**Supplementary Figure Captions**

**Supplementary Figure 1.** Orthophotos of 3D photogrammetric models of headfirst seafloor arrival teleosauroids corresponding to *Platysuchus multiscrobiculatus* (a, b) and *Macrospondylus bollensis* (c–f); images are with original texture (a, c, e) and false-color depth map (“gist\_earth”) (b, d, f). (a, b) SMNS 9930. (c, d) SMNS 51563. (e, f) SMNS 53422. All specimens are prepared from the underside. Interpreted types of landing are dorsolateral right (a, b) and dorsolateral left (c–f).

**Supplementary Figure 2.** Orthophotos of 3D photogrammetric models of headfirst seafloor arrival teleosauroids corresponding to *Macrospondylus bollensis*; images are with original texture (a, c, e, g, i) and false-color depth map (“gist\_earth”) (b, d, f, h, j). (a, b) SMNS 51753. (c, d) SMNS 51957. (e, f) SMNS 56370. (g, h) SMNS 58876. (i, j) SMNS 51555. All specimens are prepared from the topside. Interpreted types of landing are ventrolateral left (a–f) and ventrolateral right (g–j).

**Supplementary Figure 3.** Orthophotos of 3D photogrammetric models of juvenile teleosauroids corresponding to *Macrospondylus bollensis*; images are with original texture (a, c, e) and false-color depth map (“gist\_earth”) (b, d, f). (a, b) SMNS 10000. (c, d) 52033. (e, f) SMNS 15391. All specimens prepared from the topside. Interpreted type of landing is headfirst general ventral for SMNS 10000 and SMNS 52033 (a–d). Type of landing of SMNS 15391 (e, f) is unknown, mainly because of the preparation (see main text for discussion). Note the dark brown color of the cervical vertebrae in SMNS 15391 (e), all of which are reconstructed.

**Supplementary Figure 4.** Orthophotos of 3D photogrammetric models of non-headfirst seafloor arrival teleosauroids corresponding to *Macrospondylus bollensis*; images are with original texture (a, c, e) and false-color depth map (“gist\_earth”) (b, d, f). (a, b) SMNS 54603. (c, d) SMNS 51984. (e, f) SMNS 52475. Interpreted type of landing is ventrolateral right (a, b) and general ventral (c–f).

**Supplementary Figure 5.** Orthophotos of 3D photogrammetric models of headfirst seafloor arrival of non-teleosauroid vertebrates corresponding to *Stenopterygius quadriscissus* SMNS 56856 (a, b) and *Saurostomus esocinus* SMNS 51199 (c, d), images are with original texture (a, c) and false-color depth map (“gist\_earth”) (b, d). See also Figure 7 from the main text.

**Supplementary Figure 6.** Twenty-eight additional teleosauroid specimens were examined for type of landing (see also Institutional Abbreviations, Results and Table 2 in the main text). FMNH specimen (a), GZG unnumbered (b), GPIT-PV-31547 (c), GPIT-PV-31378 (d), GPIT-PV-31382 (e), GPIT-PV-31581 (f), SMNS 80235 (g), SMNS 59736 (h), PMU R161 (i), SMNS 91414 (j), PIN 2420/1 (k), RNHM F 6254 (l), SMNS 52034 (m), UMH 0001 (n), MMG BwJ 565 (o), OUMNH JZ176 (p), NHMW 1848 0031 0001 (q), UMH 0013 (r), NMWIN 13445 (s), UMH 0004 (t), UMH 0002 (u), UMH 0014 (v), UMH 0010 (w), NHMW 1878 0047 0001 (x), NMWIN 13444 (y), UMH 0005 (z), GPIT-PV-41993 (aa), and GPIT-RE-31377 (bb). There is one representative of *Mystriosaurus laurillardi* (w) and *Platysuchus multiscrobiculatus* (z), while the remaining specimens are *Macrospondylus bollensis*. Based on skull and limb proportions, four represent hypothesized juveniles (c, q, r, aa), two semi-adults (d, g) and the remaining as adults (see Johnson et al. 2023), and the biological age of (a) is unknown. Photographs were provided for FMNH (a), PMU (i), PIN (k), RNHM (l), and NMWIN (s, y) specimens by W. Simpson, B. Kear, A. Sennikov, G. Wahlefeld, and S. Sachs, respectively; all other photographs were taken by MMJ. Specimens are not to scale.