SVC53-P01 Room:Convention Hall Time:May 21 17:15-18:30

Stratigraphic variation in characteristic of pyroclastic deposits during the 2011 subplinian eruption of Mount Shinmoe

IRIYAMA, Yu[1*], TORAMARU, Atsushi[1]

[1]Earth and Planet. Sci. Kyushu Univ.

In general, we observe stratigraphic variation in characteristic of pyroclastic deposits (i.e. grain size and color), which may reflect temporal behavior of eruption intensity. However, the connection between stratigraphic variation of pyroclastic deposits and temporal behavior of eruption intensity cannot be straight found according to settling sequence because pyroclastic deposits may experience sorting process during the transportation and erosion process after the deposition. These processes make it difficult to precisely interpret time development of plinian eruption from analysis of pyroclastic deposits. Fortunately, we have a chance namely three subplinian phases of the 2011 Sinmoedake eruption January (26, 27 morning, and 27 evening), which represent the minimum influence of loss of materials. Furthermore there are additional constraints which are from different sources of observations concerning the eruption sequence such as satellite images. This opportunity allows us to consider the effect of sorting process during transportation on the stratigraphic variation of pyroclastic deposits.

We collected samples at two localities, Miike elementary school (about 7.5 km far from vent; nearer) and Natsuo elementary school (about 11 km far from vent; farther) on 29th and 30th, January. In order to observe the temporal change of deposits, we divided into 8 or 5 layers in sampling. We conducted grain size analysis for each layers by using sieve (phi=-2, -1, 0, 1) and calculated statistical properties based on Inman (1952). As a consequence, characteristic of stratigraphic variation of grain size in terms of median or mean showed two peaks at nearer locality and one peak at farther locality. Furthermore, values of dispersion increase around peaks of median or mean. In addition, we classify the sample (ash particle) into four categories depending on color (i.e. they are White, Gray-Brown, Black, and Reddish-Black), and determined number fraction of grains in each categories from counted numbers of grains. As a result, it is found that: (1) a fraction of Gray-Brown particles occupies the major part (about nine tenths) of deposits, (2) a fraction of Reddish-Black particles decreases with stratigraphic height, (3) a fraction of Black particles correlates with change of median or mean, (4) a fraction of White particles increases with stratigraphic height.

Assuming that a single plinian eruption makes a single peak of median or mean of grain size distribution, analyzed deposits correspond to two subplinian eruptions. Together with isopach data (AIST) and satellite image (Meteorological Agency) on January 26th and 27th, we can conclude that pyroclastic deposits corresponded to eruptions of 26th (16:10-18:35) and 27th (02:10-04:40). As a result, it reveals order of sedimentation, reflecting characteristic of size and color of pyroclastic deposits. From changes of number fractions of grains in each category depending on color, we speculate where particles of each category are originated from; grains of Black and Reddish-Black come from vent, grains of White come from the rim of magma chamber, and grains of Gray-Brown correspond to magma. It is also confirmed that the deposit at farther distance, contains smaller sedimentary particle size.

This study provides some extensive information of stratigraphic variation. Hereafter we need another approach to estimate how eruption intensity changes in a single eruption by considering the effect of sorting process.

Keywords: Pyroclastic Deposit, Stratigraphic Variation, Eruption Intensity

SVC53-P02 Room:Convention Hall Time:May 21 17:15-18:30

Vesiculation and degassing processes inferred from the ejecta in the Shinmoedake 2011 eruption

HOSHIDE, Takashi[1*], TORAMARU, Atsushi[1]

[1]Kyushu University

The Shinmoedake 2011 eruption which started on 26th January 2011 showed a characteristic transition of eruption styles. Two sub-plinian eruptions from 3 p.m. on 26th Jan and from midnight of 27th Jan produced a pumice deposit of 6 cm in thickness at 8 km from the vent. After the sub-plinian phase, the eruption style shifts to the phase of vulcanian eruptions which majorly produced volcanic ash since an eruption at 3 p.m. on 27th Jan. We obtained samples from the pumice deposits of the sub-plinian eruptions (26-27th Jan) and the bombs of the vulcanian eruptions (1st Feb and 14th Feb). The observation of these ejectas is expected to provide a clue to understanding the transient behavior of eruption styles.

Pumice deposits mainly consist of white, gray, brown and black-colored pumices. It is highly likely that both gray pumices and bombs originate from the mixed magma formed by mixing between dacitic and basaltic magmas (Suzuki et al., 2011, Hoshide et al., 2011, JpGU Meeting). The vesicularity of gray pumices (SiO_2= 58.6 wt%) varies about from 40% to 80% and the vesicle distributions in gray pumices are relatively homogeneous. The connectivity of pores and the average size of vesicle in pumices drastically increases at about 60-65% vesicularity.

Breadcrust bombs (several meters in size) on 1st Feb are composed of a surface quenched rind and an internal slowly-cooled part. The internal part (vesicularity: 50%~) has small (10-20 microns in size) and large (>100 micron) vesicles but the quenched rind (vesicularity: 30%~) rarely contains small vesicles. Large vesicles tend to attach to phenocrysts. Small bombs (3-4 cm in size) on 14th Feb have the vesicularities of about 0-20%. The vesicle distributions in them are heterogeneous and small vesicles (tens of microns in size) have a network arrangement.

In this presentation, we consider degassing processes of magma on the basis of quantitative texture analyses of these ejectas using SEM and X-ray computed tomography.

Keywords: bomb, pumice, degassing, vesicle texture, microlite

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P03 Room:Convention Hall Time:May 21 17:15-18:30

Petrological groups of Nekodake volcanic rocks and origin of their compositional variations

UEDA, Yasuhiro[1], HASENAKA, Toshiaki[1*], Yasushi Mori[2]

[1]Science and Technology, Kumamoto Univ., [2]Kitakyusyu Mus. of Nat. & Hum. History

Volcanic activities prior to caldera-forming eruptions give important constraints on the magma supply system leading to catastrophic eruptions. Nekodake volcano, located in the eastern end of Aso Caldera, Central Kyushu, SW Japan, was considered to have been active during the post-caldera period. However, the stratigraphic relations and radiometric ages suggest that the Nekodake volcano was active during the caldera forming periods. This study elaborated the magma genesis of the Nekodake volcano from those geological, petrographic, mineralogical and geochemical features.

