

synonymous. This synonymy is supported by our numerical cladistic analysis which places the two putative species as sister taxa, and by the similar size and stratigraphic position of the taxa. However, it must be stressed that there are limited numbers of overlapping elements between the taxa showing sufficiently good preservation to draw conclusions, and that the holotypes are from different sites - future discoveries of better preserved material from the lower Ermaying could thus potentially refute this ^{synonymy} ~~synonymization~~. It must also be noted that only a single synapomorphy, the presence of a tuber for muscle attachment on the posterior edge of the scapula, currently supports the sister group relationship between the synonymized taxa when they are treated as separate OTUs. This tuber is clearly present in the holotype of *Halazhaisuchus qiaoensis* and appears to be present in the holotype of '*Turfanosuchus*' *shageduensis*, but is not well preserved in the latter. Despite the limited extent of the evidence for synonymy, we believe that the lack of countervailing evidence means that it remains the more parsimonious hypothesis. Even were synonymy to be subsequently refuted, given their generally similar morphology, size and stratigraphic position it can be safely concluded that both taxa are stem archosaurs of a similar "ancestral-archosaur" grade.

Our phylogenetic analysis constitutes only the third test of the existence of a monophyletic, non-monospecific Euparkeriidae, the first being an analysis by Ezcurra, Lecuona, & Martinelli (2010) that included the putative euparkeriids *Osmolskina czatkowicensis* and *Euparkeria capensis* but did not find them to be sister taxa, and the second being an analysis by Sookias et al. (2014) that included the putative euparkeriids *Dorosuchus neoetus* and *Euparkeria capensis* but did not find them to be sister taxa. As a result, our analysis is the first to recover a monophyletic, non-monospecific euparkeriid clade. Our ongoing work is focused on developing a more extensive dataset to simultaneously test the positions of *Euparkeria capensis*, *Dorosuchus*

The topology (excepting of course the sister group relationship of the two taxa in question) and character optimization were identical when *Halazhaisuchus qiaoensis* and ‘*Turfanosuchus*’ *shageduensis* were combined as a single taxon, and support values differed only slightly (Bremer support of four for Archosauria+Phytosauria). This analysis recovered 270 MPTs of 1276 steps with a CI of 0.379 and an RI of 0.787. *Turfanosuchus dabanensis* was placed as the sister taxon of *Gracilisuchus*+*Yonghesuchus* within Pseudosuchia, as found by Butler et al. (2014). Seven extra steps were required to place *Turfanosuchus dabanensis* as the sister taxon to the combined *Halazhaisuchus qiaoensis*. Nineteen extra steps were required to recover a monophyletic Euparkeriidae composed of a combined *Halazhaisuchus qiaoensis* OTU, *Turfanosuchus dabanensis* and *Euparkeria capensis*.

Discussion

We consider *Wangisuchus tzeyii* to be a *nomen dubium* due to the undiagnostic nature of the holotype material. Whilst some of the material currently assigned to the taxon may indeed pertain to a euparkeriid or euparkeriid-grade species, the specimens are too fragmentary and poorly preserved for a reasonable assessment of their systematic position to be made. The problem is compounded by the lack of convincing evidence that any of the different specimens pertain to the same individual or taxon, especially given that other archosauromorphs (e.g. *Shansisuchus shansisuchus*) were collected from the same localities and strata.

Although the fragmentary nature of the material complicates taxonomic reassessment, the type specimens of *Halazhaisuchus qiaoensis* and ‘*Turfanosuchus*’ *shageduensis* are not sufficiently morphologically distinct to justify maintaining both taxa, and we consider them

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654 Our initial phylogenetic analysis (Fig. 11) including *Halazhaisuchus qiaoensis* and
655 '*Turfanosuchus*' *shageduensis* as separate taxa yielded 810 most parsimonious trees (MPTs) of
656 1257 steps with a consistency index (CI) of 0.384 and a retention index (RI) of 0.793.
657 *Halazhaisuchus qiaoensis* and '*Turfanosuchus*' *shageduensis* were found to be sister taxa,
658 forming a clade that was in turn placed as sister to *Euparkeria capensis*. This result is consistent
659 with our recognition of '*Turfanosuchus*' *shageduensis* as a junior subjective synonym of
660 *Halazhaisuchus qiaoensis*. It also supports a monophyletic Euparkeriidae, consisting of
661 *Euparkeria capensis* and *Halazhaisuchus qiaoensis*, that forms the sister clade to
662 Archosauria+Phytosauria. However, Euparkeriidae is supported only by one local apomorphy:
663 character 407, presacral osteoderms that are longer than wide. The sister grouping of
664 *Halazhaisuchus qiaoensis* and '*Turfanosuchus*' *shageduensis* is also supported by a single local
665 apomorphy: 219, teardrop-shaped tuber on posterior edge of scapula present (following the
666 wording of Nesbitt 2011 – the tuber is in fact circular, but is almost certainly homologous with
667 the teardrop shaped tubera of other taxa). Bootstrap support for the node
668 Archosauria+Phytosauria is >50%, with a Bremer support of three, but bootstrap support for
669 Euparkeriidae and for *Halazhaisuchus qiaoensis*+ '*Turfanosuchus*' *shageduensis* is <50% and
670 Bremer support for both nodes is one. Seven extra steps were required to find a monophyletic
671 clade composed of '*Turfanosuchus*' *shageduensis*, *Halazhaisuchus qiaoensis* and *Turfanosuchus*
672 *dabanensis* (whether or not '*Turfanosuchus*' *shageduensis* and *Halazhaisuchus qiaoensis* were
673 constrained to be sister taxa). Nineteen extra steps were required to recover a monophyletic
674 Euparkeriidae composed of a combined *Halazhaisuchus qiaoensis*, '*Turfanosuchus*'
675 *shageduensis*, *Turfanosuchus dabanensis* and *Euparkeria capensis* (whether or not
676 '*Turfanosuchus*' *shageduensis* and *Halazhaisuchus qiaoensis* were constrained to be sister taxa).

to form an elongated ridge (Fig. 10G, ri). The distal end of the shaft is strongly expanded ventrolaterally to dorsomedially, and the ventrolateral margin of the distal end is much wider in distal view than the dorsomedial margin. A small groove (Fig. 10K, ?gr) runs proximodistally along the ventral surface of the fibula near the distal end, though this may be an artefact of poor preservation. In lateral view, the distal margin of the fibula is embayed between dorsal and ventral rounded convexities. The lateral surface of the distal end is depressed at its dorsoventral midpoint.

