

The embodiment of the consecutive penetration tests in the Liquefaction-Fluidization place

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2011 occurred on March 11, 2011 Tohoku-Pacific Ocean earthquake and liquefaction and liquidity phenomenon of the formation by the largest aftershock (less liquid fluidization), Jinami phenomenon has occurred. Liquid flow of the embankment, man-made strata was observed also in the inland as well as coastal areas by this earthquake. Depending on the structure, because it was observed in many cases it can be used again if the lift or the subsidence part or return horizontally, this study area is located in the man-made strata distribution area that has received the liquid fluidization damage building construction jack-up by the steel pipe pile construction as the restoration method of the object has been selected. While the support layer depth and N values measured for thickness confirmation were required upon installation rather than the usual standard penetration test to implement the N value measured every 1m, continuous penetration test to implement the N value measured every 50cm it was adopted. This is a distribution in the depth direction as viewed from the N value of liquid fluidized layer, by performing as much as possible detailed observation of the sample taken without creating a non-core section, an intermediate survey and the positioning of the standard penetration test and all core boring, as long as is brought close to the no attempt, is considered rare example unparalleled is in that could also be confirmed up to now as the investigation of the time less than after the disaster in one month. Survey method is a continuous penetration test of 10-15m was carried out in 1 point (a total of 6 points) of each building vicinity, previously implemented only up to 20m 1 point corresponding to the on-site center, this each sample detailed sample observation carried out close-up on the spot of the point was carried out in the indoor (on Workstation). Results of the investigation, geological structure based on the 20m hole geological observations were classified as follows. 1st layer (N value of 4/32-9) crushed stone, concrete silt mingled with fine sand at a layer thickness of 0.40-1.25m - estimated non-liquid fluidized layer of fine sand mingled with silt. 2nd layer is sand layer (N value of 0/20-12) many very fine grain sand water at a layer thickness of 2.20-4.95m - N value of 3 or less in the middle part and in particular the entire base portion in a liquid fluidized layer of fine-grained sand (minimum 0/20) the admit. 3rd layer is clay layer (N value 1-5) estimated fluid fluidized layer of fine-grained sand mingled with silt of the lens-shaped distribution at a layer thickness of 0.85m. 4th layer is foreshore after the beach sediment layer (N value of 4/32-50 or more) non-liquid fluidized layer of fine-grained sand to the development of the black beam at a layer thickness of 1.90-7.40m. 5th layer is nearshore sediment layer (N value 14-50 or more) the confirmation layer thickness 13.60m bulk-free layer management in the array or silt contamination of irregular sand particles (biological disturbance) and sand pipes and mud pipes and fine sand - silt mingled with fine-grained non-liquid fluidized layer of sand shells fine piece is mixed, of 5, which is a division. As advantages of the present survey methods, can also be applied in the building bowing because it is a rule, a:N value measurement, there is a possibility that can discover the b:stratum fluidization trace (the discovery of re-liquefaction danger), on the other hand as the points to keep in mind, is a:hydrous very many samples need basket with shoe for fall prevention for easy to fall, focus on a flat break-all sand particles as much as possible the sample surface in the close-up of sample, sure unit investigation capable engineers in charge to things like.

Keywords: Reliquefaction-Fluidization place, Advantage of continuous intrusive examination, Fault of standard penetration test

Litho-stratigraphy on reclaimed land in northern Tokyo bay and liquefaction-fluidization horizon at the 2011 off the Pacific coast of Tohoku Earthquake: from the geological survey by continuous boring cores

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Liquefaction-fluidization phenomena caused widely on reclaimed land along northern Tokyo bay at The 2011 off the Pacific coast of Tohoku Earthquake. Stratigraphy of this site is composed of the middle- upper Pleistocene Shimousa group, the Holocene formation and Man-made formation in ascending order. Shimousa group, under 41.7m depth, consists of mainly very dense sand bed with thin silt bed and tephra beds. Holocene formation, from 41.7m depth to 5.53m depth, consists of bioturbated soft silt beds, bioturbated very fine sand beds, coarse silt beds and fine -medium sand beds with pebble from Kanto Loam formation. Man-made formation, over 5.53m depth, consists of clean fine - medium sand beds, shelly coarse - very coarse sand bed, clayey fine silt bed and coarse silt bed.

