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富山県上市町の下部中新統稲村水中地すべり堆積物

The lower Miocene Inamura subaqueous landslide deposit at Kamiichi-machi, Toyama Prefecture, central Japan

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富山県上市町稲村の廃土処分地跡(Fig. 1)において灌木を伐採し崖錐堆積物を除去したところ，南北約 80 m，東西約 70 m の範囲に下部中新統折戸凝灰岩部層の大露頭が再出現した(稲村露頭：Figs. 2 and 3)．同層は，前～中期中新世の日本海拡大期に富山県から能登半島にかけて形成された北東－南西方向のリフト帯(竹内, 2021 など)南東縁に堆積した複数の単源火山砕屑岩類と関連堆積物からなる福平層の一部層である(金子, 2001)．同層にはプロデルタで堆積した凝灰質砂岩泥岩互層が挟在し，一部は堆積後の早い時期に地すべりによって変形を受けたと解釈される(以下，稲村水中地すべり堆積物)．稲村露頭では，写真に紹介するとおりすべり面や種々の変形構造が観察され(Figs. 3, 4 and 5)，海底火山活動に伴う堆積盆地縁辺における水中地すべりの滑動メカニズムを議論することができる.

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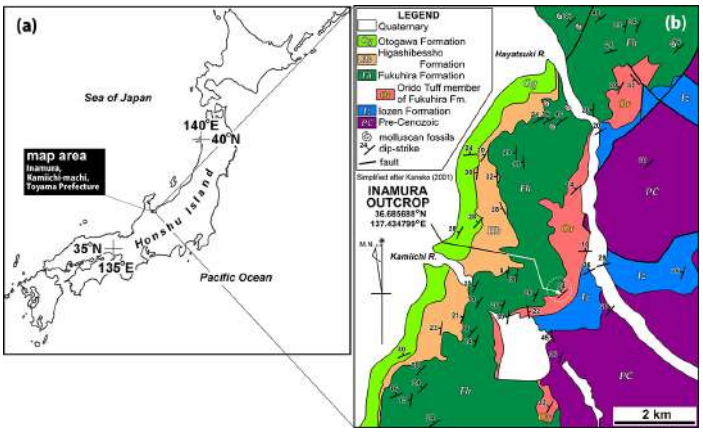


Fig. 1. Location of the Inamura outcrop (a) and geological map of the area surrounding the outcrop (b: after Kaneko, 2001). In ascending stratigraphic order, the Neogene Iozen (Iz, 医王山層), Fukuhira (Fh, 福平層), Higashibessho (Hb, 東別所層), and Otogawa (Og, 音川層) formations dipping to the northwest overlie pre-Cenozoic rocks in this area. The Orido tuff member (Or, 折戸凝灰岩部層), a lower part of the Fukuhira formation, dips 10°–25° north- to northwestward due to post-depositional uplift of the hinterland.

