHT CONDITION: DAYLIGHT
EVENT: MASSACHUSETTS PINE LOOPER OUTBREAK
STATE/COUNTRY: PLYMOUTH COUNTY & CAPE COD, MASS. U.S.A.
LOCATION: LAT: 41 DEG 30 MINS N. LONG: 70 DEG 00 MINS W.
TO
42 DEG 30 MINS N. 71 DEG 00 MINS W.
DESCRIPTION: PINE LOOPER (LAMBDINIA ATHASARIA PELLUCIDARIA) IS IN OUTBREAK PROPORTIONS IN SUBJECT AREA. IT IS CAUSING CONSIDERABLE DAMAGE TO PITCH PINES (PINUS RIGIDA), A MAJOR SPECIES OF PINE IN AREA. POPULATION NUMBERS HAVE BEEN BUILDING SINCE 1971 WHEN 111,000 ACRES WERE DEFOLIATED. IN 1972 42,000 ACRES WERE DEFOLIATED.
EVENT: LPAMPA GRASSLAND FIRES
STATE/COUNTRY: LPAMPA PROVINCE, ARGENTINA
LOCATION: LAT: 36 DEG 00 MINS S. LONG: 64 DEG 00 MINS W.
TO 38 DEG 30 MINS S. 68 DEG 00 MINS W.

DESCRIPTION: FIRES WERE REPORTED TO BE WORST IN RECORDED HISTORY OF ARGENTINA. BEGAN 16 DECEMBER 1973, FINALLY ENDED 6 JANUARY 1974. 1.2 MILLION ACRES WERE AFFECTED. AREA IS Densely forested in general, several types of trees are native, some 300-400 years old. Vast forest acreage destroyed, but fire did not involve area of major agricultural importance, either for cattle or crops. Human population density very low.

GROUND TRUTH: SEVERAL AGENCIES AFFILIATED WITH THE PROVINCIAL GOVERNMENT, LOCATED IN THE CAPITAL, SANTA ROSA, WERE INVOLVED IN INVESTIGATING AND CONTROLLING THE FIRES.

PRIORITY: MEDIUM. HIGH RESOLUTION PHOTOS SHOWING DEVASTATED AREAS WOULD BE USEFUL IN FOREST FIRE STUDIES.
TRACK: 52 REV: 3702 GHT: 26/063459 LIGHT CONDITION: DARKNESS
EVENT: ERATA'ALE VOLCANO
STATE/COUNTRY: ETHIOPIA
LOCATION: LAT: 13 DEG 57 MINS N. LONG: 46 DEG 36 MINS E.

DESCRIPTION: ERATA'ALE IS A STRATO VOLCANO 500 METERS A.S.L. TOP OF VOLCANO ALWAYS SHOWS FUMAROLIC ACTIVITY. BASE OF VOLCANO IS IN THE DANAKIL DEPRESSION 75 METERS BELOW SEA LEVEL. ACTUAL CONE CONTAINING SUMMIT CRATER BEGINS AT HEIGHT OF 450 METERS. LAVA FLOWS AND EJECTA CONSTITUTE THE FLANKS AND FOOT OF VOLCANO. HOT FUMES RISE FROM FISSURES IN THE LAVA AT CRATER BOTTOM AND THE WALLS. OVERALL AREA 1600 BY 700 METERS.


PRIORITY: FIRST PHOTOGRAPHY: HIGH - TO ESTABLISH BASELINE INFORMATION. SUBSEQUENT PHOTOGRAPHY: LOW - PERMANENTLY ACTIVE LAVA LAKE CHARACTERIZES VOLCANO.

TRACK: 60 REV: 3710 GHT: 26/144935 TO 144915 LIGHT CONDITION: DAWN
EVENT: DOUGLAS FIR TUSSOCK MOTH OUTBREAK
STATE/COUNTRY: WASHINGTON, IDAHO, OREGON, U.S.A.
LOCATION: LAT: 45 DEG 00 MINS N. LONG: 116 DEG 00 MINS W.

