島根大学地球資源環境学研究報告　22, 179～182 ページ（2003 年 12 月）
Geoscience Rept. Shimane Univ., 22, p.179～182（2003）

Data

^{14}C Dating of an Organic Paleosol Covering Gravel Beds Distributed along the San Jeronimo Fault, Western Medellin, Colombia

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Introduction

Gravel-rich surface sediments are widely distributed in and around the Aburra Valley, Central Cordillera, Colombian Andes (Fig.1). They cover granitic rocks and schistose rocks with gentle slopes. Characteristic slopes including eroded fans and alluvial cones indicate that they may have formed as the combination of numerous debris flow deposits from the late Pleistocene to Holocene. Ages of some surface sediments in the Aburra Valley are believed to exceed 2 Ma, on the basis of fission track data of volcanic ash layers within such sediments (*e.g.*, Restrepo, 1991; Toro, 1999; Rendon, 2003). Thus, the determination of the age of such sediments and their mutual relations are necessary to understand the geomorphologic and tectonic evolutions of the valley.

The San Jeronimo Fault, a major segment of the active Cauca-Romeral Fault System, runs along the western side

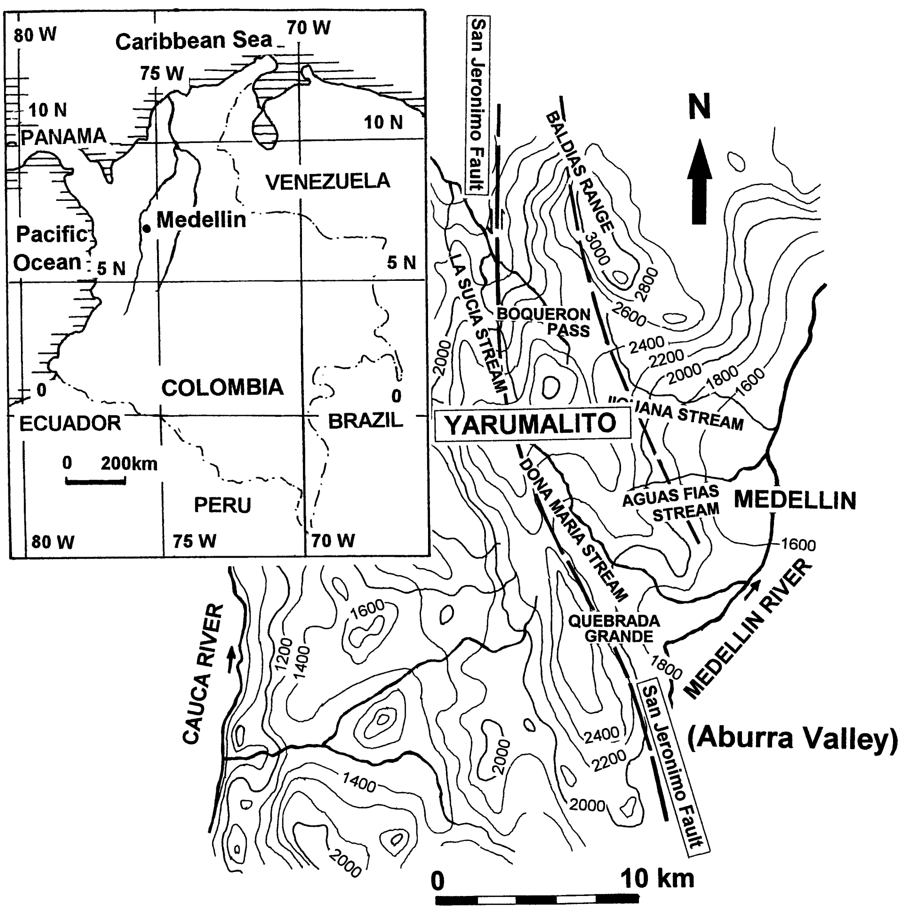

Fig.1. Gentle slopes in and around the Aburra Valley, Colombia. The San Jeronimo Fault, a major segment of the active Cauca-Romeral Fault System, runs along the western portion of the Aburra Valley, where gravel-rich surface sediments are widely distributed.

