FIRST RECORD OF FOSSIL *OPHISAURUS* (ANGUIMORPHA, ANGUIDAE) FROM ASIA

DAVIT VASILYAN,*,1,2,3 and JOZEF KLEMBARA; 1Department of Geosciences, Eberhard Karls Universität Tübingen, Sigwartstraße 10, 72076 Tübingen, Germany; 2Jurassica Museum, Route de Fontenais 21, 2900 Porrentruy, Switzerland; davit.vasilyan@jurassica.ch; 3Department of Geosciences, University of Fribourg, Chemin du musée 6, 1700 Fribourg Switzerland; 4Senckenberg Center for Human Evolution and Palaeoecology, Sigwartstraße 10, 72076 Tübingen, Germany, m.boehme@ifg.uni-tuebingen.de; 5Department of Ecology, Faculty of Natural Sciences, Comenius University in Bratislava, Ilkovicova 6, Mlynska dolina, 842 15 Bratislava, Slovakia, klembara@fns.uniba.sk

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The family of glass lizards Anguidae consists of four subfamilies. Two of them, Gerrhonotinae and Diplologlossinae, are restricted to the New World. The third subfamily, Glyptosaurus, is known exclusively from the fossil record from Late Cretaceous to late Oligocene localities in North America, Europe, and Asia (Sullivan, 1979; Estes, 1983; Böhme, 2007). The extant members of the fourth subfamily, Anguinae, occur in Eurasia, North Africa, and North America. In Eurasia, fossils of *Ophisaurus* have previously been found only in localities west of the Ural Mountains (Klembara, 1981, and references therein; e.g., Estes, 1983; Augé, 2005; Klembara, 2012, 2015). Although fossil *Ophisaurus* remains from Asia have been mentioned (Chkhikvadze, 1985), the material has never been described or figured. Because it has been hypothesized that *Ophisaurus* originated in Europe, dispersed to North Africa and Southeast Asia, and finally reached North America via the Bering Strait (Klembara, 1981; Macey et al., 1999), fossils of *Ophisaurus* are expected to be found in Asia.

Western Siberia is an area of Russia and northern Kazakhstan bordered on the west by the Urals, on the east by the Central Siberian Plateau, and to the south by the Kazakh Plain and Altay Mountains. On the north it borders the Arctic Ocean, where the major Siberian rivers Irysh and Ob drain into the ocean. In the southern part of the territory, Neogene and Quaternary sediments are widely distributed, extensively cropping out along the river banks of the Ob and Irysh rivers. Over many decades mollusks and small mammals from these deposits have been intensively studied for stratigraphic correlation, paleoclimatological reconstructions, and paleoenvironmental interpretations of the Neogene and Quaternary of the region (e.g., Zykyn, 1979, 2012; Zykkin and Zazhigin, 2008). Besides the small mammals, some of the localities have yielded amphibian and reptile fossil remains that will be published in a separate paper.

As for Anguinae, there is only one paper indicating the presence of *Anguis* and *Ophisaurus* in Miocene localities of Kazakhstan (Chkhikvadze, 1985). Without indication about the nature of the skeletal elements, Chkhikvadze (1985) mentioned from the Zaisan Basin: (1) “Anguis” [sic] in the Akzhar Svita deposits of early Miocene age; (2) “Anguis sp.” from the middle Miocene Sarybulak Svita; an assignment to a specific horizon/locality is lacking; and (3) vertebrae of “small *Ophisaurus* (or big *Anguis*)” from the late Miocene Kalmakpai Svita deposits (Fig. 1). Unfortunately, Chkhikvadze (1985) only mentions the presence of these anguins in the above-mentioned Miocene deposits. No data are given about the institution where these specimens are deposited. A visit by two of the authors (D.V. and M.B.) to the Institute of Paleobiology in Tbilisi, where the material was expected to be deposited, did not locate the material; thus, we were not able to study the specimens mentioned by Chkhikvadze (1985).

The aim of this short communication is (1) to describe the skeletal elements of *Ophisaurus* from Miocene to latest Pliocene–earliest Pleistocene deposits of western Siberia that represent the only evidence for fossil *Ophisaurus* in Asia, and (2) to demonstrate the significance of the morphology of these skeletal elements for the evolution and paleobiogeography of *Ophisaurus*.

**Institutional Abbreviations**—AMNH, American Museum of Natural History, New York, New York, U.S.A.; BSPG, Bayerische Staatsammlung für Paläontologie, Munich, Germany; CM, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, U.S.A.; DE, Department of Ecology, Comenius University in Bratislava, Faculty of Natural Sciences, Bratislava, Slovakia; GIN, the Geological Institute of the Russian Academy of Sciences, Moscow, Russia; UF, University of Florida, Gainesville, Florida, U.S.A.

**MATERIALS AND METHODS**

The skeletal remains described herein, the maxilla, the dentaries, and the vertebrae, have been recovered from two middle Miocene (Baikadam, Malyi Kalkaman 1), one late Miocene (Selety 1A), and one earliest Pleistocene (Podpusk 1) locality in Kazakhstan (Fig. 1). The fossil material is stored in the paleontological collection of the Geological Institute of the Russian Academy of Sciences. Stratigraphic assignment of the fossil localities is based on local lithostratigraphy in addition to biochronology of several small mammal lineages, e.g., *Microtocriceps molassicus* at Baikadam and Malyi Kalkaman 1; *Lophocrinetes vinogradovi*, *Rhinoceros scelentys*, and *Plioceratops antiqua* at Selety 1A; and *Mimomys plocaeni* at Podpusk 1 (Zykkin et al., 2007, 2008). For the identification of fossil bones, the following skeletons of Recent anguins were used: *Anguis fragilis* (DE 14–21, 24, 25, 45–48); *Ophisaurus ventralis* (AMNH 73057; CM 1411; DE 34, 35, 38; UF 52539); *Ophisaurus attenuatus* (DE 32, 33, 43, 44); *Ophisaurus compressus* (DE 50); *Ophisaurus mimicus* (DE 49); *Ophisaurus koellikeri* (DE 30, 41); *Ophisaurus harti* (AMNH 34956; DE 36, 37, 56, 57, 86); *Ophisaurus gracilis* (DE 42); and *Pseudopus apodus* (BSPG 1982X2383; DE 1, 3–13, 22, 23, 29, 52–54, 58, 59).

*Corresponding author.

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