10 YEARS OF VOLCANIC ACTIVITY IN ALASKA pdf

1: Los Angeles Times - We are currently unavailable in your region

the Alaska Peninsula; a m-high cinder cone within the caldera is the source of historic activity (Miller and others, in review). From March 8 to April 26, and in mid-December.

Friday, November 09, October 24, Since , there have been eruptions and 52 episodes of notable volcanic unrest at 44 U. When erupting, all volcanoes pose a degree of risk to people and infrastructure. However, the risks are not equivalent from one volcano to another because of differences in eruptive style and geographic location. The assessment uses 24 factors to obtain a score and threat ranking. The findings are in the newly published Update to the U. Eleven of the eighteen very high threat volcanoes are in Washington, Oregon, or California, where explosive and often snow- and ice-covered volcanoes can project ash or lahar debris flow hazards long distances to densely populated and highly developed areas. These include Mount St. The threat ranking is not a list of which volcano will erupt next. Rather, it indicates how severe the impacts might be from future eruptions at any given volcano. The volcanic threat assessment helps prioritize U. It is a way to help focus attention and resources where they can be most effective, guiding the decision-making process on where to build or strengthen volcano monitoring networks and where more work is needed on emergency preparedness and response. Subscribe to the Volcano Notification Service for customized emails about volcanic activity at U. Volcaniclastic sediments are the focus of this field-trip guide to Mount St. Helens and Mount Hood. August 31, Mount St. Helens and Mount Hood provide excellent depositional records of the broad spectrum of volcanic hazards that involve the flow or fall of volcaniclastic particles. This field-trip guide provides an in-depth introduction to the deposits, including criteria that are observable in the field to aid in differentiating between pyroclastic density current, pyroclastic-fall, debris-avalanche, lahar, water-flood, and glacial deposits. The guide also introduces the Holocene eruptive histories of Mount St. Helens and Mount Hood and discusses the processes responsible for deposit emplacement. This self-guided field trip provides a road log, GPS coordinates, descriptions of what you will see and how to interpret the deposits, Geologic field-trip guide of volcaniclastic sediments from snow- and ice-capped volcanoesâ€"Mount St. Helens, Washington, and Mount Hood, Oregon. New mapping, geochemistry, and argon geochronology, illuminate a brief and remarkable eruptive history of Middle Sister, Oregon. August 28, Middle Sister is the product of a profound 50,â€"15,year-ago eruptive episode that also built South Sister. Eruptions in the Three Sisters volcanic cluster prior to 50, years ago were exclusively basaltic. But lava flows erupted from 50, to 37, years ago at Middle Sister were chemically diverse, with basaltic andesite, a high-silica rhyolite, and andesite produced from the mixing of a rhyolite and mafic magma rhyolite and rhyodacite also erupted at South Sister during this time. Between 37, to 27, years ago, volcanism diminished near Middle Sister and flared up at South Sister, with abundant andesite and dacite lava flows covering South Sister, and several rhyolite flows erupting on its flanks. From 27, to 15, years ago, Middle Sister erupted mafic, intermediate, and silicic lava flows and then ceased to erupt. The eruption of rhyolite starting about 50, years ago and the mixing of mafic material with rhyolite implies development of a more complex fractionating magmatic system that waxed 50,â€"30, years ago, culminated 30,, years ago, then waned by 15, years ago. The Sisters are notable because the detailed mapping and high-resolution geochronology show that two adjacent stratovolcanoes Middle and South Sisters were concurrently active over the same short, but measurable, interval. July 20, Lahar, an Indonesian word for volcanic mudflow, is a mixture of water, mud, and volcanic rock flowing swiftly along a channel draining a volcano. Lahars can form during or after eruptions, or even during periods of inactivity. Lahars form in many ways. They commonly occur when eruptions melt snow and ice on snow-clad volcanoes; when rains fall on steep slopes covered with fresh volcanic ash; when crater lakes, volcano glaciers or lakes dammed by volcanic debris suddenly release water; and when volcanic landslides evolve into flowing debris. Lahars are especially likely to occur at erupting or recently active volcanoes. Lahars can occur with little to no warning, and may travel great distances at high speeds, destroying or burying everything in their paths. Because lahars are so hazardous, USGS scientists pay them close attention. They study lahar deposits and limits of inundation, model flow behavior, develop lahar-hazard maps, and work with community leaders and governmental authorities to help them understand and minimize the risks of devastating lahars.

