YELLOWSTONE VOLCANO OBSERVATORY INFORMATION STATEMENT

U.S. Geological Survey

Monday, February 07, 2022, 11:10 AM MST (Monday, February 07, 2022, 17:00 UTC)

SAN FRANSISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: NORMAL
Current Aviation Color Code: UNASSIGNED

SYNOPSIS: An earthquake swarm began on January 7, 2022, north of Arizona's San Francisco Volcanic Field. The volcanic field is not erupting, and there is no sign of an imminent eruption.

Summary:
An earthquake swarm in the San Francisco Volcanic Field (SFVF) was triggered by a magnitude 4.4 earthquake at 9:19 PM PST located between 6-9 mi (10-15 km) below the ground surface and 26 km (16 mi) north-northeast of Flagstaff, Arizona. There have been approximately 1200 earthquakes over a 10-square-kilometer (3.8-square-mile) area in the past month, with 21 located earthquakes between magnitudes 3.2 and 4.5. Yellowstone Volcano Observatory and partner agency scientists continue to review data and plan fieldwork to investigate further.

Seismicity:
Between January 7 and 19, the USGS estimates 20 earthquakes per day at or below magnitude 3. Since January 19, earthquake frequency has risen steadily; the daily average has increased to about 50 earthquakes for the past week. Felt earthquakes were reported on February 5, 2022, coincident with several magnitude three events occurring within minutes of each other. All located earthquakes are normal-faulting events that align with nearby NW-SE-oriented surface faults.

Earthquake location resolution is poor due to the sparse seismic network; 11 seismometers lie within 100 km (62 mi) of the SFVF. The nearest seismometer is approximately 25 km (16 mi) from the swarm's center, and there are two others within 30 km (19 mi). Therefore, earthquake depths are hard to resolve, especially for events below magnitude 3.

Deformation:
No anomalous ground movement has been detected by the regional continuous Global Positioning System (GPS) network. USGS scientists plan to deploy campaign GPS sites during the week of February 7.

Gas measurements:
USGS scientists conducted a volcanic gas and hydrology monitoring campaign on February 3, 2022. No volcanic gases were detected, and water chemistry showed average/background ratios of helium and sulfides. Additional measurements are planned for the afternoon of February 7.

The USGS Yellowstone Volcano Observatory and partner agencies are watching the activity closely and will issue the following report on Monday, February 14, or earlier if observations warrant an update.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Fransisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
For images, graphics, and general information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/observatories/yvo
For monitoring information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/volcanoes/yellowstone/questions-about-monitoring-yellowstone
For information on USGS volcano alert levels and notifications:
https://www.usgs.gov/natural-hazards/volcano-hazards/notifications
SUBSCRIBE TO VOLCANO ALERT MESSAGE by email: http://volcanoes.usgs.gov/vns
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YELLOWSTONE VOLCANO OBSERVATORY INFORMATION STATEMENT

U.S. Geological Survey
Wednesday, February 09, 2022, 9:34 AM MST (Wednesday, February 09, 2022, 17:34 UTC)

SAN FRANSISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: NORMAL
Current Aviation Color Code: UNASSIGNED

SYNOPSIS: Earthquakes increase in Arizona's San Francisco Volcanic Field swarm. Minor carbon dioxide emission & water chemistry suggest magma may be a source of unrest—no current volcanic eruption.

Summary:
New seismic, volcanic gas, and water chemistry data suggest that unrest in northern Arizona's San Francisco Volcanic Field may be driven by magma. The earthquake rate has increased in the seismic swarm that began on January 7, 2022. Over the past 48 hours, the USGS has located seven earthquakes between magnitudes 3.0 and 3.5 at depths of 3-9 miles (5 to 15 km) below the ground surface. More than 1400 earthquakes have been detected as part of this swarm. Elevated carbon dioxide emissions have been detected in the swarm area, and the chemistry of well water from Sunset Crater Volcano National Monument shows a mantle component. Yellowstone Volcano Observatory and partner agency scientists continue to review data and plan fieldwork to investigate further.