We classified the Nekodake volcanic products into six groups from phenocryst assemblage, rock type and chemical composition. We also found a correlation between petrographic groups, compositional groups and stratigraphy. For instance, incompatible elements are mainly abundant in olivine group (olivine + 2 pyroxene + plagioclase), and the volcanic ejecta of these groups are predominantly located in lower eastern part of Nekodake. Petrographical and petrological disequilibrium features, such as co-existence of olivine and hornblende, dusty plagioclase, An-rich (An72 - An92) and An-poor (An48 - An58) plagioclase, were observed in lower part and some upper part of Nekodake volcano. In contrast to them, some ejecta shows clear plagioclase and mono-modal distribution of An contents of plagioclase (An58 - An72). Moreover, we found many crustal materials in these upper parts of volcanic ejecta.

These observations indicate that several types of magma chambers are developed during volcanic activities of Nekodake, and that compositional diversity of the magmas can be explained by magma mixing among the end-member magmas in addition to fractional crystallization and crustal assimilation.

Keywords: Aso, Nekodake volcano, Whole rock chemical compositions, Mineral compotisions, Magma mixing, Assimilation

SVC53-P04 Room:Convention Hall Time:May 21 17:15-18:30

Thickness of AT tephra in the Uwa-basin in western Shikoku, southwest Japan

TSUJI, Tomohiro[1*], IKEDA, Michiharu[1], NISHIZAKA, Naoki[2], Ishikawa Yoshihiko[2], SAKAKIBARA, Masayuki[3]

[1]Department of Civil Engineering, Shikoku Research Institute Incorporated, [2]Shikoku Electric Power Co. Inc., [3]Department of Earth Science, Graduate School of Science and Engineering, Ehime University

To estimate accurate thicknesses of widespread tephra is important to anticipate potential size and influence of the eruption. However, to estimate it is sometimes difficult due to post-depositional remobilization and resedimentation. Then we drilled nine boreholes and four geo-slicers at the Uwa basin in western Shikoku, with observation and grain-size analysis to estimate accurate thickness of AT tephra.

The Uwa basin is 2.5 km in north-south by 3 km in east-west located in the uppermost part of the Hijikawa River catchment and includes many layers of widespread tephras from Kyushu Island. AT exists at the depth of 1-3 m from the surface and well-preserved condition, depositing on humic soil and being covered by clay or humic clay. The thickness of AT is thinner near the margin of the basin and thicker in the center of the basin. The maximum thickness including resedimented layer is 170 cm. The representative sequence of AT is as following from the bottom.

A: White colored glassy tephra consists of very fine sized glass shards with minor medium sized pumice. The thickness is 5 cm.

B: Brown gray colored laminae-rich tephra consists of medium to fine sized glass shards. The thickness is less than 50 cm.

C: Massive tephra consists of fine sized glass shards. The thickness is less than 50 cm.

D: Gray brown colored laminae-rich tephra consists of fine sized glass shards with heterogeneous clasts. The thickness is less than 90 cm.

Remobiled layer is recognized based on sedimentary structure and heterogeneous clasts. D layer is interpreted as remobiled layer consists of highly concentrated glass shards. There are many examples of thick AT in southwest Japan. Further observation from these may contribute to distinguish original and remobiled tephra layer.

Keywords: AT tephra, thicknesses, Uwa basin, western Shikoku

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P05 Room:Convention Hall Time:May 21 17:15-18:30

Magma plumbing system in Ofunato stage of Miyakejima volcano based on high-pressure experiments and melt inclusion study

USHIODA, Masashi[1*], TAKAHASHI, Eiichi[1], HAMADA, Morihisa[1], SUZUKI, Toshihiro[2]

[1]Earth and Planetaly Sciences, Tokyo Tech, [2]IFREE/JAMSTEC

Miyakejima is an active volcanic island located about 200 km south of Tokyo in Izu-Mariana arc. Forecasting future eruptions of Miyakejima is important, and precise knowledge on its magma pluming system is essential. Tsukui et al. (2001) divided the volcanic activity of the last 10000 years into four stages: 10000-7000 (Ofunato Stage), 4000-2500 (Tsubota Stage), 2500 y.B.P to AD1154 (Oyama Stage) since AD1469 (Shinmio Stage). Products of the Ofunato stage are basalts and they are relatively primitive. On the other hand, products in Tsubota Stage are andesites and those in the later three stages are mixed products of basalt and andesite. To understand the evolution of the magma plumbing system, first I reconstruct the simple magma chamber in Ofunato Stage by high-pressure experiments and also analyzed major elements and volatile contents in melt inclusions of phenocrysts of products in Ofunato stage in order to confirm experimental results.

OFS scoriae, which are one of the least fractionated Miyakejima basalt in Ofunato stage, were used. Phenocrysts of OFS are only plagioclase (10.9 vol.%) and olivine (0.7 vol.%). Core composition of plagioclase phenocrysts is 90 to 96 % An. Core composition of olivine phenocrysts is 78 to 82% Fo. Fig,1 shows melt composition of OFS, composition of melt inclusions (MIs) in olivine and plagioclase phenocrysts and bulk composition of eruptive products in the last 10,000 years. The chemical composition of the melt inclusions in olivine were corrected for post entrapment crystallization by adding a host olivine component up to the composition which satisfies olivine˜melt equilibrium, KD = 0.30.

Most compositions of MIs in olivine were plotted near the melt composition of OFS (gray circles in Fig.1) indicating that melt of OFS is in equilibrium with phenocrysts of olivine. Small numbers of MIs in olivine was more primitive than the other, therefore low-evolved magma may have mixed. MIs in plagioclase were not corrected for post entrapment crystallization so that their compositions are scattered (gray squares in Fig. 1)

Experiments were performed in the temperature ranges of 1050-1200C at 1.0, 1.5, 2.0, 2.5kbar using IHPV at the Magma Factory, Tokyo Tech. Based on the experimental results (phase relation, mineral composition) and petrology of OFS (modal composition and core compositions of phenocrysts), magma chamber in Ofunato Stage was reconstructed. The magma chamber was located at 5˜6km depth (˜1.5kbar) and water-rich (˜3 wt.%) basalt magma crystallized olivine and calcic plagioclase (which is the typical phenocryst assemblage throughout Ofunato Stage) at ˜1100C under NNO-buffer. Estimated depth of OFS magma chamber (ca. ˜7000 YBP) is equal to that of the shallow magma chamber in 2000 eruption (Saito et al. 2005, 2010). Accordingly, it is suggested that magma chamber survived through time in spite of two caldera forming stages.