10 YEARS OF VOLCANIC ACTIVITY IN ALASKA pdf

2: Two Volcanoes Erupting in Alaska | Science Features

10 years of volcanic activity in alaska: a video (pyre peak, akutan, bogoslof, westdahl, veniaminof, augustine, redoubt, and spurr volcanoes).

The summit of the volcano is mostly snow-covered, and the growing lava dome is seen as the dark feature in the center of the image. Some snow-free ground is observed on the southern upper flanks of the volcano, just south below of the crater. A faint steam and gas plume is observed moving towards the east right. At the time of this post, their activity continues at low levels, but energetic explosions could occur without warning. Pavlof has been erupting since May 13, , with relatively low-energy lava fountaining and minor emissions of ash, steam, and gas. So far, volcanic ash from this eruption has reached as high as 22, feet above sea level. The ash plume has interfered with regional airlines and resulted in trace amounts of ash fall on nearby communities. The ash plume is currently too low to impact commercial airliners that fly between North America and Asia at altitudes generally above 30, feet. The current episode of eruptive activity at Cleveland has been characterized by single, discrete explosions, minor ash emissions, and small flows of lava and debris on the upper flanks of the volcano. On several occasions, ash-producing explosions have occurred reaching as high as 35, feet. A small lava dome formed in the summit crater of Cleveland volcano in late January, At that time, the dome was about feet in diameter and remained that size until a brief eruption on May 4 explosively removed a portion of the dome. The presence of a lava dome increases the possibility of an explosive eruption, but it does not necessarily indicate that one will occur. Start with Science The U. Geological Survey USGS is responsible for monitoring and issuing timely warnings of potential volcano activity. Scientists at AVO were able to detect unrest at both Pavlof and Cleveland volcanoes that confirmed eruptive activity was occurring. AVO immediately sent notifications out to emergency-management authorities and those potentially affected. When Will the Eruptions Stop? Volcanic eruptions can last weeks to months, and sometime years, so the exact timing is unknown for when these two volcanoes will rest. AVO will continue to monitor them and provide updates in the event of future activity. Pavlof eruption on May 18, Brandon Wilson Detecting Signs of Unrest Signs that the volcanoes were becoming restless were determined through a combination of monitoring data. At Pavlof, a strong thermal signal was observed in satellite data at the summit that coincided with elevated seismic levels. Soon after these observations were made, more satellite data and pilot reports indicated that ash emissions were occurring. At Cleveland volcano, explosions from the summit vent were detected by an infrasound array and seismic instruments on Umnak Island about 80 miles to the east, and later a thermal feature was observed at the summit in satellite imagery, which indicated hot material at or near the surface. The pressure sensors in the infrasound array pick up air waves generated by volcanic explosions. Because of the relatively slow speed of these waves, it took nearly 40 minutes to detect the explosion from that distance and issue an alert. These forecasts by NWS are used by the aviation industry to avoid flying into the ash. The tool details where, when, and the amount of ash fall that is expected to occur. This information helps guide decisions on whether planes can safely land or depart, health warnings, potential impacts to infrastructure, and even when ash will stop falling and cleanup can begin. Monitoring Tools Pavlof is monitored with on-the-ground seismic stations although only three of the seven instruments are currently operational , satellite remote sensing, and web cameras operated by the Federal Aviation Administration FAA. A regional infrasound network operated by the University of Alaska Geophysical Institute has also helped detect explosions from Pavlof and Cleveland volcanoes. Cleveland does not have a local seismic network and is monitored using only distant seismic and infrasound instruments and satellite data. Without local seismic instrumentation, scientists cannot forecast eruptions and smaller eruptions can be missed, especially because in the Aleutians, clouds commonly obscure the volcanoes in satellite data. There are 52 that have been active within the last 10, years and can be expected to erupt again. At present, 28 are monitored with ground-based instrumentation, and all are monitored daily using satellite remote sensing. See a full list of all volcanoes in Alaska and view an interactive map of their location. Although most of the volcanoes in Alaska are remote and not close to populated areas, millions of dollars of air freight and 20,, people fly over active Alaskan volcanoes daily traveling between North America and Asia. In fact, the Anchorage International Airport is ranked the fifth busiest air cargo hub in the world based on tonnage. In addition to the threat that volcanic ash poses for aviation safety, the economic impacts due to disruption of air traffic can be substantial. The United States has approximately active volcanoes, and more than half of them could erupt explosively. When the violent energy of a volcano is unleashed, the results can be catastrophic. Lava flows, debris avalanches, and explosive blasts have devastated communities. Noxious volcanic gas emissions have caused widespread lung problems. Airborne ash clouds from explosive eruptions have caused millions of dollars damage, including causing engines to shut down in flight. To keep communities safe, it is essential to monitor volcanoes so that the public knows when unrest begins and what hazards can be expected. USGS efforts have improved global understanding of how volcanoes work and how to live safely with volcanic eruptions.

