

**Volcanic processes in
ore genesis**

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**Proceedings of a joint meeting of the Volcanic Studies Group of the
Geological Society of London and the Institution of Mining and
Metallurgy held in London on 21 and 22 January, 1976**

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PREFACE

Many geologists, particularly those in industry, have commented adversely on the adequacy of university geology courses as a realistic precursor to a vocational career in any branch of the earth sciences other than in the universities themselves. This volume, among other things, is evidence that university staff are concerned about this situation and are introducing the reality, stringency and urgency of industry into areas where, until recently, they have been absent or poorly represented. In this context the study of volcanic processes belongs almost entirely to academics, whereas ore genesis, although a fascinating intellectual subject, is of prime concern to the mining industry.

The contents of this volume are the proceedings of a joint two-day meeting of the Volcanic Studies Group of the Geological Society of London and the Institution of Mining and Metallurgy held on 21 and 22 January, 1976. It is relevant to note that the proposal to hold this meeting came from the dominantly academic Volcanic Studies Group, whose members saw it as an opportunity to usefully marry the rapidly increasing knowledge on volcanic processes to the economically critical understanding of ore genesis. The proposal to hold a joint meeting was enthusiastically supported by the Institution, and representatives from both groups started to plan the meeting.

From the start it was evident the global tectonics would be the framework and that sessions on volcanism and ore genesis at (1) constructive margin, (2) destructive margin and (3) within-plate settings would be a realistic subdivision. There then came the task of selecting speakers who would present authoritative papers ranging from global considerations to the detailed study of one orebody. Also, the theme was to be 'processes', so descriptive discourses on field, petrographic, mineralogical and/or geochemical relationships were to be discouraged. Conversely, as processes in ore genesis meant hydrothermal processes, stable isotope studies into the origin of ore-forming fluids would be particularly welcome.

The reader will find that in some contributions the geological setting of mineralization is the prime concern (Garson and Mitchell; Sillitoe; Grant *et al.*; Gass). In others (Pearce and Gale; Sato) the use of trace-element geochemistry in identifying environments and processes is the main theme. The role of hydrothermal fluids is, however, the common denominator to virtually all papers, whether considered on the global scale by Fyfe, in a regional context by Hunt and Constantinou or with respect to a single orebody

by Platt and Thurlow. As well as variations in the scale of study, there is a range in approach. Elder represents one extreme in a largely theoretical discourse on hydrothermal systems, whereas others (Sheppard; Ford *et al.*; Spooner; Heaton and Sheppard; and Williams *et al.*) all use stable isotopes in the evaluation of the origin and role of ore-forming fluids.

But what, other than a wealth of factual information and an abundance of stimulating ideas, came out of the meeting? What were the major conclusions and implications? This assessment has, of course, to be personal, but I was particularly impressed by the stable isotope evidence, which indicated that the mineralized solutions were rarely magmatic in origin — being sea water in the case of constructive margins and meteoric waters in that of destructive margins. Seemingly, magmatic processes provide the heat energy for the hydrothermal systems and very little else. Equally impressive were the semi-quantitative calculations on the time-scales involved, which indicated that mineralization processes, at least at constructive margins, immediately followed the magmatic event, were geologically short-lived, in terms of 10^3 – 10^4 rather than 10^6 years, and vigorous.

Those of us concerned with the organization of this meeting consider it to have been a successful and productive liaison between two groups of earth scientists that in the past have only too rarely collaborated. The evidence is in this volume that the studies and ideas of one group can be of use to and stimulate the other. Hopefully, this is part of a trend where fruitful collaboration between industrial practicality and academic research is the rule and not the exception.

C. Halls, M. J. Jones and J. M. Moore represented the Institution and P. W. Francis, I. G. Gass and I. L. Gibson the Volcanic Studies Group on the organizing committee. M. J. Jones, the Institution's Secretary, was entirely responsible for the preparation and processing of these proceedings for publication. His efforts, and those of other officers and members of both the Institution and the Society, which helped to ensure the success of the meeting are gratefully acknowledged.

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