Keywords: Miyakejima, magma chamber, high-pressure experiments, melt inclusion, volatile content

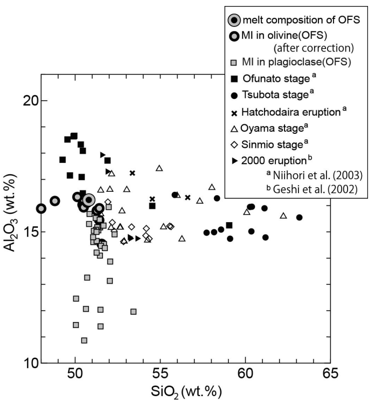

Fig.1
Composition of melt inclusions (MIs)(this study) and OFS melt.
Bulk rock compositions by previous workers (Niihori et al. 2003 and Geshi et al. 2002) are also plotted.

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P06 Room:Convention Hall Time:May 21 17:15-18:30

Petrology of gabbroic rocks from the Niijima Island, northern Izu-Ogasawara arc

ENDO, Daisuke[1*], ARAKAWA, Yoji[1]

[1]Life and Environmental Sciences, Univ. of Tsukuba

Niijima Island is the subaerial portion of the northern extremity of arcuate structural high, the Izu-Ogasawara island arc. It is composed of thirteen rhyolitic monogenetic volcanoes, one or two andesite and a basalt volcano (Isshiki, 1987). Each volcanic activity consist of pyroclastic flow or surge deposits, pyroclastic cones and a lava dome, and the latest eruption occurred in 886 A.D. Isshiki (1987) reported that Lithology of the volcano changed from hypersthene-cummingtonite-hornblende rhyolite through cummingtonite rhyolite to biotite rhyolite with some exceptions, as time elapsed. Olivine basalt of high-alumina basalt clan magma was erupted at 3ka during the activity of biotite rhyolite in the Northern part of the island. Rhyolite lavas often carry mafic inclusions which are thought to be products of mixing and/or mingling with basaltic magmas (Koyaguchi, 1986).

Xenoliths of gabbroic rocks are widely recognized in Quaternary mafic (basalt to basaltic andesite) volcanoes, in the northern part of Izu-Ogasawara arc (e.g. Oshima volcano, Miyakejima volcano). Such kind of rocks provides us important information for the structure and compositions of the underlying crust and mantle. Gabbroic rocks are also identified from silicic volcano.

In this study, we will report the newly observed gabbroic xenoliths from Niijima Volcano. Gabbroic xenoliths were collected from 2 localities, 8 samples from Wakago pyroclastic surge deposits (host rock is olivine basalt; bulk SiO_2 wt% = 49.5-51.0) and 2 samples collected from Attiyama lava dome (host lava is biotite rhyolite; bulk SiO_2 wt% = 76.8-78.0). Most of these were enclaved by thin basaltic envelopes. They are classified into amphibole absent type; leucocratic gabbro, gabbro (Streckeisen, 1976) and amphibole present type; leucocratic hornblende gabbro (Streckeisen, 1976). Petrological features of each type as shown below:

Amphibole absent (B) type: This type has relatively coarse grained (0.5-3 mm) equigranular texture and it has miarolitic cavities. This type consists of plagioclase (An mol % = 58-90) and clinopyroxene (Mg# = 76-80), orthopyroxene (Mg# = 73-78), Fe-Ti oxide and olivine (Fo = 75-80). Most of the Pl crystals show normal zoning.

Amphibole present (B) type: This type has relatively fine grained (0.3-2 mm) equigranular texture. It consists of plagioclase (bimodal compositions in An mol % = 45-55, 70-88), hornblende (Mg# = 68-73), cummingtonite (Mg# = 69-73), quartz and Fe-Ti oxide. Using amphibole-plagioclase thermometry (Holland & Blundy, 1994) and Al-in-hornblende barometry (Anderson & Smith, 1995), P-T conditions will be estimated.

A types are depleted in trace elements and REE contents (bulk compositions) compared with host basaltic rocks. N-MORB-normalized (Pearce, 1983) trace elements patterns of these rocks are similar to that of gabbroic rocks from Tanzawa plutonic complex (Kawate & Arima, 1998). B types have less evolved compositions in mineral chemistry compared with Niijima rhyolite. Hornblende compositions in that types overlap with that of gabbroic suites in Tanzawa rocks.

As proposed by Nakajima & Arima (1998), above evidences suggest a possibility that the rhyolitic magmas in Niijima volcano could be formed by partial melting of amphibolite crust.

Keywords: gabbro, xenolith, rhyolite, amphibole, Izu-Ogasawara arc

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P07 Room:Convention Hall Time:May 21 17:15-18:30

Mode of A.D.838 eruption of Tenjyo-san volcano,Kozu-shima island based on hydration of glassy fragment

KADO, Yasuyuki[1*], Keiko Suzuki-kamata[1]

[1]Earth and Planetary Sciences, Graduate School of Science, Kobe University

Kozu-shima is one of the Izu Islands and located about 170 km southwest of Tokyo. The island mainly consists of rhyolitic lava domes, thick lava flows and pyroclastic deposits. The latest eruption occurred at Tenjyo-san in 838 A. D. Individual lava activities are able to be separated easily, but pyroclastic deposits are difficult to be distinguished in detail because their component and composition are very similar. Thus it is difficult to identify sources of pyroclastic deposits and the eruption history is still uncertain. I measured the thicknesses of the hydration layers along the cracks in the glassy groundmass of Tenjyo-san lava and glassy rock fragments in pyroclastic deposits to distinguish 838 Tenjyo-san pyroclastic deposits.

Hydration layers were measured on thin sections, and results were plotted in histograms. According to the histograms, some fragments have two or more peaks of hydration layers. When the cracks are formed by cooling of magma or fracturing of rock, hydration layers begin to be formed along the crack. The thickest peak is considered to correspond to the cooling of magma. The others are estimated to relate the fracturing of rock. In the measured data, the thinnest peak of hydration layer is almost corresponding to the Tenjyo-san lava's peak. Therefore, these glassy rock fragments were formed before Tenjyo-san eruption and caught in the pyroclastic deposit when the eruption occurred.

Contrast of deposit which is based on the results of hydration layers show that the pyroclastic flow which is distributed at the southwest of island is corresponding to the base part of pyroclastic flow at northwest.

This result and shape of Tenjyo-san lava and distribution of pyroclastic flows indicate Tenjyo-san eruption began in the south part of present Tenjyo-san lava dome, and the vent shifted to the north part of the dome.