Primary sedimentary structure, lamination deformed or lost partially on sand bed in 2.65-3.75 and 5.00-5.53m depth. It is presumed that these horizons were liquefied and fluidized on the 2011 off the Pacific coast of Tohoku Earthquake.

Keywords: Liquefaction-fluidization, the 2011 off the Pacific coast of Tohoku Earthquake, continuous boring core, Man-made strata, reclaimed land

Luminescence age of Holocene sand dunes and alluvial lowlands at costal area in Tonbetsu plain, northern Hokkaido, Japan

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In Tonbetsu plain, northern Hokkaido, a series of fluvial terraces and sand dunes are distributed whose detailed chronology is unknown. Reconstructing the Holocene geological evolution in Tonbetsu plain is very important, due to the existence of many prehistoric sites are found on the sand dunes and their around area and also due to a rare ecosystem around the sand dunes and alluvial lowland (Fujita, 2014; Hamatonbetsu Town Education Board, 2014). To establish the chronology of young coastal sediments and fluvial terraces in Tonbetsu plain we used a combination of different luminescence dating methods including OSL dating of quartz and post-IR IRSL (pIRIR; Thomsen et al., 2008) dating of feldspar using both fine silt and sand sized grains. The OSL signal of the coarse grain quartz samples from the dune sand is dominated by slow components, suggesting that the sand sized quartz is not a suitable dosimeter (Thiel et al., 2015). Therefore we applied pIRIR dating of K-feldspar (pIR₁₅₀; Reimann and Tsukamoto, 2012) to the sand samples.

The results indicate that, 1) pIR₁₅₀ dating is an effective tool to date the Holocene sand sized sediments in Tonbetsu plain, 2) it is possible that the sources of quartz are different depending on grain size or geologic period, because the OSL ages of fine grain quartz are reliable in the study area (Kondo et al., 2007), 3) the sand dunes have been formed from the inland side sequentially after ca. 5.7 ka following maximum of the Holocene transgression in central Tonbetsu plain, 4) in southeastern Tonbetsu plain, the sand dune formation has been continued until the late Holocene, with alterations of stable (inactive) stages and destruction events by storm surge, and 5) in northwestern Tonbetsu plain, the sand dune formation stopped by the late Holocene, or younger sand dunes close to the coast were eroded completely by waves.

We will also show the luminescence dating results of the alluvial lowland and lower fluvial terraces in the study area.

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Keywords: sand dune, alluvial lowland, pIRIR / OSL dating, Tonbetsu plain, Holocene

Identification of Nantaisan Shichihon-sakura/Imaichi tephra (Nt-S/I) in the sediment core MD01-2421 collected off the Kashima coast, Japan

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IMAGES core MD01-2421 (45.83 m) from the northwest Pacific Ocean off central Japan yielded twenty-three tephra beds. Descriptions of the twenty-three tephra beds have been made using the major-element composition of glass shards and refractive indices (RI) of glass shards and phenocrysts. As a result, at least seven on-land maker tephra layers have been identified. Two tephras, AT and Aso-4 come from Kyushu: Aira and Aso calderas. Four tephras come from central Honshu: Ag-KP from Mt. Akagi, Hk-TP from Hakone caldera, On-Pm1 from Mt. Ontake and Tt-D from Mt. Tateyama. One tephra, TG as the lowest layer of all, comes from northeast Honshu and are correlated around the coastline of southern Fukushima. Later, we have been studying the source volcanoes of remaining sixteen tephra beds. In this study, we report the new information on the source of Tephra 1 obtained recently.

