



# ***Bulletin of World Volcanism***

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## FALSE REPORTS OF VOLCANIC ACTIVITY

A small ash plume reportedly rising from Antuco volcano, Chile was seen by a pilot. It was later revealed to have been caused by a wildfire.

Joint project with:



<http://www.volcanodiscovery.com/adventure-travel.html>: **Volcano Tours**

<http://www.volcano-news.com/>: **Volcano News**

# WORLDWIDE MONTHLY VOLCANIC ACTIVITY

## VOLCANOES ORGANIZED BY THE CAVW/GVP VOLCANO NUMBER CODE

**NAME: Guntur**

**LOCATION: Indonesia (Western Java)**

**HEIGHT: 2249 M**

**TYPE: Complex Volcano**

**COORDINATES: 7.143°S 107.840°E**

The CVGHM raised the alert level for Guntur from 'Normal' to 'Watch' on 2<sup>nd</sup> April after increased seismic activity since the end of March 2013.



*Above; Guntur volcano.*

**NAME: Dieng Volcanic Complex**

**LOCATION: Indonesia (Central Java)**

**HEIGHT: 2565 M**

**TYPE: Complex Volcano**

**COORDINATES: 7.20°S 109.92°E**

The CVGHM reported that during 10<sup>th</sup> – 26<sup>th</sup> March gas emissions continued to be elevated at Timbang, a cone that is part of the Dieng Volcanic Complex. Plumes containing carbon dioxide and hydrogen sulphide drifted 2 KM, and were toxic at a distance of 550 M. Seismicity increased during 13<sup>th</sup> – 26<sup>th</sup> March and then significantly increased on 27<sup>th</sup> March. CVGHM raised the Alert Level to 3 (on a scale of 1-4) on 27<sup>th</sup> March and warned the public not to approach Timbang Crater within a 1 KM radius.

**NAME: Tambora**

**LOCATION: Indonesia (Lesser Sunda Islands)**

**HEIGHT: 2850 M**

**TYPE: Stratovolcano**

**COORDINATES: 8.25°S 118.00°E**

The CVGHM raised the alert level for the volcano from 'Normal' to 'Watch' on 6<sup>th</sup> April after increased seismic activity at the volcano.

**NAME: Soputan**

**LOCATION: Indonesia (Sulawesi)**

**HEIGHT: 1784 M**

**TYPE: Stratovolcano**

**COORDINATES: 1.108°N 124.73°E**

CVGHM reported that seismicity at Soputan increased during January – 18<sup>th</sup> April and then significantly increased on 19<sup>th</sup> April. The Alert Level was raised to 3 on 19<sup>th</sup> April. Visitors and residents were prohibited from going within a 6.5 KM radius of the crater

**NAME: Miyake-Jima**

**LOCATION: Japan (Izu Islands)**

**HEIGHT: 815 M**

**TYPE: Stratovolcano**

**COORDINATES: 34.079°N 139.529°E**

On 19<sup>th</sup> April a swarm of earthquakes took place at the volcano. The JMA recorded 136 earthquakes with magnitudes up to 5.6. The earthquakes were at a depth of 5 – 15 KM and were located 10 KM west of the island.

**NAME: Grozny Group**

**LOCATION: Russia (Kuril Islands)**

**HEIGHT: 1211 M**

**TYPE: Complex Volcanoes**

**COORDINATES: 45.026°N 147.922°E**

The Tokyo VAAC reported that on 30<sup>th</sup> March a possible eruption from Grozny Group may have produced a plume that rose 2.1 KM a.s.l. and drifted E. A later VAAC notice stated that ash had dissipated.

The SVERT reported that on 3<sup>rd</sup> April at 07:55 ash from Grozny Group fell in Kurilsk (23 KM N) and Kitovy, producing deposits 2-3 mm thick. Cloud cover prevented observations of the volcano. The next day satellite images showed an ash plume that rose 3 km a.s.l. and drifted W and NW.

**NAME: Sabancaya**

**LOCATION: Peru**

**HEIGHT: 5967 M**

**TYPE: Stratovolcanoes**

**COORDINATES: 15.78°S 71.85°W**

In an Instituto Geofísico de Perú (IGP) report, a photo showed a fumarolic plume rising above Sabancaya on 8<sup>th</sup> March. During the third week of March, a bluish coloured plume rose 500 M above the crater, possibly indicating sulfur dioxide emissions. On 25<sup>th</sup> March



*Above; photograph showing a small ash plume from Lascar on 3 April.*

the seismic network detected a continuing high rate of volcano-tectonic (VT) earthquakes and an increasing number of long-period (LP) events. On 27<sup>th</sup> March and 1<sup>st</sup> April VT earthquakes continued to be dominant and located below the NE sector of the crater. The number and amplitude of LP events did not change.

Previously, residents of Sallalli, 11 KM S of Sabancaya, reported that fumarolic activity had increased on 5<sup>th</sup> December 2012. Four earthquakes within 15 KM of the crater during 22<sup>nd</sup> – 23<sup>rd</sup> February caused damage in Maca, 20 KM NE. In response, the Instituto Geofísico de Perú (IGP) installed seismic stations and recorded hundreds of earthquakes per day.

INGEMMET also installed monitoring equipment, and in partnership with IGP increased monitoring efforts. On 27<sup>th</sup> February scientists observed that the emissions were mostly water vapour, carbon dioxide, and sulfur dioxide. During 28 February – 5<sup>th</sup> March, there were 400-500 earthquakes per day recorded, mostly volcano-tectonic events.

On 4<sup>th</sup> April Instituto Geofísico de Perú (IGP) reported that volcano-tectonic (VT) earthquakes at Sabancaya dominated the seismic signals although long-period (LP) events continued to be detected.

**NAME: Lascar**

**LOCATION: Chile**

**HEIGHT: 5592 M**

**TYPE: Stratovolcanoes**

**COORDINATES: 23.37°S 67.73°W**

The SERNAGEOMIN reported that on 3<sup>rd</sup> April (at around 9:20 local time), degassing became more intense at the volcano. With steam and gas plumes rising to a heights of around 320 M above the crater. Some plumes were coloured grey with ash content. A photo taken by a member of the public shows a small explosion from the volcano on 3<sup>rd</sup> April. Incandescence was seen at night, but seismic

activity remained normal. On 5<sup>th</sup> April the Alert Level was raised to YELLOW.

**NAME: Hekla**

**LOCATION: Iceland**

**HEIGHT: 1491 M**

**TYPE: Stratovolcano\***

**COORDINATES: 63.98°N 19.70°W**

On 29<sup>th</sup> March the Icelandic Meteorological Office noted that Hekla had been quiet the previous few days; no additional earthquakes had been detected since a period of increased seismicity during 10<sup>th</sup> – 26<sup>th</sup> March. The Icelandic Civil Defense continued to maintain a level of "uncertainty". Tremor still rose during the month.

**NAME: Hierro**

**LOCATION: Canary Islands (owned by Spain)**

**HEIGHT: 1500 M**

**TYPE: Shield Volcano**

**COORDINATES: 27.73°N 18.03°W**

On 18<sup>th</sup> March, seismic activity at El Hierro sharply increased. Earthquakes were initially located around the NW tip of the island, at about 20 KM depth, then later migrated W about 12 – 15 KM offshore W of El Hierro Island, at similar depth. About 100 earthquakes of Mb 3.5 (body wave measurement) or greater had been located, many of them felt by residents. The biggest events occurred on 29<sup>th</sup> March (Mb 4.7) and 31<sup>st</sup> March (Mw 4.6, moment magnitude) both at 20 km depth. IGN's GPS data showed inflation of the island, with maximum deformation at the westernmost station of about 10 cm in the horizontal component and about 11 cm in the vertical. Deformation rates reached a maximum during 23<sup>rd</sup> – 24<sup>th</sup> March. An increase in carbon dioxide flux was observed in the W area. Rockfalls were reported on the steep slopes, especially during 26<sup>th</sup> – 29<sup>th</sup> March. On the evening of 27<sup>th</sup> March the Plan de Protección Civil por Riesgo Volcánico (PEVOLCA) raised the Volcanic Alert Code for the population to Yellow, and closed the access to the W part of the island.