Keywords: hydration, rhyolitic magmatism

SVC53-P08 Room:Convention Hall Time:May 21 17:15-18:30

Stratigraphy and Lithologic features of the Borehole Core from the Takamine Observation Well, Asama Volcano

NAGAI, Masashi[1*], Masaki TAKAHASHI[2], Setsuya NAKADA[3], Maya YASUI[2], Motoo UKAWA[1], Tomofumi KOZONO[1], Tatsuo KANAMARU[2], Takayuki KANEKO[3], Minoru TAKEO[3]

[1]NIED, [2]Geosystem Sciences, Nihon Univ., [3]ERI

Stratigraphy and lithologic characteristics of borehole cores from the Takamine observation well, located at the western flank of Asama Volcano, were described. The total depth of the borehole was 201 m from the surface. Based on the lithologic features, the borehole cores can be divided into of four stratigraphic groups. The uppermost part (0 to 2.8 m in depth) is of dacitic pyroclastic-flow deposits. The upper part (2.8-77.6 m in depth) consists mainly of mafic andesite debris-flow (lahar) and pyroclastic-flow deposits. The middle part (77.6-103.6 m in depth) consists mainly of andesite lava flow and debris-flow deposits. The lower part (103.6-201 m in depth) is of felsic andesitic pyroclastic-flow deposits.

The uppermost part can be correlated to pumice-flow deposits of the Hotokeiwa Stage. Pumiceous lumps found in soil at the depth of 72.0 m are similar pterographically to the On-Ot tephra (ca. 90,000 yBP). The upper part can be correlated to the deposits distributed on the mountain flank of Kurofu Volcano. The middle part can be correlated to Kurofu Volcano or Takamine Volcano that is a member of the Eboshi volcano group. The lower part may be correlated to an older felsic member of the Eboshi volcano group like Sampogamine or Mizumoto Volcano.

Keywords: Borehole core, Asama volcano, Eboshi Volcano Group, Eruptive History

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P09 Room:Convention Hall Time:May 21 17:15-18:30

The Ashikuraji pyroclastic flow deposit: a newly found pumice flow deposit erupted during Stage 2 of Tateyama volcano

NOGAMI, Keiko[1*], ISHIZAKI, Yasuo[1], Teiichi Terashima[2]

[1]Grad. School Sci. Eng., University of Toyama, [2]Toyamaken Hitodukuri Foundation

Tateyama volcano in the Toyama Prefecture, central Japan, is a partly dissected stratovolcano, and its summit area is truncated by a ~5 km wide caldera. The volcanic history of Tateyama volcano has been divided into five stage (1a, 1b, 2, 3, and 4; Harayama et al., 2000). The stage 2 eruption (ca. 130-95 ka) formed voluminous pyroclastic flow deposits that have been collectively named the Shomyodaki pyroclastic flow deposits (SPFD: Nozawa et al., 1960; Yamasaki et al., 1966; Harayama et al., 2000). The juvenile pyroclasts of the SPFD are phenocryst-rich dacitic pumice and phenocryst-poor andesitic scoria with mingling and mixing textures. Our new major and trace element data on 29 juvenile pyroclast show that the juvenile pyroclasts from the distal part (500-1000 m a.s.l. of Ashikuraji area) and those from the proximal part (2200-2350 m a.s.l. of Murododaira area) of the SPFD form distinct dacite-andesite mixing lines. Dacitic pumices collected from the distal and proximal parts are similar in major and trace element composition but varying in phenocryst content and assemblage. The distal dacitic pumices have lower hydrous phenocryst (biotite + amphibole) contents and lack quartz phenocryst. In contrast, the proximal dacitic pumices have higher biotite, amophibole, and quartz phenocryst contents. Major and trace element compositions of the andesitic scoriae collected from the distal and proximal parts are different from each other. The proximal scoriae can be distinguished from the distal scoriae by their higher FeO*, K2O, V and lower Al2O3, Na2O, P2O5, Zr concentrations. These petrological features suggest that the formerly defined SPFD consists of two distinct pyroclastic flow deposits of different whole-rock and modal compositions and ages, i.e., the Ashikuraji pyroclastic flow deposit (APFD: the lower part of the formerly defined SPFD; mainly pumice flow deposits) and the SPFD (the upper part of the formerly defined SPFD; mainly scoria flow deposits). The former is a newly found pyroclastic flow deposits, and was previously regarded the distal margins of the formerly defined SPFD (Nozawa et al., 1960). Two widespread tephras derived from Tateyama volcano, i.e., the pumice-rich Tateyama D tephra and the overlying scoria-rich Tateyama E tephra (Machida and Arai, 2003), may be correlated to the APFD and SPFD, respectively.

Keywords: Tateyama volcano, pyroclastic flow deposit

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P10 Room:Convention Hall Time:May 21 17:15-18:30

The Bentengawara pyroclastic flow deposit, Nantai volcano: a pyroclastic flow generated by scoria cone collapse

ISHIZAKI, Yasuo[1*], MORITA, Takami[1]

[1]Grad. School Sci. Eng., University of Toyama

Nantai volcano (2486 m asl), a near-conical stratovolcano with a ca. 1-km-wide summit crater, is located on the volcanic front of NE Japan. The 11-12 cal. ka BP Bentengawara pyroclastic flow deposit (BPFD; Miyake et al., 2006) occurs at the northern slope and northeastern foot of the volcano, and it consists of a single block-and-ash flow deposit unit. We describe the petrological features of the juvenile pyroclasts, identify the source, and establish the origin of the BPFD. The BPFD consists of a mixture of finely pulverized rock ash, lapilli, and volcanic blocks. The volcanic blocks are texturally and morphologically diverse, including vesicular scoria blocks, poorly to moderately vesicular cauliflower bombs, and none to poorly vesicular bread-crusted, densely-welded, lava-like blocks. The lava-like blocks commonly have curviplanar none-vesicular surfaces and prismatic joints extending inward from the surfaces to the poorly vesicular interior, which imply quenching, post-depositional vesiculation, and the resultant fracturing of hot welded materials. The coexistence of vesicular pyroclasts and densely welded blocks suggests that the BPFD was generated by the collapse of a pre-existing, partly welded, high-temperature volcanic edifice. On the basis of rock types, and modal and whole-rock compositions of the juvenile pyroclasts, we identified the partly collapsed scoria cone within the summit crater as the source for the BPFD. The scoria cone comprises a thick scoria and bomb fall deposits and a densely welded part occur at the base. Lithological characteristics of the BPFD and the source scoria cone suggest that the first phase of the eruption occurred within the summit crater and produced a scoria cone on the steep inner slope of the summit crater. During this phase, hot pyroclasts rapidly accumulated in the proximal zone as fallout, creating the variably welded source scoria cone. This phase was followed by the gravitational collapse of the scoria cone, thereby generating the BPFD.