Seismicity:
Between February 7 and the time of this statement, the USGS located seven earthquakes between magnitudes 3.0 and 3.5 at depths of 3-9 miles (5 to 15 km) below the ground surface and estimates over 70 detectable but not locatable earthquakes per day that occurred at or below magnitude 3. There were reports of 5 felt earthquakes over the last 24 hours. Focal mechanisms for the larger magnitude earthquakes that were located are consistent with the regional stress field and show normal faulting that aligns with NE-SW-oriented surface faults.

Earthquake location resolution is poor due to the sparse seismic network; there are 11 seismometers within 100 km of the SFVF. The nearest seismometer is approximately 25 km (16 mi) from the swarm's center, and there are two others within 30 km. Limited seismic station coverage and sensor issues inhibited location estimates for earthquakes with magnitudes below 3.

Gas Measurements:
USGS scientists conducted a volcanic gas and hydrology monitoring campaign on February 8, 2022. A well-water sample from Sunset Crater Volcano National Monument shows an elevated He3/He4, which is consistent with a source of Helium from the mantle. Diffuse carbon dioxide was detected in the area of the swarm by soil-gas measurements. Repeat gas and water sampling are planned for the next several days.

Deformation:
No anomalous ground movement has been detected by the regional continuous Global Positioning System (GPS) network nor by satellite data (InSAR).

The USGS Yellowstone Volcano Observatory and partner agencies are watching the activity closely and will issue the following report on Monday, February 14, or earlier if observations warrant an update.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Fransisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
For images, graphics, and general information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/observatories/yvo
For monitoring information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/volcanoes/yellowstone/questions-about-monitoring-yellowstone
For information on USGS volcano alert levels and notifications:
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YELLOWSTONE VOLCANO OBSERVATORY INFORMATION STATEMENT

U.S. Geological Survey

Monday, February 14, 2022, 12:00 PM MST (Monday, February 14, 2022, 19:00 UTC)

SAN FRANSISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: ADVISORY
Current Aviation Color Code: YELLOW

SYNOPSIS: San Francisco Volcanic Field is now ADVISORY/YELLOW. Earthquakes and ground movement suggest a magmatic dike emplacement NW of Sunset Crater - no current volcanic eruption.

Summary:
New earthquake (seismic) and ground movement (deformation) data suggest that a dike has been emplaced in northern Arizona's San Francisco Volcanic Field. YVO has raised the color code to YELLOW and alert level to Advisory to reflect the significant departure from background activity. The ongoing earthquake swarm evolved into a linear cluster of events that migrated and shallowed from the northwest to the southeast between February 10 and 14 - over 95 earthquakes between magnitudes 1.0 and 2.9 were located. The regional continuous Global Positioning Equipment (cGPS) network detected ground movement associated with this earthquake activity. Yellowstone Volcano Observatory is working with outside researchers and partner agencies to bolster monitoring of this ongoing unrest.

Seismicity:
After a brief pause in seismicity from February 9-13, earthquakes resumed Sunday and have migrated to an area NW of Sunset Crater. Between February 13 and the time of this statement, 95 earthquakes were located between magnitudes 1.0 and 2.9 at depths of 1.9 to 5.6 miles (3 to 9 km) below the ground surface. Additionally, over 100 detectable but not locatable earthquakes occurred at or below magnitude 1.0. The seismicity formed a linear cluster, with the swarm starting at the NW end at a depth of 5.6 miles (9 km) below the ground surface and migrating 5 miles (8 km) towards the SE to depths as shallow as 1.9 miles (3 km) below the ground surface. Characteristics of the larger earthquakes show a departure from the regional stress field, with focal mechanisms that reflect the increased stress caused by dike intrusion.

On Saturday, February 12th, the USGS installed two new seismic stations to improve monitoring capabilities, bringing the total to 5 stations within 19 miles (30 km) of the swarm's center. Earthquakes as low as magnitudes 1.0 are locatable, and accuracy has improved for all earthquake locations.