3: USGS: Volcano Hazards Program

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Plumes rose , m above the crater rim. The Alert Level remained at 3 on a scale of The volcano was quiet or obscured by clouds during October. Two explosions occurred during November; the larger of the two sent a plume to 2. The Alert Level remained at 3 on a 5-level scale. Ash plumes drifted in multiple directions and caused ashfall in Severo-Kurilsk during October. A thermal anomaly was visible in satellite images on 24 and 29 October. The Aviation Color Code remained at Orange the second highest level on a four-color scale. Strombolian explosions at NSEC were interspersed with long pauses from a few minutes to a few hours. The explosions sometimes produced ash emissions that quickly dispersed; ashfall was deposited around the crater and in the Valle del Bove. Spattering from the southernmost vent was also visible, as well as gas emissions. Gas emissions at Voragine Crater from a vent on the E rim of the crater were less intense compared to previous months. NEC activity was characterized by Strombolian explosions sometimes accompanied by minor ash emissions. Explosions on 4 November produced shock waves that rattled nearby structures, and on 5 November ejected incandescent material m high. A 1-km-long lava flow was active in the Ceniza drainage. Shock waves from explosions vibrated local houses. At a dense ash plume rose m above the summit and drifted N. The Alert Level remained at 2 on a scale of ; residents and visitors were warned not to approach the volcano within 2 km of the crater. By 31 October the volume of the dome, based on photos from the SE sector, was an estimated , cubic meters. White emissions of variable density rose a maximum of 50 m above the summit. The Alert Level remained at 2 on a scale of , and residents were warned to remain outside of the 3-km exclusion zone. Seismicity was characterized by moderate levels of long-period and tremor events, often associated with explosion signals. Gas emissions persisted, and sometimes contained ash. Periodic explosions sometimes ejected material that was deposited around the crater. At night incandescence emanated from the lava dome as well as from ejected ballistics. The Alert Level remained at Orange, the second highest level on a four-color scale, and residents were reminded not to approach the crater within 3 km. Periods of volcanic tremor were detected almost daily. Explosions at and on 3 November ejected material NE and generated plumes that rose 1. Weather conditions prevented webcam views and estimates of plume heights. The next day at a plume of water vapor and diffuse gas, recorded by a webcam and visible to residents to the N, rose about m above the crater rim and drifted W. Hybrid earthquakes were infrequent and of low magnitude. Gas-and-ash plumes rose as high as 3. MIROVA detected seven thermal anomalies, and on 2 November the sulfur-dioxide gas flux was high at 2, tons per day. The report noted that the public should not approach the crater within a km radius. Some avalanches generated ash plumes. Explosions during November produced ash plumes that rose m above the crater rim and drifted SW, causing local ashfall. Intermittent seismic tremor was recorded on 1 November but later that day the satellite link that transmits seismic data failed. Weather clouds obscured views of the volcano during 31 October-4 November. Nothing was observed in satellite data during November. The Aviation Color Code remained at Orange the second highest level on a four-color scale and Volcano Alert Level remained at Watch the second highest level on a four-level scale. In addition, seismicity was characterized by banded volcanic tremor, long-period earthquakes, and low-amplitude volcano-tectonic earthquakes. Passive ash emissions were visible during November. A minute-long event began at and generated plumes that rose m and drifted SW. Several short-duration minutes events were recorded at and on 2 November and at on 3 November; they generated ash plumes that rose m. Ashfall was reported in Coronado. Seismic activity remained high, with moderate-to-high amplitude banded tremor. At on 5 November a plume rose m and drifted NW. Satellite data showed elevated surface temperatures from minor lava spattering and flows. Low-amplitude continuous tremor was recorded. The webcam in Perryville, 35 km SE, periodically recorded diffuse ash emissions and incandescence from the cone. Based on a pilot observation and satellite data, a diffuse ash plume rose to 4. The Aviation Color Code remained at Orange the second highest level on a four-color scale and the Volcano Alert Level remained at Watch the second highest level on a four-level scale.

