What can lost underwater lands tell us about climate change?

May 16 2017, by Lindsay Brooke

Credit: University of Nottingham

Underwater lands that were submerged following the last Ice Age could yield vital clues about our current approach to climate change. Global experts in archaeology, climate change, history and oceanography are discussing how we can unlock these secrets at a prestigious Royal Society meeting on 15 May 2017.

Among the speakers will be Dr Eugene Ch'ng, an expert in modelling and visualization of large ancient terrestrial and marine landscapes from the University of Nottingham Ningbo China. Dr Ch'ng heads the NVIDIA Joint-Lab on Mixed Reality and is project lead for complex systems modelling and simulation of the European Research Coucil's (ERC) 'Lost Frontiers' research project.

Dr Ch'ng said: "The modelling, mapping and analysis of massive ancient terrestrial and marine landscape ecology, environmental change,

population movement spanning hundreds of thousands of square kilometres and hundreds of millions of agents – such as the flora, fauna, people and environmental factors - have implications for real-world discovery and applications. However, the greatest barrier to realising massive agent-based modelling is the computational resources required to store and simulate these detailed interactions within 3-D terrains. We need to develop strategies for scalable agent-based modelling, simulation and visualisation in time and space of large ancient landscapes."

After the last Ice Age, which ended around 20,000 years ago, global warming caused many populated landscapes to sink beneath the sea. Vast areas of land were lost around the world as ice caps melted and sea levels rose. These included the stretch of land between Britain and mainland Europe, known as Doggerland, but also even larger areas in South East Asia and the lands around and between modern Siberia and Alaska - areas known respectively as Sundaland and Beringia.

Although we know that climate change occurs periodically throughout history, we know relatively little about how our ancestors coped with such changes, and what effects a warming climate might have had on colonisation and migration. Research in these areas could help inform climate change debates in our current geological age – the Anthropocene – which is defined by the permanent and overwhelming impact of humans on the environment.

In his talk Dr Ch'ng will propose and discuss high performance computing techniques that can potentially simulate hypothetical models of massive ecological scenarios spanning landscapes up to 100,000 square kilometres and going back as far as 20,000 years.

The Royal Society's 2017 Theo Murphy International Scientific Meeting, is organised by archaeologists at the Universities of Bradford, York, St Andrews and Warwick, and the University of Nottingham Ningbo

China. It will bring together world class scientists in this trans-disciplinary project to explore how the latest technologies can be used to model and analyse underwater landscapes, many of which have, until recently, been inaccessible to researchers.

Samples taken from marine sediment cores are now yielding detailed data about the flora and fauna within these areas, but a more co-ordinated approach is needed to draw together this new wealth of information. The Theo Murphy Meeting will enable experts to start to develop large-scale projects and ways of studying these lost lands and understand their contemporary relevance.

Vince Gaffney, Professor of Archaeology at the University of Bradford, who is co-ordinating the meeting said: "These submerged landscapes have so far been inaccessible to archaeologists. The data that has been gathered has often been fragmentary, and many areas of interest are sealed beneath marine sediments. But modern technologies are now enabling archaeologists to mine these sites and extract new information about how these landscapes responded to huge environmental, cultural and technological changes. The opportunity to bring together specialists working on these landscapes will yield new insights and approaches to current climate change debates."

Provided by University of Nottingham

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