Keywords: Nantai volcano, pyroclastic flow deposit, scoria cone

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P11 Room:Convention Hall Time:May 21 17:15-18:30

Contrasting tapping processes from the magma chambers of the 17 cal. ka BP eruption of Nantai volcano, NE Japan

MORITA, Takami[1*], ISHIZAKI, Yasuo[1]

[1]Grad. School Sci. Eng., University of Toyama

Nantai volcano, located on the volcanic front of NE Japan, has been characterized by intermittent plinian and subplinian eruptions since its birth (Yamasaki, 1957; Akutsu, 1979; Muramoto, 1992; Suzuki et al., 1994), and the latest and largest one occurred at 17 cal. ka BP (Nakamura et al., 2011). The eruption sequence of the 17 cal. ka BP eruption is complex, being initiated with scoria fallout (Nantai-Imaichi tephra) and subsequent scoria flow (Sizu and Takanosu pyroclastic flow deposits) followed by pumice fallout (Nantai-Shichihonsakura tephra) and terminated by the generation of pumice flows (Arasawa-Ryuzutaki pyroclastic flow deposits) (Ishizaki and Morita, 2011). Our previous studies on the geochemistry and mixing/mingling relationships of the juvenile materials have revealed that two dacitic magma chambers (tholeiitic one and calc-alkaline one) fed the 17 cal. ka BP eruption products (Ishizaki and Kureyama, 2004). In addition, petrologic evidence have shown that the initial scoria eruption was triggered when mafic magma intruded the tholeiitic dacite chamber; then, emptying of the tholeiitic chamber and the new mafic replenishment led to successive eruption of the adjacent calc-alkaline chamber. Our new componentry data show that the tapping processes differ between the early scoria eruption and the later pumice eruption. During the scoria eruption, homogeneous phenocryst-poor chamber dacite (64.6-67.4 wt.% SiO_2) was first tapped by the plinian phase from the main portion of the preexisting magma chamber. As eruption proceeded, less-evolved, replenished andesitic magma (53.6-54.5 wt.% SiO_2) was tapped from the deeper part of the chamber, forming the uppermost part of the scoria-fall deposit and the overlying scoria-flow deposits. A similar eruption sequence from the chamber dacite to the replenished andesite has been reported for many other plinian-related eruptions (e.g., the 1912 eruption of Katmai; Hildreth, 1983). In contrast, during the later pumice eruption, relatively less-evolved hybrid magma (59.1-60.8 wt.% SiO_2) was first tapped by the plinian phase. As the eruption proceeded, more-evolved, phenocryst-rich chamber dacite magma (64.4-65.7 wt.% SiO_2) was tapped, forming the main part of the pumice-fall deposit and the overlying pumice-flow deposits. A similar eruption sequence has been reported for some other plinian-related eruptions (e.g., the 1929 eruption of Hokkaido-Komagatake; Takeuchi and Nakamura, 2001), suggesting that eruption of a mixed magma is a precursor of phenocryst-rich chamber dacitic magmas. The complex magma tapping processes and the resultant eruption sequence (i.e., dacitic precursor to andesitic successor vs. andesitic precursor to dacitic successor) may be controlled by the density contrast between the chamber dacite magma and the replenished mafic magma.

Keywords: Nantai volcano, Plinian eruption, pyroclastic flow, magma chamber

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P12 Room:Convention Hall Time:May 21 17:15-18:30

The dacite to basalt zoned Nantai-Ogawa Tephra of Nantai volcano (Part I): componentry and whole-rock compositions

AKASHI, Yuki[1*], ISHIZAKI, Yasuo[1]

[1]Grad. School Sci. Eng., University of Toyama

Nantai volcano, located on the volcanic front of NE Japan, has been characterized by intermittent explosive behavior since its birth, and the numerous tephras were dispersed toward the east (Yamasaki, 1957; Akutsu, 1979; Muramoto, 1992; Suzuki et al., 1994). The Nantai-Ogawa tephra (Nt-Og) is the oldest plinian-fall deposit of the volcano (Muramoto, 1992), and is chemically zoned from dacite at its base through andesite towards basalt at the top of the deposit. Componentry and major and trace element data on 37 juvenile pyroclasts and their petrography have been used to obtain detailed information about processes taking place in the conduit and the crustal magma chamber associated with explosive volcanism. Petrological examinations revealed that a variety of juvenile pyroclasts was ejected during the eruption. Amphibole-bearing, highly vesicular dacitic pumice (AmPm: 61.8-63.7 wt.% SiO2) is a minor component of this eruption and expelled during the initial eruption phase. This suggests that water-rich dacitic magma have accumulated beneath the pre-eruptive chamber roof just before the Nt-Os eruption. Phenocryst-poor, highly to moderately vesicular gray scoria (GrSc: 51.6-62.7 wt.% SiO2) is the dominant type of pyroclast expelled during the early eruption phase. In contrast, euhedral-phenocryst-rich, moderately to poorly vesicular black scoria (BlSc: 46.7-51.7 wt.% SiO2) with characteristic cauliflower-like surface was the dominant type of pyroclast expelled during the later eruption phase. Partially melted granitic xenolith and their crystal fragments are observed in the juvenile pyroclasts, suggesting that assimilation of the granitic rocks played major role in the compositional variation of the juvenile pyroclasts. Trends of major and trace elements are consistent with crystal-liquid-fractionation of the observed phenocryst assemblages and minor crustal assimilation processes, and rule out syn-eruptive mixing processes between the compositionally diverse magmas. The vesiculation of the H2O-rich AmPm magma beneath the chamber roof may have triggered the Nt-Os eruption. In addition, the existence of dense cauliflower-like BlSc suggests that the interaction of the magma with the external water also played important role in the Nt-Og eruption.

Keywords: Nantai volcano, Nantai-Ogawa tephra, Plinian eruption, magma chamber

SVC53-P13 Room:Convention Hall Time:May 21 17:15-18:30

Magma plumbing system of the pre-caldera volcanism: From the lithic fragments in pyroclastic flows, Shiobara Caldera

TSURUMAKI, Kensuke[1*]

[1]Geography, Meiji Univ.

Three Middle pleistocene pyroclastic flow deposits (Otawara pyroclastic flows) erupted from Shiobara caldera, consist of KN-pfl, KT-pfl (0.6Ma) and TN-pfl (0.3Ma) located in the north foot of the Takahara volcano, and distributed mainly on the southeastern side. KN-pfl and TN-pfl contain a lithic fragment concentration zone (LCZ), so this study investigated whole rock major and trace element compositions analyzed by XRF are reported from lithic fragments in LCZ of KN-pfl and TN-pfl. This study used fresh samples and analyzed each 40-50 samples at random. The results of analysis data compared with 288 samples of Takahara volcanics.