TO

49 DEG 00 MINS N. 115 DEG 00 MINS W.

DESCRIPTION: DOUGLAS FIR TUSSOCK MOTH HAS BEEN IN OUTBREAK PROPORTIONS FOR PAST TWO YEARS AND IS PRESENTLY INFESTING 700,000 ACRES OF TREES IN SUBJECT AREA. TUSSOCK MOTH IS NATIVE TO WESTERN HALF NORTH AMERICA. POPULATION EXPLOSION RESULTS WHEN WEATHER CONDITIONS AND OTHER FACTORS ARE FAVORABLE. RESULT OF INFESTATION IS DEATH OF TREES.

TRACK: 60 REV: 3710 GHT: 26/145735 TO 145745 LIGHT CONDITION: DAYLIGHT
EVENT: CHORISTONEURA POPULATION INCREASE
STATE/COUNTRY: NORTHERN MAINE, U.S.A.
LOCATION: LAT: 46 DEG 30 MINS N. LONG: 68 DEG 00 MINS W.

TO

47 DEG 30 MINS N. 70 DEG 00 MINS W.

DESCRIPTION: THERE HAS BEEN MASSIVE OUTBREAK OF SPRUCE BUD WORM (CHORISTONEURA FUMIFERANA) IN NORTHERN MAINE. ABOUT 3 TO 4 MILLION ACRES OF FOREST HAVE BEEN AFFECTED IN REGION. POPULATION INCREASE BEGAN 2-3 YEARS AGO BUT NUMBERS OF THESE MOTHS ESPECIALLY HIGH THIS YEAR.

TRACK: 63 REV: 3713 GHT: 26/200241 LIGHT CONDITION: DAYLIGHT
EVENT: CHILE-BOLIVIA BORDER EARTHQUAKE
STATE/COUNTRY: POTOSI STATE, BOLIVIA
LOCATION: LAT: 22 DEG 16 MINS S. LONG: 68 DEG 00 MINS W.

DESCRIPTION: RICHTER MAGNITUDE 6.9 EARTHQUAKE OCCURRED 1842 GMT, 2 JANUARY 1973. MAXIMUM INTENSITY REPORTEDLY FELT IN CALAMA, ANTOFAGASTA PROVINCE, CHILE. MANY BUILDINGS CRACKED, REPORTS OF SCATTERED LOCAL LANDSLIDES.

GROUND TRUTH: RESEARCHERS ON SCENE ASSESSING EFFECTS OF TREMOR ON ENVIRONMENT.

PRIORITY: HIGH. EFFECTS OF EARTHQUAKE ON PHYSICAL ENVIRONMENT MAY ONLY BE VISIBLE FROM SATELLITES OR AIRCRAFT.

23/1465Z JAN 6SAO
"SKYLAB - SHORT-LIVED EVENT ALERT PROGRAM DAILY STATUS REPORT."

**TRACK:** 11 **REV:** 39033 **GJT:** 02/005016 **LIGHT CONDITION:** DAYLIGHT

**EVENT:** NISHINO-SHIMA SUBMARINE VOLCANIC ERUPTION

**STATE/COUNTRY:** BONIN ISLANDS, JAPAN

**LOCATION:** LAT: 27 DEG 15 MINS N. LONG: 140 DEG 54 MINS E.

**DESCRIPTION:** NISHINO-SHIMA ERUPTION HAS FORMED CHAIN OF CINDER CONES ABOVE SEA SURFACE. NEW INSULAR VOLCANO APPEARED ABOVE SEA 600 METERS SOUTHEAST NISHINO-SHIMA ON 14 SEPT. ISLAND WAS 120 METERS DIAMETER WITH 70 METER DIAMETER CRATER. SMOKE EJECTED TO 1500 METERS HEIGHT. CHAIN OF CINDER CONES RUNS SOUTHWEST TO NORTHEAST AND IS 600 METERS IN LENGTH. ERUPTIONS NOW OCCURRING AT INTERVALS OF 1 TO 10 MINUTES WITH WATER PLUMES, VOLCANIC BLOCKS AND ASHES. CINDER COLUMN NOW REACHES MAXIMUM HEIGHT OF 300 METERS.

