EXPLORING MARINE MINERALS AT THE DEEP-SEA: NEW RESULTS FROM THE NORTHERN EQUATORIAL MID-ATLANTIC RIDGE

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The deep-sea knowledge remains a scientific frontier. Actually, the investigation of the ocean is gaining increasing importance fostered by the possibility of exploitation of marine mineral deposits. The gap in our understanding about oceanic features genesis, morphostrucure, lithology, depositional sequences and mineralization potential constitute one of the most exciting scientific and exploration challenges. The Mid-Ocean Ridges and their volcanic structures both on- and off-axis are the source site for an important marine mineral resource – the Seafloor Massive Sulfides (SMS) – a highly concentrated metallic ore. Despite their strategic relevance for the future of sea mining and increasing study in the last decades, there are still limited data available, with many remaining scientific questions about their origin, structure and composition, which unequivocally prevent our capacity for their exploration. For example, what are the controlling parameters on their formation? How are these deposits distributed? Are they restricted to neo-volcanic axis zone? What are the best methods to explore and detect them? From previous studies it has been proposed that the deep-sea magmatic features originate by passive volcanism and/or tectonism, with physical models preventing the occurrence of explosive volcanism and pyroclastic rock formation at depths greater than 2 km due to excessive hydrostatic pressure. We present initial results from scientific cruise carried out at the Mid-Atlantic Ridge (MAR) between 13^0-20^0N, within the contract between International Seabed Authority and the Ministry of Natural Resources and Environment of the Russian Federation for Exploration (AREA) of polymetallic sulphides (https://www.isa.org.jm/deep-seabed-minerals-contractors). The results obtained onboard R/V *Professor Logachev* revealed evidences of multiple magmatic events, originating basaltic constructions located off-axis, along the flanks of the MAR. These events have shown to be intimately associated with the formation of ore fields (SMS) and of ferromanganese crust (Dobretsova et al. *in preparation*). We present mineralogical and petrological description of inedited young volcanic rocks at the study area and explore its associations with the biogenic carbonate sediment and hydrothermal processes at the deep sea. The presence of widespread volcanism and its proximity to Seafloor Massive Sulfides fields on the northern equatorial MAR confirms the conclusion of Bogdanov about the interconnection between young volcanism and the formation of ore fields and may contribute for the future exploration and ore detection at the deep-sea.

KEY-WORDS: SEAFLOOR MASSIVE SULFIDES; MINERAL EXPLORATION