Poster D: Coccolithophore diversity and paleoecology across the Eocene-Oligocene Boundary of the Nanggulan Formation, Java, Indonesia

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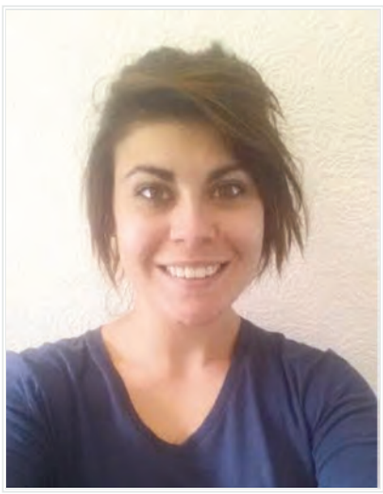
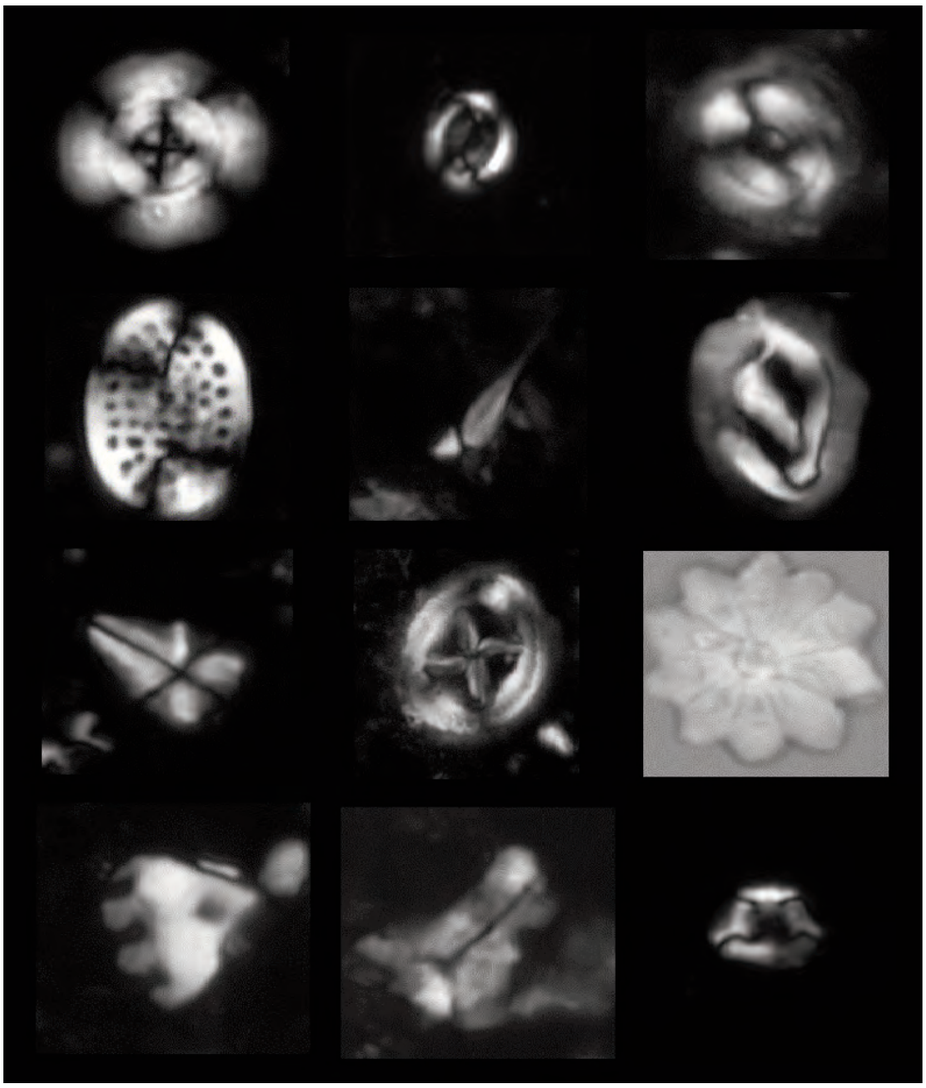


The Nanggulan Formation of Java, Indonesia, is a new low latitude locality yielding calcareous nannofossils from the latest Paleogene. Samples were collected from an onshore site in south-central Java and analysed for nannofossil content, recording diversity and ecological changes through the assemblage. Climates dramatically shifted from warm, high pCO2 conditions in the Eocene into a glaciated low pCO2 Oligocene. These changes are documented by positive excursions in benthic foraminifera δ18O and δ13C isotopes portraying a detrimental effect on the calcareous nannoplankton communities in surface waters. Using statistical analyses, documenting nannofossil diversity and abundance of species provides evidence of increased productivity associated with the Eocene - Oligocene boundary (~33.9Ma).