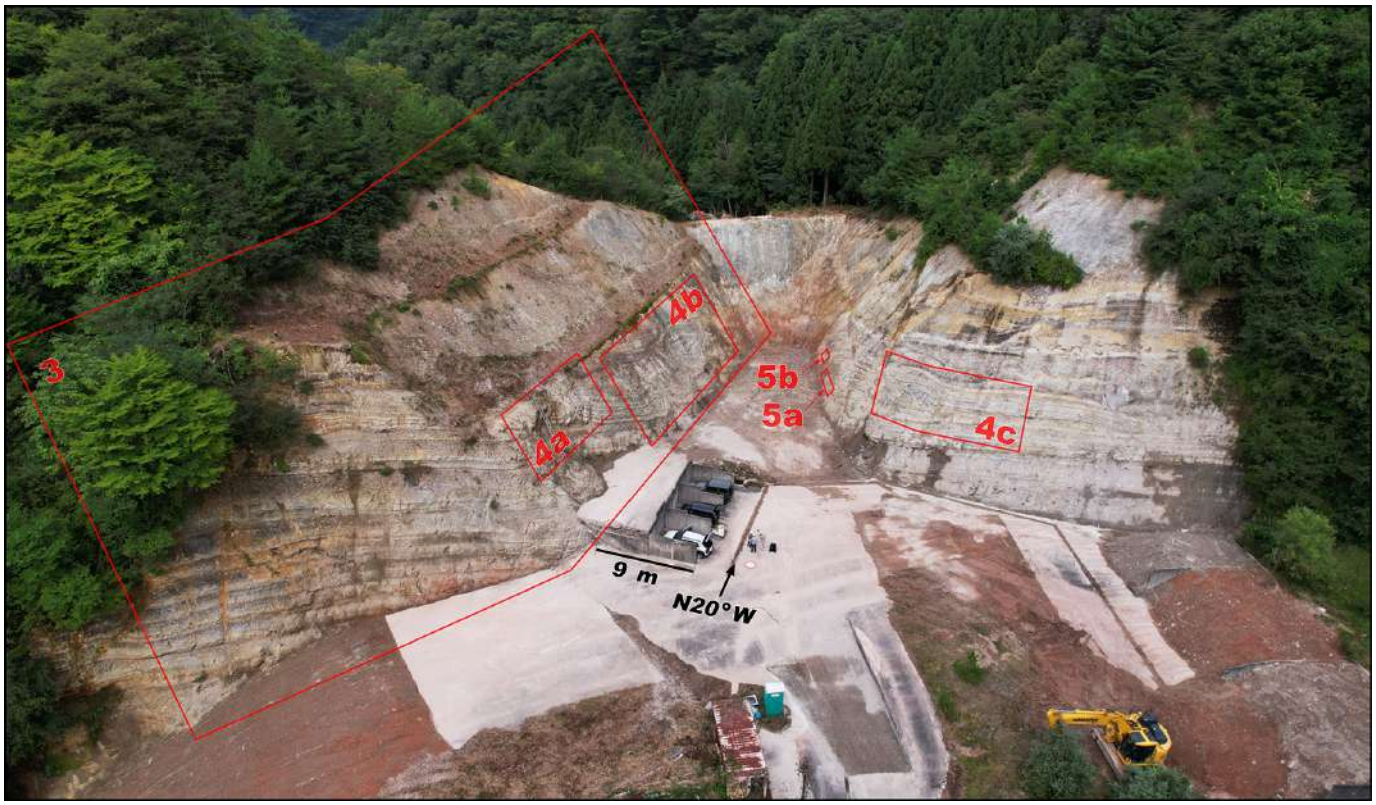


Fig. 2. Aerial photograph of the Inamura outcrop, showing large cliffs that open toward the south. The outcrop comprises alternating beds of tuffaceous sandstone and mudstone, tuff and tuff breccia of the Orido tuff member. Some of the alternating beds are thought to have slid along the seafloor relatively soon after their deposition, dipping from back to front in this image, independent of the present-day direction of the strike and dip. Red boxes and numbers indicate the locations of the photographs shown in Figs. 3, 4 and 5.

Fig. 3. Photograph (taken in 2003) of the western cliffs of the Inamura outcrop. An overturned fold and ramp anticline (see the close-up images in Fig. 4a, b) are visible in the upper portion of the alternating beds of tuffaceous sandstone and mudstone. The same interval in a downstream location (upper left) is less deformed. The underlying alternating beds are undeformed competent sediments. The overlying tuff layer contains huge slumped blocks of the alternating beds (see the close-up image in Fig. 4b). In this photograph, the slide direction is from the lower right to upper left.