## CONTINUING ACTIVITY

**NAME: Etna**

**LOCATION: Italy (Sicily)**

**HEIGHT: 3330 M**

**TYPE: Stratovolcanoes**

\* While Hekla has the form of a Stratovolcano, it is most likely a Crater Row built up over many thousands of years.



**COORDINATES: 37.734°N 15.004°E**

Sezione di Catania - Osservatorio Etno reported that on 3<sup>rd</sup> April, after almost 18 days of relative quiet, the New Southeast Crater (NSEC) of Etna produced its ninth episode of lava fountaining. Activity had increased on 2 April when small grayish-brown puffs rose from NSEC. Cloud cover prevented further visual observations through the following night; however, sporadic glow suggested Strombolian activity. On the morning of 3<sup>rd</sup> April, the volcanic tremor amplitude slowly increased and was accompanied by numerous explosion signals. Field observations revealed that at 13:30 vigorous Strombolian activity was occurring at one or two NSEC vents, with jets of pyroclastic material rising up to a few tens of meters above the crater rim. The activity progressively intensified between 14:00 and 14:30, with frequent, powerful Strombolian explosions often generating loud bangs and launching great quantities of incandescent bombs (with diameters of many meters) onto the flanks of the cone. Shortly after 14:35, ash emission started from the saddle vent (SV), followed a few minutes later by Strombolian explosions from the same vent. At 14:50, a continuous jet of incandescent lava fountained up to 100 M, whereas the vents within NSEC continued to produce powerful loud explosions. At around 15:05 a lava flow moved through the deep breach in the SE rim of NSEC and then travelled over the W rim of the Valle del Bove. During the same time interval, lava emissions started from SV, feeding a flow that went S. Since 14:30 the eruptive plume drifted SE and contained modest amounts of volcanic ash. At around 15:40 ash emissions progressively increased and the volcanic tremor amplitude showed a rapid rise. Between 15:40 and 16:15 low lava fountaining continued from SV, whereas the vents within NSEC emitted intermittent, pulsating lava fountains. The incandescent jets from the vents within NSEC rose up to 400 M above the crater rim. At 16:15, lava fountaining at SV intensified, with jets rising 400 – 500 M high. Explosions from the vents within NSEC continued, producing loud detonations every 1-2 seconds.

Lava fountaining significantly decreased between 16:25 and 16:28 when a new eruptive vent (NV) opened a few tens of meters to the W of SV, on the E slope of the old SEC cone, and emitted grayish-brown ash. A dense cloud of pyroclastic material emitted by NSEC vents and SV rose about 2 KM high and drifted SE. Fallout of pyroclastic material affected almost the same area that had already been subjected to the heavy shower of lapilli on 16 March: Zafferana Etnea and Santa Venerina on the



*Above; fire fountain from Etna's New SE crater on 3 April.*

SE flank, and the N part of Acireale plus a number of smaller villages to the N at the S margin of Giarre, in the Ionian area. The deposit was thinner than that of 16<sup>th</sup> March, and the dimensions of the lapilli were notably smaller.

Between 16:30 and 16:40, the eruptive activity reached a new peak of intensity with sustained lava fountains from SV and powerful explosions from the vents within the NSEC. At 16:37 a thermal surveillance camera recorded a pyroclastic flow from the NE flank of the NSEC cone. Two lava flows emerged from the same area and travelled toward the Valle del Bove.

After 16:40, lava fountaining activity showed a rapid decrease, followed by a long series of explosions heard many tens of kilometers away, vibrating doors and windows on the E flank. During this phase, a second pyroclastic flow from the NE flank of the NSEC cone travelled about 1.5 KM. The series of strong explosions at the conclusion of the paroxysm lasted until about 17:05; subsequently, brown ash continued to be emitted from the SV and NV vents, eventually followed by dense volumes of white vapour. After nightfall, the lava flows emitted during the paroxysm were still brightly incandescent, and slow lava emission continued from several vents on the S and NE sides of the cone. All lava emissions ceased on 4<sup>th</sup> April.

Sezione di Catania - Osservatorio Etno reported that the tenth eruptive episode of 2013 began at Etna's New Southeast Crater (NSEC) on 8<sup>th</sup> April with sporadic ash emissions occasionally accompanied by incandescent material. A large explosion at 22:52 was heard up to 15 KM away. The ash emissions continued for about 48 hours. In the late afternoon on 10<sup>th</sup> April Strombolian activity began, producing minor ash emissions during some of the explosions. In the morning on 11<sup>th</sup> April



*Above; strombolian explosions and a small lava flow from Etna's New SE crater on 11 April.*

Strombolian explosions occurred about every 2-5 seconds, ejecting incandescent pyroclastics several tens of meters above the crater rim. Strombolian activity increased slowly in intensity and frequency of explosions throughout the day; contemporaneously the volcanic tremor amplitude continued to show a gradual rise. Late in the afternoon frequent and very powerful Strombolian explosions occurred every 1-2 seconds and were widely audible around the volcano. Jets of incandescent pyroclastics often rose 200 M above the crater rim and generally contained minor amounts of ash. Around 18:40, a small amount of lava flowed over the deep breach in the SE rim of the crater. In the late evening it stopped and showed evidence of cooling.

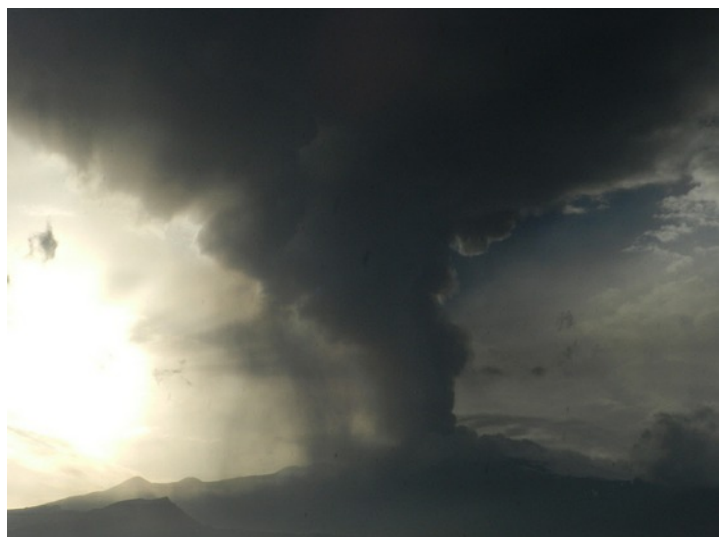
Around 01:10 on 12<sup>th</sup> April another small lava flow travelled S then SE from the saddle between the two cones of the Southeast Crater (SEC). Throughout the night powerful explosions alternated with intermittent, low lava fountains.

At daybreak on 12<sup>th</sup> April a dense eruption plume containing relatively minor amounts of pyroclastic material drifted ESE. Until about 10:25 on 12<sup>th</sup> April, all eruptive activity occurred exclusively at one or two closely spaced vents within the NSEC, then lava was emitted from two vents at the NE base of the NSEC cone. At 10:24 a flow of hot pyroclastic material from the same area travelled about 2 KM NE in less than 1 minute.

In the meantime, eruptive activity continued at the NSEC with frequent, powerful Strombolian explosions and emission of modest quantities of volcanic ash, which was rapidly dispersed. Lava emission from the SSE rim of the NSEC, the saddle, and the NE base of the cone remained active. Shortly before 12:00, the eruptive activity changed from low lava fountains to Strombolian explosions and intermittent ash emissions.

