The ICDP Mochras borehole (ICDP JET project) will recover a complete Early Jurassic sedimentary record at the site of a previously drilled borehole at Llanbedr (Mochras Farm). The new Mochras record will comprise an exceptionally thick (1300 m) and biostratigraphically complete succession of marine mudrocks. Here the drillcore represents 27 million years of Early Jurassic time with sedimentation rate of approximately 5 cm/kyr. The attributes of the succession are ideal for an integrated astrochronology, chemostratigraphy, biostratigraphy, and magnetostratigraphy, which would become the international standard for this period of Earth history. At that time the planet was subject to distinctive tectonic, magmatic, and orbital forcing, and fundamental aspects of the modern biosphere (the so-called Mesozoic Marine Revolution) were becoming established in the aftermath of the end-Permian and end-Triassic mass extinctions. The research project objective is to use this unique record together with existing data and an integrative modelling approach to produce a step-change in understanding of Early Jurassic Earth system dynamics. Through a comprehensive and integrated stratigraphy, the JET project has the potential to provide a global template for Early Jurassic Earth Systems interaction, an interval of major tectonic change (e.g., supercontinent breakup and formation of the Central Atlantic Magmatic Province (CAMP), one of the largest large igneous provinces), biological change (e.g., the radiation of eukaryotic phytoplankon), and climate change (e.g., the transition from an icehouse to a super greenhouse associated with a major Oceanic Anoxic Event). JET is a large-scale, multi-faceted, international programme of research on the functioning of the Earth system at a key juncture in its history – the Early Jurassic. The project team comprises ~50 scientists from 14 countries, including 2 from Poland. Proposed science programme is broken down into a number of inter-related studies that together will deliver the overall aims. The proposed herein Polish work package embrace lithological high-resolution logging of the core, analysis of ichnofabric and >40 SHRIMP mass spectrometry analyses of zircons in order to recognize provenance of the siliciclastic sediments. Detailed, cm by cm logging of the core will be performed. The goal of lithological logging of the core will be quantifying of layers and their arrangement in order to recognize the “background” sedimentation. Analysis of traces left by bottom-dwelling animals is a very good tool in recognition n of food availability of oxygenation on the sea floor. Together with paleontological, geochemical and palynological evidence this can help in recognition of eutrophic/oligotrophic conditions. The impact of the whole project on our understanding of the processes governing the Earth system will be fundamental. The target borehole profile is absolutely unique, and it’s systematic investigation will have much to say about the stratigraphy, paleoclimate, palaeoceanography, paleoecology and global changes through a long time. This combination will provide unparalleled opportunity for quantitative understanding of the evolution of the Earth system and its relationship to solar system evolution at the point of emergence into the modern world. Advances in our understanding of the Earth System and the system responses to perturbations of the global carbon and nutrient cycles have obvious societal relevance and obtained results may serve as comparators for present-day and future environmental transitions. Furthermore, major environmental change events through deep time are almost always associated with perturbed patterns of organic carbon burial in marine sediments, and often resulted from the rapid liberation and reburial of sedimentary organic carbon into strata that are now hydrocarbon source rocks: the Early Jurassic events are no exception to this generalisation and, indeed, Early Jurassic oil and gas source rocks are of known global importance. More details can be found at:

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