Median osteoderms. IVPP V6027-1 (Fig. 4A–E) and IVPP V6027-2 (Fig. 4F–J) include median osteoderms in articulation with cervicodorsal and dorsal vertebrae, respectively, and IVPP V6027-9 (Fig. 5E–F) is an isolated median osteoderm. The osteoderms form two parallel rows that contact one another along the midline (Fig. 4B,G). The osteoderms are similar to those of *Euparkeria capensis* (UMZC T.692; Fig. 5G–H) in each possessing a medially offset longitudinal keel (Fig. 5E,K), in being leaf shaped, and in that each osteoderm dorsally overlaps the immediately more posterior one in the same row. Each osteoderm is around twice as long anteroposteriorly as it is wide mediolaterally. Each osteoderm overlaps the neural spines of two vertebrae (Fig. 4B,G), covering the anterior third of the spine of the more posterior vertebra and the posterior two thirds of the spine of the more anterior vertebra. Adjacent left and right osteoderms are, as in *Euparkeria capensis* (SAM-PK-13666) level with each other anteroposteriorly rather than staggered.

Phylogenetic relationships of *Halazhaisuchus qiaoensis* and ‘*Turfanosuchus*’ *shageduensis*

displays a dorsally convex curvature in lateral view (Fig. 10D). The cross-sectional shape of the shaft is a mediolaterally compressed ellipse. As preserved, the distal end of the tibia has the outline of an oval elongated along a ventrolateral-to-dorsomedial axis (Fig. 10C), and is slightly concave to flat. No definite attachment site for the *m. puboischiotibialis* can be identified (unlike the condition in *Erythrosuchus africanus*, Gower 2003). There is a step (Fig. 10F, step) on the medial surface of the tibia, beginning around one quarter of the way down the shaft. This step separates the more prominent ventral part of the medial surface of the tibia from the more subdued dorsal part.

Fibula. IVPP V6028 includes a right fibula (Fig. 10G–L; either IVPP V6028-7, IVPP V6028-8, or IVPP V6028-9, see above). The fibula is long and slender (ratio of shaft diameter to shaft length is lower than in, e.g., *Batrachotomus kupferzellensis*: Gower and Schoch 2009, fig. 6K–N), relatively straight, and flattened mediolaterally. The proximal end of the fibula is missing, but the proximalmost preserved part of the bone bears an eminence on the lateral surface (Fig. 10J, m.if) that was interpreted by Wu (1982) as the insertion site for the *m. iliofibularis* (corresponding to the anterior trochanter of e.g. Borsuk-Białynicka & Sennikov 2009). This interpretation is plausible, but the attachment would then be more proximally positioned than in most stem and early archosaurs (e.g., Nesbitt 2011: fig. 41). A possible exception is *Osmolskina* (Borsuk-Białynicka & Sennikov 2009), but no fibula has been assigned to this taxon with more than tentative certainty. However, a proximally placed *m. iliofibularis* insertion is characteristic of derived pseudosuchians (e.g. *Crocodylus niloticus*: Borsuk-Białynicka & Sennikov 2009). The shaft tapers mediolaterally and dorsoventrally for more than half of its preserved length before reexpanding distally. The long axes of the distal part of the shaft and the proximalmost preserved part are offset by around 75°. The shaft is oval in cross-section, but the dorsal surface is pinched

582 trochanter (Fig. 9E, cfb) may be the area of insertion for the *m. caudofemoralis brevis*, and the
583 trochanter itself in addition to a proximomedially adjacent rugose area (Fig. 9E, cfl) may
584 represent the area of insertion for the *m. caudofemoralis longus* (see Romer, 1923; Hutchinson,
585 2001b; Schachner, Manning, & Dodson, 2011). A rounded and raised area on the lateral surface
586 of the femur (Fig. 9B, fte), about one third of the shaft length from the proximal end, may mark
587 the proximal part of the area of origin of the *m. femorotibialis externus* (Romer, 1923;
588 Hutchinson, 2001b; Schachner, Manning, & Dodson, 2011). This raised area is adjacent to a
589 slight bulge on the ventrolateral margin of the femur, referred to here as the ventral eminence
590 (Fig. 9B, ve). The shaft has an egg-shaped cross-section, in that the ventral margin of the shaft is
591 narrower mediolaterally than the dorsal margin and narrows further to form the adductor crest
592 (Fig. 9D, ac) as it passes distally. The distal end of the femur is divided into lateral and medial
593 condyles (Fig. 9E, lc, mc) that are separated by an intercondylar groove distally (Fig. 9 C, ig) and
594 dorsally, and by a shallowly depressed popliteal space ventrally (Fig. 9E, ps). The lateral condyle
595 bears a tapered, ventrally projecting *crista tibiofibularis* (Fig. 9E, ct). The bone surface of the
596 distal end (Fig. 9 C) is rugose, indicating a large cartilaginous epiphysis in life.

597

598 *Tibia*. IVPP V6028-6 (Fig. 10A–F) is a right tibia. The proximal end of the tibia is around twice
599 as expanded dorsoventrally and mediolaterally as the distal end. The proximal end has relatively
600 straight dorsomedial, dorsolateral and ventrolateral edges and a convexly curved ventromedial
601 edge in proximal view (Fig. 10A). The dorsal margin of the proximal end is expanded to form a
602 cnemial crest (Fig. 10A,D, cn), whereas the ventrolateral corner of the proximal end is very
603 slightly expanded to form an indistinct posterior condyle (Fig. 10A, pc). The proximal surface of
604 the tibia is convex overall, but is interrupted by a dorsoventrally elongated concavity that is
605 closer to the lateral margin of the proximal surface than the medial margin. The shaft of the tibia

above). The proximal and distal ends of the shaft are formed of unfinished bone (Fig. 8M,O), and their outlines are mediolaterally expanded ovals. The proximal end is expanded further laterally than medially, and the centre of the proximal surface is depressed. The ventral surface bears a groove that extends along some 80% of the length of the bone (Fig. 8R, gr), and begins and ends roughly equidistant from each end of the radius. The dorsal surface of the radius (Fig. 8Q) is flattened along about 60% of the length of the shaft, beginning near the proximal end; this flattened area is bordered both medially and laterally by an abrupt break of slope and low ridge. The ventral part of the distal end of the radius is slightly bevelled (Fig. 8R, bev) and rugose. The distal end is convex. The radius of IVPP V6028 appears to be slightly more slender than that of IVPP V6027-7, especially distally, but this difference is largely accounted for by the smaller size of the former combined with damage to its distal end.

