genus *Scaloposaurus*, a well-represented Early Triassic therocephalian known previously to occur at Donald 207. However, linear dimensions of the present specimen (basal skull length 117 mm) dwarf others, being 175% larger than the previous largest specimen from Thaba 'Nchu (basal skull length 67 mm). Our discovery of the largest *Scaloposaurus* reveals distinctive adult morphology in the genus and underscores previously documented plasticity in growth rates of Permo-Triassic therapsids (gleaned from histologic analysis by our research team). Nevertheless, mixed-age theriodont assemblages are occasionally documented in the *Lystrosaurus* AZ, and fully-grown specimens continue to be remarkably rare. These findings are consistent with our recent hypothesis that, unlike in preceding intervals, juvenile excess mortality was high during Early Triassic *Lystrosaurus* AZ times.

SIZE MATTERS? A NEW RELICT MEGATEUTHIDID BELEMNITE FROM THE OXFORDIAN OF WYOMING (USA)

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Herein, we present the results of a study of peculiarly large (diameter ~6 cm) and stout belemnite rostra, collected from the lower-middle Oxfordian of Wyoming (upper part of the Sundance Formation) and belonging to a new taxon. There are only two such finds per thousands of 'normal' belemnites of the family Cylindroteuthididae that are common in the same strata. Our investigation, based on the analysis of several yet poorly understood belemnite characters, allows us to justify the affinity of these large rostra with genus *Brevibelus* (family Megateuthididae) — a cosmopolite genus common in the Toarican–Bajocian interval. The last record of this lineage is from the early Bathonian of West Pacific (New Caledonia), while the family Megateuthididae is a typical Early – early Middle Jurassic group with a single post-Bathonian report from the upper Kimmeridgian of Central Russia. Thus, the new belemnite from Wyoming represents a relict member of the *Brevibelus* group and is the first record of the megateuthidid belemnites for the North American Late Jurassic. In contrast, several records of morphologically similar rostra from the same region and strata, turned out to be typical cylindroteuthidids of pathological nature, resulting from injuries during life.

At first glance, the new belemnite from Wyoming was a real giant — no other known belemnite species attain 6–7 cm in rostrum width. But the comparative study of body proportions among several related taxa, known from various exceptionally preserved fossils from Lagerstätten, indicates that this impression is false. The mantle length of our new taxon was estimated as not exceeding 40–50 cm, comparable to co-occurring cylindroteuthidids. The extreme rarity of finds indicates some narrow specialization, which was reflected either in adaptation to a certain type of prey, or to a highly specific biotope.

To conclude, our data show the existence of previously unknown megateuthidid refugium in the Northwestern Pacific area. Contrary to the widespread perception, this family crosses the Middle/Late Jurassic boundary by several lineages in different parts of the world.

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THE IMPORTANCE OF GEOCHRONOLOGY FOR INTERPRETING NON-MARINE RECOVERY FROM THE END-PERMIAN MASS EXTINCTION

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Over the past two decades, a critical question has been the nature and timing of ecological recovery from the end-Permian mass extinction. With the advent of accurate and precise CA-ID-TIMS U-Pb dating of interbedded volcanic zircons, key Early-Middle Triassic sedimentary archives of marine fossil assemblages are now well-constrained by radioisotopic ages. These data demonstrate that the Early Triassic was relatively short (~4.7 Ma), and that ultimate recovery of most marine ecosystems did not occur until the beginning of the Middle Triassic, some five million years after the extinction event. Recent work with non-marine fossil assemblages suggests that recovery in these ecosystems was also delayed until the Middle Triassic,

with elevated endemicity in these early Middle Triassic recovery assemblages. However, proper interpretation of these non-marine fossil patterns is severely limited by the fact that most key fossiliferous strata have been dated in a relative sense using long-distance vertebrate biostratigraphy, and remain largely unconstrained by precise and accurate radioisotopic ages. Thus, it is largely unknown whether 'Early Triassic' and 'Middle Triassic' non-marine strata are actually assignable to these chronostratigraphic units (whose boundaries are defined in marine sections), and the timing of extinction recovery is unclear. New U-Pb ages from multiple basins in Argentina suggest several iconic "Middle Triassic" assemblages are actually Late Triassic (Carnian) in age. Preliminary age data from the supposedly Anisian upper Moenkopi Formation of the western United States suggest these strata could be as young as upper Ladinian. The iconic and intensely studied fossil records of southern and eastern Africa remain unconstrained by radioisotopic ages, so any age model applied to these data is largely heuristic. The unknown or Late Triassic ages of many "Middle Triassic" assemblages means they cannot speak to ecological recovery from the end-Permian mass extinction. Suggestions of Middle Triassic endemicity among non-marine ecosystems may instead reflect differing ages among the different assemblages sampled. As such, these new radioisotopic ages demonstrate that we know relatively little about the non-marine recovery from this mass extinction, and more broadly, the importance of accurate and precise biostratigraphically-independent age constraints when interrogating the fossil record with macroevolutionary and paleoecological questions.

THE EDIACARA FOSSIL SITE AT NILPENA, SOUTH AUSTRALIA: FINDING NEW WAYS TO MANAGE A NEW NATIONAL PARK

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The Ediacaran Hills in South Australia's Flinders Ranges are the original location after which the Ediacaran biota was named. Immediately south is the globally significant Nilpena Ediacara Fossil Site, which over the last 20 years has been managed by the private owners of the Nilpena Station as an *in situ* research site.

In recognition of the significance of Nilpena, and to secure its long term protection, a new national park is being created but with all of the challenges of ensuring it is well managed and secure, and made accessible for researchers and visitors.

To meet these challenges, a new approach to managing a national park is being pursued through the creation of the philanthropic Flinders Ranges Ediacara Foundation. A sustainable, long-term partnership between the foundation and the government will establish a new way for managing a fossil site in the context of a large national parks system where palaeontology competes with many other demands.

This talk will present this unfolding initiative for conserving and managing Nilpena's fossils against the backdrop of World Heritage Listing that is being pursued for the Flinders Ranges.

A COMPARISON OF MIS5E AND MODERN CORAL REEFS IN THE RED SEA

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Our oceans are rapidly warming as a consequence of an increase in atmospheric CO_2 concentrations. Corals are suffering from the heat stress and often react with bleaching, which can result in a decreased live coral cover and diversity. While it is crucial for conservation efforts to predict the adaptation and acclimatization potential of corals as well as future biogeographic shifts, it can be difficult to make projections based on experimental data alone. Using the recent geological past to study in situ behavior of coral reefs under higher temperatures is a crucial tool to improve projections derived from modelling.

In the substage MIS5e of the last interglacial period, ~125,000 years ago, oceanic temperatures and sea level were higher than today, while coral species were largely identical to the modern ones. Therefore, the distribution and diversity of the fossil coral reefs are a valuable analogue for the near future. A global comparison of MIS5e and modern coral reefs indicated species range expansion towards higher latitudes and contractions from the equator, especially in the northern hemisphere.

By studying the fossil and modern reefs along the coast of Egypt and Sudan, we will be able to gain insights about ecosystem stability under higher temperature conditions and along latitudinal gradients within the Red Sea. Data are collected with line intersect transects (LIT) and photo-quadrates. A comparison of the datasets will reveal community differences between MIS5e and recent reefs, including potential northward shifts during warmer climates. First results