Re-evaluating the wealth of the Late Triassic Phuthiatsana ichnosite, Maseru District, Lesotho

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Abstract:

Late Triassic ichnites attributable to quadrupedal basal sauropodomorphs (prosauropods) are known from several palaeosurfaces from the main Karoo Basin in Lesotho (southern Africa). The Phuthiatsana tracksite (Maseru District, Lesotho) was briefly documented by Ellenberger ET AL. (1963). This palaeosurface yielded a diversity of well-preserved tridactyl, tetradactyl and pentadactyl ichnites, which are attributed to theropods, prosauropods and dicynodonts, respectively. Our re-documentation of the ~320 m2 Phuthiatsana palaeosurface revealed new ichnological, stratigraphic and sedimentological details. The more refined palaeoenvironmental reconstruction of this tracksite has yielded palaeobiological and palaeoecological implications. Stratigraphically, we now firmly place this site and others with similar ichnoassemblages (e.g., Subeng, Ha Falatsa) into the lower Elliot Formation. Moreover, via detrital zircon geochronology, we have recently dated these sites as being as old as middle Norian. Many ichnites are modified true tracks with expulsion rims and sediment collapse features. Associated interference ripples and desiccations cracks assist in determining the substrate consistency and its impact on track morphology. Several tetradactyl pes and manus impressions are registered in some of the trackways, and are considered to have been made by quadruped sauropodomorphs with pronounced heteropody and possibly flexed limb postures. Pes tracks, of both quadruped and biped animals, show little morphological variability along the individual trackways, in which toe-drag and tail-drag marks are locally present. Phuthiatsana provides comprehensive insights into a middle Norian dinosaur-dominated vertebrate community in southern Gondwana, and broadens the discussion concerning the evolution of locomotion mode (i.e., quadrupedality) in basal sauropodomorph dinosaurs (e.g., lessemsaurids).

Keywords: sauropodomorphs, Elliot Formation, Upper Triassic, tetradactyl, quadrupedalism

References

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