Vigorous ash emissions resumed at 12:14 both from the main vent of the NSEC and from the saddle vent. Expulsion of blocks, bombs and ash from the saddle vent continued until 12:34, when the main vent of the NSEC reactivated, and for the next nearly 20 minutes both vents were the source intense ash emissions. The activity shifted back entirely to NSEC, entering into the true paroxysmal phase of this episode at 12:50 with sustained lava fountaining, accompanied by a return to high levels of the volcanic tremor amplitude. During the following 10 minutes, there was a considerable increase in the quantity of pyroclastic material in the plume, which drifted ESE. Tephra fall (ash and small lapilli) affected Fleri, Zafferana Etnea, Milo and S. Maria la Scala, although the quantity of fallout was much smaller compared to those of the previous paroxysms. Sustained lava fountaining continued for about one hour; a few minutes after 14:00 the activity switched to sporadic Strombolian explosions and ash emissions, which gradually diminished in vigor. During 14:00 and 14:10, repeated collapses occurred on the SE flank of the NSEC cone, possibly from new vents at the base of the cone, from which a new lava flow travelled toward the Valle del Bove. The collapses generated avalanches and clouds ash. Explosive activity progressively diminished and completely ceased around 17:00.

On the evening of 12<sup>th</sup> April, the lava flows emitted from the saddle and from the various vents on the flanks of the cone were incandescent and slowly moving; during the night, the surveillance cameras showed the cessation of all lava emission and the cooling of the flows. However, on the morning of 13<sup>th</sup> April, slow lava effusion resumed from the lower of the vents and a small flow advanced a few hundred meters. This flow ceased in the early morning hours the following day. Once more, on the evening of 14<sup>th</sup> April, there was a rather weak resumption of effusive activity from this vent, which ceased after a few hours.



*Above; paroxysmal eruption of Etna on 20 April.*



Sezione di Catania - Osservatorio Etneo reported that the eleventh lava-fountaining episode of 2013 began at Etna's New Southeast Crater (NSEC) on 18<sup>th</sup> April. Activity increased on 16<sup>th</sup> April with ejected incandescent tephra and small ash puffs from a vent inside NSEC, followed by weak Strombolian explosions. Strombolian explosions became more frequent and intense on the morning of 18<sup>th</sup> April and then were almost continuous by 13:00. During the next two hours lava fountains developed and a dense plume drifted SSW. Ash and lapilli fell in between the villages of Ragalna, Belper, and Paterno, as well as the tourist area "Etna Sud." Lapilli-fall was a few centimeters deep and clasts were at most 5 cm in diameter. Three lava flows were produced; the largest flowed through the deep notch in the SE rim of the crater and travelled 4 KM towards the Valle del Bove. The interaction of the lava with snow led to rapid melting, generating small lahars. The two other lava flows originated in the saddle between the two SEC cones; one travelled N and the other S. After the lava fountains ceased, strong explosions were heard the rest of the day. On 19<sup>th</sup> April explosions produced little puffs of ash and ejected hot tephra. The twelfth episode occurred two days later during the late afternoon of 20<sup>th</sup> April. Intermittent explosions ejected incandescent tephra and generated small ash puffs on 19<sup>th</sup> April. During the evening a large dark plume rose from NSEC, and sporadic Strombolian explosions were observed. The explosive activity ceased in the late evening, but shortly afterwards the lower of the two effusive vents at the base of the NSEC cone produced a lava flow that travelled 1.5 KM towards the Valle del Bove. Around 17:00 ash puffs rose from the crater, followed by incandescent tephra ejected at 17:13. Within a few minutes sustained lava fountains were observed, along with a tall eruption plume that drifted E. Ash and lapilli fell over a wide area to the E, including along the Ionian coastline, just S of Guardia Mangano, up to Fiumefreddo, including the towns of Taormina, Ripon, and Mascali, and further upstream, including Santa Venerina, Zafferana, Milo, and Sant'Alfio. On 20<sup>th</sup> April several lava flows on the W wall of the Valle del Bove interacted with the snow, generating explosions and lahars. Around 18:15 lava-fountain activity decreased and turned into explosions and ash emissions. At 18:40 the paroxysm was over. In the evening, the lava flow emitted from the effusive vent at the base of the SE part of the NSEC cone was still well-fed. Poor

weather conditions prevented visual observations until the evening of 21<sup>st</sup> April, when surveillance videos showed sporadic Strombolian explosions accompanied by small ash puffs at the NSEC, and the emission of a small lava flow from the base of the cone.

**NAME: White Island**

**LOCATION: New Zealand**

**HEIGHT: 321 M**

**TYPE: Stratovolcanoes**

**COORDINATES: 37.52°S 177.18°E**

On 26<sup>th</sup> March GeoNet Data Centre reported that a pattern of repeating minor activity at White Island had become established over the last month. Periods of passive steaming and degassing were accompanied by very low levels of volcanic tremor. This activity alternated with minor mud-and-steam explosions from the active crater when there was strong volcanic tremor. Sulfur dioxide gas measurements on 20<sup>th</sup> March were at similar levels to the past month, although carbon dioxide levels were higher.

**NAME: Yasur**

**LOCATION: Vanuatu**

**HEIGHT: 361 M**

**TYPE: Stratovolcano**

**COORDINATES: 19.53°S 169.442°E**

Increased strombolian activity at the volcano began on 2<sup>nd</sup> April. Bombs from the volcano reached the car park at the base of the cone. The Alert Level was raised from 1 to 2.



*Above; the small volcano of Yasur on Tanna island, Vanuatu, which has been continually active since at least 1774.*

**NAME: Manam**

**LOCATION: Papua New Guinea**

**HEIGHT: 1807 M**

**TYPE: Stratovolcano**

**COORDINATES: 4.080°S 145.037°E**

The RVO reported that during 1<sup>st</sup> – 14<sup>th</sup> April Strombolian activity was observed from Manam Southern Crater. During 1<sup>st</sup> – 7<sup>th</sup> April ash plumes rose above the crater. Island residents reported incandescent tephra ejections from the crater at night, and roaring and rumbling noises. Activity increased on 8<sup>th</sup> April. Strombolian activity was sustained for extended periods during 9<sup>th</sup> – 11<sup>th</sup> and 13<sup>th</sup> – 14<sup>th</sup> April. Loud roaring and rumbling noises were reported by residents in Bogia, 25 – 30 KM SSW of Manam on the N coast of the mainland. A few loud banging noises on 13<sup>th</sup> April rattled bush-material houses at Dugulava village on the SW side of the island. Most fragments from the Strombolian eruptions, including a small volume of lava, were channeled into SW valley. Ash plumes rose as high as 600 M above the summit crater and drifted NW. White vapour plumes rose from Main Crater during the reporting period.

The RVO reported that a high level of activity at Manam continued on 15<sup>th</sup> April. Ash plumes rose 500 M above the crater. A loud explosion was heard at 08:04. At about 19:50 dense ash plumes rose 2 KM and drifted SW. At night loud jet-like noises were reported by residents in Bogia, 25 – 30 KM SSW of Manam on the N coast of the mainland. Bright red glow was visible within the dense mixture of ash plumes and atmospheric clouds. Lava was observed flowing from a new vent on the headwall of SW valley during a brief clear period from 18:00 to 18:50. Ash and scoria fell in most villages between Dugulava on the SW side of the island and Kuluguma on the NW side. Similar activity continued during the first half of 16<sup>th</sup> April and then changed to gentle light gray ash emissions until 20<sup>th</sup> April. On 23<sup>rd</sup> April dense white vapour plumes occasionally rose from the crater.

**NAME: Rabaul**

**LOCATION: Papua New Guinea (New Britain)**

**HEIGHT: 688 M**

**TYPE: Pyroclastic Shield**

**COORDINATES: 4.271°S 152.203°E**

The RVO reported that roaring and rumbling noises from Rabaul were heard during 1<sup>st</sup> – 14<sup>th</sup> April, especially at night. White vapour plumes with ash rose at most 100 M above the main crater and drifted NW, causing ash fall in Rabaul town (3 – 5 KM NW).