Deformation:
On Friday February 11, 2022, crews installed a continuous GPS instrument at Sunset Crater Volcano National Monument. The continuous Global Positioning System network has detected small regional deformation consistent with dike emplacement.

Gas measurements:
A gas sampling crew is completing carbon dioxide flux measurements in the swarm area and processing data collected over the weekend. Measurements will be reported as soon as the analysis is completed.

The USGS Yellowstone Volcano Observatory and partner agencies are watching the activity closely and will issue a report on Wednesday, February 16, or earlier if observations warrant an update.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Fransisco Volcanic Field:
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YELLOWSTONE VOLCANO OBSERVATORY INFORMATION STATEMENT

U.S. Geological Survey

Tuesday, February 15, 2022, 09:00 AM MST (Monday, February 14, 2022, 16:00 UTC)

SAN FRANSISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: ADVISORY
Current Aviation Color Code: YELLOW

SYNOPSIS: Earthquakes at San Francisco Volcanic Field. Carbon Dioxide and ground-movement data support continued magma movement beneath the surface - no volcanic eruption.

Summary:
New earthquake data in northern Arizona's San Francisco Volcanic Field suggest continued magmatic activity. Satellite-detected ground movement (deformation) and elevated carbon dioxide gas emission data further support this magma emplacement a few miles northwest of Sunset Crater. In the past 24 hours, a cluster of 34 located earthquakes migrated to the northwest of the February 13-14 activity and shallowed to depths of 0.6 to 2.5 miles (1 to 4 km) below the ground surface.
Yellowstone Volcano Observatory is working with outside researchers and partner agencies to bolster monitoring of this ongoing unrest.

Seismicity:
Over the past 24 hours, 34 earthquakes located between magnitudes 1.0 and 2.4 at below-surface depths of 0.6 to 2.5 miles (1 to 4 km) and over 20 detectable but not locatable earthquakes at or below magnitude 1.0 occurred. The seismicity formed a linear cluster north of the activity of February 13-14, with the events starting from SE and propagating 3.4 miles (5.5 km) towards the NW and shallowing.

On Saturday, February 12th, the USGS installed two new seismic stations to improve monitoring capabilities, bringing the total to 5 stations within 19 miles (30 km) of the swarm's center. Earthquakes as low as magnitudes 1.0 are locatable, and accuracy has improved for all earthquake locations.

Deformation:
An ascending Sentinel-1 interferogram spanning February 2-14 shows a maximum of about 13 inches (39 centimeters) of line-of-sight deformation in a butterfly pattern consistent with the emplacement of a dike within about 3 km (2 miles) of the surface.

On Friday, February 11, USGS crews installed a continuous GPS instrument at Sunset Crater Volcano National Monument at the Visitor Center. The Global Positioning System network, including that new station, has detected centimeter-scale deformation signals, although displacement patterns are difficult to interpret given that data from the new GPS station have high uncertainty.

Gas:
A USGS gas sampling crew completed a grid-based carbon dioxide flux measurement survey in the swarm area between Friday and Sunday (February 11th to 13th). Results show elevated gas emissions in the area above the magmatic activity. Measurements range from 3 to 1750g/m^2 per day, with the highest values above the earthquakes, where the emplacement of a magmatic dike is occurring.

The USGS Yellowstone Volcano Observatory and partner agencies are watching the activity closely and will issue a report on Wednesday, February 16, or earlier if observations warrant an update.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Fransisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
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https://www.usgs.gov/observatories/yvo
For monitoring information about Yellowstone and the Southwestern U.S. volcanoes:
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YELLOWSTONE VOLCANO OBSERVATORY
VOLCANO ACTIVITY NOTICE
U.S. Geological Survey
Monday, February 21, 2022, 1:00 PM MST (Monday, February 21, 2022, 20:00 UTC)

SAN FRANCISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: WATCH
Current Aviation Color Code: ORANGE

SYNOPSIS: Data suggests renewed magma ascent & shallow accumulation at San Francisco Volcanic Field. Ground cracks close U.S. Route 89. YVO raises level to WATCH/ORANGE – no current eruption.