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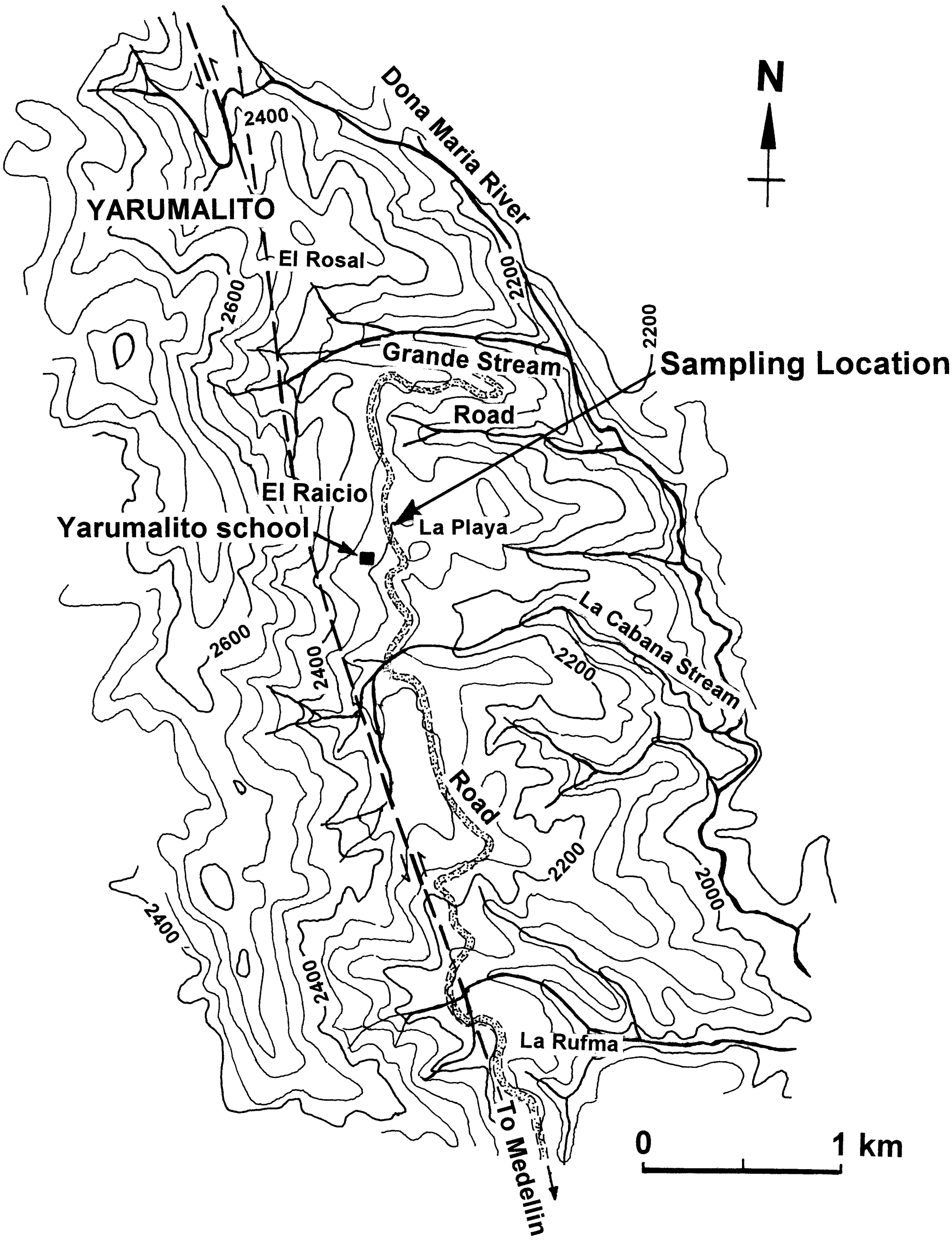

Fig.2. Sampling location near Yarumalito School. Dashed lines indicate the main trace of the San Jeronimo Fault, which divides western mountains slopes from gentle slopes to the east.

of the Aburra Valley, where such sediments are widely distributed. Determination of the ages of such sediments is therefore important for the evaluation of fault activity. Consequently, we attempted carbon 14 dating of an organic paleosol covering gravel beds forming gentle slopes in the Yarumalito area of western Medellin (Fig.1). This is a short report of the result.

Gravel-rich surface sediments along the San Jeronimo Fault in Yarumalito area

The NNW-SSE trending San Jeronimo Fault is an active fault which constitutes a major segment of the Cauca Romeral Fault System. It runs along the western border of the northern part of Central Cordillera, Colombian Andes. The San Jeronimo Fault divides gentle eastern slopes from steep western mountainous slopes. Gravel-rich sediments are widely distributed on the former, and cover schistose and granitic rocks in the Yarumalito area.

A local road runs on the gentle slopes along the fault in N-S trend (Fig.2). The sequences which are exposed along the road are soft, and consist of subrounded to subangular rock fragments of schistose and granitic rocks with weak stratification. Systematic strike-slip stream offsets are

Table 1. Results of ^{14}C dating (Beta Analytic Inc.)