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Presentation 10: The importance of understanding complex magma rheology

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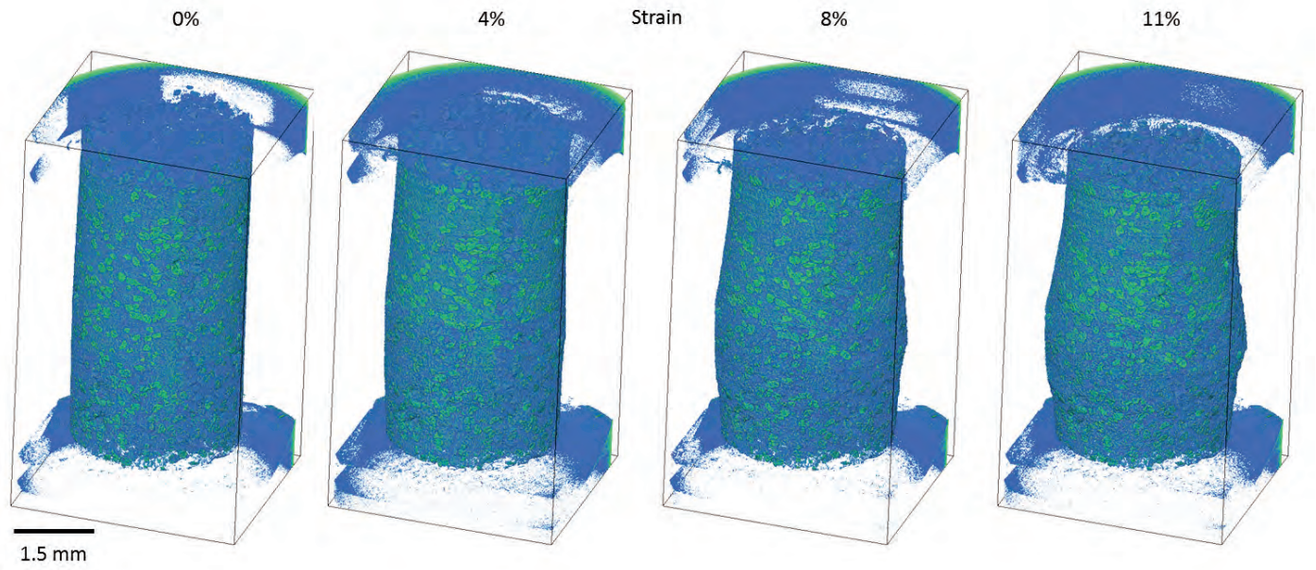
Rheology is defined as the study of the flow and deformation of materials under applied forces. Magmas are complex liquids by nature, and understanding their rheology will, one day, be fundamental in forecasting their eruption style. Transitions in flow dynamics can be linked to changes in porosity, crystallinity and melt chemistry. Physical interactions due to the presence of both crystals and bubbles in a volcanic melt can influence a system's rheology by causing variations in viscosity, and deformation dependent flow behaviour, shifting eruption style, often in ways difficult to predict. It is therefore essential to gain an insight into the manner in which crystalline, porous magmas flow and fail.

To investigate the influence of crystals and bubbles on the rheology of magmas, we carried out uniaxial compressive experiments on a suite of both natural and synthetic samples; these allow measurements of strength as well as computation of the suspensions' viscosity. Variably porous (9-32 vol.%) and highly crystalline (> 50 vol.%) dacites from Mt. Unzen, Japan were selected along with sintered glass with air filled pores (<3, 20 and 30 vol.%) and TiO2 particles (0-50 vol.%) for natural magma and analogue testing, respectively.

We found that the strength of a magma and its viscosity have a dependence on porosity, crystal content and temperature, for which we surmise that complex pore/crystal interactions are the dominant factors. We recently undertook a series of high-temperature compression experiments on the synthetic magma imaged by x-ray tomography in-situ at the Diamond Light Source, the results of which will shed light on these complex interactions.



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