Femur. IVPP V6028-5 (Fig. 9) is a right femur. The shaft is sigmoidal. In distal view, the angle of offset between the long axes of the distal and proximal ends (40–50°) is greater than the corresponding angle in *Euparkeria capensis* (SAM-PK-6047B). The proximal end is a dorsomedially-ventrolaterally elongated oval in proximal view (Fig. 9A); the bone surface is rugose and slightly concave, indicating the presence of a large cartilaginous epiphysis in life. A low ridge (=medial tuber of Nesbitt 2011) extends distally along the ventral surface of the femur, beginning at the proximal margin then ~~subsequently~~ nearly merging indistinguishably with the bone surface, before redeveloping into a clear fourth trochanter (Fig. 9D–F, 4t). The fourth trochanter forms a laterally convex arc in ventral view. The apex of the trochanter is halfway between the proximal and distal ends of this structure and situated closer to the medial margin of the femur than to the lateral margin; the trochanter is mediolaterally widest at this point. A raised ring of bone surrounding a rugose depression ~~that is placed~~ lateral to the proximal end of the

534 *Ulna*. IVPP V6027-6 (Fig. 8A–F) consists of a right ulna, and IVPP V6028 includes a right ulna
 535 (Fig. 8G–L) that is either IVPP V6028-7, IVPP 6028-8 or IVPP V6028-9 (it is unclear which of
 536 these numbers refers to the ulna of IVPP V6028, and which ones to the radius and fibula). The
 537 olecranon (Fig. 8A–L, ol) is better developed than in *Euparkeria capensis* (SAM-PK-6047) and
 538 is rounded proximally. The proximal surface is convex dorsoventrally. The entire proximal end,
 539 including most of the olecranon, has an unfinished surface texture and was seemingly not fully
 540 ossified. The proximal end is suboval in proximal view, tapering dorsally and flattened medially.
 541 The shaft is slightly twisted along its length, and has the cross-sectional shape of a dorsoventrally
 542 elongated oval with a flattened medial edge. A rounded fossa midway between the dorsal and
 543 ventral edges on the medial side of the shaft, near the proximal end, in IVPP V6027-6 (Fig. 8B,
 544 fos) is probably an artefact of preparation rather than a genuine feature not present in the ulna of
 545 IVPP V6028. The distal end is convex in lateral or medial view and straight in dorsal and ventral
 546 view. In distal view the distal end is a dorsoventrally elongated oval. There is a slightly raised
 547 area on the lateral surface at the proximal end of the bone (Fig. 8D–E, ra), although this swelling
 548 is too poorly developed to be considered a true radial tuber. A ridge (Fig. 8D–E, ri) extends
 549 distally along the shaft, beginning around 20% of the way from the proximal end and extending
 550 nearly to the distal end. Ventral and parallel to this ridge runs a groove, which becomes narrower
 551 distally. Bounding this groove ventrally is a second ridge, less well developed than the first,
 552 which angles dorsally as it extends distally. The ridges and groove are not preserved in IVPP
 553 V6028, a difference almost certainly reflecting the poor preservation of that specimen rather than
 554 biological variation.

if it's not
 there, how can
 you be certain?

556 *Radius*. IVPP V6027-7 (Fig. 8C–R) is a right radius, and IVPP V6028 includes a poorly
 557 preserved right radius (Fig. 8S–X; either IVPP V6028-7, IVPP V6028-8, or IVPP V6028-9, see

humeral shaft does not differ noticeably from that seen in *Euparkeria capensis* (SAM-PK-5867),
 contra Wu (1982). In lateral view (Fig. 7C) the deltopectoral crest projects ventrally as a broad
 triangular flange and extends to around half of the way distally along the shaft. The internal
 tuberosity (Fig. 7 G–L, it) is visible as a rounded medial projection from near the proximal
 margin in ventral view in IVPP V6027-4, but appears to be less prominent in IVPP V6027-5;
 however, this difference is also likely to at least partly reflect mediolateral compression of the
 proximal end of IVPP V6027-5. The humerus lacks a distinct trochlea (=radial/lateral condyle)
 and capitellum (=ulnar/medial condyle); in ventral view the distal end is expanded, with a
 concave distal margin separating distally convex ect- and entepicondyles (Fig. 7D, ect, ent). The
 rugose and unfinished surface between these epicondyles would probably have borne a strip of
 cartilage connecting and covering the ect- and entepicondyles as in *Caiman* (see Romer 1956,
 Figs. 166–167), possibly with a small trochlea and capitellum formed by this cartilage. The
 supinator process (Fig. 7B, sup) is a low, rounded ridge extending proximally along the
 ventrolateral edge of the shaft from the distal end. The distal part of the supinator process may
 have been more prominent in life, but the surface appears to be damaged in both IVPP V6027-5
 and IVPP V6028-4. Dorsal to the supinator process there is no clear ectepicondylar groove,
 unlike in *Erythrosuchus africanus* (Gower 2003), but this part of the surface of the humeral shaft
 is gently concave (Fig. 7B, ectg). It is possible that a more pronounced groove was once present
 distally, but is now obscured by post-mortem damage. The angle between the long axes of the
 distal and proximal ends of the humerus is around 20°. Whilst the deltopectoral crest and internal
 tuberosity may differ slightly between the specimens in terms of their direction and development
 respectively, there are no differences that cannot be convincingly ascribed to a combination of
 post-mortem damage and intraspecific variation.

biological variation; however, this variation is minor, and can be regarded as intraspecific given the lack of striking morphological differences between IVPP V6027 and IVPP V6028. The scapula-coracoid suture is gently dorsally convex, with the point of maximum curvature lying around halfway along its length. The suture is clear, though the elements appear to have been firmly attached to one another.

492

Coracoid. IVPP V6027-3 (Fig. 6A–B) includes a left coracoid and IVPP V6028-3 (Fig. 6E–F) includes a partial right coracoid, both preserved in articulation with the corresponding scapulae. The coracoid is suboval with a single coracoid foramen (Fig. 6A–B, cof) near the dorsal margin, close to the anteroposterior midpoint of the bone. The coracoid grows mediolaterally thicker towards its contribution to the glenoid (becoming at least five times thicker than at the anteroventral corner, where the bone is thinnest), and also immediately dorsal to the coracoid foramen. The lateral surface of the coracoid immediately ventral to the glenoid is depressed. There are no notable differences between the coracoids of IVPP V6027-3 and IVPP V6028-3, other than those caused by damage.