Sample Number	EOY-1 (39.27 gr) organic sediments
Laboratory number	Beta-163352
Conventional radiocarbon age	1,440 ± 50 BP
2 sigma calibrated result	Cal AD 540 to 670 (Cal BP 1,410 to 1,280) (95% probability)

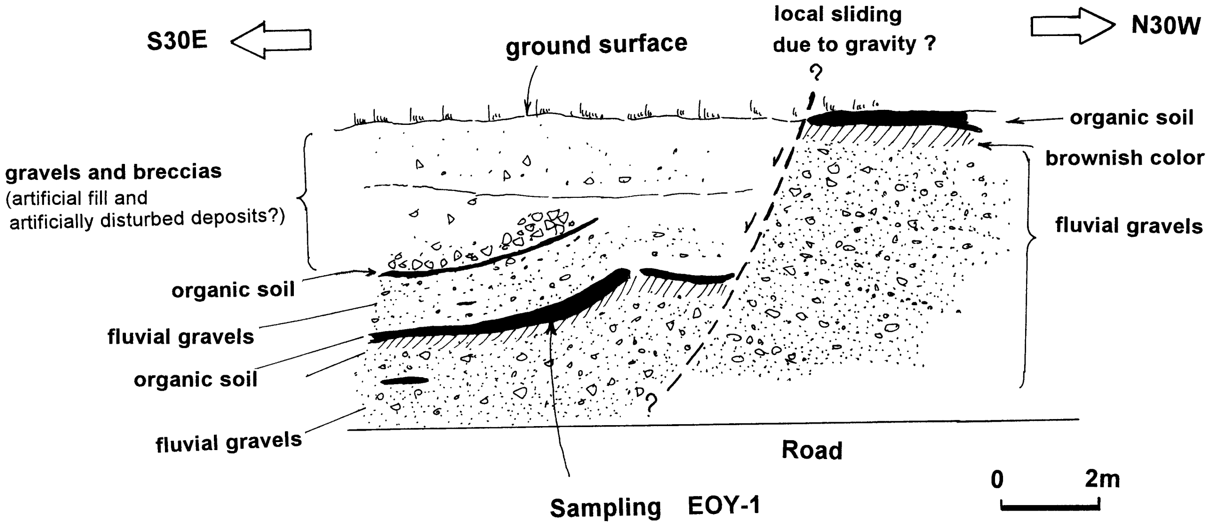

Fig.3. An exposure facing the road at the sampling location. Modified after Ortiz (2002). Sample EOY-1 was obtained from an organic paleosol layer, which occurs within gravel beds dipping northwest.

recognized along the San Jeronimo Fault in this area (Fig.2). Ortiz (2002) estimated the amounts of strike-slip displacements along the fault. Determination of ages for the surface sediments may lead to assessment of displacement rates along the fault system in this area.

Sampling location

Fig. 2 shows the sampling location near the Yarumalito School, which is sited at an elevation of around 2,400 m. Gravel beds and gentle ground surfaces dip northwestward, contrary to the normal inclination of hill slopes. This northwestward dip may be tectonic evidences of recent fault movements, as it is probably related to strike slip movements of the fault.

Fig.3 shows an exposure facing the road. Thin black organic paleosol layers occur within thick gravel beds. Local sliding due to gravity separates the exposure two portions as shown in Fig.3. Two organic paleosol layers are recognized in the left of the exposure, whereas one is present in the right. Based on this occurrence, the upper paleosol layer may be reworked from the lower one in the left. A sequence of yellowish brown ash fall is intebedded within the lower paleosol layer. We obtained a sample weighting 39.27 gr from the lower organic paleosol in the southern part, and numbered it EOY-1.

Result of dating

Sample processing of dating was carried out by Beta Analytic Inc. Table 1 shows the results. The conventional radiocarbon age is 1,440±50 BP, and this corresponds AD 540 to 670. Although some ash layers within surface sediments in the Aburra Valley have been reported and dated by some authors (e.g., Hermelin, 1990; Toro 1999), no data in this age range have yet been obtained. Considering the geographical location of the Yarumalito area, the origin of this volcanic ash may be related to southern region volcanoes, including Mt. Nevado del Ruiz.

Concluding remarks

Although the practical age of the sequences of gravel beds is not clear, they at least predate 1.4 ka. At present, we have no evidence of the time gap between the organic paleosol and the gravel bed. If the latter was deposited just before sedimentation of the paleosol, it may be the order of 1.4 ka. If so, this may indicate active movement of the San Jeronimo Fault during the Holocene.

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(Received: Oct. 1, 2003, Accepted: Nov. 12, 2003)