Summary:
Increased levels of unrest in the San Francisco Volcanic Field warrant increasing the volcano alert level to WATCH and aviation color code to ORANGE. All activity indicates magma ascent and accumulation at less than 1.2 mi (2 km) below the ground surface. An eruption is possible in the area between Sunset Crater and Highway 89. Updates will be made daily or as situations warrant.

Earthquake data, combined with thermal and gas emissions, from northern Arizona's San Francisco Volcanic Field suggest a sudden increase in magmatic activity. Measurements of volcanic gas indicate that magma has reached shallow levels. Satellites have detected elevated ground temperatures in the area of the past weeks' seismic swarm. Steaming ground cracks have become visible in the past several hours and have intersected U.S route 89 at milepost 434. The road has been closed by the Arizona Department of Transportation under an incident command system that has been initiated by Sunset Crater National Monument, which unifies the response from the National Park Service, Coconino National Forest, Arizona Department of Transportation, and other state and local agencies.

Yellowstone Volcano Observatory is working with outside researchers and partner agencies to monitor this ongoing and evolving activity.

Seismicity:
Over the past 24 hours, 230 earthquakes between magnitudes 0.5 and 3.1 have been located at depths of 0.6 to 2.5 miles (1 to 4 km) below the ground surface. The seismicity formed a 5.2-mi-(8.5-km-) long linear cluster parallel to and northeast of the inferred magmatic dike that formed February 13-15. In the past two hours, 45 earthquakes have been recorded, and event clustering has tightened to a 1.2 mi (2-km) diameter area at 0.5 to 1.2 mi (0.8 to 2 km) below the ground surface. These observations suggest renewed magma ascent and accumulation at shallow depths.

On February 17-18, the USGS installed three new seismic stations to improve monitoring capabilities, bringing the total to 8 stations within 19 miles (30 km) of the swarm's center.

Earthquakes as low as magnitudes 0.5 are locatable, and accuracy has improved for all earthquake locations. A 3-element infrasound array was also installed at one of the seismometer locations.

Deformation:
The continuous GNSS station at Sunset Crater showed sudden movement to the east-northeast of tens of centimeters (several inches), consistent with magma accumulation in a shallow dike just to the west of the National Monument. New InSAR data spanning this latest deformation episode should be available in the coming day.

Gas:
Airborne volcanic gas was collected on February 17 and recorded elevated carbon dioxide (CO2) measurements in the area around the swarm. In the six days since it was installed, the continuous Multi-GAS instrument has recorded increasing amounts of sulfur dioxide (SO2) gas relative to CO2, indicating shallow magma is present.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Francisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
For images, graphics, and general information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/observatories/yvo
For monitoring information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/volcanoes/yellowstone/questions-about-monitoring-yellowstone
For information on USGS volcano alert levels and notifications:
https://www.usgs.gov/natural-hazards/volcano-hazards/notifications
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Follow USGS Volcanoes on Facebook (https://www.facebook.com/USGSVolcanoes), Twitter (https://twitter.com/USGSVolcanoes).

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YELLOWSTONE VOLCANO OBSERVATORY
VOLCANO ACTIVITY NOTICE
U.S. Geological Survey
Tuesday, February 22, 2022, 8:00 AM MST (Monday, February 21, 2022, 15:00 UTC)

SAN FRANCISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: WARNING
Current Aviation Color Code: RED

SYNOPSIS: YVO raises level to WARNING/RED. Eruption occurring in San Francisco Volcanic Field, northern Arizona. Spatter cones growing east of Highway 89, north of Flagstaff. High gas emissions.

Summary:
On February 22, 2022, at 7:38 AM Mountain Standard Time, an eruption began northwest of Sunset Crater in Arizona's San Francisco Volcanic Field as indicated by satellite thermal data, infrasound, and ground observations. Field observations report low-intensity activity ejecting molten spatter to heights of 100 m (330 ft) from three vents along a linear trend. Spatter cones are growing around those vents. A gas plume is emanating from the vents and is being carried by wind to the east-northeast.

