SEAFLOOR HYDROTHERMAL MINERALIZATION

containing invited papers and proceedings of a conference convened by the Mineral Exploration Research Institute in Montreal, February 5–6, 1987

PREFACE

Few phenomena have had as major an impact on the field of economic geology as the discovery of active seafloor hydrothermal systems. The study of these natural laboratories over the past decade has led to a substantial refinement of our models of ore-forming processes, particularly as applied to ancient volcanogenic massive sulfide analogs.

This special volume of The Canadian Mineralogist is an outgrowth of a two-day international conference on seafloor hydrothermal systems which was held at McGill University on February 5 and 6, 1987. Papers were invited relating to hydrothermal processes at a variety of mineralized oceanic rifts, including experimental and theoretical investigations. The conference was organized by the Mineral Exploration Research Institute (IREM–MERI), which is a university–industry research consortium composed of Ecole Polytechnique de Montréal, McGill University, and the Université de Montréal.

This volume attempts to provide an updated and hopefully representative coverage of seafloor metallogenic studies. An overview of seafloor hydrothermal deposits is provided by the paper by Rona. Several articles in the volume examine the growth of sulfide chimneys and mounds from a variety of mineralogical, petrological and fluid-evolution perspectives (the ARGO-RISE Group, Graham et al., Bluth & Ohmoto, Marchig et al., Peter & Scott, Paradis et al., and Juniper & Fouquet). Also included are documentations of recent seafloor stockwork-type alteration and mineralization (Embley et al., Kawahata & Shikazono), of the ‘unexpected’ vent fields on the Mid-Atlantic Ridge (Thompson et al.), of unusually radioactive sulfide chimneys (Grasty et al.), and of gold enrichment in recent seafloor sulfides (Hannington & Scott).
The products of hydrothermal activity associated with the important but hitherto little-described class of deposits found in sediment-buried oceanic rifts are the subject of six papers (Peter & Scott, Koski et al., Goodfellow & Blaise, Gieskes et al., Simoneit, and Barrett et al.). Mineralization within the unusual brine pools of the Red Sea is discussed by Ramboz et al., Cole, and Zierenberg & Shanks. The character of metalliferous sediments away from active vents is the subject of papers by Herzig & Pliiger, Barrett et al., and Lalou et al. Experimental and computational models for the metasomatic and fluid mixing phenomena involved in active seafloor mineralization are also examined (Janecky & Shanks, Seyfried et al.). Many of the papers contain information or models that should be of relevance to the massive sulfide exploration community.

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