The RVO reported that during 15<sup>th</sup> – 23<sup>rd</sup> April white vapour plumes containing some ash rose at most 100 M from Rabaul caldera's Tavurvur cone and drifted SE. Roaring and rumbling noises were less intense than during previous weeks. Based on analyses of satellite imagery, the Darwin VAAC reported that on 18<sup>th</sup> April an ash plume rose to an altitude of 4.6 KM a.s.l. and drifted more than 35 KM E. Satellite images later that day showed that the plume had dispersed.

**NAME: Bagana**

**LOCATION: Papua New Guinea (Bougainville autonomous territory)**

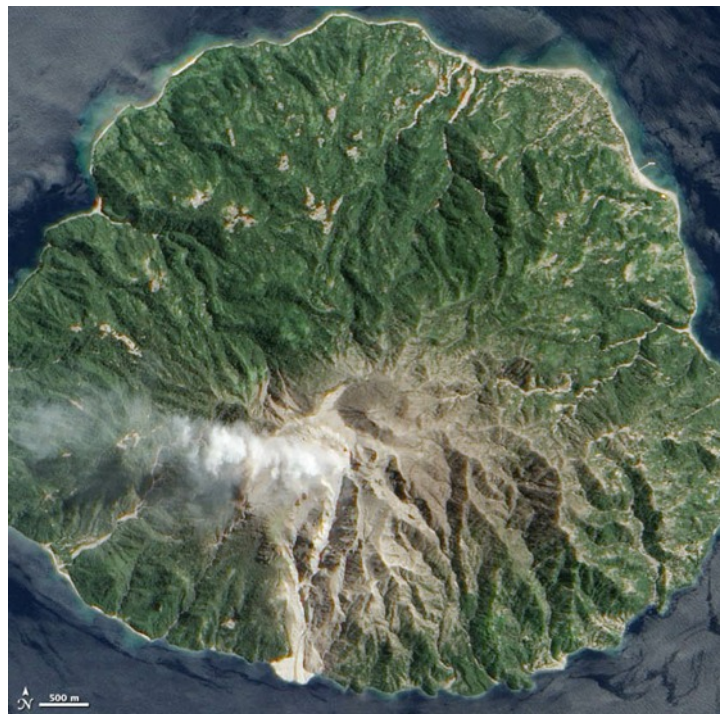
**HEIGHT: 1750 M**

**TYPE: Lava Cone**

**COORDINATES: 6.140°S 155.195°E**

The Darwin VAAC reported that on 7<sup>th</sup> April ash plumes from Bagana rose to an altitude of 3 KM a.s.l. and drifted almost 85 KM SW and WSW. On 9<sup>th</sup> April an ash plume rose to an altitude of 4 KM a.s.l. and drifted almost 75 KM SW.

The Darwin VAAC reported that during 10<sup>th</sup> – 11<sup>th</sup> April, ash plumes from Bagana rose to an altitude of 2.4 KM a.s.l. and drifted 75 KM SW and W. On 15<sup>th</sup> April, an ash plume rose to an altitude of 1.8 KM a.s.l. and drifted almost 30 KM S and W. The next day ash plumes rose to an altitude of 3 KM a.s.l. and drifted 65 KM SW.



*Above; steaming lava dome of Paluweh on April 19.*

**NAME: Paluweh**

**LOCATION: Indonesia (Lesser Sunda Islands)**

**HEIGHT: 875 M**

**TYPE: Stratovolcano**

**COORDINATES: 8.32°S 121.708°E**



The Darwin VAAC reported that during 27<sup>th</sup> March – 1<sup>st</sup> April, ash plumes from Paluweh rose to altitudes of 2.4 – 3.7 KM a.s.l. and drifted 45 – 100 KM N, NE, and E.

The Darwin VAAC reported that on 3<sup>rd</sup> April an ash plume from Paluweh rose to an altitude of 2.1 KM a.s.l. and drifted 37 KM SE and W. During 6<sup>th</sup> – 7<sup>th</sup> April ash plumes rose to an altitude of 3 KM a.s.l. and drifted over 45 KM W and WSW.

The Darwin VAAC reported that on 16<sup>th</sup> April an ash plume from Paluweh rose to an altitude of 2.1 KM a.s.l. and drifted 37 KM E.

The Darwin VAAC reported that on 20<sup>th</sup> April an ash plume from Paluweh rose to an altitude of 2.1 KM a.s.l. and drifted 45 KM NW.

**NAME: Batu Tara**

**LOCATION: Indonesia (Komba Island)**

**HEIGHT: 748 M**

**TYPE: Stratovolcano**

**COORDINATES: 7.792°S 123.579°E**

The Darwin Volcanic Ash Advisory Centre

(VAAC) reported that during 30<sup>th</sup> March - 1<sup>st</sup> April, ash plumes from Batu Tara rose to altitudes of 2.4 – 3 KM a.s.l. and drifted 55 – 75 KM NE.

The Darwin Volcanic Ash Advisory Centre

(VAAC) reported that during 5<sup>th</sup> – 7<sup>th</sup> April ash plumes from Batu Tara rose to an altitude of 2.1 KM a.s.l. and drifted 35 – 45 KM SW, WSW, and NW.

The Darwin Volcanic Ash Advisory Centre

(VAAC) reported that during 13<sup>th</sup> – 14<sup>th</sup> April, ash plumes from Batu Tara rose to altitudes of 1.5 – 2.1 KM a.s.l. and drifted 25 – 45 KM NW, N, NE, and SE.

The Darwin Volcanic Ash Advisory Centre

(VAAC) reported that during 17<sup>th</sup> and 20<sup>th</sup> – 21<sup>st</sup> April, ash plumes from Batu Tara rose to an altitude of 2.1 KM a.s.l. and drifted 45 – 55 KM N, NW, and W. On 23<sup>rd</sup> April, an ash plume rose to an altitude of 1.5 KM a.s.l. and drifted 18 – 27 KM NW.

**NAME: Lokon-Empung**

**LOCATION: Indonesia (Sulawesi)**

**HEIGHT: 1580 M**

**TYPE: Stratovolcano**

**COORDINATES: 1.358°N 124.792°E**

The Darwin VAAC reported that on 3<sup>rd</sup> April an eruption from Lokon-Empung produced an ash plume that rose to altitudes of 3 – 3.4 KM a.s.l. and drifted S and SE. On 8<sup>th</sup> April an ash plume

rose to an altitude of 4.6 KM a.s.l. and drifted SW. Ash was not detected in satellite imagery.

The Darwin VAAC reported that on 11<sup>th</sup> April an ash plume from Lokon-Empung rose to an altitude of 4.6 KM a.s.l. and drifted SW. Ash was not detected in satellite imagery.

On 14<sup>th</sup> April at around 09:00 a large explosion ejected a plume of ash to a height of 4 KM. Strong vibrations were felt 5 KM away.

**NAME: Karengetang [Api Siau]**

**LOCATION: Indonesia (Sangihe)**

**HEIGHT: 1784 M**

**TYPE: Stratovolcano**

**COORDINATES: 2.78°N 125.40°E**

The Darwin VAAC reported that on 9<sup>th</sup> April an ash plume from Karangetang rose to an altitude of 4.3 KM a.s.l. and drifted over 45 KM WNW. According to a news article, pahoehoe lava flows travelled 150 M and rock avalanches travelled 2 KM down the flanks on that same day.

**NAME: Dukono**

**LOCATION: Indonesia (Halmahera)**

**HEIGHT: 1335 M**

**TYPE: Complex Volcano**

**COORDINATES: 1.68°N 127.88°E**

On 16<sup>th</sup> April, increased SO<sub>2</sub> emissions were noted from the volcano, likely due to increased activity.



