Will the Next Global Crisis Be Produced by a Large Volcanic Eruption? Constraining the Source Volcanoes for 6th Century Eruptions

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Core VM33-116 is located in the Bismarck Sea near one of the most volcanic regions on Earth. We are studying the composition and age of volcanic ash layers in core VM33-116 and from the 18 volcanoes surrounding it to determine which Holocene eruptions were large enough to be recorded in ice cores sulfate records. We also want to learn if layers with higher magnetic susceptibility have more abundant volcanic glass and if volcanic eruptions increase the local submarine biological productivity. A Bartington magnetic susceptibility meter and a scanning electron microscope (SEM) were used to measure magnetic susceptibility and changes in overall foraminiferal and volcanic glass compositions. PETDB database and GeoMap App were used to discern and compare possible volcano candidates' chemical compositions and caldera widths. Results show a magnetic susceptibility peak at 39-40 cm. In the >250u fraction: we found the most abundant volcanic glass in the layer at 38-39 cm. Additionally, a bright red C-rich grain with barite crystals was found in the 38-39 cm layer, and black foraminifera coated with Mn and Fe oxides were found at 40-41cm. More black foraminifera were found at 184-185 cm, 204-205 cm, and 214-215 cm within a single 35 cm thick ash layer. In the deeper layers (184-185 cm, 204-205 cm, 214-215 cm) in VM33-116, we found Mn, Fe, and Ni coatings on the internal surfaces of the black foraminifera. The higher Ni (1.3-1.5 wt.% NiO) was associated with higher Fe (1.1-2.9 wt.% Fe2O3) and lower Mn (59.7-52.3 wt.% MnO). Black foraminifera containing Mn, Fe, and Ni oxides suggest higher biological productivity resulting from volcanism and/or increased hydrothermal venting. The most promising volcanic sources for VM33-116 are all partially or fully submerged. They are St. Andrew (W=1.2), Tavui (W=5), Hankow Reef (W=6), Rabaul (W=16), and Bismarck (W=5), where W is caldera width in km.