Yellowstone Volcano Observatory scientists are working with state, local, and academic partners to monitor this ongoing eruption. More information will be provided as it becomes available.

Monitoring Data:
Seismicity is dominated by tremor associated with the start of the eruption. Small eruptive bursts from the vents are accompanied by very long period (VLP) earthquakes. Infrasound is being generated from the small spatter cone eruptions and is characterized by tremor due to the lava fountaining and degassing along with intermittent, short-duration explosion signals. Continuous GNSS data indicated motion away from the current eruption site in the hours before the onset of the eruption. Based on field reports, sulfur dioxide is being emitted in large amounts but is currently difficult to measure. Ground cracks that extend northwest from the eruption site and across Highway 89 continue to steam and emit volcanic gases.

Hazards:
The main hazards are in the immediate vicinity of the eruption site, where small explosions are throwing molten spatter up to 330 feet (100 meters) high and 100-200 feet (tens of meters) from the source. Gas emissions near the eruptive vents are dangerously high, and downwind communities may notice degradation in air quality soon. Lava is forming spatter cones around the eruptive vents, and there is no presence of lava flows. Follow the guidance from Coconino County Emergency Management for evacuations and actions to take.

Prognosis:

Whether the current eruption is the start of a more prolonged eruption or a weak expression of a fading intrusion is unknown. If the eruption rate increases, lava flows are likely, although their paths and extent are uncertain. Additional vents may open at any time, and activity may wax or wane without warning, including high lava fountains that could produce extreme levels of gas and may generate low-level tephra plumes.

ADDITIONAL INFORMATION:

For images, graphics, and general information about the San Francisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
For images, graphics, and general information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/observatories/yvo
For monitoring information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/volcanoes/yellowstone/questions-about-monitoring-yellowstone
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YELLOWSTONE VOLCANO OBSERVATORY
VOLCANO ACTIVITY NOTICE
U.S. Geological Survey
Saturday, February 26, 2022, 6:00 AM MST (Monday, February 26, 1:00 PM 2022, 15:00 UTC)

SAN FRANCISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: ORANGE
Current Aviation Color Code: WATCH

SYNOPSIS: Eruption ended or paused at the San Francisco Volcanic Field. YVO lowering the level to WATCH/ORANGE.

Summary:
The eruption in the San Francisco Volcanic Field stopped at 1:48 am Saturday, February 26, 2022. After 90 hours of weak spattering, three uniformly sized, 100-foot- (30-meter-) tall spatter cones were formed. Over the course of the eruption, lava occasionally breached the cone walls, but flows traveled no more than 30 feet (10 meters). At the end of the eruption, a small amount of lava was seen draining back into the vents. The approximate total volume of lava erupted is 35.3 million cubic feet (one million cubic meters, 400 Olympic swimming pools). Volcanic gas emissions have decreased dramatically, but the eruptive vents and nearby cracks continue to steam and emit sulfur dioxide and other gases.

Yellowstone Volcano Observatory scientists are working with state, local, and academic partners to monitor this ongoing eruption. More information will be provided as it becomes available.

Monitoring Data:
Seismicity has ceased, and ground movement detected by deformation equipment shows no change since the eruption ended. Data continue to be collected, and gas-monitoring flights will resume this morning.

Prognosis:
YVO and colleagues continue to monitor the situation closely. These types of eruptions can pause and resume without warning.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Francisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
For images, graphics, and general information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/observatories/yvo
For monitoring information about Yellowstone and the Southwestern U.S. volcanoes:

https://www.usgs.gov/volcanoes/yellowstone/questions-about-monitoring-yellowstone
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YELLOWSTONE VOLCANO OBSERVATORY
VOLCANO ACTIVITY NOTICE
U.S. Geological Survey
Wednesday, March 9, 2022, 1:25 PM MT (Wednesday, March 9, 2022, 22:25 UTC)

SAN FRANCISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: WARNING
Current Aviation Color Code: RED

SYNOPSIS:
Volcanic eruption occurring in the San Francisco Volcanic Field, northern Arizona. Spatter cone is growing near eruptive fissures east of U.S. Route 89. High gas emissions.