4: Timeline of volcanism on Earth - Wikipedia

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The first sign of reawakening was a swarm of small volcano-tectonic VT earthquakes beneath Crater Peak in August Following two months of relative calm, seismicity beneath the volcano increased to about ten times the pre-August level Figure 2. Pulses of seismicity occurred in February, May, and June On 3 June AVO issued an advisory to government agencies and the airline industry to plan for an eruption. An overflight on 8 June revealed upwelling in the crater lake, which had turned from green to gray. One to 24 shallow tremor bursts per day, each minutes long, were recorded at stations within 10 km of Crater Peak between 6 and 26 June. On 11 June, a field party found the lake temperature to be 50 C, pH 2. Small new geysers erupted in the talus pile at the base of the crater wall. Tremor duration increased abruptly at ADT all times in this article are Alaska Daylight Time, UT-8 hours, unless otherwise noted on 24 June with the onset of a tremor episode which lasted minutes. Twelve hours later a similar episode lasted minutes. Eight additional tremor bursts occurred within the following 18 hours. On the morning of 26 June a field party reported that the crater lake had mostly disappeared and that lithic blocks, presumably forcefully ejected, had impacted the residual mudflat. At continuous tremor began. Meanwhile, at , AVO issued formal warning of concern and went on hour staffed duty. The final stage of the prelude began at on 27 June with a swarm of VT at km depth, which built to rates of 1 event every 2 minutes, and a few long-period LP earthquakes. This swarm probably reflected the forceful injection of magma into the upper conduit. Abrupt doubling of tremor amplitude at heralded onset of eruption, which soon destroyed the closest seismic station, m from the vent. Tremor amplitude gradually increased throughout the eruption, peaking between and , and was recorded on stations more than km away. Midmorning pilot reports estimated the plume to be as high as 9 km, and the National Weather Service NWS estimated a plume height of Small volumes of hot pyroclastic debris mixed with snow late in the eruption, forming flows which swept down the south side of the cone to the Chakachatna River, 6 km from the crater. The eruption lasted 4 hours. Seismicity decreased and by 8 July was below pre-August levels. In intensity and brevity, the volcano had repeated its performance Juhle and Coulter, The 27 June airfall-tephra formed a narrow black stripe that passed northward into sparsely populated areas, broadening in the lee of the Foraker-McKinley massif in the Alaska Range Figure 3. Tephra volume was about 50x m3 [20x m3 dense-rock equivalent DRE], and was mostly juvenile andesite. The plume passed north to the Beaufort Sea, turned southeast into Canada and the contiguous United States, and drifted eastward. Seismicity remained low through July and the first half of August. Seismic monitoring of the volcano was somewhat compromised by the destruction of the crater rim station. Despite repeated attempts to reinstall the crater-rim station, the closest seismometer was now 4. Only one shallow and two deep events were recorded between 12 August and 17 August. Perhaps the 27 June eruption "opened" the conduit, and allowed magma to rise undetected. At on 18 August a min episode of weak tremor including several LP events began. At a pilot reported an ash-rich plume. The main eruption began at when strong tremor was recorded on all Spurr stations. By a subplinian column thrust through low clouds to reach 11 km altitude. Large bombs were thrown m above the vent Ultimately, the radar-determined plume top reached about 14 km -- pilot reports were higher. Small pyroclastic flows descended the east and southeast flanks of Crater Peak. Some flows were dry and hot, and left coarse, clast-supported deposits with lobate, steep-fronted margins. Other flows mixed with snow and ice high on the cone and were more mobile and cooler. A late shower of mostly lithic blocks as large as 1 m were hurled as far as 3. The southeastward distribution of these deposits was controlled by the position of the vent against the northwest crater wall. More than lightning strikes were detected by the AVO lightning detection system during the second half of the eruption. Eruption ended after 3 hours and 28 minutes at , but intermediate and deep crustal seismicity increased afterward to levels comparable to those of mid-June. The volume of August tephra is about x m3 40x m3 DRE. Upper-level winds took the tephra plume east-southeast directly over Anchorage Figure 3 , Figure 4 , where sand-sized ash fell as thick as 3 mm. Beyond Anchorage, the axis of the plume crossed the Chugach Mountains and followed the coast toward Yakutat Bay. At Yakutat, km downwind, ashfall was significant; at Juneau, km downwind, the plume was opaque enough to disrupt air traffic. Ashfall forced the closing of Anchorage International Airport for 20 hours. Air-quality alerts were issued during the ashfall and on the following day, as vehicular traffic resuspended the ash. Seismicity remained elevated after the August outburst, but