

Volcanic and Magmatic Studies Group

- How does volcanism impact society? For example, how do we determine and mitigate the effects of volcanic eruptions upon aviation?
- Eruption forecasting: how do we identify the switch from unrest phase to the eruption? Are we able to identify critical tools and critical signals? What triggers volcanic eruptions and will this ever be predictable? What triggers the destabilisation of magma chambers that causes large eruptions?
- What triggers changes in the volcanic eruptive style during the same eruption?
- What are the relationships between deep system and shallow system in a volcano? What are the implications on the eruptive behaviour?
- How do magmatic and volcanic processes control magma fragmentation, eruption style and ash formation?
- What are the effects of volcanogenic gas release (e.g., SO₂ and CO₂ + others) upon atmospheric dynamics and chemistry?
- How are pyroclastic density currents and their deposits formed?
- What processes lead to large, caldera-forming 'super-eruptions', and what is the impact of these on the global environment?
- What causes flood basalt events?
- What are the links between flood basalt events and global mass extinctions and oceanic anoxia?
- What is the role of volatiles in controlling magma crystallisation and eruptive style?
- Plumbing of volcanoes – how is magma stored under a volcano, and how does it make its way to the surface? What is the architecture of magmatic plumbing systems?
- How does pre-existing host rock lithology and structure influence the migration and distribution of magma?
- How does the evolving rheology of complex three-phase deforming magma control physical and chemical processes in the crust?
- How are plutons formed, and what is the link between plutons and surface volcanism?
- What does chemical zonation in crystals tell us about magma evolution?
- Are volcanic products and processes observed on the Earth appropriate analogues for understanding magma genesis and volcanism on the other terrestrial-type bodies (i.e., planets and rocky satellites)?
- What is the composition of the Earth's mantle?
- What are the processes that control element cycling within the Earth?
- What is the role of magmatism in the formation and evolution of the Earth's crust (at rifting margins, subduction zones, and intra-plate settings)?
- How have magmatic processes and products varied throughout geological time?
- What are the links between magmatism and metallogenesis?
- How does igneous activity affect the evolution of sedimentary basins and petroleum systems?