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お詫び

地球科学49巻2号掲載のフォト1995年2月18日落下「根上隕石」概報の英文要旨及び説明が，編集委員会の連絡不十分のため欠落してしまいましたのでここに掲載します。今回のことは一度受理した原稿を編集委員会が著者の同意を得ずに大幅に改変したこととなり，重大な問題です。執筆者並びに読者各位に多大なご迷惑をかけたことを心からお詫び致します。今後このようなことの起こらないよう編集委員会内で十分検討し改善していく所存ですのでご了承ください。

地球科学編集委員会

なお，文献引用の際は次のようにして下さい。

地球科学，49巻，71～76ページ及び179-182ページ，または，地球科学，49：71-76＋179-182.

The following abstract and explanations should have appeared with Ishiwatari *et al.*'s article published in pages 71-76 of this volume, though they have been unreasonably eliminated by an editorial mistake. The editorial board express sincere apology to the authors and readers for this mistake. The article should be cited with English abstract and explanations in a manner like "Ishiwatari, A. et al. (1995) A preliminary report... Earth Science (Chikyu Kagaku), vol. 49, pp. 71-76 and 179-182."

A preliminary report on the Neagari meteorite fall on February 18th, 1995.

Akira Ishiwatari*, Keiichi Sasatani**, Kazue Tazaki*,
Koh Sakamoto+, Takashi Nakanishi+, Kazuhisa Komura++,
Tatsuki Tsujimori*, Yasuji Oura+, Yutaka Miyamoto+,
Hisatada Akahane#, Makoto Watanabe# and Katsushi Nunomura#

Abstract A stone meteorite was found by the second author (Sasatani) in a small town near Kanazawa, central Japan, in the morning of Sunday, February 19th, 1995. Place of finding is Ho-4, Taisei, Neagari (pronounced neh-ah-gari) Town, Nomi County, Ishikawa Prefecture, Japan (N36°26′57″, E136°27′55″), and it is named "Neagari Meteorite." The meteorite hit a car parked in the central shopping district of the town (Photo A). Sasatani started his car which was parked aside his house that morning, and found that the rear trunk cover of his car flapped. He found a black, rounded stone on the trunk cover, which was trapped in a triangular hole at the center of the trunk cover.

The shape of the hole formed on the car indicates that the meteorite came from NNW direction (333°) at an impact angle of 40° from the horizon (Photo B). Size and weight of the biggest fragment (presumably about 2/3 of the entity) are W6.5×H4.0×L6.0 cm (Length may have been 10 cm before crush) and 325 g, respectively. The meteorite is egg-shaped. Black glass crust, 1 mm thick, covers all over the surface. The interior is gray white, fine-grained rock (Photo C). There were three other major fragments (40, 30 and 18 g) and many tiny fragments in and outside the trunk. Weight of the collected fragments totals 420 g, but the original weight may have been about 500 g before crush. White paint fragments of the car are attached to the glass surface of the meteorite in a circular manner, suggesting that the meteorite rotated around its axis parallel to its flight direction when it hit the car (Photo D). However, the western side of the impact hole is bounded by a supporting pipe, and the shape of the hole is apparently controlled by this pipe (Photo

*Department of Earth Sciences, Faculty of Science, Kanazawa University, Kanazawa 920-11, Japan.
**Ho-4-1, Taisei, Neagari Town, Ishikawa 929-01, Japan
+Department of Chemistry, Faculty of Science, Kanazawa University, Kanazawa, Ishikawa 920-11, Japan.
++Low Level Radioactivity Laboratory, Faculty of Science, Kanazawa University, O-24, Wake, Tatsunokuchi Town, Ishikawa 923-12, Japan.
#Toyama Science Museum, 1-8-31 Nishi-Nakanomachi, Toyama 939, Japan.

B). It is also possible that the meteorite came from the north or northeast. The meteorite may have been prevented to pass through the trunk cover by the pipe and rotated toward northwest.

The precise time of the hit is unknown, but a neighbour heard a big sound at about 22 : 00 (JST : GMT+9) of Saturday, February 18th, 1995. The discoverer did not notice this sound, though he was in bed in his house at this time. On the other hand, five witnesses are so far available in the Kanazawa-Toyama area for a fireball which appeared in the northwestern sky, passing to the south (to the left) (Fig. 1, Table 1). Three witnesses correspond with each other in the time of appearance, which may be identified at about 23 : 55 of February 18th, 1995. The azimuth and elevation of the fireball appearance from each witness site define a point where the radial line reaches the height of 80 km from sea level, an assumed height of fireball ignition. These points are distributed in the area at about 100 km to the northwest of Noto Peninsula, and the flight path of the meteorite restored from the shape of the impact hole passes the area (Fig. 1). This suggests that the fireball has been the Neagari meteorite itself.

