16th SGA BIENNIAL MEETING
KEYNOTE SPEAKER

In concurrent session: *VMS Systems: modern and ancient*

John Jamieson

Department of Earth Sciences, Memorial University of Newfoundland, St. John's, NL, Canada A1B 3X5

Evaluating hydrothermal episodicity and rates of ore-forming processes at the seafloor

The rates of formation of volcanogenic massive sulfide deposits can be evaluated by investigating actively forming hydrothermal deposits on the modern seafloor. High-resolution bathymetric mapping combined with U-series geochronology allow for deposit accumulation rates to be constrained. However, to accurately interpret these data, it is necessary to understand if venting has been continuous or episodic over the history of the deposit's formation. The results of monitoring of several vent fields over years to decades indicate relatively stable, continuous venting over these timespans. However, many vent fields are older than 10,000 or even 100,000 years, and dating of sulfide-rich samples using U-series disequilibrium techniques can provide insights into both the age and the continuity or episodicity of venting. For example, dating of over 70 samples from the active TAG mound, on the Mid-Atlantic Ridge, has produced an age spectrum that suggests the mound has been active for only 5,000 to 10,000 years during its 50,000 year history (Lalou et al., 1995). However, the number of samples collected and dated at TAG is exceptional. In most cases, because of the challenges associated with collecting rock samples from these deposits, the often much lower number of dated samples results in age distributions that contain significant time gaps that could be interpreted as evidence of either continuous or episodic venting. Evaluating episodicity will not change the results for calculations of overall average deposit growth rates, but can have a profound effect on the assessment of potential instantaneous deposit growth rates and metal fluxes. In this talk, we will discuss our current understanding of the ages and growth rates of seafloor hydrothermal deposits, and present a statistical approach for evaluating the probability of episodicity from the determined age spectrum for several hydrothermal vent fields on the seafloor.

John Jamieson

John is an Associate Professor and Canada Research Chair in Marine Geology in the Department of Earth Sciences, Memorial University of Newfoundland, Canada. His research focuses on submarine hydrothermal systems, marine mineral resources, and seafloor exploration. He has participated on 17 research cruises to investigate hydrothermal systems hosted in diverse tectonic settings ranging from fast to ultraslow spreading ridges, volcanic arcs, and backarc basins.