Summary:
On March 9, 2022, at 12:52 PM Mountain Time, an eruption began 4.8 miles (7.75 kilometers) northwest of Sunset Crater in Arizona's San Francisco Volcanic Field, as indicated by infrasound and ground observations. Field crew flying Unoccupied Aerial Vehicles (UAVs) witnessed the onset of the eruption, which began as an approximately 500-foot- (150-meter-) long fissure with several active vents ejecting spatter to 100 feet (30 meters) high feeding a short lava flow. Presently, a single vent is dominant, and erupting lava fountains are sustained at approximately 330 feet (100 meters) high, with a spatter cone growing around the vent. A gas plume is emanating from the vent and is being carried by the wind to the northwest.

Yellowstone Volcano Observatory scientists are working with state, local, and academic partners to monitor this ongoing eruption. More information will be provided as it becomes available.

Monitoring Data:
Current seismicity and infrasound are dominated by tremor associated with the eruption's start. Continuous GNSS data indicated motion away from the current eruption site in the hours before the onset of the eruption. Based on field reports, sulfur dioxide is being emitted in large amounts. Monitoring crews will be deploying UAV flights for aerial gas measurements. Ground cracks southeast of the eruption site are steaming and emitting volcanic gases.

Between February 27 and March 6, earthquake and deformation data showed no significant change in volcanic activity. In the two days before eruption onset, linear clusters of 203 earthquakes occurred between magnitudes 0.5 and 2.7 at depths of 0.6 to 1.9 miles (1 to 3 kilometers) below the ground surface. These earthquakes are offset 1.3 kilometers to the northeast of the eruption between February 22 and 26, 2022. InSAR data from February 27 - March 9 indicate this seismicity was associated with dike emplacement. In the past two hours, 25 earthquakes have been located and migrated towards the vent location just before the eruption began.

Hazards:

The main hazards are near the eruption site, where bursts of lava are throwing molten spatter up to 500 feet (150 meters) high and 200 feet (60 meters) from the vent. Gas emissions near the eruption are dangerously high, and downwind communities may notice degradation in air quality. People impacted by the gas plume should stay indoors or, if needed, leave the area for cleaner air to the north or south. Lava flows are flowing toward the north-northwest, away from the vent. Follow the guidance from Coconino County Emergency Management for evacuations and actions to take.

Prognosis:
It is unknown whether the current eruption will continue for longer than the 90-hour eruption Feb 22-26. At its current eruption rate, lava fountains could continue to feed lava flows. Lava flow forecasts are being conducted and communicated with emergency management personnel. Additional vents may open at any time, and activity may wax or wane without warning, including higher lava fountains that could produce extreme levels of gas and may generate low-level tephra plumes.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Francisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
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YELLOWSTONE VOLCANO OBSERVATORY
VOLCANO ACTIVITY NOTICE
U.S. Geological Survey
Thursday, March 17, 2022, 12:35 PM MT (Wednesday, March 17, 2022, 21:35 UTC)

SAN FRANCISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: WARNING
Current Aviation Color Code: RED

SYNOPSIS:
Volcanic eruption occurring in the San Francisco Volcanic Field, northern Arizona. Eruption has intensified and is producing a plume of rocks, gas, and ash up to 3.1 mi (5 km) above the vent.

Summary:
The eruption that began on March 9, 2022 located 4.8 miles (7.75 kilometers) northwest of Sunset Crater in Arizona's San Francisco Volcanic Field, is continuing and intensifying. At 07:02 Mountain Time on March 16, 2022, explosive activity intensified and transitioned a pulsing plume up to 3.1 mi (5 km) above the vent, with the tephra cone now 820 ft (250 m) tall. Winds are somewhat variable and are depositing tephra towards the northwest. Current seismicity and infrasound are dominated by tremor associated with the eruption. Continuous GNSS data show no new deformation. Based on field reports, sulfur dioxide is being emitted in large amounts - measurements in the past week have been approximately 20,000 tonnes/day.