502

Humerus. IVPP V6027-5 (Fig. 7A–F) and IVPP V6028-4 (Fig. 7G–L) are both right humeri. The angle in distal view between the deltopectoral crest and the main shaft is smaller in IVPP V6027-5 (Fig. 7E, dpc) than in *Euparkeria capensis* (SAM-PK-5867), indicating that the crest protrudes ventrally rather than ventrolaterally in the former. The crest is broken in IVPP V6028-4; it appears to be slightly more laterally directed than in IVPP V6027-5, but this is probably at least in part due to mediolateral compression of the entire proximal end of IVPP V6027-5, as evidenced by extensive cracks across the surface of the bone. The position of the crest on the

like 60°
not a word

concave curve. The scapulae of IVPP V6027 each possess a pronounced posterolaterally directed
 tuber placed immediately dorsal to the glenoid along the posterior margin of the bone (Fig. 6A–
 D, tu; the tuber on the left scapula is damaged). This tuber is for attachment of the scapular head
 of the *m. triceps*, and has a depressed lateral surface that is circular in outline in lateral view. The
 acromion process (Fig. 6C–F, acr) is larger and more prominent than in *Euparkeria capensis*
 (SAM-PK-5867). The lateral surface of the scapula bears a muscle attachment area (Fig. 6A,C,
 mar) in the form of a parallel ridge and groove. The groove is situated just anteroventral to the
 ridge, and both extend posteroventrally from a point on the anterior margin of the scapula that
 lies about two thirds of the way down from the dorsal end and coincides with the level at which
 the shaft is anteroposteriorly narrowest. On the medial surface a similarly oriented muscle
 attachment ridge (Fig. 6B,D, mar) begins on the anterior margin around two thirds of the way up
 from the ventral end, and terminates at the anteroposteriorly narrowest point of the shaft just
 anterior to the posterior margin. The posterior part of the shaft is substantially thicker
 transversely than the anterior part. The proximal end of the shaft is strongly thickened
 transversely in the glenoid region, which articulates with a similarly thickened part of the
 coracoid.

The scapula of IVPP V6028-3 is poorly preserved. The margin of the bone is broken in
 the region in which the tuber for the *m. triceps* would have been placed, but there is a swelling in
 this position that probably represents what remains of the tuber after post-mortem damage. The
 muscle attachment ridges identified in IVPP V6027 are not visible in IVPP V6028-3, but this is
 almost certainly due to the poor preservation of the surface of the scapula. The scapula of IVPP
 V6028-3 has a mediolaterally thinner and slightly anteroposteriorly wider shaft than either
 scapula of IVPP V6027. This almost certainly is in part due to damage to the scapular shaft of
 IVPP V6028-3, which has been mediolaterally compressed, but may also represent slight

439 differences with respect to the cervical vertebrae become more pronounced posteriorly along the
 440 dorsal column. In successively more posterior presacral vertebrae the diapophysis and
 441 parapophysis become gradually joined, first being connected by a paradiapophyseal lamina (Fig.
 442 4 A, F, ppdl; already present in the more posterior cervical vertebrae) and then fusing entirely to
 443 form a single apophysis. The latter condition is present by the fourth vertebra in IVPP V6027-2,
 444 although in this vertebra the parapophysis and diapophysis remain distinguishable as components
 445 of the apophysis. The diapophysis and parapophysis are indistinguishable from the fifth vertebra
 446 of IVPP V6027-2 onwards. A low anterior centroparapophyseal lamina (Fig. 4A,F, acpl) connects
 447 the parapophysis (and in more posterior vertebrae, the single fused apophysis) to the anterior
 448 margin of the centrum. A thick, rounded prezygadiapophyseal lamina (Fig. 4A,F, prdl) connects
 449 the prezygapophysis and the diapophysis. A spinodiapophyseal fossa (Fig. 4F, sdf) is present
 450 dorsal to the diapophysis in the third and fifth preserved vertebrae, but the presence of this
 451 structure in other vertebrae is difficult to assess due to damage. The plane of articulation between
 452 the zygapophyses is roughly horizontal, rather than inclined as in the cervical vertebrae.
 453 Intercentra (Fig. 4F,H, ic) are preserved in apparent articulation posterior to the fourth, fifth and
 454 sixth vertebrae of IVPP V6027-2; they are mediolaterally elongated ovals in ventral view, and
 455 their lateral tips curve dorsally which would have made them crescentic in anterior or posterior
 456 view. The dorsal ends of the neural spines (Fig. 4F,G, ns) are expanded into anteroposteriorly
 457 elongated oval spine tables that are covered in rugosities.

458

459 *Scapula.* IVPP V6027-3 (Fig. 6A–B) is a left scapula in articulation with the coracoid, and IVPP
 460 V6027-4 is a right scapula (Fig. 6C–D). IVPP V6028-3 is a right scapula in articulation with a
 461 partial coracoid (Fig. 6E–F). The scapula is long and bladelike, and the shaft is waisted at its
 462 dorsoventral midpoint in lateral view. In posterior view the shaft of the scapula arcs in a medially

Cervical ribs. IVPP V6027-1 (Fig. 4A–E) includes three partial cervical ribs in articulation with vertebrae and IVPP V6027-8 (Fig. 5A–B) consists of a single left cervical rib. The cervical ribs are two-headed and their shafts extend posteriorly, ventrally and laterally and are gently curved posteriorly, especially towards their distal ends. The tuberculum is longer than the capitulum (Fig. 5, tub, cap) and is directed medially whereas the capitulum is directed anteromedially. A dorsoventrally thin flange (Fig. 5, fl), which widens transversely as it continues proximally, extends along the anterolateral margin of each rib. A similar structure is present in several other archosauriforms, including *Batrachotomus kupferzellensis* (Gower & Schoch 2009, fig. 2M; SMNS 91046), *Gracilisuchus stipanicorum* (Romer 1972, fig. 7), and *Smilosuchus gregorii* (Nesbitt 2011, fig. 28J).

Dorsal vertebrae. IVPP V6027-1 (Fig. 4A–E) includes what are probably the anteriormost three dorsal vertebrae in articulation, and IVPP V6027-2 (Fig. 4F–J) consists of seven mid to posterior dorsal vertebrae. The dia- and parapophyses (Fig. 4A,F, di, pa) are close together in the anteriormost vertebra of IVPP V6027-2, indicating that this vertebra is already a mid- or posterior dorsal. In the posteriormost vertebra of IVPP V6027-1, by contrast, the dia- and parapophyses are relatively well-separated, and at least the posterior two dorsal vertebrae (what we regard here as the anteriormost dorsal may in fact be the posteriormost cervical – identification of the exact point of transition is difficult) preserved in this specimen can be unequivocally identified as anterior dorsals because they are in articulation with the posteriormost cervicals. Accordingly, IVPP V6027-1 and V6027-2 cannot be combined to form a continuous dorsal series.