**GROUND TRUTH:** THE SEISMOLOGICAL DIVISION OF THE JAPAN METEOROLOGICAL AGENCY, TOKYO, JAPAN, IS CLOSELY MONITORING THIS VOLCANO AND HAS BEEN EVER SINCE IT BEGAN ERUPTING IN MAY 1973. PHOTOS HAVE BEEN TAKEN OF THE ERUPTION, BUT TEAMS OF INVESTIGATORS HAVE BEEN UNABLE TO LAND THEIR BOATS ON THE ISLANDS BECAUSE OF ROUGH SEAS.

**PRIORITY:** FIRST PHOTOGRAPHY: HIGHEST - TO ESTABLISH BASELINE DATA. SUBSEQUENT PHOTOGRAPHY: HIGHEST - VOLCANIC ACTIVITY HAS SLOWED DOWN CONSIDERABLY AND SOME OF THE CINDER CONES ARE BEING ERODED BY WAVE ACTION. ALL CINDER-CONE ISLANDS MAY BE COMPLETELY ERODED BY WAVE ACTION BY END OF DECEMBER.

**TRACK:** 13 **REV:** 3806 **GJT:** 02/040201 **LIGHT CONDITION:** DAYLIGHT

**EVENT:** SOUTH VIETNAM FOREST DEFOLIATION

**STATE/COUNTRY:** SOUTH VIETNAM

**LOCATION:** LAT: 11 DEG 00 MINS N. LONG: 106 DEG 40 MINS E.

TO

11 DEG 45 MINS N. 107 DEG 20 MINS E.

**DESCRIPTION:** ERTS IMAGERY OBTAINED 20 JAN 1973 (PHOTO 1181-02443) SHOWS MANY NORTH-SOUTH SWATHS OF DEFOLIATION WITH HIGH REFLECTIVITY SCATTERED IN PREVIOUSLY DENSELY FORESTED AREA APPROXIMATELY 60 KM BY 60 KM. SWATHS ARE ABOUT 10 KM LONG AND 200 METERS WIDE, AND ARE PARTICULARLY CONCENTRATED IN TWO AREAS: AT LONGITUDE 106 DEG 58 MIN EAST FROM 11 DEG 18 MIN NORTH TO 11 DEG 27 MIN NORTH, AND AT LONGITUDE 107 DEG 07 MIN EAST FROM 11 DEG 10 MIN NORTH TO 11 DEG 15 MIN NORTH. GEOGRAPHICAL CENTER OF SWATH AREA IS 107 DEG 00 MIN EAST, 11 DEG 20 MIN NORTH. DR MATTHEW MESELSON, BIOLOGICAL LABORATORIES, HARVARD UNIVERSITY, CAMBRIDGE, MASS., BELIEVES LONG-TERM EFFECTS OF DEFOLIATION WILL PROBABLY RESULT IN AFFECTED AREAS TURNING INTO SAVANNAS.

**PRIORITY:** HIGH. COMPARISON OF IMAGERY FROM SKYLAB WITH ERTS PHOTO VERY DESIRABLE IN ORDER TO DETERMINE CHANGES OVER ONE YEAR PERIOD, AND TO SEE WHAT CURRENT STATUS IS. WEATHER THIS TIME OF YEAR FAVORABLE FOR PHOTOGRAPHY. HIGH RESOLUTION PHOTOGRAPHY REQUESTED.
EVENT: PACIFIC SUBMARINE VOLCANIC ERUPTION
STATE/COUNTRY: AREA BETWEEN BONIN ISLANDS AND MARIANA ISLANDS, PACIFIC OCEAN
LOCATION: LAT: 22 DEG 00 MINS N. LONG: 144 DEG 00 MINS E.


GROUND TRUTH: DR. ROCKNE JOHNSON, HAWAII INSTITUTE OF GEOPHYSICS, HONOLULU, SENT REPORT OF THIS ACTIVITY.

PRIORITY: HIGH. DESIRABLE TO COMPARE SKYLAB IMAGERY WITH HYDROPHONE REPORTS.

MORE

30/1410Z JAN GSAO

"SKYLAB - SHORT-LIVED EVENT ALERT PROGRAM DAILY STATUS REPORT."

EVENT: REVENTADOR VOLCANIC ACTIVITY
STATE/COUNTRY: NAPO, ECUADOR
LOCATION: LAT: 00 DEG 05 MINS S. LONG: 77 DEG 40 MINS W.

