

**Cratonic Basin Formation:  
A Case Study of the Parnaíba Basin of Brazil**

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## Preface

This Special Publication of the Geological Society had its formal beginnings at an Anglo-Brazilian Heads of State meeting in Brasília on September 28 2012. In the presence of the Brazilian President and British Prime Minister, BP announced and signed up to support a joint Anglo–Brazilian, industry–academia research programme, the Parnaíba Basin Analysis Project (PBAP). The collaborative project involved BP Exploration, five Brazilian<sup>1</sup> and three British<sup>2</sup> Universities, working together to address a geoscience problem of Brazilian national interest and global scientific relevance, and, in parallel, to build international research capability in both countries. The idea and purpose of the Project was developed through discussions between BP Exploration leadership and the Brazilian Agência Nacional do Petróleo (ANP).

The Project had two major objectives: firstly, to develop the understanding of the deep structure, geodynamic evolution and resource habitat of the Parnaíba cratonic basin of Brazil and test what insights that might have for the formation and resources of cratonic basins globally; secondly, the training and development of a number of research students to become familiar with large, complex, multi-national projects and the various techniques of modern basin and resource analysis. These objectives were to be achieved through the acquisition, processing and interpretation of a series of geophysical data sets and the participation of a number of post-graduate research students. The ultimate aspiration was to create a multi-disciplinary, geophysical data base that could be integrated with geological, geochemical and geomorphological data to bring new insight to the geodynamic processes active in the formation of cratonic basins in general, and the Parnaíba basin in particular. In parallel, the intent was to develop a cadre of talented young geoscientists with international connections and perspectives.

Underpinning PBAP are five major geophysical acquisition projects, each conducted along broadly the same c. 1400 km long corridor across the Parnaíba Basin between latitudes 4° S and 5° S, and each undertaken without a major safety incident:

- (1) A deep crustal seismic reflection profile acquired by Global Geophysical Services Incorporated (GCSI).

- (2) A wide angle reflection refraction profile (WARR) acquired by Universidade de Brasília in collaboration with Aberdeen University.
- (3) A teleseismic profile acquired by Universidade Federal do Rio Grande do Norte in collaboration with Cambridge University.
- (4) A detailed gravity and magnetic profile acquired by Observatório Nacional in collaboration with Oxford University.
- (5) A magneto-telluric profile acquired by Observatório Nacional.

Throughout the five-year Project, BP convened and chaired five meetings of the participating universities, their principal investigators and research students to review progress and share emerging results. Augmenting these formal meetings, several student exchange visits and extended stays were made throughout the duration of the project. BP also ran an extended field visit to the Parnaíba Basin, conducted as a west to east reconnaissance traverse along the same broad corridor as the geophysical acquisition programme.

This Special Publication of the Geological Society is a compilation of the results of PBAP, together with a number of invited papers covering recent complimentary work on the basin. Internationally peer reviewed articles from the Project have also been published elsewhere, and further publications will be forthcoming in the coming months and years. However, this Special Publication is the primary product of what we believe is an exceptional, industry–academia research project, involving eight universities from two countries and focused on a major geodynamic issue with the explicit intent of building international capability.

Listed below are the nineteen postgraduate students trained under the auspices of PBAP. All of these students are co-authors on internationally peer-reviewed papers within the Special Publication, with many as first authors. Engagement of undergraduate students in research activities was also encouraged. In publishing this volume we make widely available the results of PBAP and present a record of the output of both the science project and the goal of the development of international research capability.

Finally, projects of this scale do not happen without the enduring support of many people

<sup>1</sup>Observatório Nacional, Universidade do Brasília, Universidade Federal da Bahia, Universidade Federal do Rio Grande do Norte, Universidade Federal do Pernambuco.

<sup>2</sup>Aberdeen University, Cambridge University, Oxford University.

whose names do not necessarily appear on the many publications. In particular, I would like to acknowledge Liz Jolley and Neil Piggott for their early input and support of the project, and the BP Brasil team of Alice Almada, Shafe Alexander and Vander

Andrade for supporting the project from an idea through to this completed publication.

**Mike Daly**  
Editor

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