The anterior dorsal vertebrae are generally similar to the cervical vertebrae described above, but differ in that the diapophyses are longer and dorsoventrally compressed, and are situated higher and further back on the centrum, on the suture with the neural arch. These

391 *Cervical vertebrae*. IVPP V6027-1 (Fig. 4A–E) includes what we identify as the articulated
 392 posterior three cervical vertebrae (in articulation with what we identify as the anterior three
 393 dorsals; the exact point of the cervical-dorsal transition is hard to pinpoint with certainty) and
 394 IVPP V6028-2 (Fig. 4K–O) consists of six very poorly preserved, articulated cervical vertebrae,
 395 all of which lack the dorsal part of the neural arch including the neural spine. The neurocentral
 396 sutures are fused. The centra of the cervical vertebrae are spool-shaped and longer than tall, with
 397 a low ventral keel. In the anterior cervicals the diapophysis (Fig. 4A–K, *di*) is placed near the
 398 anterodorsal corner of the centrum, and the parapophysis (Fig. 4A–K, *pa*) is placed near the
 399 anteroventral corner; posteriorly along the column the diapophysis moves posterodorsally, the
 400 parapophysis moves dorsally to approximately halfway up the centrum, and the two become
 401 connected by a variably developed paradiapophyseal lamina (Fig. 4A, *ppdl*). A thick, rounded
 402 prezygadiapophyseal lamina (Fig. 4A, *prdl*) connects the prezygapophysis and the diapophysis. A
 403 shallow spinodiapophyseal fossa (Fig. 4A, *sdf*) is present immediately dorsal to the diapophysis.
 404 The anterior and posterior articular facets of the centra are gently concave and subcircular. Some
 405 of the postzygapophyses bear epipophyses (Fig. 4A, *ep*), but these do not extend posteriorly
 406 beyond the postzygapophyseal articular surfaces. The neural spines (Fig. 4A–B, *ns*) widen
 407 transversely towards their distal ends to form broad, flat spine tables, each of which attains its
 408 maximum transverse width at a point slightly anterior to the midlength. No intercentra can be
 409 identified between the cervical vertebrae, although their absence could be preservational. The
 410 vertebrae of IVPP V6028-2 are slightly longer and lower in their proportions than those of IVPP
 411 V6027-1, but this appears to be due to post-mortem compression of the former given that their
 412 ventral surfaces are flattened; thus no differences in cervical vertebral morphology separate the
 413 two individuals.

4A, K ?
 more specific
 4F
 Issues - these are related to

dorsoventrally, but the heavily damaged and compressed posterior end of the ramus was probably
 deeper in life. A mandibular fenestra cannot be identified with certainty due to poor preservation.
 At least five teeth (Fig. 3, t) and three additional empty alveoli can be identified, and the dentary
 appears to be long enough to accommodate ^{approx - at least?} ~~around~~ 12 teeth in total, but the exact posterior extent
 of the dentary is unclear. The teeth are close to circular in cross-section, but further details of
 their morphology cannot be discerned. The prearticular (Fig. 3, pra) can be identified posteriorly
 on the medial side, expanding in dorsoventral depth towards its posterior end. The prearticular is
 mediolaterally thin and dorsoventrally deep with an almost flat (very slightly medially convex in
 posterior view) and smooth medial surface. An abrupt, approximately longitudinal step (Fig. 3,
 step) demarcates a slightly inset ventral portion of the medial surface of the prearticular that
 would have been covered by the angular in the intact mandible.

Contributing to the anterior portion of the ramus are fragments of bone ^{that} which based on
 their positions probably represent parts of the splenial (Fig. 3, sp) and coronoid (Fig. 3, c); the
^{portion} part of the ramus formed by these elements is medially convex in posterior view. The possible
 coronoid medial to the tooth row is transversely wider in dorsal view than is the part of the
 dentary lateral to the tooth row. The ventrolateral edge of the dentary (Fig. 3, d) is convex in
 anterior view. Ventrally, the dentary and splenial (Fig. 3, sp) are separated by a narrow gap, but
 this may be due to post-mortem damage. The dorsolateral edge of the area of the mandibular
 ramus that is likely formed by the surangular (Fig. 3, sa) is convex in anterior view, and was
 clearly dorsally convex in lateral view when intact. The area of the mandibular ramus that is
 likely formed by the angular (Fig. 3, a) forms the ventralmost point of the jaw. The lateral surface
 of the angular is dorsoventrally convex, and the angular tapers posteriorly in lateral view.

But, is it present in the holotype of UT?

listed in the original diagnosis are essentially also shared with *Euparkeria capensis* (Ewer 1965; UMZC T.692).

However, the exact shape of the *m. triceps* attachment tuber is identified here as autapomorphic, because although corresponding tubera are present in other basal archosauriform taxa (e.g. *Batrachotomus kupferzellensis*, Gower and Schoch 2009), they differ in form. Similarly, the muscle attachment scar on the blade of the scapula described here as autapomorphic in form is much more pronounced than in any other early archosauriform that we have examined. We have also identified a combination of features present in *Halazhaisuchus* that distinguishes it from other taxa. For example, although *Euparkeria capensis* possesses similarly-shaped osteoderms, it lacks an *m. triceps* tuber (Ewer 1965). Osteoderm morphology distinguishes *Halazhaisuchus qiaoensis* from many other taxa (e.g. *Batrachotomus kupferzellensis*, in which the osteoderms are blunter anteriorly), and the presence of anterior flanges on the cervical ribs differentiates *Halazhaisuchus qiaoensis* from some other non-archosaurian archosauriforms such as *Chanaresuchus bonapartei* (Romer 1972) and *Erythrosuchus africanus* (Gower 2003).