As a result, all of lithic fragments are similar to tholeiitic rocks of Takahara volcanics, be considered accessory rocks. In addition, most lithic fragments in LCZ of KN-pfl resembles that basalt-andesite rocks distributed east and south side of Takahara volcano. In contrast, many lithic fragments in LCZ of TN-pfl are undiscovered dacite rocks in this area. In Harker diagrams, K_2O content become two trends suggested the different processes of magma genesis.

Considering these characteristics of chemical compositions about lithic fragments in LCZ, two types of tholeiitic basalt-andesite magma activity were until 0.6Ma, and KN-pfl and KT-pfl erupted by two types of felsic magma activity, then the caldera was formed. The tholeiitic dacite-rhyolite magma fed at 0.6Ma to 0.3Ma, and the caldera forming or expanding eruption by TN-pfl. Since 0.3Ma, the magma plumbing system of Takahara volcano has extremely changed. Then calc-alkaline magma activity built post-caldera stratovolcano.

Keywords: Volcanic history, Magma plumbing system, Caldera, Pyroclastic flow, Lithic concentration zone, Whole rock composition

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P14 Room:Convention Hall Time:May 21 17:15-18:30

Stratigraphy of pryoclastic flow deposits in the Onoda Formation distributes on Iwagasaki region in the north of Miyagi

FUJINO, Masayoshi[1*], MIYAMOTO, Tsuyoshi[2], ISHIWATARI, Akira[2]

[1]Faculty of Science, Tohoku University, [2]Center for Northeast Asian Studies, Tohoku University

Introduction

The Onoda Formation, formed in the Late Pliocene to the Pleistocene, distributes on Iwagasaki region on the east of Onikobe and Naruko calderas (Tsuchiya et al. 1997). It is mainly recognized at Mozume area in Osaki City and Uguisuzawa area in Kurihara City. Pyroclastic flow deposits on Quarternary period over lie on the Onoda Formation, and some similar pyroclastic flow deposits are also in Onoda Formation. Soda (1993) and Kuzumaki and Oba (2009) counted five and four pyroclasic flow deposits in Onoda Formation at Mozume area, respectively, and three of them are considered to be identical. Kuzumaki and Oba (2011) also studied Uguisuzawa area and found that two pyroclastic flow deposits are identical with those at Mozume area, although they did not reveal their source.

It is important to reveal the source of the pyloclastic flow layers in Onoda formation and to investigate their relations with the eruption products of Onikobe and Naruko calderas. To re-examine the stratigraphy of pryoclastic flow deposits in Onoda formation we observed the outcrops at Uguisuzawa area.

Stratigraphy of pyroclastic flow deposits in the Onoda Formation

The stratigraphy was studied based on the distributions of each deposit, inferred topography at deposition, heavy mineral assemblages and bulk chemical compositions ofpumice clast.

These analyses revealed that the Onoda Formation at Uguisuzawa area contains at least seven discrete pyroclastic flow deposits, named Flow 1 to Flow 7 from bottom to top. Heavy minerals in pumice are: opx and cpx in Flow 1; opx in Flow 2; opx (minor) in Flow 3; opx in Flow 4; opx and cpx in Flow 5; opx in Flow 6; opx and hb in Flow 7 (opx=orthopyroxene, cpx=clinopyroxene, hb=hornblende).

Among the seven flows five of them are identical to those at Mozume area reported by Soda (1993).

Characteristics of chemical composition

SiO_2 content in bulk pumice ranges 70-74 wt% on Flow 1 and 2, 74-77 wt% on Flow 3 and 4, and 72-75 wt% on Flow 5, 6 and 7.

SiO_2-K_2O plot shows that K_2O content of Flow 5-7 pumices are higher than those of Flow 1-4. Compared with these, and with Onikobe pumice, Naruko pumice is poor in K_2O. Flow 1-4 pumices are on the same SiO_2-K_2O trend with the pumices from Onikobe caldera, but Flow 5-7 pumices, which are rich in K_2O, deviate from it.

Discussion

Since five pyroclastic flow deposits in Mozume area (Soda, 1993) are identical with those found in Uguisuzawa area, the distribution area of each flow in Onoda Formation is over 200 km^2, all of which are categorized as large pyroclastic flow.

SiO_2-K_2O plot indicates Flow 1-4 were from the same eruption source and the source magma had become felsic with age. They might be from Onikobe caldera because Flow 1-4 pumices are on the same chemical composition trend with the pumice from Onikobe caldera.

K_2O content of Flow 5-7 are so high that they should not be from Onikobe and Naruko caldera. There are calderas, formed in the Late Miocene to the Pleistocene, around the Iwagasaki region (Ito et al. 1989). Among them Innai, Sanzugawa, Genbi, and Ginzan calderas are not the origins of Flow 5-7 because they are too old and topographic barriers on their activity periods should hinder to distribute the Onoda formation pyroclastic flow deposits on Iwagasaki region. To the contrary Akakura caldera and Mukaimachi caldera, locate on the west of Mozume area and back arc side of Onikobe and Naruko calderas, formed between 3-1.4 Ma (Otake, 2000) and between 1.0-0.6 Ma (Koike et al. 2005), respectively, which agrees with the period when Onoda formation was deposited (3.3-0.6 Ma; Tsuchiya et al. 1997). In addition, there was no obstacle between these calderas and Iwagasaki region. For these reasons we propose Akakura and Mukaimachi calderas are the source of Flow 5-7. Our proposal is in harmony with the fact that K_2O content of Flow 5-7 are higher than that of Onikobe and Naruko, because K_2O content tends to be higher from fore to back arc.

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P15 Room:Convention Hall Time:May 21 17:15-18:30

Temporal variation of geological and petrological features of the Kattadake pyroclastic rocks in the Zao newest activity

TAKEBE, Yoshinori[1*], BAN, Masao[2]

[1]Graduate School Sci. and Engineer., Yamagata Univ., [2]Faculty Sci., Yamagata Univ.

Based on petrologic analyses of successively corrected samples, we have examined the magmatic evolution in the newest activity (ca. 30 ka to the present) of Zao volcano. In this study, we will present geological and petrologic characteristics of the Kattadake pyroclastic rocks which is one of the units of the newest activity, and reveal the magmatic evolution of this unit.