A temporary flight restriction (TFR) has been declared, and airspace is closed within a 30-mile (50-kilometers) radius of the eruptive vent.

Yellowstone Volcano Observatory scientists are working with state, local, and academic partners to monitor this ongoing eruption. More information will be provided as it becomes available.

Monitoring Data:
Current seismicity and infrasound are dominated by tremor associated with the eruption. Continuously recording GPS/GNSS equipment shows no new deformation. Based on field reports, sulfur dioxide is being emitted in large amounts. The TFR has grounded all UAV flights - no additional airborne gas measurements will be made until the restriction is lifted. Satellite imagery indicates the plume altitude is up to 3.1 mi (5 km) above the vent. Tephra is reported up to 46.6 miles (75 kilometers) to the northwest by park rangers at the south rim of the Grand Canyon.

Hazards:
The main hazards are the eruption plume to aviation and gas/tephra emissions in the vicinity of the eruption. Gas emissions are dangerously high along with tephra fall near the eruption, and downwind communities may also notice degradation in air quality. Heed all closure and evacuation advice from the Coconino County Emergency Management. Subscribe to their alerts and, if available, use a weather radio for emergency advice.

Prognosis:
It is unknown how long the current eruption will continue. Additional vents may open at any time, and activity may wax or wane without warning, including higher eruption plumes that could produce extreme levels of gas and tephra over longer distances. As the tephra cone steepens, its sides could collapse and feed lava flows.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Francisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
For images, graphics, and general information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/observatories/yvo
For monitoring information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/volcanoes/yellowstone/questions-about-monitoring-yellowstone
For information on USGS volcano alert levels and notifications:
https://www.usgs.gov/natural-hazards/volcano-hazards/notifications
SUBSCRIBE TO VOLCANO ALERT MESSAGE by email: http://volcanoes.usgs.gov/vns
Follow USGS Volcanoes on Facebook (https://www.facebook.com/USGSVolcanoes), Twitter (https://twitter.com/USGSVolcanoes).

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YELLOWSTONE VOLCANO OBSERVATORY
VOLCANO ACTIVITY NOTICE
U.S. Geological Survey
Saturday, March 26, 2022, 11:55 PM MT (Saturday, March 26, 2022, 18:55 UTC)

SAN FRANCISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: WARNING
Current Aviation Color Code: RED

SYNOPSIS:
Volcanic eruption occurring in the San Francisco Volcanic Field, northern Arizona. I-40 closed due to tephra fall. Lava flows issue from eruptive vent.

Summary:
The eruption in San Francisco Volcanic Field continues. Between March 19-26 the frequency of explosive eruptions from the active vent diminished. On the evening of March 25, the cone surrounding the eruptive vent was measured at 1312 feet (400 meters) in height. A pause in activity was observed in the early morning hours of March 26.

Following this pause, an intense explosive eruption occurred at 6:45 AM local time and persisted for 3 hours. The onset of this explosive phase was witnessed by ground crews on their way to the field to collect rock samples and survey the eruption site. They a maximum tephra column that briefly reached a maximum height of 11 miles (18-kilometers) above the vent shortly after the onset of the eruption. Crews observed the full three-hour explosive phase from a distance and measured the average column height at 7.5 miles (12 kilometers) above the vent for its duration.

Winds are out of the north-northwest and significant tephra fallout has occurred in Doney Park, a community 10 miles (16 kilometers) south-southeast of the vent. Greater than 2 inches (5 centimeters) of tephra has fallen on Interstate-40 east of Flagstaff and approximately 15.5 miles (25 kilometers) from the volcano. In response, the Arizona Department of Transportation has closed I-40 until cleanup can be completed.

Following the cessation of this explosive eruption at approximately 9:45 AM (local time), the tephra cone maximum height was measured at 820 feet (250 meters). Thus, the cone has been truncated and its height reduced by 500 feet (150 meters) from the maximum height of 1312 feet (400 meters) observed the previous day. A new vent has opened on the northwest flank of the scoria cone. Lava began issuing from this vent at approximately 10:45 AM (Local time).

