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Initial results from coring at Prees, Cheshire Basin, UK, and future plans for the Early Jurassic Earth System and Timescale Project (JET)

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The Prees-2 fully cored borehole was drilled in November and December 2020 and captures a thick biostratigraphically complete, hemipelagic marine record for the Triassic-Jurassic boundary and for the Hettangian, Sinemurian and lower Pliensbachian stages. The borehole is sited at the centre of the Prees Jurassic outlier in the Cheshire Basin, Shropshire, England. The overall JET project, funded principally by ICDP, NERC, and DFG, aims to construct a fully integrated age model and timescale for the Early Jurassic combining new data from the Prees core with data generated from the historic Llanbedr (Mochras Farm) borehole in NW Wales. The new timescale and a wide range of geological data are then being used to reconstruct and understand diverse aspects of the Early Jurassic Earth system, and to provide constraints on astronomical solutions for solar system dynamics over this crucial time interval that links oceanic records of the Cenozoic and later Mesozoic to continental records of the Triassic. The Prees-2 borehole was drilled to a total depth of 656 m below rig floor, and the Early Jurassic succession comprises mudstone, limestone, and siltstone, which is fossiliferous throughout and includes many biostratigraphically significant ammonite fossils. Diverse trace fossil assemblages are also observed, and lithological cyclicity is apparent through the Jurassic on a scale of about one metre, compatible with interpretations of Milankovitch cyclicity in the precession band based on analysis of Mochras core. Core recovery was largely at 100% and the core quality is excellent. A suite of downhole logs was obtained and ongoing work at the British Geological Survey Core Scanning Facility is generating a high-quality, high-resolution geochemical and geophysical dataset that will provide a fundamental basis for further core-log integration, astrochronology and palaeoenvironmental work.

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