The Kattadake pyroclastic rocks distribute inner part of the Umanose caldera which formed in early part of the newest activity. This unit is composed of more than 20 pyroclastic layers, which are divided into lower, middle, and upper parts. The deposits show four facies, scoriaceous ash, agglutinate, volcanic breccia, and tuff breccia. The dominant facies is scoriaceous ash all the way. The tuff breccia facies is observed in lower and upper parts, and the agglutinate and volcanic breccia facies are in the upper part. The agglutinate facies also occur in top of the middle part. The scoriaceous ash facies layers are composed of black scoriaceous ash matrix with planer stratification, and include black scoriae fragments. The agglutinate facies layers are composed of black scoria spatters, bombs and fragments. The volcanic breccia facies is characterized by abundant andesitic blocks in blown ash matrix. The tuff breccia facies layers are constituted of white to pinkish clay matrix with altered lithics.

The rocks belong to medium-K, calc-alkaline rock series, and are mainly olv-bearing-cpx-opx basaltic-andesite to andesite. In the upper part, olv-cpx-opx basaltic-andesite also occur. The range of the SiO_2 and K_2O contents are ca. 55.0-58.4 % and ca. 0.69-1.18 %, respectively. The whole rock SiO_2 contents of rocks from lower to middle parts are almost constant, ca. 55.5 %. In contrast, the contents increase to ca. 57.0 % in upper layers. In addition, the rocks form top layer of the upper part show Cr-Ni richer trends than the other layers.

By textural and compositional features, phenocrysts can be divided into following three groups. Group A includes low-An plagioclase (An = ca. 58-80), orthopyroxene (Mg# = ca. 64-68), and clinopyroxene (Mg# = ca. 65-71). Most of these plagioclases have patchy textured core, oscillatory zoned mantle with or without dusty zone, and thin clear rim. Some of An-richer ones have honeycomb textured core and clear rim. The pyroxenes show homogeneous core and have narrow Mg-rich zone (Mg#, up to 78) just inner part of rim. Glass inclusions in core are common. Group B includes high-An plagioclase (An = ca. 88-92) and olivine (Fo = ca. 74-85). Both plagioclase and olivine usually show a homogeneous clear core with normal zoned rim, whereas some Fo-poorer olivines (Fo, lower than 80) have narrow Fo-rich zone (Fo = ca. 83) just inner part of rim. Group C includes small and subhedral orthopyroxene (Mg# = ca. 70), although this phenocryst is always rare.

We inferred that the Kattadake pyroclastic rocks were formed by magma mixing between two end-member magmas for group A and B. Proportion of felsic end-member would increase form lower to upper parts. The bulk SiO_2 content and temperature of the felsic end-member magma are estimated to be ca. 59-61 % and ca. 950 degrees C. The similarity of the chemical compositions of group A phenocrysts among layers suggests that the felsic end-member magma had similar composition during the activity. The bulk SiO_2 content of the mafic end-member magma are estimated to be 50-52 %. Further, the olivines with Fo-rich zone indicate that the mafic end-member magma would be tapped by more mafic basaltic magma form deeper area. The more mafic magma would be effective in forming the Cr-Ni richer magma in top of upper part. During the injection of the mafic end-member magma into the felsic magma chamber and subsequent mixing, dusty zone of plagioclase, Mg-rich zone of pyroxene, and group C phenocrysts would be formed. Consequently, well mixed magma erupted.

Keywords: Magma evolution, Magma mixing, Phenocryst types, Kattadake pyroclastic rocks, Zao volcano, NE Japan

SVC53-P16 Room:Convention Hall Time:May 21 17:15-18:30

Recent volcanic activity at Akita-koma. and Iwate Volcanoes after large trench-type earthquakes

DOI, Nobuo[1*]

[1]Faculity of Edcation, Iwate Univ.

The gigantic reverse-faulting of the 2011 earthquake off the Pacific coast of Tohoku brings about large crustal movements in the eastern part of Japan. The crustal movements occur the temporal extensional stress field which activates the volcanic activity and seismicity in the eastern and central parts of Japan.

The volcanic earthquakes began to occur at the north flank of Akita-komagatake Volcano after about 33 hours of the Miyagi-ken Oki earthquake on May 28, 2003 (Ueki at al., 2004). Earthquakes have occurred at the southern area in 2004, and below the summit in 2005. It is important to note that no volcanic earthquake below the summit has been found during the past observations. The geothermal manifestations were found out at the northeastern flank of the Medake cone on April, 2009, which has been the most active cone for about 80 years in Akita-komagatake Volcano. The manifestations are becoming gradually larger now.

The volcanic tremors and earthquakes began to occur at Iwate Volcano after the Sanriku-haruka Oki earthquake (M7.6) on December 28, 1994. The volcanic tremor which continued for 45 minutes occurred at a depth of about 8km at the eastern flank of the volcano on September 15, 1995. Many volcanic earthquakes continiued to occur from December, 1997 (Hamaguchi, 2005). The crustal movements also suggested the intrusion of magma in the direction of EW. On March, 1999, the geothermal manifestations were discovered at the Nishi (West)-Iwate Volcano and became large rapidly to the peak of activity in eary 2001.

The volcanic eruptions and/or geothermal activities of Akita-komagatake and Iwate Volcanoes have often occurred five years before or after the large trench-type earthquakes since 1896 (Doi, 2000).

It is clear that Akita-komagatake and Iwate Volcanoes have erupted and/or activated the geothermal activities in relation to the large trench-type earthquakes. So, it is necessary to predict their long-term activities by the eruption-model which is combined with the crustal movement and temporal extensional stress field caused by the large trench-type earthquakes.

Keywords: trench-type earthquake, Akita-komagatake Volcano, Iwate Volcano, extensional stress field

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P17 Room:Convention Hall Time:May 21 17:15-18:30

Magma ascending and formation processes of Tokachi-Ishizawa obsidian lava, northern Hokkaido, Japan

SANO, Kyohei[1*], WADA, Keiji[1], SATO, Eiichi[2]

[1]Hokkaido University of Education at Asahikawa, [2]Kobe University Edu.

Volcanic products generally contain several crystals. These crystalline materials can be formed due to cooling, ascending and vesiculation processes of magma. Obsidian is also volcanic product, and obsidian-forming magma must experience these processes. However, obsidian contains rare crystals, and formation processes of obsidian are poorly understood. This includes the poor understanding of obsidian eruption process, like a magma ascending and emplacement. Thus we need the discussion about these processes.

