

At the crossroads: Continental connections with the Bunger Hills, East Antarctica

The separation of India and Australia from Antarctica marked the final breakup of Gondwana. As such, the continental margins of these three blocks can provide a wealth of evidence on the demise of a supercontinent. Here, we will collect new geological and geophysical data, suitably integrated with available datasets, to reconstruct the initial configuration of these blocks. Besides providing constraints on the termination of the Gondwana supercontinent cycle, this project will provide important insights into their possible association within the earlier Rodinia cycle.

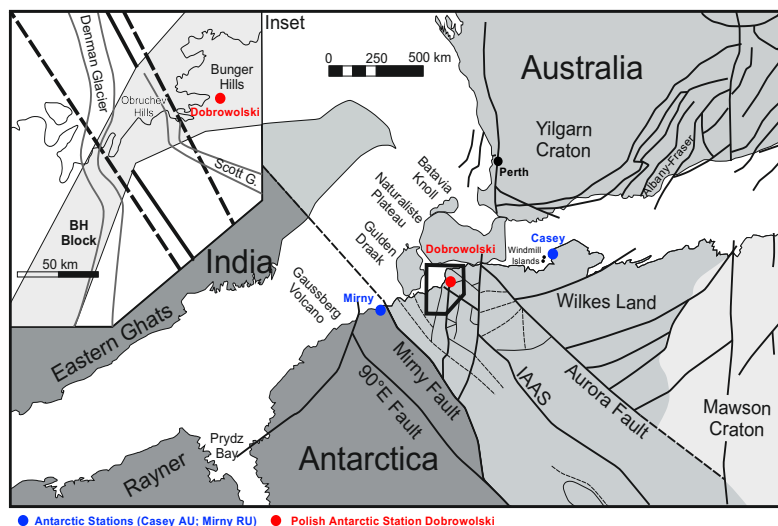


Figure 1. Reconstruction of Gondwana showing position of Bunger Hills, modified after Daczko et al., (2018). IAAS: Indo-Australo-Antarctic-Suture.

Prior to the breakup of the supercontinent Gondwana, there was a triple junction between Western Australia, East Antarctica and the Indian Peninsula (Fig. 1). At this geological ‘crossroads’, mobile belts (also known as mobile belts or orogens) met that joined together continental blocks. A number of small crustal fragments in these mobile belts exist, including the Bunger Hills, which is the largest single area of rock not covered by ice in East Antarctica. The area

around the Bunger Hills has recently seen a revival of interest amongst geoscientists from several countries. Although it is recognised that this geological block lies at the crossroads of mobile belts, conflicting interpretations exist in the recent literature regarding the connection of the Bunger Hills with different continental blocks. The scientific goal of the project is to determine the relationship between the Bunger Hills of East Antarctica and continental blocks in Australia and India that were adjacent in the Gondwana (500 million years ago) and Rodinia (one billion years ago) supercontinents.

This project involves geochemistry and geophysics applied to geological relationships within three continents: Eastern Antarctica, Western Australia and Peninsular India. The aim of the project will be achieved by testing three competing scientific hypotheses: whether the Bunger Hills was associated with 1) the Yilgarn Craton and Albany Fraser Orogen (Australo-Antarctic continent); 2) the Mawson Craton (Australo-Antarctic continent) or 3) the Indo-Antarctic continent, which may also be related to the Pinjarra Orogen in Western Australia. The novelty of the project will be the bringing together of senior international researchers with a long history of research in the Precambrian and broad experience in Antarctica, Australia and India, with a new generation of postdoctoral fellows and PhD students, to work together integrating fieldwork, geochemistry and geophysics on one of the most intriguing problems facing the supercontinent reconstruction of both Rodinia and Gondwana.

To discriminate between these hypotheses, expeditions will be mounted to Antarctica, SW Australia and eastern India to map the geology and collect samples. This will form the basis for an integrated analytical program involving research partners in several countries to provide world-class data. Interpretations and regional correlations will be underpinned by geophysical mapping and analysis.