Description

Mandible. IVPP V6028-1 (Fig. 3; measurements for this and all other elements given in Table S1) is a poorly preserved right mandibular ramus lacking the posteriormost part. Extensive cracking and damage to the external surfaces of most elements prevents accurate identification of sutures. The mandible is ventrally convex in lateral view. The ramus is long anteroposteriorly and shallow

are no morphological features that distinguish the two nominal species with certainty (all possible differences are minor and can be ascribed to preservation and/or intraspecific variation) and that the two nominal species group as sister taxa just outside Archosauria in a phylogenetic analysis. *Turfanosuchus dabanensis* is by contrast placed phylogenetically distant from *Halazhaisuchus qiaoensis* and '*Turfanosuchus*' *shageduensis* as part of Archosauria (see below). *Halazhaisuchus qiaoensis* and '*Turfanosuchus*' *shageduensis* were originally named in the same paper (Wu 1982), and we consider *Halazhaisuchus qiaoensis* to be the valid senior subjective synonym based on page priority. Wu (1982) distinguished the two nominal species primarily based on the presence of intercentra and dorsal osteoderms in *Halazhaisuchus qiaoensis*, in contrast with the supposed absence of these features in '*Turfanosuchus*' *shageduensis*. However, both osteoderms and intercentra can easily be lost during preservation, and the highly incomplete and poorly preserved nature of IVPP V6028 ('*Turfanosuchus*' *shageduensis*) suggests that taphonomic removal is a particularly likely possibility in this case. IVPP V6028 has even suffered post-mortem loss of the dorsal portions of the preserved vertebrae, above which any osteoderms would have lain. Moreover, intercentra are absent in the cervical vertebrae of IVPP V6027 (*Halazhaisuchus qiaoensis*), and the only vertebrae that are preserved in IVPP V6028 are from the cervical region. The strata bearing both taxa are of the same age and are not widely separated palaeogeographically, making synonymization even more parsimonious as an alternative to retaining '*Turfanosuchus*' *shageduensis* as a separate species.

The original differential diagnosis of *Halazhaisuchus qiaoensis* was insufficient because it did not adequately distinguish the taxon from other stem- and early archosaurs. Many features listed (e.g. "pectoral girdle well-developed") were not sufficiently clear or distinct to be effective in diagnosing the taxon. Other features are shared with other taxa: leaf-shaped osteoderms and presacral intercentra are shared with *Euparkeria capensis* (Ewer 1965), and the vertebral features

scutes overlap one another and are leaf-like in outline; posterior ends of scutes grooved ventrally; in cervical and anterior dorsal regions scutes from both sides are sutured together firmly (paraphrased from Wu 1982).

Figure call-outs?

Revised diagnosis. Relatively small (femur length 127 mm) archosauriform diagnosable on the basis of two autapomorphies: (1) strongly pronounced tuber on the scapula, for attachment of the scapular head of the *m. triceps*, that is circular in outline when the scapula is in lateral view, with the apex of the tuber slightly depressed; (2) pronounced muscle attachment scar on the scapula in the form of a depressed strip on the lateral surface of the blade running from anterodorsal to posteroventral, beginning at an abrupt kink in the anterior margin at around midlength of the blade. The species is further diagnosable on the basis of the following unique combination of characters: two rows of paramedian scutes that are longer than wide, taper to an anterior process anteriorly and are broad and rounded posteriorly, with a longitudinal keel closer to the medial margin than the lateral one; large flattened flange projecting from the proximal part of the anterior margin of each cervical rib; presence of a tuber on the scapula for attachment of the scapular head of the *m. triceps*; presence of dorsal intercentra.

not on "T"

rebuild

Remarks. IVPP V6028 was designated by Wu (1982) as the holotype of a putative new species of the genus *Turfanosuchus*, '*T. shageduensis*'. The type species of *Turfanosuchus*, *Turfanosuchus dabanensis*, is from the Kelamayi Formation (Middle Triassic) of Xinjiang, China. Subsequently Gower & Sennikov (2000) expressed doubts that '*Turfanosuchus shageduensis*' and *Turfanosuchus dabanensis* were congeneric, and noted instead the strong similarities of '*Turfanosuchus shageduensis*' to *Halazhaisuchus qiaoensis* from the same formation. We synonymize *Halazhaisuchus qiaoensis* and '*Turfanosuchus shageduensis*' on the basis that there

273 isolated left cervical rib (V6027-8), and an isolated median osteoderm (V6027-9). All material
274 probably pertains to a single individual.

275

276 *Referred specimen.* IVPP V6028 (holotype of *Turfanosuchus shageduensis* Wu, 1982), mostly
277 complete right mandible (V6028-1), six cervical vertebrae missing upper neural arches and neural
278 spines (V6028-2), right scapula (V6028-3), coracoid (V6028-3), humerus (V6028-4), radius
279 (V6028-7/8/9; note that the correct subnumbers for the radius, ulna and fibula are uncertain), ulna
280 (V6028-7/8/9), femur (V6028-5), tibia (V6028-6) and fibula (V6028-7/8/9). All material
281 probably pertains to a single individual.

282

283 *Horizon and locality.* IVPP V6027 is from Fugu County, Shaanxi Province, China (Fig. 1), and
284 IVPP V6028 is from Jungar Banner, Nei Mongol Autonomous Region, China (Fig. 1). Both are
285 from the lower Ermaying Formation (Lower or Middle Triassic: late Olenekian or early Anisian).
286 Both localities have been entered into the Paleobiology Database, as locality numbers 100138
287 and 92436. See *Geological Setting* for further information.

288

289 *Original diagnosis.* Relatively small pseudosuchian. Pectoral girdle well developed. Scapula
290 exceptionally elongated and strongly expanded at both ends; ratio of scapula to humerus over
291 1.15:1; oval muscle-attachment area above glenoid with notably projecting ridge. Coracoid very
292 large, forming two thirds of glenoid. Humerus robust, terminating in triangularly expanded apex
293 proximally due to well-developed deltopectoral crest along proximal quarter of shaft. Radius and
294 ulna slender, ulna with well-developed olecranon process. Vertebrae slightly amphicoelous, with
295 elongated centra and low neural spines expanded distally; presacral vertebrae with intercentra.
296 Cervical and anterior dorsal ribs three-headed. Row of dorsal scutes on either side of midline,

verbukim? translated in quotes? page #4

what? large

anterodorsal margin. As discussed by several authors (Kuhn 1976; Parrish 1993; Gower and Sennikov 2000; Nesbitt 2011), an unnumbered calcaneum within this previously referred material demonstrably belongs to a suchian archosaur, but there is no evidence to support the referral of this calcaneum to '*Wangisuchus tzeyii*'.

EUPARKERIIDAE von Huene, 1920 sensu Sookias and Butler 2013

Halazhaisuchus Wu, 1982

Type and only species. Halazhaisuchus qiaoensis Wu, 1982.

Halazhaisuchus qiaoensis Wu, 1982

Synonymy. Turfanosuchus shageduensis Wu, 1982 (junior subjective synonym).

Figs. 3-10?