The glassy surface is rugged, porous and heterogeneous (Photo E). Chondrules are not obvious by the naked eyes, but some spherical features, 1 mm in diameter, are visible under the microscope (Photo F, arrows). Tiny iron metal and iron sulfide grains are disseminated.

Mineral composition was determined by the Akashi Alpha-30A SEM - Philips EDAX-9100 system of Kanazawa University (Photo G, H, Table 2). A very small fragment (3.5 mm in size) was polished for SEM use (Photo G and H). About 70 vol.% of the rock is occupied by olivine (Fo_{76}). Other silicate minerals include orthopyroxene (mg=79, Wo=2.0), clinopyroxene (mg=85, Wo=44.7) and plagioclase ($Or_7An_{11}Ab_{82}$). Iron metal with 4-5 wt.% Ni (kamacite) and iron sulfide with some Ni (troilite) occupy only less than 5% of the total volume. These minerals are very homogeneous in their chemistry and distribution. The mineral chemistry clearly corresponds to that of L-chondrite. In view of the obscure chondrules and homogeneous mineral chemistry, this meteorite may be a metamorphosed ordinary chondrite of L6 type.

Gamma-ray spectrometric measurement of the biggest (325 g) fragment of the meteorite started about 67 hours after the fall by using a heavily-shielded germanium detector (Ortec HPGe, GEM-10020; low-background type) of Kanazawa University. Several radioactive nuclides produced from heavier nuclides through nuclear spallation induced by high-energy cosmic-rays (mainly protons) were identified by their gamma-ray spectrum obtained from 62 hours measurement (Fig. 2). The nuclides includes ^{7}Be ($T_{1/2}$=53.3d), ^{22}Na (2.60y), ^{26}Al (7.16×10^{5}y), ^{44m}Sc (2.44d), ^{46}Sc (83.8d), ^{48}V (15.98d), ^{51}Cr (27.7d), ^{52}Mn (5.6d), ^{54}Mn (312d), ^{58}Co (70.8d), etc. The clear peak of ^{40}K may be due to radiogenic potassium which has originally been contained in the rock (see plagioclase analysis in Table 2). A further measurement is necessary for a quantitative assay of the cosmic-ray induced radionuclides to depict irradiation history of the meteorite.

The Neagari meteorite is the 7th "fall" in Japan in these 50 years, following the Mihonoseki meteorite fallen in Shimane Prefecture, western Japan, on December 10th, 1992. As described above, the Neagari meteorite is a L6-type ordinary chondrite come from a northern direction most probably at about 23 : 55 of February 18th, 1995. The radioactive nuclides in this meteorite were measured in the earliest, world-record time (2.7 days) after its fall. Our further research would provide important information on the irradiation history of the meteorite.

Captions

Photo A (p. 71). The Neagari meteorite hit the rear trunk cover of the car behind the person with red cap. The car is positioned just as it was at the impact time.

Photo B (p. 71). Shape of the impact hole. The red half of the compass points the north, and the scale measures 7 cm. The shape suggests that the meteorite came from NNW direction.

Photo C (p. 71). The biggest fragment of the Neagari meteorite. The white, fine-grained rock is surrounded by the black glass crust (1 mm thick). Scale is 15 cm long.

Photo D (p. 71). The white paint fragments of the car are attached to the glassy surface of the meteorite. The circular pattern of the attached paint fragments suggests that the meteorite headed to the left and rotated

when it collided. Scale is 10 cm long.

Photo E (p. 72). Microscopic view of the black glass crust. The glass is vesicular and heterogeneous. The inner, white, fine-grained rock appears in a fracture with strong contrast in color. Scale is 1 cm long.

Photo F (p. 72). Microscopic view of the inner white rock. Some obscure chondrules, about 1 mm in diameter, are visible (arrows). Tiny black minerals are iron sulfide (troilite) and iron metal (kamacite). Scale is 1 cm long.

Photo G (p. 72). SEM back-scattered electron image of the Neagari meteorite. A full view of a fragment, 3.5 mm in maximum length. Bright minerals are iron metal (im) and iron sulfide (is). The most abundant gray mineral is olivine (ol). Clinopyroxene (cp) and orthopyroxene (op) are darker, and plagioclase (pl) looks almost black.

Photo H (p. 72). Magnified view of the lower left corner of Photo G. White scale in the lower part is 0.042 mm long.

Figure 1 (p. 74). Fall site of the Neagari meteorite (F) and its possible flight path (arrowed) suggested by the shape of the impact hole; coming from azimuth 333°, elevation 40°. The point where the path reaches 80 km altitude is indicated by a circle (F′). Witness sites of the fireball (A-E) are plotted with big dots. Appearing (with bars) or finding (without bars) azimuth of the fireball at each site is represented by a numbered circle (A′ to E′), where the elevation reaches 80 km altitude; an assumed firing level. Elevation of 25° is assumed for A′, B′, D′ and E′, while 40° is certain for C′. The azimuths with uncertain elevations are in parentheses. Extinction (with bars) or lost (without bars) azimuth of the fireball at each site is represented by a numbered small dot, which is projected on the possible flight path (A″-E″). Open squares stand for large cities. See Appendix for detailed data.