Tephra 1 (925.6-933.1 cm) are characterized by coarse and bad selected volcanic sands consisting of white to pale brown pumice and black scoria which grain size is limited to 3 mm. Its thickness is 7.5 cm disturbed in liquid mud. The deposited age of this tephra is estimated at 17.7 ± 1.38 ka based on the oxygen isotopic stratigraphy of the benthic foraminifera and the calendar ages of foraminiferal fossils calculated from the accelerator mass spectrometry (AMS) ¹⁴C ages. Pumices are cross-foaming and include many microlites. Refractive index of volcanic glass shards exhibits bimodal as 1.498-1.503 and 503-1.509. Aoki et al. (2008) pointed out that 63-125 μm size particles consist of weathering minerals besides volcanic materials and geochemistry of 125-250 μm size volcanic glass shards indicated heterogeneity, hence there is a strong possibility that particles limited to 250 μm in this tephra bed included contaminant besides essential volcanic materials. To address this problem, we hand-picked 2-3mm size pumice grains, and crushed them for EPMA analysis. Consequently, it becomes clear that geochemistry of pumices are rhyolitic and rich in alkaline component elements relatively (SiO₂; 78.3wt%, Na₂O; 3.18wt%, K₂O; 3.79wt%). Next, geochemistry of Nantaisan Shichihon-sakura/Imaichi tephra (Nt-S/I), in some tephra erupted around 17.7±1.38 ka, has slightly bimodal, and the group which K₂O content is rather little (SiO₂; 77.7wt%, Na₂O; 3.23wt%, K₂O; 3.97wt%) is similar to the geochemistry of pumices in Tephra1. Nt-S/I is originated from Nantaisan, which belong to the Nikko volcanic area, west Tochigi Prefecture and consisting of Shichihon-sakura pumice unit (SP; Kanto Roam Kenkyu Group, 1965) as upper part and Imaichi pumice unit (IP; Kanto Roam Kenkyu Group, 1965) as lower part. These fall-out pumice units involving scoria distribute toward east from the source mainly, and its correlatives are found at the Kinu River Lowland area, around Mito and furthermore the Jyoban Coast (Machida and Arai, 2003; Suzuki, 2011). As Nt-S/I correlatives in Tephra 1 are almost pumice grains and there are much contaminated grains in fine materials of Tephra 1, it seems less possibly that Nt-S/I tephra fell out at this site off Kashima. We suppose, as a highly probable transportation process, that Nt-S/I pumice grains falling out at sea off Mito, or carried out to the Pacific by the Kinu River and the Naka River are transported off Kashima by marine current. Then, Suzuki (2011) reported that Asama Itahana Yellow tephra (As-YP; Machida and Arai, 2003) found just under Nt-S/I around Nikko area. Twenty three tephra beds in this core Aoki (2008) reported are visible tephra beds, so As-YP would be bearing under Tephra 1 that correlated to Nt-S/I.

Keywords: Nantaisan Shichihon-sakura/Imaichi tephra, tephrostratigraphy, oxygen isotopic stratigraphy, IMAGES, marine core, off Kashima

Reexamination of the eruptive age of Late Pleistocene widespread DKP tephra by using MD01-2421 core collected off the Kashima-Pacific coast, Japan

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DKP tephra derived from the Daisen volcano, west Japan, is one of the most important Late Pleistocene widespread tephras because it covers a broad area including Central Japan, North Kanto and South Tohoku where inland fluvial terraces formed in the Last Glacial Period are well developed. It also plays an important role as a useful key bed for evaluating paleo-climate changes and crustal movement and so on in this period. However, the age of DKP is highly controversial since the end of 1970s, that is, 45–47 ka (Machida and Arai, 1979), ca. 50 ka (Takemoto, 1991), 50–52 ka (Nakamura et al., 1992), >55 ka (Machida and Arai, 2003), 49–53 ka (Yamamoto and Hasebe, 2014), 55–66 ka (Suzuki et al., 2016). In order to determine the reliable eruptive age of DKP, we examined MD01-2421 core collected off the Kashima-Pacific coast, Japan.

