

The Champagne Hot Springs Shallow Water Hydrothermal Area, Dominica, Lesser Antilles

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Champagne Hot springs is a shallow submarine hydrothermal vent field located on the northern end of Soufriere Bay on the Island of Dominica in the Lesser Antilles. Venting occurs onshore to approximately 50 meters seaward, although some active venting is present outside of the vent field. An estimated forty to fifty active vents comprise the vent field at a depth of 3-4 meters. Venting occurs in several linear formations that extend seaward, suggesting possible fault related controls. Hydrothermal activity is vigorous with vent water temperatures of up to 69°C, about 41°C above ambient seawater. A high degree of bubbling indicates a considerable emission of gas as well as liquid from the vents. Small patches of yellow hydrothermally altered sand occur in this area. Repeated excursions to the vent field during different time periods have revealed variations in size and distribution of these hydrothermally altered sand patches, indicating possible seasonal variations. Iron staining occurs throughout the vent field along with the precipitation of ferrihydrite in the immediate vicinity of the vent orifices. Vent waters show a slight enrichment in As, Zn, Sb, Pb, Fe, and Ba along with considerable enrichment of Sr, Mn, B, and Si in comparison to seawater. In particular, at a concentration of 73.5 ppm, Si enrichment indicates a reservoir temperature of about 118°C. Comparison of this value to vent water temperature (69°C) would suggest flow rates of fluid between the reservoir and vent field are slow enough to allow temperatures to attain a new state of equilibrium.