The geological exploration of the sub-Antarctic island of South Georgia: a review and bibliography, 1871-2015 (Stone, P. 2015. *British Geological Survey Report* OR/15/058). Addendum and supplementary material to 2021.

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Bibliographical addendum

Two relevant publications were omitted from the original, 2015 report. In both cases the authors used examples derived from the Cumberland Bay Formation, as assessed during their South Georgia fieldwork in the 1970s, to illustrate discussions of broader geological processes. Macdonald (1986) described aspects of turbidity current sedimentation and debated its implications for the depositional architecture of submarines fans; Tanner (1989) investigated the structural mechanism of chevron folding and associated deformation.

Geological investigations, 2015-2021

Since the main phase of geological investigations on South Georgia during the 1970s there has been a rapid acceleration in the rate of glacier retreat. This has led to the exposure of many extensive, clean rock faces, but in only one instance has there been any geological follow-up of the opportunities provided. At Gold Harbour, retreat of the Bertrab Glacier revealed a large fold structure in a deglaciated cliff. Having worked in that area in 1972, Stone (2019) utilised recent photographs to establish the style and orientation of the folding and related it to the previously recognised deformation sequence.

The consensus arising from the 20th century geological work on South Georgia, was that the island had an original, close connection to the southernmost Andes, and was transported to its current location during the tectonic development of the Scotia Arc. From analyses of GPS and marine seismic data Dalziel et al. (2019) concluded that the South Georgia microcontinental block was still moving independently within the plexus of faults that make up the North Scotia Ridge transform zone. Nevertheless, the extent of the required lateral movement, approximately 1700 km in 40 million years, proved hard to accommodate within models of the Scotia Sea region developed from marine geophysical data, for which there is now a burgeoning literature. The following three examples are illustrative.

The interpretation by Beniest and Schellart (2020), developed from a range of sources and geophysical datasets, struggled to resolve the South Georgia geological dilemma (and their claim to have produced the first geological map of the Scotia Arc is dubious

– see Dalziel (2021) for discussion). A more successful result for South Georgia was achieved by van de Lagemaat *et al*. (2021) who provided a kinematic explanation for the transfer of small continental fragments from South America and the Antarctic into the tectonic regime of the Scotia Sea, albeit their model relied largely on constraints provided by marine magnetic anomalies. An iconoclastic approach was taken by Eagles and Eisermann (2020). They dismissed the Andean correlation for South Georgia, maintaining that their regional model, derived from an interpretation of geomagnetic data, "rules out venerable correlation-based interpretations for a Pacific margin location and subsequent long-distance translation of the South Georgia microcontinent". Their solution was a radical regional reinterpretation in which South Georgia originated at the southern margin of the Falklands Plateau, adjacent to the Maurice Ewing Bank.

The increasing tendency to dismiss the geological evidence when it did not conveniently fit with regional modelling of large geophysical datasets was challenged by Dalziel *et al*. (2021) in a comprehensive review of South Georgia's Andean correlations. The result was an emphatic confirmation of the geological relationships and a reconstruction of South Georgia in an original position immediately south of Burdwood Bank. The Pacific hinterland of the southernmost Andes is missing in Tierra del Fuego where it terminates at a submarine escarpment forming the continental margin immediately east of Cape Horn. The arc and marginal basin infill rocks of South Georgia correspond exactly to part of the missing Cordilleran hinterland. Additional support for this correlation came from a comparison of palaeomagnetic data for South Georgia and the Fuegian Andes by Beaver *et al*. (*in press*) which supported a palaeoposition for the South Georgia microcontinent south of Burdwood Bank.

References additional to those listed in the 2015 report

Beaver, D.G., Kent, D.V. and Dalziel, I.W.D. *in press* (2021/2022?). Paleomagnetic constraints from South Georgia on the tectonic reconstruction of the Early Cretaceous Rocas Verdes marginal basin system of southernmost South America. *Tectonics*.

Beniest, A. and Schellart, W.P. 2020. A geological map of the Scotia Sea area constrained by bathymetry, geological data, geophysical data and seismic tomography models from the deep mantle. *Earth-Science Reviews*, **210**, 103391.

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GPS and marine seismic data. *Geological Society of America Annual Meeting, Phoenix, Arizona. Abstracts with Programs*.

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Stone, P. 2019. Glacial retreat at Gold Harbour, South Georgia: discovering unforeseen geology, remembering unexpected guests. *Falkland Islands Journal*, **11**(3), 40-56.

Tanner, P.W.G. 1989. The flexural-slip mechanism. *Journal of Structural Geology***,** **11**, 635–655.

van de Lagemaat, S.H.A., Swart, M.L.A., Vaes B., Kosters M.E., Boschman L.M., Burton-Johnson, A., Bijl, P.K., Spakman, W., Douwe J. and van Hinsbergen D.J.J. 2021. Subduction initiation in the Scotia Sea region and opening of the Drake Passage: When and why? *Earth-Science Reviews*, **215**, 103551.

South Georgia place names celebrating geologists and geological contributions (Appendix 1, 2015): addendum

(The dates given are those when fieldwork was undertaken)

Two place names from the 2015 listing require modification.

Andersson Peaks: 54° 26′ S, 36° 52′ W.
J. G. Andersson, geologist with the Swedish Antarctic Expedition 1901–04, who visited South Georgia in 1902. This is a redefinition of *Andersson Passhöhe*, which was previously regarded as redundant.

Macdonald Cove: 54° 00′ S, 37° 29′ W.
D. I. M. Macdonald, BAS geologist 1975–77. Fieldwork dates revised.

Three additional place names celebrating individuals involved in geological field work should be added.

Jewell Glacier: 54° 16′ S, 37° 08′ W.
J. A. Jewell, BAS field assistant 1976–77, supported the geological work of D. I. M Macdonald. See also Macdonald Cove.

Johnson Point: 54° 24′ S, 36° 50′ W.
C. E Johnson, BAS field assistant 1975–76, supported the geological work of D. I. M Macdonald and P. W. G. Tanner. See also Macdonald Cove and Tanner Island.

Lawther Knoll (Annenkov Island): 54° 29′ S, 37° 04′ W.
E. G. Lawther, BAS field assistant 1971–73, supported the geological work of P. Stone and T. H. Pettigrew. See also Pettigrew Scarp.

Place names celebrating six eminent Scandinavian geologists were omitted from the 2015 listing. None of them were personally involved with work on South Georgia.

Esmark Glacier: 54° 13′ S, 37° 14′ W.
Jens Esmark (1763–1839). Danish-Norwegian geologist and glaciologist. Professor of Mineralogy at Kristiania University, Oslo.

Hamberg Glacier (and adjacent Hamberg Lakes): 54° 21′ S, 36° 33′ W.
Axel Hamberg (1863–1933). Swedish geologist and glaciologist.

Helland Glacier: 54° 28′ S, 36° 37′ W.
Amund Helland (1846–1918). Norwegian mining geologist and glaciologist.

Keilhau Glacier: 54° 16′ S, 37° 03′ W.
Baltazar Keilhau (1797–1858). Norwegian geologist. Succeeded J. Esmark (q.v.) as Professor of Mineralogy at Kristiania University, Oslo.

Kjerulf Glacier: 54° 21′ S, 36° 47′ W.
Theodor Kjerulf (1825–1888). Norwegian geologist. Succeeded B. Keilhau (q.v.) as Professor of Mineralogy at Kristiania University, Oslo.

Reusch Glacier: 54° 29′ S, 36° 28′ W.
Hans Reusch (1852–1922), Norwegian geologist. Director of the Norges Geologiske Undersøkelse.