*Above; small ash eruption from Dukono in 1991. The volcano has been in continuous activity since 1933.*

**NAME: Sakura - Jima**

**LOCATION: Japan (Kyushu)**

**HEIGHT: 1117 M**

**TYPE: Stratovolcano**

**COORDINATES: 31.585°N 130.657°E**

The Tokyo VAAC reported that explosions from Sakura-jima during 28<sup>th</sup> March 1<sup>st</sup> April generated plumes that rose to altitudes of 1.8 – 2.7 KM a.s.l. and drifted NE, E, and SE. JMA reported that during 29<sup>th</sup>

March – 1<sup>st</sup> April four explosions from Showa Crater ejected tephra at most 1.3 KM from the crater.

The JMA reported that during 1<sup>st</sup> – 5<sup>th</sup> April, three explosions from Sakura-jima's Showa Crater ejected tephra at most 1.8 KM from the crater. Crater incandescence was occasionally detected at night. Based on a pilot report, the Tokyo VAAC reported that an ash plume drifted N on 4<sup>th</sup> April. The JMA reported that occasional very small eruptions from Sakura-jima's Showa Crater occurred during 8<sup>th</sup> – 12<sup>th</sup> April. Crater incandescence was detected at night. Based on information from JMA, the Tokyo VAAC reported that on 13<sup>th</sup> April an eruption produced an ash plume that rose to an altitude of 1.8 KM a.s.l. and drifted SE.

The Tokyo VAAC reported that on 17<sup>th</sup> April an eruption from Sakura-jima produced an ash plume that rose to an altitude of 2.4 KM a.s.l. and drifted E. JMA reported that three large eruptions from Showa Crater occurred during 19<sup>th</sup> – 22<sup>nd</sup> April and ejected tephra at most 1.3 KM from the crater. Crater incandescence was detected at night.

**NAME: Chirpoi**

**LOCATION: Russia (Kuril Islands)**

**HEIGHT: 742 M**

**TYPE: Caldera**

**COORDINATES: 46.525°N 150.875°E**

The SVERT reported that a weak thermal anomaly over Snow, a volcano of Chirpoi, was detected in satellite images on 6<sup>th</sup> April; cloud cover prevented observations of the volcano on other days during 1<sup>st</sup> – 8<sup>th</sup> April.

The SVERT reported that a weak thermal anomaly over Snow, a volcano of Chirpoi, was detected in satellite images during 12<sup>th</sup> – 13<sup>th</sup> April; cloud cover prevented observations of the volcano on other days during 8<sup>th</sup> – 15<sup>th</sup> April.

**NAME: Karymsky**

**LOCATION: Russia (Kamchatka)**

**HEIGHT: 1536 M**

**TYPE: Stratovolcano**

**COORDINATES: 54.05°N 159.45°E**

The KVERT reported that satellite data showed a thermal anomaly on Karymsky on 1<sup>st</sup> and 3<sup>rd</sup> April. Technical problems prevented seismic data collection.

**NAME: Kizimen**

**LOCATION: Russia (Kamchatka)**

**HEIGHT: 2376 M**

**TYPE: Stratovolcano**

**COORDINATES: 55.130°N 160.32°E**

The KVERT reported that during 22<sup>nd</sup> – 29<sup>th</sup> March, moderate seismic activity continued at Kizimen.

Video and satellite data showed that lava continued to extrude from the summit, producing incandescence, strong gas-and-steam activity, and hot avalanches on the W and E flanks. Satellite images detected a daily thermal anomaly over the volcano.

The KVERT reported that during 29<sup>th</sup> March – 5<sup>th</sup> April, moderate seismic activity continued at Kizimen. Video and satellite data showed that lava continued to extrude from the summit, producing incandescence, strong gas-and-steam activity, and hot avalanches on the W and E flanks. Satellite images detected a daily thermal anomaly over the volcano. Based on information from Yelizovo Airport (UHPP) and analysis of satellite imagery, the Tokyo VAAC reported that an ash plume rose to an altitude of 4.6 KM a.s.l. and drifted S on 4<sup>th</sup> April.

The KVERT reported that during 5<sup>th</sup> – 12<sup>th</sup> April moderate seismic activity continued at Kizimen. Video and satellite data showed that lava continued to extrude from the summit, producing incandescence, strong gas-and-steam activity, and hot avalanches on the W and E flanks. Satellite images detected a daily thermal anomaly over the volcano.

The KVERT reported that during 12<sup>th</sup> – 19<sup>th</sup> April moderate seismic activity continued at Kizimen. Video and satellite data showed that lava continued to extrude from the summit, producing incandescence, strong gas-and-steam activity, and hot avalanches on the W and E flanks. Satellite images detected a daily thermal anomaly over the volcano.

**NAME: Tolbachik**

**LOCATION: Russia (Kamchatka)**

**HEIGHT: 3682 M**

**TYPE: Shield Volcano**

**COORDINATES: 55.830°N 160.330°E**

The KVERT reported that the S fissure along the W side of Tolbachinsky Dol, a lava plateau on the SW side of Tolbachik, continued to produce very fluid lava flows during 22<sup>nd</sup> – 29<sup>th</sup> March that travelled to the W, S, and E sides of the plateau. Cinder cones continued to grow along the fissure. Gas-and-ash plumes rose to an altitude of 3.5 KM a.s.l. and drifted in multiple directions. A very large thermal

anomaly on the N part of Tolbachinsky Dol was visible daily in satellite imagery.

The KVERT reported that the S fissure along the W side of Tolbachinsky Dol, a lava plateau on the SW side of Tolbachik, continued to produce very fluid lava flows during 29<sup>th</sup> March – 5<sup>th</sup> April, that travelled to the W, S, and E sides of the plateau. Cinder cones continued to grow along the fissure. Gas-and-ash plumes rose to an altitude of 3.5 KM a.s.l. and drifted in multiple directions. A very large thermal anomaly on the N part of Tolbachinsky Dol was visible daily in satellite imagery.

The KVERT reported that the S fissure along the W side of Tolbachinsky Dol, a lava plateau on the SW side of Tolbachik, continued to produce very fluid lava flows during 5<sup>th</sup> – 12<sup>th</sup> April that travelled to the W, S, and E sides of the plateau. Cinder cones continued to grow along the S fissure. Gas-and-ash plumes rose to an altitude of 3.5 KM a.s.l. and drifted in multiple directions. A very large thermal anomaly on the N part of Tolbachinsky Dol was visible daily in satellite imagery. A weak thermal anomaly was detected over the crater of the volcano on 6<sup>th</sup> and 9<sup>th</sup> April. The KVERT reported that the S fissure along the W side of Tolbachinsky Dol, a lava plateau on the SW side of Tolbachik, continued to produce very fluid lava flows during 12<sup>th</sup> – 19<sup>th</sup> April that travelled to the W, S, and E sides of the plateau. Cinder cones continued to grow along the S fissure. Gas-and-ash plumes rose to an altitude of 3 KM a.s.l. and drifted in multiple directions. A large thermal anomaly on the N part of Tolbachinsky Dol was visible daily in satellite imagery.

**NAME: Shiveluch**

**LOCATION: Russia (Kamchatka)**

**HEIGHT: 3283 M**

**TYPE: Stratovolcano**

**COORDINATES: 56.653°N 161.360°E**

The KVERT reported that during 22<sup>nd</sup> – 29<sup>th</sup> March a viscous lava flow effused on the E flank of Shiveluch's lava dome, accompanied by hot avalanches, incandescence, and fumarolic activity. Satellite imagery showed a daily thermal anomaly on the lava dome. The KVERT reported that during 29<sup>th</sup> March – 5<sup>th</sup> April, a viscous lava flow effused on the E flank of Shiveluch's lava dome, accompanied by hot avalanches, incandescence, and fumarolic activity. Satellite imagery showed a daily thermal anomaly on the lava dome. An

explosion on 5<sup>th</sup> April observed by video generated an ash plume that rose to altitudes of 5.5 – 6 KM a.s.l.