Hakone-Tokyo Tephra (Hk-TP) is crucial tephra for determination of the eruptive age of DKP because it is positioning immediately above DKP. However, characteristic properties for the identification of DKP in volcanic soil deposits just above Hk-TP are insufficient, and the age of Hk-TP have been estimated to be older (e.g. 66.0 ± 5.5 ka: Aoki et al., 2008) than previous studies.

In this study, we detected fine white pumice clasts (0.2 mm in diameter) with characteristic properties similar to those of DKP at a depth of 2018.20–2020.45 cm (93.45 cm above Hk-TP). Refractive indices of volcanic glass shards is 1.508–1.514, and major element composition (wt.%; mean and standard deviation for 15 measurements) in those is SiO₂: 73.57 (0.34), Al₂O₃: 14.74 (0.14), FeO: 1.90 (0.12), CaO: 2.12 (0.05), K₂O: 2.55 (0.09), Na₂O: 4.13 (0.34). These features are quite similar to those of well preserve DKP tephras in terrestrial sediments collected in Toyama and Fukushima Prefectures. Stratigraphic position where these pumice clasts were detected is dated at 60.08 ± 5.68 ka (MIS 4.0–4.22) due to oxygen isotope stratigraphies shown by Oba et al. (2006) and Martinson et al. (1987).

Keywords: Widespread tephra, Late Pleistocene, DKP, marine tephra

Reconstruction of sedimentation rates during the last ca. 50,000 years using multiple cores in Lake Suigetsu, central Japan

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Lake Suigetsu in Fukui Prefecture, central Japan, is a one of the tectonic lake located in a subsiding area related to the active Mikata reverse Fault (Okada, 2004). The sediments of Lake Suigetsu annually laminated over the last ca.70 kyr (Nakagawa et al., 2012) with a significant number of event layers (e.g. associated with earthquakes and floods; Scholaut et al., 2014), which record paleoclimate and palaeoenvironment changes. Two long cores (SG93, SG06) have previously been recovered from the centre of the lake in 1993 and 2006, respectively, and an exceptionally precise age model has been established for the cores through a combination of over 800 radiocarbon dates and high precision varve counting (Staff et al., 2011; Marshall et al., 2012; Scholaut et al., 2012; Bronk Ramsey et al., 2012). Recently, new cores (SG14) were recovered by the Fukui prefecture from boreholes ca. 500 m to the east of the SG06 coring site. In this study, we report those sedimentation rates of Lake Suigetsu during ca. 50,000 years and its triggers on the basis of these cores and the precise age model.

The SG14 core was obtained from 4 separate boreholes (E, F, G, H) to ensure overlapping with each other. Half cut sections of these cores were immediately photographed before oxidizing under precisely controlled lighting conditions. Furthermore, long soft X-ray images were taken on 1 m long giant thin-section slabs of these cores. On the basis of these images, we stratigraphically correlated the SG14 core with the SG06 core at more than 300 points in ca. 70 m lengths using a number of event layers to apply the precious age model of the SG06 core.

Focusing on the age of 0 to 50 ka, the SG14 core was deposited at 0.5 m/kyr and show strong correlation with that of the SG06 in depth. The rate increases after 13 ka and has gradual several thousand-year cycles. These cycles may relate to global environmental change. Furthermore, the rate drastically increases at the some horizons, which are able to classify into two types on the basis of comparison with the rate of the SG06 core: synchronous type and asynchronous type. The synchronous type increase the rate in each site at the same time, indicating the rate is likely affected by relatively large-scale event. On the basis of the age model, one of the this type is correlative with Kanbun historical earthquake in 1662. Therefore, this type may be induced by tectonic event. The rate of asynchronous type is clearly different between each site, indicating the rate is strongly affected by local event such as turbidites. As a result, we probably detected global environmental changes, tectonic events, and local events on the basis of high precise correlation between the SG14 and SG06 cores. Additional correlation data between the SG14 and SG06 are necessary in future research to improve understanding of the sedimentary process of Lake Suigetsu.

