

Physical volcanology and
geochemistry of the lower Gawler
Range Volcanics in the southern
Gawler Ranges

Thesis submitted in accordance with the requirements of the University of
Adelaide for an Honours Degree in Geology

Alastair Ross
November 2015



THE UNIVERSITY
of ADELAIDE

PHYSICAL VOLCANOLOGY AND GEOCHEMISTRY OF THE LOWER GAWLER RANGE VOLCANICS IN THE SOUTHERN GAWLER RANGES

VOLCANOLOGY OF THE SOUTHERN GAWLER RANGES

ABSTRACT

The Gawler Range Volcanics are a Silicic Large Igneous Province that has been extensively studied due to the atypical nature of its widespread felsic lava flows. These low viscosity lavas form the upper sequence of the GRV, termed the Upper Gawler Range Volcanics (UGRV). The older sequence or Lower Gawler Range Volcanics (LGRV) are readily distinguished from the UGRV as they appear as numerous discrete volcanic centres, the best exposed of which are at Kokatha and Lake Everard. A much less discussed volcanic area of the LGRV are the Southern Gawler Ranges Area Volcanics (SGRAV), which form a curvilinear belt along the southern margin of the GRV. The SGRAV are dominantly represented by two volcanic units, the Bittali Rhyolite (BR) and Waganny Dacite (WD) which are exposed discontinuously for ~200km E-W. The SGRAV may be divided into a western section of dominantly effusive volcanism, with elevated temperatures and halogen contents comparable to that of the UGRV, and a central-eastern section where explosive volcanism predominates. Petrogenetic modelling suggests that assimilation fractional crystallization (AFC) processes which played a role in the development of the LGRV, were active in the formation of the SGRAV. However, using AFC modelling, the SGRAV can be reconstructed through a dominant fractional crystallization process with late stage crustal assimilation, as opposed to continual crustal assimilation in the other LGRV magma systems.

KEYWORDS

Lower Gawler Range Volcanics, Bittali Rhyolite, Waganny Dacite, volcanology, geochemistry, SLIP, felsic

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