signs of an impending eruption remained so weak, even on the newly reinstalled station m from the vent, that AVO had a crew in the crater on the afternoon of 16 September. At about on 16 September, seismic activity - both discrete events and weak tremor - began to increase at the crater rim station. Tremor amplitude increased again at An eruption, accompanied by brief incandescence, began at but lasted only 11 min. Weak tremor followed for the next hour. This eruption lasted 3 h 36 min. Pyroclastic flows swept down the south, east, and east-northeast flanks of Crater Peak, entraining snow to become lahars. Other flows moved down the south flank. Although these flows look like pyroclastic flows, they were cool and water-saturated by the afternoon of 17 September. A narrow ballistic field extends at least 10 km east from the vent. This time a strong swarm of about 50 VT shocks occurred between depths of km during the last part of, and for a few hours following the eruption, perhaps reflecting readjustment of the system after magma withdrawal. The ash cloud rose to a radar-determined height of nearly 14 km NWS, pers. There was substantial ashfall in Glenallen, km east, and detectable ashfall at Burwash Landing, km east. Tephra volume is about 50x m3 20x m3 DRE. Rates of seismicity remained high through , with two notable seismic crises. Nearly 24 hours of continuous tremor on October followed by 72 hours of intermittent, quasi-periodic, tremor drove AVO to its highest concern-code, although no eruption occurred. These earthquakes had mixed frequency contents, occurred at three locations a few hundred meters apart and 1. They probably were caused by the shallow intrusion of magma. The duration of this swarm was similar to those of the three eruptions. Seismicity is gradually returning to background level at this time. Chemistry and Petrology Most proximal bombs are cauliflower-like porphyritic hornblende-bearing andesite with brown, microlite-rich andesitic groundmass glass. Subordinant light grey-green andesite scoria has clear rhyolitic glass. Rare light-colored pumice composed of nearly microlite-free rhyolitic glass with a few percent of plagioclase phenocrysts and rare quartz grains also occurs. Much of the distal tephra appears to be the same as the proximal bomb material. Despite large variations in groundmass glass composition, the andesite is uniform in major and trace element composition throughout the eruptions. The andesite differs from andesite in having similar or lower concentrations of highly incompatible elements at higher SiO2 Figure 5. Prehistoric Crater Peak lava flows record the rise of small, chemically unrelated, batches of magma which fed only a few eruptions. August and September pyroclastic flows contain several percent of gneissic xenoliths that are partly melted and highly inflated. Smaller proportions of similar material were also found in proximal June 27 deposits. These xenoliths consist of clear, vesicular, rhyolitic glass with crystals of plagioclase, orthopyroxene, cordierite, sillimanite, garnet, and spinel. Subordinate xenolith lithologies include white plagioclase-quartz-glass rock, which is siliceous 76 wt. All xenoliths are metamorphic, which is remarkable because most of the country-rock exposed near Spurr is granitic. Nye and Turner suggested that silicic "sweat" from the upper crust forms a significant component of all Spurr magmas. These xenoliths in bulk cannot be this component, because of their high concentrations of compatible transition metals, but their interstitial melt as yet unanalyzed may be. The xenoliths provide direct evidence of extensive partial melting of country rock beneath Spurr. SO2 values were low after the August eruption, and before and after the September eruption, although again TOMS data indicate that the plumes contained and kilotonnes of SO2, respectively Global Volcanism Network b. The lack of SO2 between eruptions, despite the S-rich nature of the magma, may reflect absorption of SO2 by an active hydrothermal system during non-eruptive degassing. Alternatively, magma may have remained deep, below the depth of gas-saturation, until just before each eruption. Discussion Spurr has departed from its behavior by erupting three times instead of once. Yet all four eruptions share a commonality in volume and duration, as if controlled by some unchanging parameters involving initial overpressure, conduit volume, and magma-production dynamics in the deep source. What is not shared is the associated pattern of seismicity -- a vexing problem for would-be forecasters. We have observed most possible permutations: We also observed intense seismicity without eruption in October and November. This fascinating story, and the character of magmatic behavior it implies, continues to unfold. Acknowledgments This work was supported by the Alaska Volcano Observatory. Spurr eruption, July 9, ; Transactions, Amer. Union, 36, , Power, A networked computer configuration for seismic monitoring of volcanic eruptions, U. Survey Open-file Report , 19 pp, Miklius, Application of a real-time data acquisition and analysis system in response to activity at Mount Pinatubo, Phillippines, abstract , Eos, 72, 47,