The KVERT reported that during 5<sup>th</sup> – 12<sup>th</sup> April a viscous lava flow effused on the E flank of Shiveluch's lava dome, accompanied by hot avalanches, incandescence, and fumarolic activity. Satellite imagery showed a daily thermal anomaly on the lava dome.

The KVERT reported that during 12<sup>th</sup> – 19<sup>th</sup> April, a viscous lava flow effused on the NW flank of Shiveluch's lava dome, accompanied by hot avalanches, incandescence, and fumarolic activity. Satellite imagery showed a daily thermal anomaly on the lava dome. Based on analyses of satellite imagery, the Tokyo VAAC reported that on 22<sup>nd</sup> April ash plumes rose to an altitude of 3.7 KM a.s.l. and drifted NE. Subsequent images that day showed that the ash had dissipated.

**NAME: Kilauea**

**LOCATION: USA (Hawaii)**

**HEIGHT: 1222 M**

**TYPE: Shield Volcano**

**COORDINATES: 19.421°N 155.287°W**

During 27<sup>th</sup> March – 2<sup>nd</sup> April, HVO reported that the circulating lava lake periodically rose and fell in the deep pit within Kilauea's Halema'uma'u Crater. The plume from the vent continued to deposit variable amounts of ash, spatter, and Pele's hair onto nearby areas.

At Pu'u 'O'o Crater, glow emanated from four spatter cones on the crater floor. Two lava flows (Peace Day and Kahauale'a) were fed by lava tubes extending from Pu'u 'O'o. Multiple lava flows from the NE spatter cone, collectively called the Kahauale'a flow, travelled across the NE flank of Pu'u 'O'o cone to the cone's base and advanced more than 4.4 km NE over older flows. A branch also travelled S, just S of Pu'u Kahauale'a. Peace Day activity consisted of lava flows active above the pali (5 km SE of Pu'u 'O'o), on the pali, and on the coastal plain. Lava also entered the ocean at two main locations spanning the National Park boundary.

During 3<sup>rd</sup> – 9<sup>th</sup> April, HVO reported that the circulating lava lake periodically rose and fell in the deep pit within Kilauea's Halema'uma'u Crater. The plume from the vent continued to deposit variable amounts of ash, spatter, and Pele's hair onto nearby areas.

At Pu'u 'O'o Crater, glow emanated from four spatter cones on the crater floor. Two lava flows (Peace Day and Kahauale'a) were fed by lava tubes extending from Pu'u 'O'o. Multiple lava flows from the NE spatter cone, collectively called the Kahauale'a flow,



travelled across the NE flank of Pu'u 'O'o cone to the cone's base and advanced more than 4.9 KM NE over older flows. Peace Day activity consisted of lava flows active above the pali (5 KM SE of Pu'u 'O'o), on the pali, and on the coastal plain. Lava also entered the ocean at two main locations spanning the National Park boundary.

During 10<sup>th</sup> – 16<sup>th</sup> April, HVO reported that the circulating lava lake periodically rose and fell in the deep pit within Kilauea's Halema'uma'u Crater. The plume from the vent continued to deposit variable amounts of ash, spatter, and Pele's hair onto nearby areas.

At Pu'u 'O'o Crater, glow emanated from four spatter cones on the crater floor. Two lava flows (Peace Day and Kahauale'a) were fed by lava tubes extending from Pu'u 'O'o. Multiple lava flows from the NE spatter cone, collectively called the Kahauale'a flow, travelled across the NE flank of Pu'u 'O'o cone to the cone's base and advanced more than 4.9 KM NE over older flows. Peace Day activity consisted of lava flows active above the pali (5 KM SE of Pu'u 'O'o), on the pali, and on the coastal plain. Lava also entered the ocean at two main locations spanning the National Park boundary.

During 17<sup>th</sup> – 23<sup>rd</sup> April, HVO reported that the circulating lava lake periodically rose and fell in the deep pit within Kilauea's Halema'uma'u Crater. The plume from the vent continued to deposit variable amounts of ash, spatter, and Pele's hair onto nearby areas. At Pu'u 'O'o Crater, glow emanated from three spatter cones and a small lava pond on the crater floor. Just before midnight on 19<sup>th</sup> April a vigorous lava flow gushed out of the N spatter cone and quickly covered the N portion of the crater floor, then went over the E rim. The lava pond on the NE crater's edge briefly overflowed.

On 21<sup>st</sup> April the two spatter cones on the S portion of the crater floor produced lava flows. Two lava flows (Peace Day and Kahauale'a) were fed by lava tubes extending from Pu'u 'O'o. Multiple lava flows from the NE spatter cone, collectively called the Kahauale'a flow, stopped advancing on 20<sup>th</sup> April, although a few breakout lava flows were observed during 20<sup>th</sup> – 22<sup>nd</sup> April. Peace Day activity consisted of lava flows active above the pali (5 KM SE of Pu'u 'O'o), on the pali, and on the coastal plain. Lava also entered the ocean at two or three locations spanning the National Park boundary.

**NAME: Colima**  
**LOCATION: Mexico**

**HEIGHT: 3850 M**

**TYPE: Stratovolcanoes**

**COORDINATES: 19.514°N 103.62°W**

A visit to the volcano in early April shows that the new lava dome has begun to overflow the summit crater. A viscous lava flow is effusing from the lava dome onto the western flank of the cone and reached 100 M in length.

**NAME: Popocatepetl**

**LOCATION: Mexico**

**HEIGHT: 5426 M**

**TYPE: Stratovolcanoes**

**COORDINATES: 19.023°N 98.622°W**

The CENAPRED reported that during 26<sup>th</sup> March – 1<sup>st</sup> April, seismicity at Popocatepetl indicated continuing gas-and-steam emissions that contained ash. Although views of the volcano were often obscured by cloud cover, gas-and-ash plumes were observed daily. Incandescence from the crater was observed at night and sometimes increased in



*Above; modified photograph showing the current, growing lava dome of Colima volcano.*

*Below; the crater of Popocatepetl on 16 April, the lava dome formerly in its crater was destroyed by recent eruptions. A minor amount of ash venting is seen from two vents in the crater.*

conjunction with emissions. On 26<sup>th</sup> March incandescent fragments ejected as far as 1 KM from the crater landed on the NNE flanks. An explosion produced an ash plume that rose 1.5 KM above the crater. On 29<sup>th</sup> March incandescent fragments ejected 700 M from the crater landed on the N and NE flanks. On 31<sup>st</sup> March ash emissions were observed continuously for about an hour. Ash plumes rose over 2 KM and drifted E.

CENAPRED reported that during 10<sup>th</sup> – 16<sup>th</sup> April seismicity at Popocatepetl indicated continuing gas-and-steam emissions that sometimes contained ash. Incandescence from the crater was observed at night and sometimes increased in conjunction with emissions. On 10<sup>th</sup> April gas-and-steam plumes rose 800 M above the crater and drifted ESE, and ash plumes rose 900 M and also drifted ESE.

During 11<sup>th</sup> – 13<sup>th</sup> April gas-and-ash plumes rose 500 M and drifted NE. An explosion on 13<sup>th</sup> April produced a steam-and-ash plume that rose 400 M and drifted NE. Ashfall was reported in the towns of San Nicolas de los Ranchos (15 KM ENE) and Huejotzingo (27 KM NE), and in the northern part of Puebla (40 KM E). On 14<sup>th</sup> April a period of tremor was accompanied by continuous emissions of dense steam-and-gas plumes with small amounts of ash that rose as high as 1 KM and drifted NE. The next day ash plumes rose 1.5 KM above the crater, and incandescent tephra ejected from the crater landed 400 M away on the NE flank. On 16<sup>th</sup> April gas-and-steam plumes rose 1 KM and drifted NE.