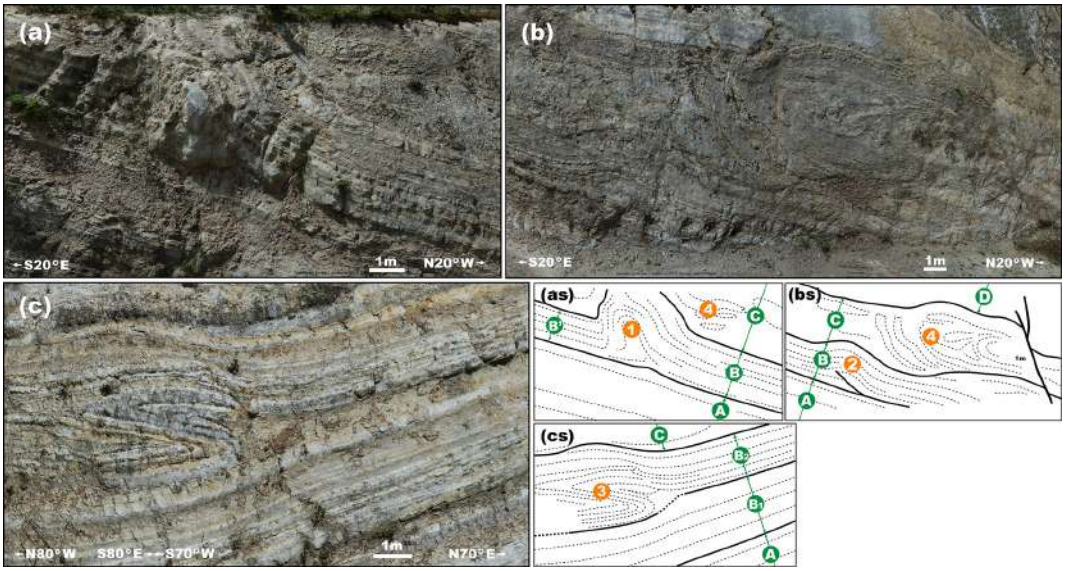
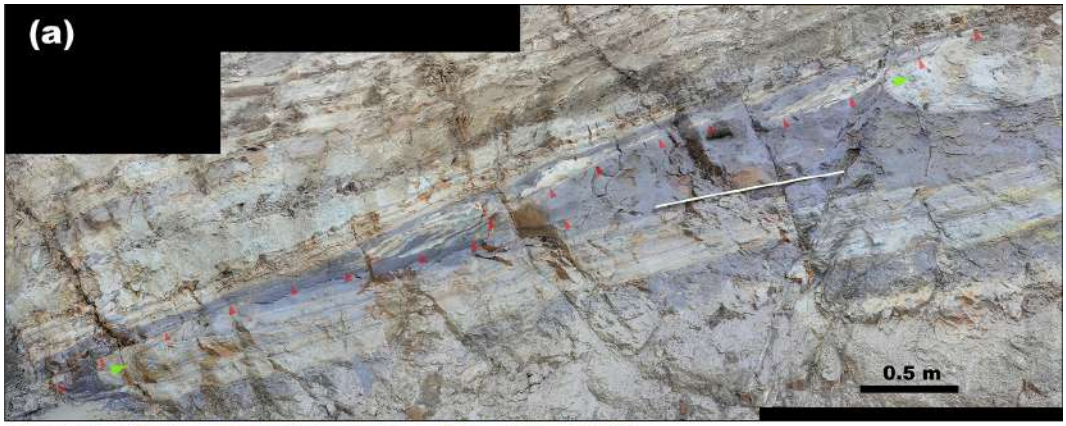


Fig. 4. Close-up photographs of the overturned fold (a) and ramp anticline (b) described in Fig. 3, and a high-angle overturned fold (c). In (c), the upper part of the alternating beds of sandstone and mudstone (B2) was thinly collapsed into an overturned fold (3). This interval is repeated in the underlying alternating beds (B1), becoming thinner to the east of the cliff shown in Fig. 2. The top of layer B2 was eroded by tuffaceous layer C. In (c), the slide direction is from back to front.



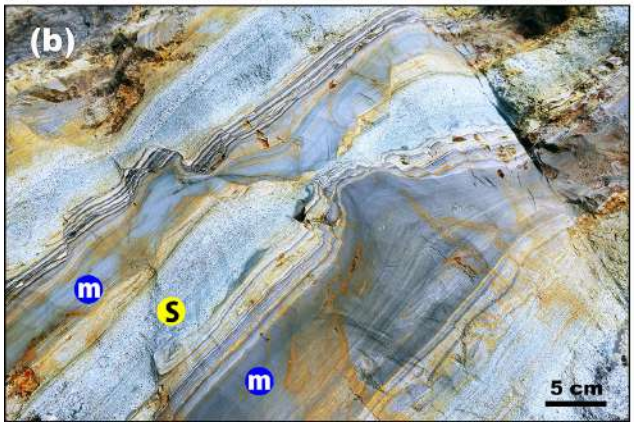


Fig. 5. Photographs of the slide surface (a) and boudin (b). The row of red triangles in (a) indicates the slide surface. Pale sandstone flakes are incorporated into the mudstone just above the surface. Sandstone below the slide surface turned upward into an overturned fold (yellowish-green triangles), the upper part of which was cut away by the slide. The pale grey sandstone bed (S) is narrow at the center of the image shown in (b), and the space is compensated by plastic deformation of the over- and underlying mudstones (m).

以下は，地質学雑誌データファイルとして，J-STAGE Data< https://jstage-data.jst.go.jp/geosoc> で公開されています.

Fig. A. Aerial video of the Inamura (稲村) outcrop and surrounding landscape. The lower Miocene Orido tuff member is exposed at the outcrop, which expands generally southward. Some of the alternating beds are thought to have slid along the seafloor at the time, dipping from north to south, independent of the present strike and dip direction. In this video, Toyama (富山) Plain, Toyama Bay and Noto (能登) Peninsula are seen from a distance in the northwest, with Hayatsuki (早月) River in the northeast.

文　献

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