A cluster of sinkhole scars and sinkhole outcrops in Onikobe caldera

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A collapse accident occurred at Nuruyu area in Onikobe caldera, northwestern Miyagi Prefecture on July 12, 2001. An access road and a parking lot were damaged. A car and a utility pole on the parking lot fell into a sinkhole 11 meters in diameter. The estimated depth of the sinkhole was 7 meters (according to Naruko town office), and it was backfilled with an amount of soil of about 510 cubic meters (according to the Kahoku Newspaper) after the accident.

Just before the collapse occurred, they heard a thunderous roar like a heavy rain spattering on a tin roof for a few minutes. Just after the hole gaped open, there gradually sprang out transparent groundwater, but the water turned opaque white in a few days later.

Not less than 20 sinkhole scars have been found in Nuruyu area. These sinkhole scars are arranged in a zone, when extended east-north-eastward, within the limits of 800 meters, sporadically and partly concentrated in clusters.

The estimated sizes of sinkhole scars range in diameter from 4 to 10 meters, and range up to 13.5 meters in depth; probably the original depth was somewhat in excess of this amount. Almost all sinkhole scars have been to some extend filled with mud, soil and plant fragments. Each sinkhole scar separately exists even if it is so close to the other. Ground water overflows naturally from the sinkhole scars.

It is said the origin of sinkhole scars could be traced back to Edo era. Fortunately, no one injured so far.

Some of the collapses of sinkholes were triggered by earthquake occurred on August 11, 1996.

New outcrop, with 6 meters high and 12 meters wide, was excavated along the Nuruyu forestry road and the exposure gave us the chance to observe the sinkhole scars in the geological age.

The road-cut exposure contains poory stratified grayish white fine tuffs(A), laminated sands(B), liquefied sands with silt blocks(C), blocky silts with gravels(D) and gravels(E). The sketch of the outcrop is shown in the attached figure. The color of each layer is as follows: (A); pink color, (B); pale yellow color, (C); yellow and blue color, (D); light blue color and (E); reddish brown color.

The stratigraphic position of fine tuffs(A) , used as polishing powder because of much content of volcanic glass, may be assigned to Pleistocene Miyazawa formation. (D)and(E) are colluvial deposits.

(A) are cut by many minor faults, trending NNE-SSW and ENE, which are dominant in Onikobe area.

(C) and (E) are bounded to the north by ENE trending fault.

(D) and (E) are also bounded to the north by ENE trending fault and to the east by NNE trending fault. These fault planes are very sharp.

These field observations indicate that sinkhole phenomena had repeatedly occurred at this outcrop.

These features are possibly indicative of the underground movement of water that might be locally causing caves, but we can't deny the possibility that Nuruyu area is underlain by some caverns.


南
北
0
2m
灰白色細粒凝灰岩
（“みがき粉”）
陥没穴内（水中）で
再堆積した“みがき粉”
陥没穴に堆積した崩積土
陥没穴内（水中）で
再堆積した砂岩
陥没穴内（水中）に落下し，
水の動きで変形した
凝灰じりシルト岩ブロック
腐植
陥没穴内（水中）に落下し，
水の動きで変形した砂岩ブロック
陥没穴内に落下した
凝灰じりシルト岩ブロック
崩積土
陥没穴内（水中）での
液状化を示す砂岩
陥没穴内に落下した
凝層ブロック
礫