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Keywords: sedimentation rate, Lake Suigetsu, varve, earthquake

Temperature change in northern Japan during the last 6,700 years and the related human activity

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Marine coastal sediments provide a big advantage to have continuous record of both marine and terrestrial environments in their sedimentary sequence. In addition, high correlation between atmospheric and sea surface temperature in bays present very unique opportunity to reconstruct terrestrial temperature quantitatively. In this study we therefore collected one core from semi-closed bay in southern Hokkaido. We measured organic material of alkenone and analyzed pollen assemblage to estimate temperature. Our goal was to reconstruct with high time resolution of temperature in marine and adjacent terrestrial environments, to evaluate the process behind long and short term trend of temperature for the last 6000 years, and to understand the relationship between climatic changes and the human activity including the rise/fall of the human population at the Sannai-Maruyama site. This time Core St. 5 was collected at a distance of only 7.8 km from the coast and at a water depth of 65 m of Site 5 in Uchiura Bay during the research program by Geological Survey of Hokkaido in 2010. Then we analyzed alkenone SST. It showed a variation of 8.7 °C (maximum and minimum of 14.5 °C to 23.2 °C, respectively). The mean SST was 14.5 °C. The SSTs gradually increased during the last 7000 years. The SST peaked in 4529 BC, 2546 BC, 759 AD and 1782 AD. Smaller peaked in 4057 BC, 3585BC, 3018BC, 1885BC, 1508 BC, 1035 BC, 469 BC, 122AD, 381AD, 1164 AD. Large temperature falls occurred in 4500-4000 BC, 2550-2000 BC and 760-1080AD.

Keywords: temperature, Jomon people, Climate

Abrupt cooling event during the middle Holocene from pollen data of marine coastal sediments in Uchiura bay, northern Japan

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Holocene climate records provide valuable information for inferring past interaction between humans and environment. We present well dated pollen data covering the last 7,000 years from Uchiura bay in southern Hokkaido, northern Japan, in order to better understand the change of human population for the Jomon sites around northern Japan. In addition, we show the palaeoclimatic reconstructions since the middle Holocene from the pollen data, using the best modern analogue technique (MAT). The pollen-based quantitative palaeoclimatic data in Uchiura bay indicate that small-scale cooling events took place at ca. 4.2-4.5 ka cal BP, 2.3-2.4 ka cal BP, and ca. 1.0-1.2 ka cal BP. From the data, the temperature at ca. 4.2-4.5 ka cal BP drastically decreased about 1.5 °C. The cooling at the period corresponds to the decrease of alkenone-SST in Uchiura bay and other palaeoclimatic records throughout East Asia. We can suggest that the abrupt cooling event at ca. 4.2-4.5 ka cal BP influenced human activities and population during the Jomon period in northern Japan.

Keywords: pollen data, palaeoclimatic reconstruction , modern analogue technique , Uchiura bay, northern Japan

Food Diversity, Climate Change and the Resilience of Subsistence-Settlement Systems: A Case Study from the Jomon Period

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Archaeologists have long been interested in the study of the mechanisms of long-term culture change. Factors that involve specialization and centralization, such as domestication of plants, technological developments and social competitions, have been proposed as prime movers for the "development" of human societies. Contrary to these interpretations, this presentation proposes a hypothesis that diversity and decentralization may be critical for maintaining long-term sustainability of human societies in the order of hundreds to tens of thousands of years. Using the research outcomes of a Full Research Project "Long-term Sustainability through Place-based, Small-scale Economies: Approaches from Historical Ecology" at the Research Institute for Humanity and Nature, Kyoto, this presentation aims at testing the hypothesis described above and examining the long-term impacts of the loss of subsistence/food diversity in relation to other environmental and cultural factors. The theoretical genesis of this project is the approach of historical ecology, which conducts comprehensive research on long-term culture change while emphasizing the impact of human activities on the environment.

