

Antarctic research: The role of the Earth Sciences

ANTONIO C. ROCHA-CAMPOS

Instituto de Geociências, Universidade de São Paulo, Caixa Postal 20.899, São Paulo, SP 01498, Brasil

Interest in Antarctic geology started during initial exploration of the continent. Pre-IGY (1957-1958) research involved mostly reconnaissance surveys resulting in rudimentary knowledge of the general geological structure of Antarctica. The establishment of SCAR in 1958, following the success of the IGY, initiated a new phase of coordinated international scientific research in Antarctica. SCAR's present science strategy emphasizes the understanding of the role of Antarctica in planet-wide systems and global change. The emergence of the mineral resources issue within the Antarctic Treaty System (ATS) in the 1970s influenced Earth sciences research by stimulating more economically-oriented activities, particularly marine seismic reflection surveys. In spite of speculations, no mineral deposits have yet been found in the Antarctic and most prospects for exploration or exploitation are pessimistic because of both technological problems and an unfavorable market situation. Stricter rules for the regulation of scientific and logistic activities in the Antarctic may impose some extra difficulty for the planning and conducting of science programs. Whatever the context, however, participation of Earth scientists will undoubtedly continue to be extremely relevant.

O interesse pela geologia da Antártica surgiu durante a exploração inicial do continente. A pesquisa pré-AGI (1957-1958) envolveu, principalmente, trabalhos de reconhecimento que resultaram num conhecimento rudimentar da estrutura geológica geral da Antártica. O estabelecimento do SCAR em 1958, em consequência do sucesso do AGI, deu início a uma nova fase de pesquisa científica internacional coordenada. A atual estratégia científica do SCAR enfatiza o entendimento do papel da Antártica nos sistemas e mudanças globais. O surgimento da questão dos recursos minerais no seio do Sistema do Tratado da Antártica (STA), nos anos 70, influenciou a pesquisa em ciências da Terra, es-

timulando atividades de orientação mais econômica, particularmente levantamentos de reflexão sísmica marinha. A despeito de especulações, nenhum depósito mineral foi ainda detectado na região antártica e a maioria das previsões de exploração e lavra é pessimista, em razão tanto de problemas tecnológicos quanto de condições de mercado desfavoráveis. Regras mais exigentes para a regulamentação das atividades científicas e logísticas podem impor dificuldades adicionais para o planejamento e condução de programas científicos. Em qualquer contexto, entretanto, a participação dos geocientistas continuará, sem dúvida, a ser extremamente relevante.

Antarctic rocks attracted the attention of virtually every expedition to the continent since the pioneer days of the "heroic age" in the XIX century. The limited number of exposures (ice-free areas) which comprise about 1% of the continent are mainly situated near the coast. Therefore, they immediately drew the attention of expeditions seeking ice-free ground to establish bases (Fig. 1).

Despite this attention, the first century or so of Antarctic geology prior to the IGY (1847-1957/58) resulted mainly in scattered observations of small areas and provided only limited insight into a complex geological history. In the mid-1950s, knowledge of the geological composition, structure and evolution of Antarctica was rudimentary, and broad-ranging reconnaissance programs

were predominant in the Earth sciences. By the end of 1950's, geological research had established that East Antarctica was a shield area with a basement complex of mainly Precambrian schists and gneisses overlain by Paleozoic and Mesozoic sediments, and that West Antarctica appeared to be composed of greatly deformed Mesozoic and Tertiary sediments fairly similar to the Andes. The structural relationships between East and West Antarctica were (and still are) a major geological question (Fig. 2).

Post-IGY years: The role of SCAR

Coordinated international scientific research in Antarctica, initiated during the IGY of 1957/58, provided geo-

Correspondence to: Antonio Carlos Rocha-Campos, Instituto de Geociências, Universidade de São Paulo, Caixa Postal 20.899, São Paulo, SP 01498, Brasil