**NAME: Santa Maria**

**LOCATION: Guatemala**

**HEIGHT: 3772 M**

**TYPE: Stratovolcano**

**COORDINATES: 14.756°N 91.552°W**

The INSIVUMEH reported that during 27<sup>th</sup> – 29<sup>th</sup> March, explosions from Santa María's Santiaguito lava-dome complex produced ash plumes that rose 800 M and drifted SW. During 29<sup>th</sup> – 30<sup>th</sup> March ashfall was reported in El Faro (SW flank) and La Florida (5 KM S). An explosion during 1<sup>st</sup> – 2<sup>nd</sup> April generated ash plumes that rose 500 M and drifted SE, causing ash fall in San José. Avalanches were generated by active lava flows during 29<sup>th</sup> March – 2<sup>nd</sup> April.

**NAME: Fuego**

**LOCATION: Guatemala**

**HEIGHT: 3763 M**

**TYPE: Stratovolcano**

**COORDINATES: 14.473°N 90.880°W**

The INSIVUMEH reported that during 27<sup>th</sup> – 2<sup>nd</sup> April explosions from Fuego generated rumbling noises, occasional shock waves, and ash plumes that rose 0.6 – 1.3 KM above the crater and drifted 8 – 15 KM W, SW, and S. Incandescent material was ejected 100 – 200 M above the crater. Ashfall was reported in Panimaché I and II (8 KM SW), Morelia (9 KM SW), and Hagia Sophia. Block avalanches descended the flanks and during 1<sup>st</sup> – 2<sup>nd</sup> April reached vegetated areas.

**NAME: Nevado Del Ruiz**

**LOCATION: Colombia**

**HEIGHT: 5321 M**

**TYPE: Stratovolcano**

**COORDINATES: 4.895°N 75.322°W**

The INGEOMINAS reported that during 13<sup>th</sup> – 14<sup>th</sup> April seismicity associated with fluid movement beneath Nevado del Ruiz was detected along with volcano-tectonic earthquakes. The earthquakes were located NW of Arenas Crater at depths between 5 and 9 KM; the largest was a M 2.6, felt by officials of Los Nevados National Park in the area of Brisas (50 KM SW). During the early morning of 14<sup>th</sup> April webcams recorded a gas-and-ash plume that rose 630 M and drifted NW. On 15<sup>th</sup> April a M 3 volcano-tectonic earthquake was located NW of Arenas Crater at a depth of 6.6 KM. Later that day a M 2.5 volcano-tectonic earthquake was located again NW of Arenas Crater at a depth of 5.78 KM. On 16<sup>th</sup> April at 07:14 a M 3.2 earthquake was located in the same area at a depth of 6.22 KM. Earthquakes continued to be felt by officials in the National Park. A gas-and-steam plume rose 1 KM above the crater and drifted SW. Sulfur dioxide emissions were significant and deformation was detected.

**NAME: Galeras**

**LOCATION: Colombia**

**HEIGHT: 4276 M**

**TYPE: Complex Volcano**

**COORDINATES: 1.22°N 77.37°W**

The INGEOMINAS reported that during 10<sup>th</sup> – 16<sup>th</sup> April earthquakes at Galeras were located in various areas as far as 13 KM from the crater, at depths no greater than 14 KM and with maximum magnitudes of 2. Moderate levels of sulphur dioxide were detected; plumes drifted NW. Cameras recorded ash emissions all week, especially on 9<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, and 14<sup>th</sup> April, when pulsating activity produced plumes



*Above; the steaming summit area of Galeras, Colombia.*

that drifted W. Plumes rose no more than 1 KM above the crater.

**NAME: Reventador**

**LOCATION: Ecuador**

**HEIGHT: 3562 M**

**TYPE: Stratovolcano**

**COORDINATES: 0.077°S 77.656°W**

On 12<sup>th</sup> April an ash plume from Reventador was observed in visible satellite images along with a corresponding thermal anomaly in short wave infrared images.

**NAME: Tungurahua**

**LOCATION: Ecuador**

**HEIGHT: 5023 M**

**TYPE: Stratovolcano**

**COORDINATES: 1.467°S 78.442°W**

The IG reported that during 27<sup>th</sup> March – 2<sup>nd</sup> April, seismicity at Tungurahua continued to trend downward, remaining at moderate levels. Cloud cover often prevented observations; a weak steam plume was observed rising from the crater on 27<sup>th</sup> March.

**NAME: Sangay**

**LOCATION: Ecuador**

**HEIGHT: 5230 M**

**TYPE: Stratovolcano**

**COORDINATES: 2.002°S 78.341°W**

The Washington VAAC reported that on 11<sup>th</sup> April an ash plume from Sangay drifted W.

**NAME: Copahue**

**LOCATION: Chile/Argentina border**

**HEIGHT: 2997 M**

**TYPE: Stratovolcano**

**COORDINATES: 37.85°S 71.17°W**

The Buenos Aires VAAC reported that on 28<sup>th</sup> March steam-and-gas emissions with small amounts of ash rose from Copahue.

*All volcano reports in this issue are subject to change. All reports in this issue were from the following sources.*

### **Global Reports:**

Activolcans: <http://activolcans.info/>

VolcanoDiscovery:

<http://www.volcanodiscovery.com/news.html>

Global Volcanism Program (Weekly Reports):

<http://www.volcano.si.edu/reports/usgs/>

Volcanolive - John Seach:

<http://www.volcanolive.com/index.html>

And Also the writers and commenters of Eruptions and VolcanoCafe.

### **Acronyms and Abbreviations**

a.s.l - Above Sea Level

CENAPRED - Centro Nacional de Prevencion de Desastres

CVGHM - Center of Volcanology and Geological Hazard Mitigation

HVO - Hawaii Volcano Observatory

IG - Instituto Geofísico

IGN - Instituto Geográfico Nacional

INSIVUMEH - Instituto Nacional de Sismologia, Vulcanologia, Meteorologia e Hidrologia

INGEMMET - Instituto Geológico Minero y Metalúrgico



JMA - Japanese Meteorological Agency

KVERT - Kamchatkan Volcanic Eruption  
Response Team

MODIS - Moderate Resolution Imaging  
Spectroradiometer

RVO - Rabaul Volcano Observatory

SERNAGEOMIN - Servicio Nacional de  
Geología y Minería

SVERT - Sakhalin Volcanic Eruption  
Response Team

VAAC - Volcanic Ash Advisory Centre

## The Latest in Volcanoes and Volcanic Eruptions

*A Bulletin of World Volcanism magazine*

[www.volcanismbulletin.org](http://www.volcanismbulletin.org)

[bulletinwv@hotmail.co.uk](mailto:bulletinwv@hotmail.co.uk)

### Active Volcanism in Romania?



Romania is not the first place that people think of when it comes to volcanoes. But recent studies have shown that eruptions have occurred in Romania and its surrounding countries in the recent geologic past.

A recent scientific article has noted that a magma chamber still exists under Ciomadul volcano.

Recent dating of rocks has also supported the view that the... **Continued on Page 17**

### Also in this Issue:

What are Tangaroan Eruptions?

## Recent Volcanism in Romania

volcanoes in the region have been active very recently.

### Tectonic Setting

Collision caused by the subduction of a lithosphere oceanic slab in the region was followed by a post-collision process of segments of the slab being broken off and detaching from the main block.

This resulted in volcanism in Southern Carthapinians about 10 Ma. This activity continued for 7 Ma.

Around 3 Ma volcanism began to shift along the southern Carthapinians until the recent past due to the slab detachment process.

The most recent in the chain of volcanoes is the Ciomadul volcanic complex.

### Ciomadul Volcano

Ciomadul is a small volcano, made up of Lava Domes and a few other, smaller domes on its flanks.