Obsidian lava complex in Shirataki, Hokkaido, erupted at 2.2Ma and formed obsidian monogenetic volcanoes. A cross section of Tokachi-Ishizawa obsidian lava (TI lava) in the complex is about 50 m in height and is stratigraphically observed from its flow bottom; brecciated perlite layer, obsidian layer (Ob layer), banded obsidian layer (BO layer), and rhyolite layer (Rhy layer). The BO is alternate layer of obsidian and rhyolite. We collected lowermost (Rhy-1) and interior (Rhy-2) samples in rhyolite layer. Rhyolite in BO layer (BO_rhy) is the brittlest and the most vesiculated in all rhyolite samples. On the other hand, Rhy-1 has low vesicularity.

In this study, we conducted chemical analysis and precisely described the rock micro-textures of TI lava samples from obsidian layer to the rhyolite interior in order to understand the magma ascending and formation processes of silicic obsidian lava structure.

TI lava obsidian is almost aphyric, composed of glasses (>98% in volume), rare plagioclase phenocryst (0.4-1.0 mm), plagioclase microlite (<0.2 mm), magnetite microphenocryst (= 0.05-0.07 mm), magnetite microlite (<0.05 mm) and rare biotite (<0.01 mm). Rhyolite samples have crystalline texture.

We counted crystal number (N_v) of magnetite microlite by 3D counting method (Castro et al., 2003). The N_v value in all of the TI lava samples is high with $10^{13.4}$-$10^{14.2}$ [number/m^3]. N_v is considered to reflect the super-cooling of crystallizing magma (Toramaru, 1991; Toramaru et al., 2008). TI lava magnetite microlite indicates no systematic change of crystal number toward lava interior. If the magnetite microlite is cooling-induced crystal, N_v of TI lava samples should indicate the decreasing correlation toward lava interior due to the slow cooling of lava interior. Furthermore, Rhy-1 shows the lowest number density and the highest value of mean width of magnetite microlite. This tendency of crystal growth observed in Rhy-1 can not be explained by cooling, because Rhy-1 is the outer sample than Rhy-2, and cooling rate of Rhy-2 should have been lower than Rhy-1. And for so we infer the magnetite microlite in TI lava are decompression-induced (i.e. crystallized by vesiculation) crystals.

We performed X-ray diffraction analysis (XRD) for all TI lava samples. Rhyolite samples indicated the distinguished peak of albite. Based on the result of XRD, crystallinity of all rhyolite samples are following order: Bo_rhy > Rhy-2 > Rhy-1. Furthermore, this order is corresponding to the N_v value and degrees of vesiculation, that is, high N_v sample indicated the highest crystallinity and vesiculality in TI lava rhyolite. This relation may reflect the crystallization process by the vesiculation.

N_v and crystallinity inferred from XRD in TI lava indicate magma ascending and formation processes of obsidian-rhyolite layer during conduit and surface flow. Based on the rock texture and XRD, we can consider that crystallization process in rhyolite layer is affected by vapor phase. We intend to model the formation process that produced the obsidian-rhyolite internal structure of TI lava by viscous silicic magma.

Keywords: obsidian, rhyolite, lava, Shirataki

SVC53-P18 Room:Convention Hall Time:May 21 17:15-18:30

Eruption history of Akanfuji in the Me-akan volcano, eastern Hokkaido, Japan

SATO, Eiichi[1*], WADA, Keiji[2]

[1]Kobe University, [2]Hokkaido University of Education

Akanfuji, situated in the Me-akan volcano of Eastern Hokkaido, started its eruption ca. 2.5 ka, and its activity continued for 1,500 years. For about 1,500 years during the period, 17 eruption deposits (Ak1-Ak17) were recognized. The mode of eruption of this volcano was mainly scoriaceous sub-plinian type. Lava flows were often associated with the scoria eruption.

The eruption history of Akanfuji is divided into five stages. In the first stage (Ak1), scoria fall with many lithic fragments was deposited from northeast to east of the volcano. In the second stage (Ak2-Ak3), two larger eruptions occurred and the coarse scoria falls were deposited to northeast. In the third stage (Ak4-Ak13), some eruptions occurred and the scoria falls were dispersed in a northeast to southeast direction. This stage is characterized by finding orthopyroxene in the deposits. In the forth stage (Ak14-Ak16), three larger eruptions occurred and voluminous scoriae were deposited from southeast to south. In the final stage (Ak17), fine scoria fall was deposited from northeast to southeast.

Keywords: Me-akan volcano, Akanfuji, eruption history, scoria fall, lava

Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

SVC53-P19 Room:Convention Hall Time:May 21 17:15-18:30

Characteristic Eruption Sequence at the Main Stage of Nakamachineshiri in the Me-Akan Volcano, Eastern Hokkaido

ANZAI, Keisuke[1], WADA, Keiji[1*]

[1]Hokkaido University of Education

Throughout the eruption history of Me-Akan volcano on the Akan caldera, eastern Hokkaido, the largest eruptions occurred about 13000 years ago, referred to as Nakamachineshiri eruptive stage-I (Nak-I). Nak-I can be subdivided into two eruption stages. The initial eruptive stage is characterized by pumice-rich pyroclastic flows followed by lava eruptions (Nak-I-E), whereas the main eruptive stage by continuously eruptive sequence of lava fragments-rich pumice and scoria pyroclastic flows, Plinian pumice and scoria eruption, and pyroclastic flow eruption (Nak-I-M). From the observation of outcrop along the Me-akan river at eastern frank and analysis of eruption products, we report the characteristics of eruptive sequence and its magma plumbing system at Nak-I-M.

Nak-I-M is stratigraphically composed of scoriaceous pyroclastic flow layer containing plenty of lava rock fragments (M1 to M7), pumice and scoria pyroclastic flow layer (M8), Plinian pumice scoria fall layer (M9), pumice and scoria pyroclastic flow layer (M10), Plinian pumice scoria fall layer (M11), pyroclastic surge and volcanic ash fall layer (M12). These layers are piled up without gap of time, and are throughed by degassing pipe. The eruption sequence of M1 to M7 was formed by repeated basaltic andesite pyroclastic flows with scoria and agglutinate fragments accompanied by much of destructive lava fragments. The following eruptions (M8 to M12) are due to the magma mixing plumbing system of basaltic andesite and dacite magma. This eruption cycle of pyroclastic flows to Plinian falls, characterized by the increasing vesicularity and simultaneity of Plinian and pyroclastic flows eruptions, shows no typical eruption seqence but can be tentatively called ”eruptive sequence of Me-Akan type” .

Keywords: Me-akan volcano, Nakamachineshiri, eruption sequence, pyroclastic flow