PRESIDENT'S DAY 2017
TALK ABSTRACTS

Richard Alley

Crumbling at the edges: Ice sheets and sea-level rise

Paleoclimatic evidence and ice-flow models show with increasing confidence that we could soon commit to loss of much of the ice on Greenland and in the marine basins of West Antarctica, and perhaps some from East Antarctica. Physical insights guided by recent ice-sheet behavior and analogy to geological settings raise the possibility that some of the rise could be much faster than generally anticipated.

Rosalind Rickaby

*Coccoliths coasting through the Elderfield Curve (*R E M Rickaby, M Hermoso, H McLelland, R B Y Lee)

Traditional geochemical proxies have relied on the rich geochemistry of foraminifera as the purveyors of information from the past, due to the ease of separation of single species from sediments and decades of development of foraminiferal proxies. But the sensitivity of those geochemical proxies to the environment, as preserved within foraminifera, can rarely be shoehorned into the inorganic framework which often inspires their application. The challenge of their laboratory culture and reproduction has hindered a broad physiological understanding of how the signals trapped within their calcite relate to the environment.

By contrast the geochemistry of coccolithophores, which can be easily grown and manipulated in the laboratory have, until now, been largely overlooked due to large and enigmatic "vital effects". However recent culture experiments, coupled with modelling, and advanced methods for separation of different species from sediments have started to unveil insight into the co-evolution between adaptation of these photosynthesising biomineralisers, and the changing environment. Such evolutionary adaptation leaves a physiological footprint in the isotopes of both coccolith calcite and the polysaccharides therein. Coccolith geochemistry therefore offers a new approach to reading past changes in e.g. carbon availability, based on a mechanistic and biological understanding of the proxy, which can be extended into the Mesozoic era.

Tim Elliott

Surface environmental changes constrain rates of mantle stirring

(abstract to follow)

John Walsh

Fundamentals of faulting and the pursuit of failure!

Over the past few decades, a great deal has been learned about fundamental issues of the geometry, growth and flow impact of faults, which are the most important response to brittle failure of the Earth's crust. These advances have often been achieved using sub-surface data acquired by industry, with the associated findings sometimes having significant practical implications. The use of industry data to establish fundamental geological insights was pioneered by William Smith who recognised, from his work in mines and canals, that an understanding of geological processes provided much improved practical and predictive capabilities. An understanding of faults can have a major economic impact as they often control the flow of groundwater, hydrocarbons and mineralising fluids. This talk briefly outlines recent and ongoing research on faulting, and highlights fundamental insights achieved by the convergence of basic and applied research.