5: Mt. Spurr's Eruptions

Description 23 p. ill., map ;28 cm. Part or all of this report is presented in Portable Document Format (PDF). For best results viewing and printing PDF documents, it is recommended that you download the documents to your computer and open them with Adobe Reader. PDF documents opened from your.

Evidence from mountain glaciers does suggest increased glaciation in a number of widely spread regions outside Europe prior to the twentieth century, including Alaska , New Zealand and Patagonia. However, the timing of maximum glacial advances in these regions differs considerably, suggesting that they may represent largely independent regional climate changes , not a globally-synchronous increased glaciation. Thus current evidence does not support globally synchronous periods of anomalous cold or warmth over this interval, and the conventional terms of "Little Ice Age" and " Medieval Warm Period " appear to have limited utility in describing trends in hemispheric or global mean temperature changes in past centuries The result is a picture of relatively cool conditions in the seventeenth and early nineteenth centuries and warmth in the eleventh and early fifteenth centuries, but the warmest conditions are apparent in the twentieth century. Given that the confidence levels surrounding all of the reconstructions are wide, virtually all reconstructions are effectively encompassed within the uncertainty previously indicated in the TAR. The major differences between the various proxy reconstructions relate to the magnitude of past cool excursions, principally during the twelfth to fourteenth, seventeenth and nineteenth centuries. There is no consensus regarding the time when the Little Ice Age began, [12] [13] but a series of events before the known climatic minima has often been referenced. In the 13th century, pack ice began advancing southwards in the North Atlantic , as did glaciers in Greenland. Anecdotal evidence suggests expanding glaciers almost worldwide. Based on radiocarbon dating of roughly samples of dead plant material with roots intact, collected from beneath ice caps on Baffin Island and Iceland , Miller et al. Therefore, any of several dates ranging over years may indicate the beginning of the Little Ice Age: The Little Ice Age ended in the latter half of the 19th century or early in the 20th century. Farms and villages in the Swiss Alps were destroyed by encroaching glaciers during the midth century. Freezing of the Golden Horn and the southern section of the Bosphorus took place in The winter of â€" was particularly harsh: Sea ice surrounding Iceland extended for miles in every direction, closing harbors to shipping. The population of Iceland fell by half, but that may have been caused by skeletal fluorosis after the eruption of Laki in Greenland was largely cut off by ice from to the s. Crop practices throughout Europe had to be altered to adapt to the shortened, less reliable growing season, and there were many years of dearth and famine such as the Great Famine of â€" , but that may have been before the Little Ice Age. In Estonia and Finland in â€"97, losses have been estimated at a fifth and a third of the national populations, respectively. Some of them resulted in permanent loss of large areas of land from the Danish, German, and Dutch coasts. The colder climate is proposed to have caused the wood used in his violins to be denser than in warmer periods, contributing to the tone of his instruments. Fireplace hoods were installed to make more efficient use of fires for indoor heating, and enclosed stoves were developed, with early versions often covered with ceramic tiles. In the late 17th century, agriculture had dropped off dramatically: Both of these outcomes â€" disease and unemployment â€" enhance each other, generating a lethal positive feedback loop. Evidence from several studies indicate that increases in violent actions against marginalized groups that were held responsible for the Little Ice Age overlap with years of particularly cold, dry weather. Oster and Behringer argue that this resurgence was brought upon by the climatic decline. Prior to the Little Ice Age, "witchcraft" was considered an insignificant crime and victims were rarely accused. Not everybody agreed that witches should be persecuted for weather-making, but such arguments primarily focused not upon whether witches existed, but upon whether witches had the capability to control the weather. Since landscape painting had not yet developed as an independent genre in art, the absence of other winter scenes is not remarkable. The derivative nature of so much of this work makes it difficult to draw any definite conclusions about the influence of the winters between and There is then a hiatus between and , before the main period of such subjects from the s to the s, which relates well with climate records for the later period. The subjects are less popular after about , but that does not match any recorded reduction in severity of winters and may reflect only changes in taste or fashion. In the later period between the s and s, snowy subjects again became popular. Both Europeans and indigenous peoples suffered excess mortality in Maine during the winter of â€", and extreme frost was reported in the Jamestown, Virginia , settlement at the same time. The extent of mountain glaciers had been mapped by the late 19th century. In China , warm-weather crops such as oranges were abandoned in Jiangxi Province , where they had been grown for centuries. The event is the most dramatic climate event in the SD Holocene glaciochemical record. In the north, evidence suggests fairly dry conditions, but coral cores from the Great Barrier Reef show similar rainfall as today but with less variability. A study that analyzed isotopes in Great Barrier Reef corals suggested that increased water vapor transport from southern tropical oceans to the poles contributed to the Little Ice Age. This was associated with a 1. In , another expedition noticed that the glacier reached the lagoon and calved into large icebergs. Hans Steffen visited the area in , noticing that the glacier penetrated far into the lagoon. Such historical records indicate a general cooling in the area between and The rate of Arctic cooling is roughly 0.