Results of lithic assemblage analysis, residue analysis on pottery, starch grains analysis on stone tools, stable isotope analysis of skeletal remains and faunal remains, and AMS radiocarbon dating of skeletal remains are used to understand changes through time in food and subsistence diversity and other cultural factors. These results are compared against the patterns and timings of climate change identified through pollen analysis and alkenone sea surface temperature analysis. In addition, GIS analyses are conducted to understand changes in settlement size and site distribution patterns. Simulation studies of population dynamics of the Early to Late Jomon periods using SPD (summed probability distribution) analysis are also conducted.

Keywords: Food diversity, Climate change, Resilience, Jomon, Subsistence-settlement systems

Long-time sustainability of prehistoric subsistence of Jomon culture.

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In order to reconstruct the variability of dietary habit among individuals and/or population of Jomon periods, we are investigating the carbon and nitrogen isotope ratios in human bones from the Tokyo Bay area and Aomori prefecture. One of the main goals is the comparison of Jomon dietary habits in the latter part of Jomon periods in light of diversity, variability and sustainability. Our testing hypothesis is that "the Middle Jomon started an intensive exploitation of plant resources and this strategy decreased the resilience of Jomon subsistence and 'a population collapse' was observed in the Late Jomon period". Now we are working on the series of Middle, Late, and Final Jomon skeletons (ca. 6 to 3 thousand years BP) from the Tokyo Bay area and Aomori prefecture. The comparison between two Jomon sub-groups provide an insight into the response of Jomon hunter-gatherers against cooling and regression events in this periods and social change in time series as well by comparing diversitie of diet among social members. We would liket discuss the change of carbon and nitrogen isotope ratios in both ecological and social points of view.

Keywords: physical anthropology, prehistoric archaeology, isotope ecology

The estimation of formation ages of fans at the eastern foot of Ikeda Mountains, central Japan by the AMS¹⁴C dating and re-examination of average slip rates of Ikedayama fault

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A number of small fans have been developed at the eastern foot of Ikedayama Mountain of Ibuki Mountains, central Japan. These fans are regarded as useful landforms in evaluating the reverse fault activity of Ikedayama fault, dividing from the Nobi Plain, because it runs across the terraces with different ages. The average slip rates of Ikedayama fault, with a length of ca.16 km, was once evaluated as 0.8-0.9 m/1,000 years (Gifu Prefecture, 1998, 1999, and AIST), and recently, re-evaluated as 0.4-0.7 m/1,000 years in the area of northern margin, and 1.3-1.7 m/1,000 years or more in the central part of fault (Ishimura, 2010). On the other hand, we have been carried out AMS¹⁴C dating of humus developed on the debris-flow fan deposits, and classification of the terrace landforms in order to clarify the geomorphologic development process of these small fans. Our results show the estimated age of terrace surface as 17-20ka (upper surface), 10ka (middle surface (upper)), 9ka (middle surface (lower)) and 8ka (lower surface) (Takaba et al., 2016). These ages clearly differ from those estimated by the detection of crypto-tephras from the topsoil (Ishimura, 2010). Therefore, we consider the necessity for re-examination of the activities of Ikedayama fault, again. In this study, using the Fundamental Geospatial Data (Digital Elevation Model of 5 m mesh) by the Geospatial Information Authority of Japan, the fault vertical offsets on the terrace surfaces of same age were measured. They are 9-10.5 m in the upper surface of the northmost part, 10-11 m in the middle surface (upper), 8-10 m in the middle surface (lower), 9-11 m in the middle surface of the central (lower), 6-7 m in the lower surface, 2-2.5 m in the lower surface of the south, and 1.5-2 m in the lower surface. Based on the estimated ages of the terrace surfaces and their vertical offsets above, the average slip rates were calculated to 0.45-0.53 m/1,000 years (the upper surface), 1.0-1.1 m/1,000 years (the middle surface (upper)), 0.89-1.18 m/1,000 years (the middle surface) in the north part of fault, and 1.00-1.29 m/1,000 years (the middle (lower) surface), 0.71-0.88 m/1,000 years (the lower surface) in the central part of fault, and 0.18-0.25 m/1,000 years and 0.24-0.32 m/1,000 years (the lower surfaces) in the south part of fault. Although the lower values should be discounted, the representative average slip rate of Ikedayama fault can be 0.8-1.2 m / 1,000 years, close to the estimate by the Gifu Prefecture (1998, 1999).