Volcanism began by the eruption of tightly packed domes surrounded by a ring of pyroclastic deposits.

Late stage eruptions formed two late stage craters. The eruptive events are termed the Mohos and Sfanta Ana eruptions.

The date for the explosive Mohos eruption is unknown but the Sfanta Ana eruption took place around 37 - 10.7 thousand years ago and produced pyroclastic flows.

### Magma Chamber Revealed

*Popa et.al, 2012* revealed by seismic data that an active magma body in the Lithosphere lies beneath Ciomadul and faults beneath other mountains in the area.

### Hazards in Ciomadul Area



### RECENT VOLCANISM IN CAMBODIA?

When one's mind think's about places of active volcanism, places like Cambodia don't spring to mind. In fact volcanism in the whole of SE Asia is poorly known, yet it is highly abundant (for distribution of volcanoes and the tectonics in the region, I suggest you refer to P. I. Fedorov and A. V. Koloskov's paper here:

[http://www.kscnet.ru/ivs/bibl/sotrudn/koloskov/f\\_k.pdf](http://www.kscnet.ru/ivs/bibl/sotrudn/koloskov/f_k.pdf)).

This region has even recorded several historical volcanic eruptions: Hainan Dao Island, China (1883 and 1933); Ile des Cendres, Vietnam (1923 and probably 608 AD); and the Pleiku Volcanic Field, Vietnam (1993).

Cambodia too has signs of recent volcanism (freshly preserved cones and craters). In this post I will only focus on the only confirmed site of recent volcanic activity, Yeak Loam Maar, This is, in fact the only scientific article ever published about this volcano.

### YEAK LOAM MAAR

Yeak Loam maar is situated in Ratanakiri province in NE Cambodia and is a popular tourist destination. It sits atop a small plateau with the small cone of volcanic deposits around it reach a maximum height of around 347 M The lake which fills the crater is known for being exceptionally deep (around 48 m deep). Its steep walls around the lake are around 20 - 30 M high. The lake is 0.72 km in diameter. The eruption that created the maar was around 4000 years old, making it the most recent known eruption in Cambodia.

It is also worth to note that several young volcanic cones are in the same vicinity of the Yeak Loam.



*Popa et. Al. 2012* stated that due to many earthquakes recorded to the SE of Ciomadul, the area to the SE of the volcano is the most likely area for an eruption.

An eruption there would endanger the towns of Micfalau and Malnas. Considering past activity at the volcano, an explosive phase producing ash columns would likely be the first eruptive activity.

This would be followed by the extrusion of a medium - large lava dome. The biggest hazard would be the channeling of pyroclastic flows in the valley which the above towns sit.

## Conclusions

As shown by dating of rocks and the discovery of a magma chamber underneath Ciomadul, it is shown that Romania is far from volcanically inactive.

It is known that volcanoes can become active after long repose periods (some remain quiet for hundreds of thousands of years). Since Ciomadul's last eruption was only 10,700 years ago, it should be referred to as active.



*Above; Mt. Hatado (far left) is a forested lava dome SE of Ciomadul volcano. This area is speculated where the next eruption of Ciomadul will occur.*

## Reference

Popa, M., Radulian, M., Szakács, A., Seghedi, I., & Zaharia, B. (2012). New Seismic and Tomography Data in the Southern Part of the Harghita Mountains (Romania, Southeastern Carpathians): Connection with Recent Volcanic Activity. *Pure and Applied Geophysics*, 169(9), 1557-1573.

## What are Tangaroan Eruptions?

For many years scientists grouped volcanic eruptions into two categories: (1) Effusive, where the eruptions are non-explosive and produced lava flows, lava domes or lava lakes; and (2) explosive eruptions, where material explodes out of the vent violently and generally ejects bomb's and lapilli and ash.

But when a group of geologists (Rotella, M. D., Wilson, C. J., Barker, S. J., & Wright, I. C. (2013). Highly vesicular pumice generated by buoyant detachment of magma in subaqueous volcanism. *Nature Geoscience*, 6(2), 129-132) analysed material from the submarine 6300 B.P. Sandy Bay tuff eruption of Macauley Island they found a different type of eruption.

### Discovery of the Eruptions

Most of Macauley volcano (apart from Macauley island) is a submarine island. They analysed pumice from Macauley island and dredged the floor of the submarine caldera.

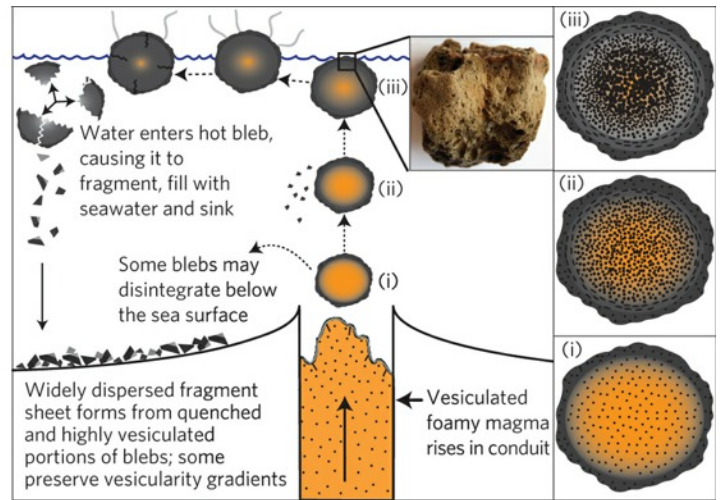
They found that the pumice that was dredged was different to that deposited on land. The pumice that was dredged had a different texture and that they had a much wider range of density that those on land.

Different textures and densities were all found in the same sample of rock, meaning just one eruptive style created this rock. These changes are not found in explosive eruptions or effusive eruptions.

This new 'inbetween' style of eruption has never been noted before.

### Tangaroan Eruptions (see image)

The eruptions start when frothy magma rises up in the conduit of the volcano, the rock is so bubbly that it becomes buoyant. Fragments of the magma gently



Above; description of a Tangaroan Eruption. Published in Rotella et. al. 2013.

break off when they reach the sea floor, the rocks rise through sea until they reach the sea surface (although some don't make it), eventually they crack, become waterlogged and sink.

### Are Tangaroan Eruptions Common?

Although not yet proven to exist anywhere else apart from Macauley volcano, these 'lava-lamp' eruptions may have been witnessed elsewhere. Rotella et.al., 2013 noted that Tangaroan eruptions may have been witnessed at West Mata submarine volcano in 2009 and Kikai's submarine eruption in 1934 - 1935.

### Significance

It is very rare that such a major breakthrough is made in Volcanology and hopefully this will contribute more to our understanding of this planet's active volcanism.

## Table of Different Types of Volcanic Eruption

EFFUSIVE	Hawaiian
	Icelandic*
	Baganian*
TANGAROAN	Tangaroan
EXPLOSIVE	Strombolian
	Surtseyan
	Vulcanian
	Pelean
	Plinian
	Ultra-Plinian
	Bandian
	Icelandic*
	Baganian*

In light of the recent addition of Tangaroan Volcanism, here is a table of all known types of volcanism. Type's marked with a \* mean that they exhibit both effusive and explosive volcanism. All the types mentioned above will be explained in an upcoming issue of Volcano Express.



## **Website of the Month**

### **Eruptions - Wired Science**

Originally created in 2009 by the Geoscientist Erik Klemetti, Eruptions is now one of the most popular websites about volcanoes in the world

The website is in blog format and every week information about volcanic processes are explained and updates about volcanic activity around the world is noted.

The website gained further fame in mid-2012 when the source of a pumice raft seen in the Pacific Ocean was successfully discovered by Erik.

The comments box below the blog is a great place to share information on volcanic activity and your thoughts and opinions.

<http://www.wired.com/wiredscience/eruptions/>