

16 – MÉTODOS GEOFÍSICOS POTENCIAIS APLICADOS À EXPLORAÇÃO DE RECURSOS MINERAIS MARINHOS *POTENTIAL GEOPHYSICAL METHODS APPLIED TO THE EXPLORATION OF MARINE MINERAL RESOURCES*

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Resumo

Desde a década de 1950, após o “Ano Geofísico Internacional”, a comunidade de geocientistas marinhos investe continuamente na exploração dos recursos minerais marinhos. Ao longo das décadas de 1960 a 1980 as pesquisas tinham como principal objetivo geral o entendimento da tectônica global e suas relações com a cinemática das placas litosféricas, magmatismo e a gênese e evolução da crosta oceânica. Deve-se enfatizar que todas estas relações estão intimamente ligadas à formação dos recursos minerais marinhos e sua distribuição nos oceanos; sendo essa pesquisa básica de fundamental importância. Dos anos 1980 até os anos 2000, uma série de tecnologias foram desenvolvidas para a aquisição, processamento e interpretação dos métodos geofísicos potenciais marinhos, dentre elas: a gravimetria, a magnetometria, a eletrorresistividade e a magnetotelúrica. Nesses 20 anos, além das técnicas clássicas para dados de navios, teve destaque as técnicas para análise de dados de satélites, de aviões e de helicópteros, área denominada de Aerogeofísica. Essas técnicas possibilitaram uma visão global e regional, respectivamente, da geologia dos oceanos e suas relações com os recursos minerais marinhos. Dos anos 2000 até os dias atuais, a comunidade ligada à exploração de minerais marinhos cresceu significativamente e novas tecnologias foram desenvolvidas para o aumento da resolução e precisão no mapeamento, em escala de detalhe, dos recursos minerais marinhos; com destaque para a instalação dos sensores geofísicos em ROV’s, AUV’s, SAV’s e DRONE’S. Atualmente os principais recursos minerais marinhos explorados pela comunidade nacional e internacional, com base nesses métodos geofísicos potenciais, são os nódulos polimetálicos, as crostas polimetálicas, os sulfetos polimetálicos e os pláceres de minerais pesados. Vale destacar que todos estes recursos minerais metálicos possuem um grande valor econômico e estratégico para a sociedade do século XXI; pois apresentam, em geral, altos teores de minerais nobres. Os elementos que compõem estes minerais são raros, escassos ou de difícil beneficiamento na mineração continental, tais como: o ouro, a prata, a platina, o cobalto, o lítio, o níquel, o cobre, o zinco e diversas terras raras. Há de se enfatizar que, atualmente, as chamadas “Economia Azul” (*Blue Economy*), “Economia Verde” (*Green Economy*) e as Metas da Organização das Nações Unidas para o Desenvolvimento Sustentável, em particular no tocante a ODS-14 e a “Década dos Oceanos (2021-2030)”, impõem uma nova realidade geopolítica para as nações; onde os recursos minerais marinhos terão papel relevante. É nesse contexto que o presente capítulo está estruturado, visando permitir ao leitor um panorama atual sobre os fundamentos, tecnologias e aplicações dos métodos geofísicos potenciais na exploração dos recursos minerais marinhos.

Palavras-chave: métodos potenciais; gravimetria, magnetometria, eletromagnetometria, recursos minerais, exploração mineral.

Abstract

Since the 1950s, after the “International Geophysical Year”, the community of marine geoscientists has continuously invested in the exploration of marine mineral resources. Throughout the 1960s to the 1980s, research had as its main general objective the understanding of global tectonics and its relations with the kinematics of lithospheric plates, magmatism and the genesis and evolution of the oceanic crust. It must be emphasized that all these relationships are closely linked to the formation of marine mineral resources and their distribution in the oceans; this basic research being of fundamental importance. From the 1980s to the 2000s, a series of technologies were developed for the acquisition, processing and interpretation of potential marine geophysical methods, among them: gravimetry, magnetometry, electroresisivity and magnetotelurics. In these 20 years, in addition to the classic techniques for ship data, the techniques for analyzing data from satellites, airplanes and helicopters were highlighted, an area called Aerogeophysics. These techniques enabled a global and regional view, respectively, of the geology of the oceans and their relationship with marine mineral resources. From the 2000s to the present day, the community linked to the exploration of marine minerals has grown significantly and new technologies have been developed to increase resolution and precision in mapping, in a detail scale, marine mineral resources; with emphasis on the installation of geophysical sensors in ROV’s, AUV’s, SAV’s and DRONE’S. Currently, the main marine mineral resources explored by the national and international community, based on these potential geophysical methods, are poly-metallic nodules, poly-metallic crusts, poly-metallic sulphides and heavy mineral plates. It is worth mentioning that all these metallic mineral resources have great economic and strategic value for society in the 21st century; because they present, in general, high levels of noble minerals. The elements that make up these minerals are rare, scarce or difficult to process in continental mining, such as: gold, silver, platinum, cobalt, lithium, nickel, copper, zinc and several rare earths. It should be emphasized that, currently, the so-called “Blue Economy” (Blue Economy), “Green Economy” (Green Economy) and the Goals of the United Nations Organization for Sustainable Development, in particular with regard to the SDG-14 and the “Decade of the Oceans (2021-2030)”, impose a new geopolitical reality for the nations; where marine mineral resources will play a relevant role. It is in this context that this chapter is structured, aiming to allow the reader a current overview of the foundations, technologies and applications of potential geophysical methods in the exploration of marine mineral resources.

Keywords: potential methods; gravimetry, magnetometry, electromagnetometry, mineral resources, mineral exploration.

Esta é uma visualização. O conteúdo exibido é limitado.

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