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Chaired by: Laith Tapper, NGI

Imaging the seafloor: Toward a regional high-resolution bathymetry of the North West Shelf

Ulysse Lebrech, PhD Candidate, University of Western Australia / Norwegian Geotechnical Institute

High resolution bathymetry is a critical input to marine scientists. It can be used to study the seafloor and its marine habitats, and to support the development of offshore engineering projects. Most methods to acquire bathymetry are costly and can only be practically deployed on relatively small areas. The University of Western Australia developed an integrated method which builds on Sentinel satellites images, 3D seismic surveys and existing datasets to generate a regional digital elevation model. The method was applied to the North West Shelf of Australia and led to the creation of a new high-resolution bathymetry of the area, with a resolution of 10 m in nearshore areas and 30 m elsewhere. This dataset marks a major upgrade of the pre-existing regional 250 m data. The dataset produced reveals seabed features never observed to date and shed a new light on the origin of the North West Shelf calcarenite ridges.

About the speaker:

Ulysse moved to Australia five years ago to work at the Perth office of the Norwegian Geotechnical Institute. As a geologist, Ulysse was responsible for integrating geophysical and geotechnical datasets to create predictive ground models. During that time, he developed an interest in carbonate sediments and started to collaborate with the Centre for Offshore Foundation Systems on how to better forecast the properties of such problematic sediment. In 2019, Ulysse started a PhD. at UWA to delve into this topic using the calcarenite of the North West Shelf as a case study. He is now investigating how the depositional environment of the sediment affects its geotechnical properties.



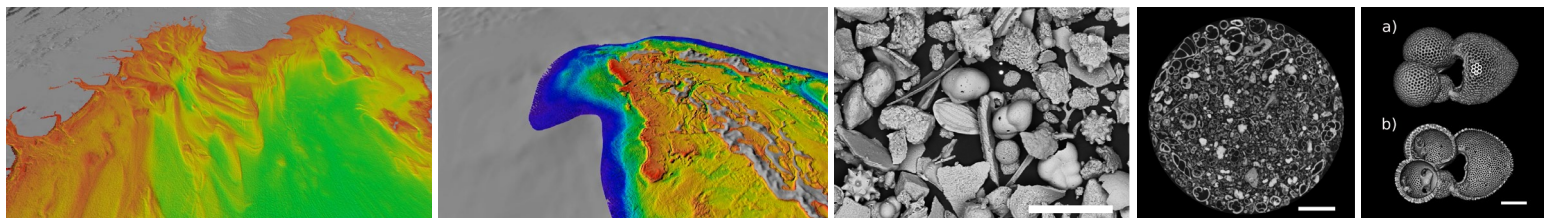
How biology and geological history impacts calcareous sediment geotechnics

Ryan Beemer, Assistant Professor, University of Massachusetts Dartmouth

Classifying calcareous sediments has long vexed geotechnical engineers. Particle size distribution, Atterberg limits, and calcium carbonate content are not good indicators of problematic behaviors like high compressibility, softening, and pile running. Calcareous sediments are biogenic in nature, they largely consist of the skeletal remains of calcium carbonate bearing marine micro- and macro-organisms (foraminifera, coccolithophore, coral, mollusks, etc.) and their bioclasts. Despite their origin, the biology of the soil grains is typically not considered when classifying these sediments. This presentation will explore recent microscopy, micropaleontological, and geotechnical studies on hemipelagic calcareous sediments from North West Australia. The results of which demonstrate that granular density, particle size distribution, and particle breakage are dependent on the soil’s biological composition and geological history.

About the speaker:

Dr. Ryan D Beemer is an Assistant Professor in the Department of Civil and Environmental Engineering at the University of Massachusetts Dartmouth. Prior to moving to Massachusetts, he worked at the Centre for Offshore Foundation Systems in the Oceans Graduate School at the University of Western Australia. His current research activities include monopiles for offshore foundations, compliant geosystems, and impact of biology and diagenesis on the micromechanics of calcareous sediments.



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