DESCRIPTION: REVENTADOR, A STRATO VOLCANO, IS ONE OF THE MOST ACTIVE VOLCANOES IN ECUADOR, AND RISES 3485 METERS ABOVE SEA LEVEL.

REVENTADOR ON 15 DEC 1973: CONE (1,000 FEET HIGH) IN SW CORNER OF CALDERA IN ERUPTION. VAPOR PLUME, 1 KM LONG, HEADS SW. CONSIDERABLE NOISE FROM CRATER, NO EXPLOSIONS, N. MATERIAL BEEN EJECTED. SMALL LAVA LAKE IN CRATER. NARROW LAVA FLOW 1.5 KM LONG LEAVES LAKE, FLOWS DUE E DOWN CONE AND OUT ONTO PLAIN. FLOW BEGAN NOV. 1973 AND IS IN MOTION. IT IS A BLOCKY FLOW OF OLIVINE-RICH BASALTIC ANDESITE. THE FLOW IS DARK BLACK IN COLOR, BUT GREY ON SIDES DUE TO FRESH EXPOSURE OF NEW MATERIAL BY AVALANCHE. FLOW SLOWLY HEADING E FOR MAIN ROAD, OIL PIPE LINE, AND RIO COCA. IN N, EXTENSIVE MUD FLOW (5KM LONG, 1 KM WIDE), GREY IN COLOR, FLOWED NE. BLACK BASALT FLOW OF JULY 1972 LIES IMMEDIATELY N OF LAHAR, FLOWED NE FROM CONE.

AREA OF RECENT ACTIVITY, AND NOT OVERGROWN BY JUNGLE, APPROXIMATELY 4KM IN DIAMETER.


PRIORITY: HIGH. THIS VOLCANO VERY INACCESSIBLE AND IMAGERY FROM SKYLAB WOULD BE MOST USEFUL TO COMPARE WITH DECEMBER AND FEBRUARY GROUND TRUTH OBSERVATIONS.
TRACK: 17 REV: 3809 GMT:02/1114 LIGHT CONDITION: DARKNESS
EVENT: KILAUEA VOLCANIC ERUPTION
STATE/COUNTRY: ISLAND OF HAWAII, U.S.A.
LOCATION: LAT: 19 DEG 24 MINS N. LONG: 155 DEG 16 MINS W.

DESCRIPTION: LAVA LAKE IN MAUNA Ulu CRATER FILLED TO BRIM AND OVERFLOWED 4 NOV. FOUNTAINS WITH HEIGHTS OF 40 METERS AND OVERFLOWS CONTINUED FOR 4 DAYS. ON 10 NOV. LAVA FOUNTAINS BEGAN AS FISSURE OPENED IN PAUAHI CRATER, 6 KM SOUTHEAST KILAUEA CALDERA AND 2 KM WEST OF MAUNA Ulu. ADDITIONAL FISSURES OPENED EAST AND WEST OF PAUAHI IN BELT 2 KM LONG. FOUNTAINS REACHED HEIGHTS OF 75 METERS. SLAGGISH OUTFLOW WAS CONTINUING 16 NOV. AND SUMMIT INFLATION HAS RESUMED. APPROX 100 HECTARES OF LAND COVERED BY NEW LAVA DURING PAUAHI EPISODE. APPROX 3 MILLION CUBIC METERS LAVA Erupted DURING THE 5 HOURS OF STRONGEST ACTIVITY.

GROUND TRUTH: DR. DONALD PETERSON, U.S. GEOLOGICAL SURVEY AND TEAM OF SEISMOLOGISTS, GEOPHYSICISTS, GEOCHEMISTS, AND VOLCANOLOGISTS CONDUCT LONG-TERM, CONTINUOUS MONITORING OF VOLCANO SEISMICITY, LAVA VOLUME, LEVELS, FLOW RATES, COMPOSITION, TEMPERATURE, ETC. CONTINUOUS RESEARCH PROGRAM INCLUDING DEVELOPMENT OF ERUPTION PREDICTION TECHNIQUES IS BEING UNDERTAKEN USING DATA FROM U.S. GEOLOGICAL SURVEY'S HAWAIIAN VOLCANO OBSERVATORY LOCATED IN HAWAII VOLCANOES NATIONAL PARK, ISLAND OF HAWAII, HAWAII.