Holotype. IVPP V6027, posterior three cervical and anterior three dorsal vertebrae in articulation with osteoderms and incomplete ribs (V6027-1), seven dorsal vertebrae in articulation with osteoderms (V6027-2), left (V6027-3) and right (V6027-4) scapulae, left (V6027-3) and partial right (V6027-4) coracoids, right humerus (V6027-5), ulna (V6027-6), and radius (V6027-7), an

229 County (Fig. 1). This locality has been entered in the *Paleobiology Database* as number 101059.

230 See Geological Setting for further information.

231

232 *Remarks.* The holotype maxilla, IVPP V2701 (Fig. 2A–B), is fragmentary and undiagnostic, as
 233 are the paratype specimens. Whilst the presence of alveoli and interdental plates indicates
 234 thecodont tooth implantation (a synapomorphy of *Erythrosuchus*+Archosauria: Nesbitt 2011),
 235 neither a suite of autapomorphies nor a unique combination of character states can be identified
 236 in the maxilla. The original diagnosis presented by Young (1964) was inadequate for a number of
 237 reasons: it referred to the “long and low” shape of the maxilla, but the holotype maxilla does not
 238 differ in this regard from those of most early archosauriforms; the posterior process of the maxilla
 239 was described as “pointed”, but is in fact incomplete; the anterior margin of the maxilla was
 240 described as “rounded” but is also incomplete; and teeth and other elements not preserved in the
 241 holotype were used in the diagnosis, but there is no convincing case for referring these elements
 242 to the same taxon as the holotype. We therefore consider ‘*Wangisuchus tzeyii*’ to be a nomen
 243 dubium. The most exclusive phylogenetic placement that can be reasonably supported for the
 244 holotype is Archosauriformes indet., based on the inferred presence of thecodont dental
 245 implantation in the maxilla. As noted above, this feature supports a position crownward of
 246 *Proterosuchus* (Nesbitt 2011).

247 Young (1964) referred many isolated and poorly preserved postcranial elements from the
 248 type locality and other localities in the same region to ‘*Wangisuchus tzeyii*’, but first-hand
 249 inspection of much of this material revealed it to be undiagnostic. Furthermore, there are no
 250 compelling similarities to justify regarding even the two relatively complete paratype maxillae
 251 (IVPP V2703, V2704) as necessarily conspecific with the holotype, and in fact both of these
 252 paratype maxillae appear to differ from the holotype in having a convex rather than straight

Refer to figure 1

209 **Systematic palaeontology**

210

211 ARCHOSAUIROMORPHA von Huene, 1946 sensu Gauthier, Kluge, & Rowe 1988

212 ARCHOSAURIFORMES Gauthier, Kluge, & Rowe, 1988 sensu Nesbitt, 2011

213

214 '*Wangisuchus*' Young, 1964

215 [Nomen dubium]

216

217 *Type and only species.* '*Wangisuchus tzeyii*' Young, 1964.

218

219 '*Wangisuchus tzeyii*' Young, 1964

220 [Nomen dubium]

221

222 *Holotype.* IVPP V2701, an incomplete left maxilla lacking teeth.

223

224 *Syntypes.* IVPP V2702-V2704, maxillae (paratypes).

225

226 *Horizon and locality.* All specimens assigned to *Wangisuchus tzeyii* are from the upper Ermaying

227 Formation of Shanxi Province (Middle Triassic: Anisian). IVPP V2701 (holotype) and IVPP

228 V2702-V2704 (paratypes) are from locality 56173, Xishiwa near Louzeyu Village, Wuxiang

Fig. 2

Phylogenetic analyses were carried out using the matrix of Butler et al. (2014), modified from Nesbitt (2011), with *Halazhaisuchus qiaoensis* and '*Turfanosuchus*' *shageduensis* (not previously included by Nesbitt [2011] or Butler et al. [2014]) included in separate analyses as both distinct taxa and as a combined taxon. Additionally, we changed the scoring of osteoderm shape in *Euparkeria capensis* from that used by Nesbitt (2011: character 407) from "square-shaped, about equal dimensions" to "longer than wide" (see Discussion). The analyses were conducted in TNT v. 1.1 (Goloboff, Farris, & Nixon, 2003; 2008). We employed the same methodology as Nesbitt (2011), eliminating the same taxa from the dataset prior to analysis, with the same characters treated as ordered, and using equally weighted parsimony. An initial search using the "New Technology search" option was carried out using sectorial search, ratchet and tree-fusing options with default parameters. Minimum tree length was obtained for 1000 separate replicates and the trees were stored in RAM. A heuristic tree search was then conducted using the stored trees, followed by TBR branch swapping. Standard bootstrap values and Bremer support values (decay indices) were calculated for each node using the inbuilt functionality of TNT and the BREMER script respectively.

Institutional abbreviations

IVPP, Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing, China; SAM, Iziko South African Museum, Cape Town, South Africa; SMNS, Staatliches Museum für Naturkunde, Stuttgart, Germany; UMZC, University Museum of Zoology, Cambridge, UK.

All material referred to *Wangisuchus tzeyii* is from the white sandstones and mudstones of the upper Ermaying Formation. Hancox et al. (2013) and Rubidge (2005) assigned the upper Ermaying Formation to the late Anisian based on the presence of the dicynodont *Shansiodon*. The same genus occurs in Subzone C of the *Cynognathus* Assemblage Zone of South Africa (Hancox, Angielczyk, & Rubidge, 2013), and the shansiodont *Vinceria* occurs in the Río Mendoza and Upper Puesto Viejo formations of Argentina (Renaut and Hancox 2001; Hancox 1998). The proposed late Anisian date for Subzone C of the *Cynognathus* Assemblage Zone is itself based on long-range vertebrate biostratigraphy (Hancox 2000). The upper Ermaying Formation was referred to the Perovkan land-vertebrate faunochron by Lucas (2010), again based upon vertebrate biostratigraphy. As noted above, new SHRIMP analyses have confirmed an Anisian date for the upper Ermaying Formation.

Terminology and methods

We use the limb orientation terminology of Gower (2003), which combines that of Romer (1942) and that of Rewcastle (1980). This orientation corresponds to a fully anteriorly extended hindlimb (the anterior surfaces of hindlimb bones in descriptions of fully erect taxa such as dinosaurs thus correspond to the dorsal surfaces in our terminology), and a forelimb with the humerus fully extended posteriorly and the epipodials fully extended anteriorly (the anterior surfaces of forelimb bones in fully erect taxa thus correspond to the ventral surface of the humerus and to the dorsal surfaces of the radius and ulna here). The scapula is described with the shaft held vertically. We use the terminology of Wilson (1999) for vertebral laminae and that of Wilson et al. (2011) for vertebral fossae.