Yellowstone Volcano Observatory scientists are working with state, local, and academic partners to monitor this ongoing eruption. More information will be provided as it becomes available.

Monitoring Data:
Current seismicity and infrasound are dominated by tremor associated with the eruption. Continuously recording GPS/GNSS equipment shows no new deformation. Based on field reports, sulfur dioxide is being emitted in large amounts.

Hazards:
The current hazards are high gas emissions and lava flows. Gas emissions continue to be dangerously high, and volcanic smog (vog) is widely reported in Flagstaff, Munds Park, and Sedona to the south of the eruption. Communities downwind will continue to experience degradation in air quality. Heed all closure and evacuation advice from the Coconino County Emergency Management. Subscribe to their alerts and, if available, use a weather radio for emergency advice.

Prognosis:
It is unknown how long the current eruption will continue. Additional vents may open at any time, and activity may wax or wane without warning. Lava flows may continue and flow forecasts will be issued to Coconino County Emergency Management to communicate areas at risk of inundation.

ADDITIONAL INFORMATION:
For images, graphics, and general information about the San Francisco Volcanic Field:
https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
For images, graphics, and general information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/observatories/yvo
For monitoring information about Yellowstone and the Southwestern U.S. volcanoes:
https://www.usgs.gov/volcanoes/yellowstone/questions-about-monitoring-yellowstone
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SUBSCRIBE TO VOLCANO ALERT MESSAGE by email: http://volcanoes.usgs.gov/vns
Follow USGS Volcanoes on Facebook (https://www.facebook.com/USGSVolcanoes), Twitter (https://twitter.com/USGSVolcanoes).

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YELLOWSTONE VOLCANO OBSERVATORY
VOLCANO ACTIVITY NOTICE
U.S. Geological Survey
Monday, April 11, 2022, 11:55 AM MT (Monday, March 11, 2022, 18:55 UTC)

SAN FRANCISCO VOLCANIC FIELD (VNUM #329020)
35.37° N, 111.5° W, Summit Elevation 8028 ft (2447 m)
Current Volcano Alert Level: WARNING
Current Aviation Color Code: ORANGE

SYNOPSIS:
Volcanic eruption in San Francisco Volcanic Field feeding lava flows. YVO downgrades color code to ORANGE – alert level remains WARNING.

Summary:
The eruption in San Francisco Volcanic Field continues. State Route 89 was cut by lava flows on April 1, 2022, and eventually covered approximately 1.5 miles of the road between mile markers 439 and 441. Between March 27 and April 11, low lava fountains continuously fed lava flows, which have traveled approximately 9 miles (15 kilometers) from the vent. Lava fountain heights range between 30-60 feet (10-20 meters). No explosive eruptions have occurred since the sub-Plinian event on March 26.

U.S. Route 89 remains closed to all traffic between Doney Park and Cameron, Arizona. Check the Arizona Department of Transportation website for information on alternate routes and closure status.

Yellowstone Volcano Observatory scientists are working with state, local, and academic partners to monitor this ongoing eruption. More information will be provided as it becomes available.

Monitoring Data:
Current seismicity and infrasound are dominated by tremor associated with the eruption. Continuously recording GPS/GNSS equipment shows no new deformation. Based on field reports, sulfur dioxide is being emitted in large amounts.

Hazards:
The current hazards are high gas emissions and lava flows. Gas emissions continue to be dangerously high, and volcanic smog (vog) is widely reported in Flagstaff, Munds Park, and Sedona to the south of the eruption. Communities downwind will continue to experience degradation in air quality. Heed all closure and evacuation advice from the Coconino County Emergency Management. Subscribe to their alerts and, if available, use a weather radio for emergency advice.

Prognosis:
It is unknown how long the current eruption will continue. Additional vents may open at any time, and activity may wax or wane without warning. Lava flows may continue, and flow

forecasts will be issued to Coconino County Emergency Management to communicate areas at risk of inundation.

ADDITIONAL INFORMATION:
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https://www.usgs.gov/volcanoes/san-francisco-volcanic-field
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