Figure 2 (p. 75). The gamma-ray spectrum of the Neagari meteorite. The biggest fragment (325 g) was placed at 1 cm from the detector window (Ortec HPGe, XLB-GEM-10020). Measurement started at ca. 2.7 days after the inferred impact time, and continued for 2.6 days.

Table 1 (p. 74). Witness observations of the fireball possibly related to the Neagari meteorite, appeared in the midnight of February 18th, 1995. See appendix for further data.

Table 2 (p. 76). Mineral chemistry of the Neagari meteorite. Deficiency of Na in plagioclase may be caused by rugged, deeply etched surface of the mineral.

Appendix

Detailed witness observations of the fireball possibly related to the Neagari meteorite with new data obtained in March, 1995. Time is in JST (GMT+9). Azimuths of appearance and extinction are measured from the north in a clockwise (eastern) direction.

Locality	latitude N	longitude E	Time 950218	App. (Find)	Ext. (Lost)	Elev. (unc.)	Color
Witnesses confirmed in February							
A Kanazawa Takao (Ishikawa Pref.)	36°30′41″	136°38′03″	23:56±	318°	293°	(20°)	Pink
B Kanazawa Nakamura (Ishikawa Pref.)	36°33′26″	136°38′49″	23:50-24:00	323°	233°	(20°)	Orange
C Kanazawa Fukuhisa (Ishikawa Pref.)	36°37′00″	136°41′11″	24h-25h	(323°)	(293°)	40°	?
D Shinminato Koshinokata (Toyama Pref.)	36°46′15″	137°06′53″	23:55-56 or24:15-16	320°	300°	(25°-20°)	Blue-white
E Yatsuo Onagatani Higashihara (Toyama Pref.)	36°26′42″	137°05′09″	23h-24h	323°	298°	25° 22°	Blue-red

F Neagari Taisei (Ishikawa Pref.)	36°26′57″	136°27′55″	22h?	from 333°	40°	Black

Additional witnesses confirmed in March

G Terai Aou (Ishikawa Pref.)	36°27′22″	136°30′35″	23:55±	338	303	(15°)	?
H Kanazawa Toriki (Ishikawa Pref.)	36°33′31″	136°37′42″	23:45±	328	278	(15°)	White & Red

Notes:

A: Split into two parts at 322°, one flew on horizontally, and the other dropped down vertically. Duration: 10 sec. Place: small parking ground aside a big hotel.

B: Smoke has been left along the flight path. Duration: 20 sec. Place: big parking ground in the city center.

C: View over a window (w180×h80 cm) along a spiral stairway in a two-storied house. The fireball crosscut the window horizontally and quickly. The observer stood in front of the stairway and looked up to ascend, when the fireball passed. Duration: a few seconds. Place: from inside of the observer's house.

D: With a short tail. Elevation slightly lowered during the flight. Duration: 1 sec. Place: Ferry terminal of the Toyama New Port. The observer is a ferry staff.

E: Split into two parts at 320°. One flew on to the left with a tail, slightly lowering its elevation, but the other dropped vertically and extinguished at 20° elevation. The elevation values may be relatively valid, because the fireball passed just above high mountains. Duration: 2 sec. Place: in the Hida Mountains to the south of Toyama

F: The fall site. A neighbour heard a big sound at about 22 h, though the discoverer did not notice this sound in his house. The azimuth and elevation were estimated from the shape of the impact hole on the car.

G: Split into two parts just before its extinction (310°). One part flew on horizontally, but the other dropped vertically. Duration: 5-10 sec. Observers: four high school students. Place: a big, open parking ground in the Tetori Fish Land (a private entertainment facility).

H: Three objects flew horizontally in group within the radial diameter of the moon. The foregoing two objects were milky white, and the lower one was slightly in advance. Another red, darker object flew behind them. This object extinguished at 303°, just above a tall building. The two other objects flew on for about 2 seconds, and extinguished at the same time. Observers are a young woman with very good eyes and her husband with glasses. The husband could see only one object. Duration: 5-15 sec. Place: aside a wide rice field surrounded by houses and buildings in the suburb of Kanazawa.

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訂 正

ページ	行	正	誤
74(4)	右20	第2表	第1表
75(5)	右 2	^{26}Al, ^{22}Na	Al, Na
	3	^{44m}Sc, ^{46}Sc	Sc, Sc
	4	^{48}V, ^{51}Cr, ^{52}Mn, ^{54}Mn	V, Cr, Mn, Mn
	5	^{58}Co	Co
	6	^{40}K	K