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Keywords: Ikedayama Fault, Average Slip Rates, Offsets

Quaternary activity of the Erciyes fault southeast of the Kayseri basin, Turkey

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The Erciyes fault in southeast of the Kayseri basin is one of the most significant Quaternary faults in Central Anatolia, together with the Eceemis fault and the Tuz Golu fault. Emre et al. (2011: New active fault maps of Turkey, Kayseri sheet) mapped about 100 km long strands of the Erciyes fault with its 30 km long southwestern section run across the center of the Erciyes volcano. A M 7+ earthquake from the fault might be a big threat for the 1.5 million people in Kayseri basin, but little has been known about its Quaternary activity and the reality of the fault traces on the volcanic edifice. We have studied Plio-Pleistocene ignimbrites and Quaternary sediments in southeast of the Kayseri basin and recognized significant dip-slip separation in the central portion east of Kayseri city and Quaternary left-lateral (?) strike-slip activities in the northeastern portion of the fault as they are mapped by Emre et al. (2011). Along with field observations, we applied a high-definition topographic mapping approach using a small unmanned aerial vehicle (sUAV) and structure-from-motion (SfM) multi-view stereo photogrammetry. This enabled us to generate topographic data with a resolution of centimeters for a range of hundreds of meters, which were used to identify small topographic features such as scarps on the land surface. The Valibabatepe (or the Incesu) ignimbrite dated as 2.52 ± 0.49 Ma (Aydar et al., 2012) or 2.6 to 3.0 Ma (Le Penne et al., 2005) is a very distinctive extremely densely welded thin (~5 m) and hard ignimbrite layer capping the plateaus around western Kayseri basin. At Gesi Guney, 18 km ENE of Kayseri city center, the Incesu ignimbrite is distributed both on the 1340 m a.s.l. plateau and on the 1250--1270 m a.s.l. upland below the plateau. The ~70 m high scarp clearly demonstrates the Quaternary activity of the Erciyes fault. At the base of the scarp, talus deposits are juxtaposed with bedrock ignimbrite with an apparently NW dipping normal fault. An alluvial fan formed by a gully cutting into the Incesu plateau is also deformed by the fault. Around Gunesli, 25 km northeast of Kayseri city center, a fluvial gravel and sand layer that postdates the Valibabatepe ignimbrite is distributed along the foot of upland consists of pyroclastic flows older than the Valibabatepe ignimbrite. The fluvial gravel and sand layer, together with underlying pyroclastic flow deposits and an overlying pumice fall layer, is truncated by a swarm of vertical faults and dragged into the fault zone. The fault zone structure indicates the faults are strike-slip faults. These faults are located about 100 m inside the upland there is no offset topography on top of the faults. The ages of the faulted tephra layers are not known yet, but it is clear that significant strike-slip fault movement occurred during Quaternary after the Valibabatepe ignimbrite.

Keywords: active fault, pyroclastic flow deposits, Kayseri