PRIORITY: FIRST PHOTOGRAPHY: HIGHEST - TO ESTABLISH BASELINE DATA. SUBSEQUENT PHOTOGRAPHY: HIGH - TO OBTAIN SYSTEMATIC OBSERVATIONS AND TIME HISTORY OF ERUPTION PHENOMENA. MAJOR ACTIVITY USUALLY LASTS ONLY A FEW DAYS OR WEEKS. EXPECT CURRENT ACTIVITY TO STOP BY MID-DECEMBER.

TRACK: 18 REV: 3810 GMT:02/1309 LIGHT CONDITION: DAYLIGHT
EVENT: MASSACHUSETTS PINE LOOPER OUTBREAK
STATE/COUNTRY: PLYMOUTH COUNTY & CAPE COD, MASS. U.S.A.
LOCATION: LAT: 41 DEG 30 MINS N. LONG: 70 DEG 00 MINS W. TO 42 DEG 30 MINS N. 71 DEG 00 MINS W.

DESCRIPTION: PINE LOOPER (CLAMBDINIA ATHASARIA PELLUCIDARIA) IS IN OUTBREAK PROPORTIONS IN SUBJECT AREA. IT IS CAUSING CONSIDERABLE DAMAGE TO PITCH PINES (PINUS RIGIDA), A MAJOR SPECIES OF PINE IN AREA. POPULATION NUMBERS HAVE BEEN BUILDING SINCE 1971 WHEN 11,000 ACRES WERE DEFOLIATED. IN 1972 42,000 ACRES WERE DEFOLIATED.
EVENT: DOUGLAS FIR TUSSOCK MOTH OUTBREAK
STATE/COUNTRY: WASHINGTON, IDAHO, OREGON, U.S.A.
LOCATION: LAT: 45 DEG 00 MINS N. LONG 116 DEG 00 MINS W.
TO 49 DEG 00 MINS N. 118 DEG 00 MINS W.
DESCRIPTION: DOUGLAS FIR TUSSOCK MOTH HAS BEEN IN OUTBREAK PROPORTIONS FOR PAST TWO YEARS AND IS PRESENTLY INFESTING 750,000 ACRES OF TREES IN SUBJECT AREA. TUSSOCK MOTH IS NATIVE TO WESTERN HALF NORTH AMERICA. POPULATION EXPLOSION RESULTS WHEN WEATHER CONDITIONS AND OTHER FACTORS ARE FAVORABLE. RESULT OF INFESTATION IS DEATH OF TREES.

EVENT: LA PAMPA GRASSLAND FIRES
STATE/COUNTRY: LA PAMPA PROVINCE, ARGENTINA
LOCATION: LAT: 36 DEG 00 MINS S. LONG: 64 DEG 00 MINS W.
TO 38 DEG 30 MINS S. 68 DEG 00 MINS W.
DESCRIPTION: FIRES WERE REPORTED TO BE WORST IN RECORDED HISTORY OF ARGENTINA. BEGAN 16 DECEMBER 1973, FINALLY ENDED 6 JANUARY 1974. 1.2 MILLION ACRES WERE AFFECTED. AREA IS DENSELY FORESTED IN GENERAL, SEVERAL TYPES OF TREES ARE NATIVE, SOME 300-400 YEARS OLD. VAST FOREST ACREAGE DESTROYED, BUT FIRE DID NOT INVOLVE AREA OF MAJOR AGRICULTURAL IMPORTANCE, EITHER FOR CATTLE OR CROPS. HUMAN POPULATION DENSITY VERY LOW.
GROUND TRUTH: SEVERAL AGENCIES AFFILIATED WITH THE PROVINCIAL GOVERNMENT, LOCATED IN THE CAPITAL, SANTA ROSA, WERE INVOLVED IN INVESTIGATING AND CONTROLLING THE FIRES.
PRIORITY: MEDIUM. HIGH RESOLUTION PHOTOS SHOWING DEVASTATED AREAS WOULD BE USEFUL IN FOREST FIRE STUDIES.

30/1410Z JAN GSAO