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SUPPLEMENTARY DATA

An Upper Triassic (Norian) ichthyosaur (Reptilia, Ichthyopterygia) from northern Alaska
and dietary insight based on gut contents

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DESCRIPTION

Cranial Fragments

Three poorly preserved but large fragments located at the anterior end of the skeleton of UAMES 2437 are interpreted to be cranial elements (Fig. S1). The largest fragment is approximately 40 cm long and on the basis of it being elongate, narrow, and gently bowed in cross-section, could either be mandibular (angular, splenial, or dentary) or possibly a partial premaxilla, although no evidence of teeth, alveoli, or a dental groove was observed anywhere with the specimen. The identity of the other two fragments is equivocal.

Postcranium

Vertebrae and Ribs—No vertebral centra or neural arches were recovered in UAMES 2437, but the impressions and partial remains of three vertebrae were found, all of which indicate the presence of concave articular facets. The largest of these vertebrae, found in the posterior half of the torso (Fig. S1) provides a minimum estimate of vertebral diameter of 9 cm. It is not possible to reliably estimate the number of presacral vertebrae. The specimen preserves approximately 60 ribs, most of which appear in articulation, although their attendant vertebrae are absent. The longest preserved rib has a maximum length of 63 cm and width of 2.3 cm. The proximal rib ends are either absent or not well enough preserved to discern their shape, while the distal ends appear to terminate in a blunt end, but are not visibly swollen or expanded. The rib shafts are ovoid in cross-sectional shape.

Gastralia—Numerous semi-articulated to disarticulated gastralia are preserved. At least four median elements lie in the mid-ventral region of the specimen and are boomerang-shaped and point anteriorly. The most complete median gastralia measure approximately 12 cm from the midline to their lateral end. The majority of the remaining gastralia are mostly straight to slightly curved and little can be said regarding their morphology.

Pectoral Girdle and Forelimbs—Based on their size and location, two large, flat elements found at the anterior end of the specimen (Fig. S1) are interpreted to be remains of either the pectoral girdle (coracoid?) or the humerus. Unfortunately, weathering has obliterated the margins so their shape cannot be determined. Neither the clavicles nor interclavicle can be discerned. Three proximal and apparently articulated limb elements were also found in the anterior portion of the skeleton (Fig. S2). All three appear to have been originally complete but have been split in the horizontal plane of the bone; however, a good approximation of their original shape can be discerned. It is unclear whether the elements are from the right or left forelimb. Based on their relative sizes and shapes the largest element is interpreted to be a zeugopodial element, probably the radius. The margins of the largest element are difficult to discern, but it has a subrectangular shape, and is wider than long (9.7 cm and 9.2 cm, respectively; Fig. S2). There does not appear to be a notch along either the preaxial or postaxial margins of the element, although the entire margin cannot be wholly discerned. Another feature supporting its identity as a radius is its size relative to the femur. In UAMES 2437 the radius length/femur length ratio is 0.70, comparable to other large, Late Triassic ichthyosaurs (0.65 in *Callawayia*;

0.70 in *Guanlingsaurus liangae*; 0.75 in *Shastasaurus pacificus*; 0.82 in *Besanosaurus*; Merriam, 1908; Dal Sasso and Pinna, 1996; Nicholls and Manabe, 2001; Sander et al., 2011). In contrast, the humerus is typically longer than the femur in these taxa. The identification of the proximal element as a radius is also suggested by the large size disparity between it and the two distal elements, which are likely proximal mesopodials. Based on their position relative to the radius, the anterior-most element is interpreted as the radiale, and the other element as either the intermedium or ulnare. Identification of the posterior mesopodial element is complicated by the fact that the intermedium is absent in some Triassic ichthyosaurs (McGowan and Motani, 1999). The two elements are nearly equal in size, and are slightly longer than wide, having maximum length and width measurements of 5.7 by 4.7 cm, and 5.8 cm by 5.1 cm, respectively. The possible radiale has a slightly concave medial margin and appears to bear a slight protuberance or flange on its proximomedial margin, which lies in close proximity to the distal margin of the radius. The intermedium/ulnare is nearly oval in outline and lacks any evidence of notching. The total number of digits in UAMES 2437 is uncertain.

Pelvic Girdle and Hind Limbs—Similar to the pectoral girdle, poor preservation precludes a positive identification of many of the elements. One element may represent a partial ilium; although incomplete, the preserved portion is relatively short (9.5 cm long), and narrows away from an expanded end (Fig. S1). Another larger element likely represents either the ischium or pubis. Portions of one articular surface and one concave lateral margin are visible, but the presence or absence of an obturator notch and the remainder of its overall morphology cannot be discerned. One femur is clearly preserved and measures approximately 13 cm in length and 4.2 cm in width at mid-shaft. The expanded proximal end is approximately 5.5 cm wide; the distal end appears to be at least equally expanded but is incomplete. Parts of at least one and possibly two imperfectly preserved zeugopodial elements are located at the distal end of the femur but little else can be seen of their shape.

FIGURES

FIGURE S1. Photomontage (A) and interpretation (B) of the UAMES 2437 (anterior to left, dorsal to top). **Abbreviations:** **cran**, cranial fragments; **dr**, dorsal rib; **fem**, femur; **gast**, gastralium; **hum**, humerus; **il**, ilium; **isch**, ischium; **pub**, pubis; **rad**, radius; **vert**, vertebra; **ze**, zeugopodial element.

FIGURE S2. Photograph (A) and interpretation (B) of the preserved forelimb elements of UAMES 2437 (anterior to left, dorsal to top). **Abbreviations:** **rad**, radius; **rde**, radiale; **une**, ulnare.

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