6: Publications - Volcanic Eruption | Alaska Division of Geological & Geophysical Surveys

Kienle, Juergen, , Volcanic ash-aircraft incidents in Alaska prior to the Redoubt eruption on 15 December in Casadevall, T. J., (ed.), Volcanic ash and aviation safety: proceedings of the first international symposium on volcanic ash and aviation safety, U.S. Geological Survey Bulletin , p.

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Seismic monitoring of the volcano was somewhat compromised by the destruction of the crater rim station. Despite repeated attempts to reinstall the crater-rim station, the closest seismometer was now 4. Only one shallow and two deep events were recorded between 12 August and 17 August. Perhaps the 27 June eruption "opened" the conduit, and allowed magma to rise undetected. At on 18 August a min episode of weak tremor including several LP events began. At a pilot reported an ash-rich plume. The main eruption began at when strong tremor was recorded on all Spurr stations. By a subplinian column thrust through low clouds to reach 11 km altitude. Large bombs were thrown m above the vent Ultimately, the radar-determined plume top reached about 14 km -- pilot reports were higher. Small pyroclastic flows descended the east and southeast flanks of Crater Peak. Some flows were dry and hot, and left coarse, clast-supported deposits with lobate, steep-fronted margins. Other flows mixed with snow and ice high on the cone and were more mobile and cooler. A late shower of mostly lithic blocks as large as 1 m were hurled as far as 3. The southeastward distribution of these deposits was controlled by the position of the vent against the northwest crater wall. More than lightning strikes were detected by the AVO lightning detection system during the second half of the eruption. Eruption ended after 3 hours and 28 minutes at , but intermediate and deep crustal seismicity increased afterward to levels comparable to those of mid-June. The volume of August tephra is about x m3 40x m3 DRE. Upper-level winds took the tephra plume east-southeast directly over Anchorage Figure 3 , Figure 4 , where sand-sized ash fell as thick as 3 mm. Beyond Anchorage, the axis of the plume crossed the Chugach Mountains and followed the coast toward Yakutat Bay. At Yakutat, km downwind, ashfall was significant; at Juneau, km downwind, the plume was opaque enough to disrupt air traffic. Ashfall forced the closing of Anchorage International Airport for 20 hours. Air-quality alerts were issued during the ashfall and on the following day, as vehicular traffic resuspended the ash. Seismicity remained elevated after the August outburst, but signs of an impending eruption remained so weak, even on the newly reinstalled station m from the vent, that AVO had a crew in the crater on the afternoon of 16 September. Tremor amplitude increased again at An eruption, accompanied by brief incandescence, began at but lasted only 11 min. Weak tremor followed for the next hour. This eruption lasted 3 h 36 min. Pyroclastic flows swept down the south, east, and east-northeast flanks of Crater Peak, entraining snow to become lahars. Other flows moved down the south flank. Although these flows look like pyroclastic flows, they were cool and water-saturated by the afternoon of 17 September. A narrow ballistic field extends at least 10 km east from the vent. This time a strong swarm of about 50 VT shocks occurred between depths of km during the last part of, and for a few hours following the eruption, perhaps reflecting readjustment of the system after magma withdrawal. The ash cloud rose to a radar-determined height of nearly 14 km NWS, pers. There was substantial ashfall in Glenallen, km east, and detectable ashfall at Burwash Landing, km east. Tephra volume is about 50x m3 20x m3 DRE. Rates of seismicity remained high through , with two notable seismic crises. Nearly 24 hours of continuous tremor on October followed by 72 hours of intermittent, quasi-periodic, tremor drove AVO to its highest concern-code, although no eruption occurred. These earthquakes had mixed frequency contents, occurred at three locations a few hundred meters apart and 1. They probably were caused by the shallow intrusion of magma. The duration of this swarm was similar to those