139 Geological setting

140

141 All of the Chinese putative euparkeriid specimens discussed here are from the Ermaying
142 Formation, which was deposited during the Triassic in a meandering fluvial environment with an
143 east to west palaeocurrent (Liu et al. 2012). The specimens assigned to *Halazhaisuchus qiaoensis*
144 (IVPP V6027) and '*Turfanosuchus*' *shageduensis* (IVPP V6028) are from the sandstones of the
145 lower Ermaying Formation. The lower Ermaying formation is made up of yellowish pink,
146 yellowish green and greyish white quartz arkose (Yin 2003). The lower Ermaying Formation has
147 been considered early Anisian in age as a result of long-range biostratigraphic correlation with
148 Subzone B of the *Cynognathus* Assemblage Zone of South Africa, based primarily on the
149 presence of the dicynodont *Kannemeyeria* (Rubidge 2005; Fröbisch 2009). Dating of Subzone B
150 of the *Cynognathus* Assemblage Zone is itself based on long-range vertebrate biostratigraphy
151 (Hancox 2000). Lucas (2001) argued for an Olenekian date for the lower Ermaying based on the
152 presence of the dicynodont *Shansiodon* in the upper Ermaying (see below). Sues and Fraser
153 (2010) concurred with this age assessment, based on a proposed correlation of the upper
154 Heshanggou Formation of northern China with the lower Ermaying Formation and the presence
155 of the typically Olenekian spore-bearing tree *Pleuromeia sternbergii* in the former. However,
156 Butler et al. (2011) noted that *Pleuromeia sternbergii* extends into the early Anisian in Germany,
157 and that at least part of the Heshanggou Formation may be Anisian in age. Using sensitive, high-
158 resolution ion microprobe (SHRIMP) U-Pb dating, the age of the upper Ermaying Formation
159 (Member II) was recently found to be 245.9 ± 3.2 Ma (Liu, Li, & Li, 2013). Although the range
160 of error encompasses the entire Anisian (currently dated as 247.2–242 Ma: Cohen, Finney, &
161 Gibbard, 2013), this result supports an Anisian date for the upper Ermaying, and by inference an
162 early Anisian or late Olenekian date for the lower Ermaying and Heshanggou formations.

but also identified differences including the presence of intercentra in *Halazhaisuchus qiaoensis* and discrepancies in osteoderm morphology between *Halazhaisuchus qiaoensis* and *Turfanosuchus dabanensis*. Borsuk-Bialynicka and Evans (2003) tentatively supported the referral of *Halazhaisuchus qiaoensis* to Euparkeriidae, whilst Borsuk-Bialynicka and Evans (2009) regarded the euparkeriid affinities of the taxon as doubtful.

Several other taxa from the Chinese Triassic and Lower Jurassic have historically been assigned to Euparkeriidae but are no longer regarded as potential members of the group and are not discussed in detail here. *Xilousuchus sapingensis* Wu 1981 was assigned to Euparkeriidae by Sennikov (1989a,b), but recent analyses have reidentified it as a ctenosauriscid poposauroid (Butler et al. 2011; Nesbitt 2011; Nesbitt, Liu, & Li 2011). *Platyognathus hsui* Young 1944 was referred to Euparkeriidae by Huene (1956), but this taxon is a crocodyliiform (Wu & Sues 1996). *Turfanosuchus dabanensis* Young 1973 was initially assigned to Euparkeriidae, but was regarded by Parrish (1993) as a suchian. The species was redescribed by Wu & Russell (2001) as a non-pseudosuchian not closely related to *E. capensis*, but was placed in Pseudosuchia by the most recent and extensive phylogenetic analysis of Archosauriformes (Nesbitt 2011), and has since been identified as a member of the pseudosuchian clade Gracilisuchidae (Butler et al. 2014). 'Fukangolepis' barbaros Young 1978 was mentioned as having been referred to Euparkeriidae by Parrish (1986) but presumably this was a *lapsus calami* given that the holotype of the species is an indeterminate dicynodont skull fragment (Lucas & Hunt 1993) assigned by Young (1978) to Aetosauria; the fact that Parrish (1986) cites Young (1973) for this assertion indicates Parrish may have confused 'Fukangolepis' barbaros with *Turfanosuchus dabanensis*. Finally, *Yonghesuchus sangbiensis* Wu, Liu and Li 2001 was listed without discussion as a euparkeriid by Wu & Sun (2008), but this taxon is also a gracilisuchid pseudosuchian (Butler et al. 2014).

1 **Title:** Systematics of putative euparkeriids (Diapsida: Archosauriformes) from the Triassic of
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3

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20

Systematics of putative euparkeriids (Diapsida: Archosauriformes) from the Triassic of China

The South African species *Euparkeria capensis* is of great importance for understanding archosaur evolution and the early radiation of archosauromorphs following the Permo-Triassic mass extinction, ^{as} being ~~placed~~ ^{place it} by most phylogenetic analyses as the sister taxon to Archosauria (using a crown-group definition) within the clade Archosauriformes. Although a number of species from Lower-Middle Triassic deposits worldwide have been referred to the putative family Euparkeriidae, the monophyly of this ^{Euparkeriidae} taxon is controversial and has yet to be demonstrated by quantitative phylogenetic analysis. Three Chinese taxa have been recently suggested to be euparkeriids: *Halazhaisuchus qiaoensis*, '*Turfanosuchus*' *shageduensis*, and *Wangisuchus tzeyii*, all three of which were collected from the Middle Triassic Ermaying Formation of northern China. Here, we reassess the taxonomy and systematics of these taxa. We regard '*Turfanosuchus*' *shageduensis* as a junior synonym of *Halazhaisuchus qiaoensis*, because no morphological features distinguish the two putative species and their holotypes emerge as sister taxa in a novel phylogenetic analysis. *Halazhaisuchus qiaoensis* is resolved as the sister taxon to *Euparkeria capensis*, forming a monophyletic Euparkeriidae that is in turn sister to Archosauria+Phytosauria. This is the first quantitative phylogenetic analysis to recover a non-monospecific, monophyletic Euparkeriidae, but euparkeriid monophyly is only weakly supported and will require additional examination. We regard *Wangisuchus tzeyii* as a *nomen dubium*, because the holotype is undiagnostic and there is no convincing evidence that the previously referred additional specimens represent the same taxon as the holotype. Our results have important implications for understanding the species richness and palaeobiogeographical distribution of early archosauriforms.

Discussed first
in paper