of the three eruptions. Seismicity is gradually returning to background level at this time. Chemistry and Petrology Most proximal bombs are cauliflower-like porphyritic hornblende-bearing andesite with brown, microlite-rich andesitic groundmass glass. Subordinant light grey-green andesite scoria has clear rhyolitic glass. Rare light-colored pumice composed of nearly microlite-free rhyolitic glass with a few percent of plagioclase phenocrysts and rare quartz grains also occurs. Much of the distal tephra appears to be the same as the proximal bomb material. Despite large variations in groundmass glass composition, the andesite is uniform in major and trace element composition throughout the eruptions. The andesite differs from andesite in having similar or lower concentrations of highly incompatible elements at higher SiO_2 Figure 5. Prehistoric Crater Peak lava flows record the rise of small, chemically unrelated, batches of magma which fed only a few eruptions. August and September pyroclastic flows contain several percent of gneissic xenoliths that are partly melted and highly inflated. Smaller proportions of similar material were also found in proximal June 27 deposits. These xenoliths consist of clear, vesicular, rhyolitic glass with crystals of plagioclase, orthopyroxene, cordierite, sillimanite, garnet, and spinel. Subordinate xenolith lithologies include white plagioclase-quartz-glass rock, which is siliceous 76 wt. All xenoliths are metamorphic, which is remarkable because most of the country-rock exposed near Spurr is granitic. Nye and Turner suggested that silicic "sweat" from the upper crust forms a significant component of all Spurr magmas. These xenoliths in bulk cannot be this component, because of their high concentrations of compatible transition metals, but their interstitial melt as yet unanalyzed may be. The xenoliths provide direct evidence of extensive partial melting of country rock beneath Spurr. SO_2 values were low after the August eruption, and before and after the September eruption, although again TOMS data indicate that the plumes contained and kilotonnes of SO_2, respectively Global Volcanism Network b. The lack of SO_2 between eruptions, despite the S-rich nature of the magma, may reflect absorption of SO_2 by an active hydrothermal system during non-eruptive degassing. Alternatively, magma may have remained deep, below the depth of gas-saturation, until just before each eruption. Discussion Spurr has departed from its behavior by erupting three times instead of once. Yet all four eruptions share a commonality in volume and duration, as if controlled by some unchanging parameters involving initial overpressure, conduit volume, and magma-production dynamics in the deep source. What is not shared is the associated pattern of seismicity -- a vexing problem for would-be forecasters. We have observed most possible permutations: We also observed intense seismicity without eruption in October and November. This fascinating story, and the character of magmatic behavior it implies, continues to unfold. Acknowledgments This work was supported by the Alaska Volcano Observatory. Spurr eruption, July 9, ; Transactions, Amer. Union, 36, , Power, A networked computer configuration for seismic monitoring of volcanic eruptions, U. 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Activity for the week of 24 October October The Weekly Volcanic Activity Report is a cooperative project between the Smithsonian's Global Volcanism Program and the US Geological Survey's Volcano Hazards Program.

8: Global Volcanism Program | Smithsonian / USGS Weekly Volcanic Activity Report

Activity could yet again resume at any moment- the volcano has been in a state of high activity for over a year. [more] Volcanic activity worldwide 1 Nov Fuego volcano, PopocatÃ©petl, Barren Island, Dukono, Reventa.

9: Publications - Volcanic | Alaska Division of Geological & Geophysical Surveys

Volcano Observatory Notices for Aviation (VONA) Volcano Observatory Notices for Aviation (VONA) are succinct, plain-English messages aimed at dispatchers, pilots, and air-traffic controllers to inform them of volcanic unrest and eruptive activity that could produce ash-cloud hazards.

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