

# Structure and sedimentology in the Scotia Arc: the southernmost Andes

IAN W. D. DALZIEL

*Lamont-Doherty Geological Observatory  
Columbia University  
Palisades, New York 10964*

R. H. DOTT, JR.

*Department of Geology and Geophysics  
University of Wisconsin  
Madison, Wisconsin 53706*

Our program to study the geologic evolution of the Andean-West Antarctic Cordillera and of the Scotia Arc continued during the 1973-1974 austral summer with field work in the Patagonian and Fuegian Andes (fig. 1).

In January, Dr. Dalziel, together with Drs. M. J. de Wit and C. R. Stern, continued the study, initiated the previous field season, of the Lower Cretaceous ophiolite complex in the Patagonian Andes north of the Straits of Magellan. During February and March, de Wit and Stern carried out further field work in Cordillera Darwin immediately north of Canal Beagle. In addition to structural geology, an extensive collecting program was undertaken for petrologic and

ANTARCTIC JOURNAL

paleomagnetic studies at Lamont-Doherty Geological Observatory, in cooperation with Dr. John Tarney, University of Birmingham, England. The field work was supported logistically by the Empresa Nacional del Petroleo (ENAP), the Chilean National Oil Company. Several ENAP geologists participated.

In April and May, Dr. Dalziel was co-chief scientist, along with Mr. Peter F. Barker, University of Birmingham, England, for *Glomar Challenger* leg 36 of the Deep Sea Drilling Project.

A goal of the Scotia Arc tectonics project is to do a comparative study of South Georgia Island, at the eastern end of North Scotia Ridge, and the geologically similar Navarino Island, immediately south of Canal Beagle. It is believed that South Georgia and Navarino islands once were much closer together (fig. 2). Field work on South Georgia in 1973 (Dalziel and Dott, 1973; Dalziel *et al.*, 1973; Dalziel *et al.*, in press) was followed by studies on Navarino, Hoste, and neighboring islands in May 1974 from aboard R/V *Hero* (cruise 74-6). Dr. Dott was senior scientist on the cruise, accompanied by Messrs. Ronald L. Bruhn and Robert D. Winn, Jr. (all three worked on South Georgia the previous year), and Dr. de Wit and Ms. Margaret A. Winslow.



Figure 1. Cape Horn as seen on June 3, 1974, from R/V *Hero* as the ship passed under sail in unusually good weather. A successful landing was made on the north side of Cape Horn Island and geologic observations were made and specimens were taken.

Preliminary results from the Navarino-Hoste cruise confirmed a close likeness of Lower Cretaceous strata in Tierra del Fuego with those of South Georgia. Field work revealed not only a similarity of overall sedimentary appearance, but also of current patterns during deposition of the ancient sediments; laboratory analysis of mineral compositions of the sandstones, by Winn, will further test our hypothesis. Structurally,

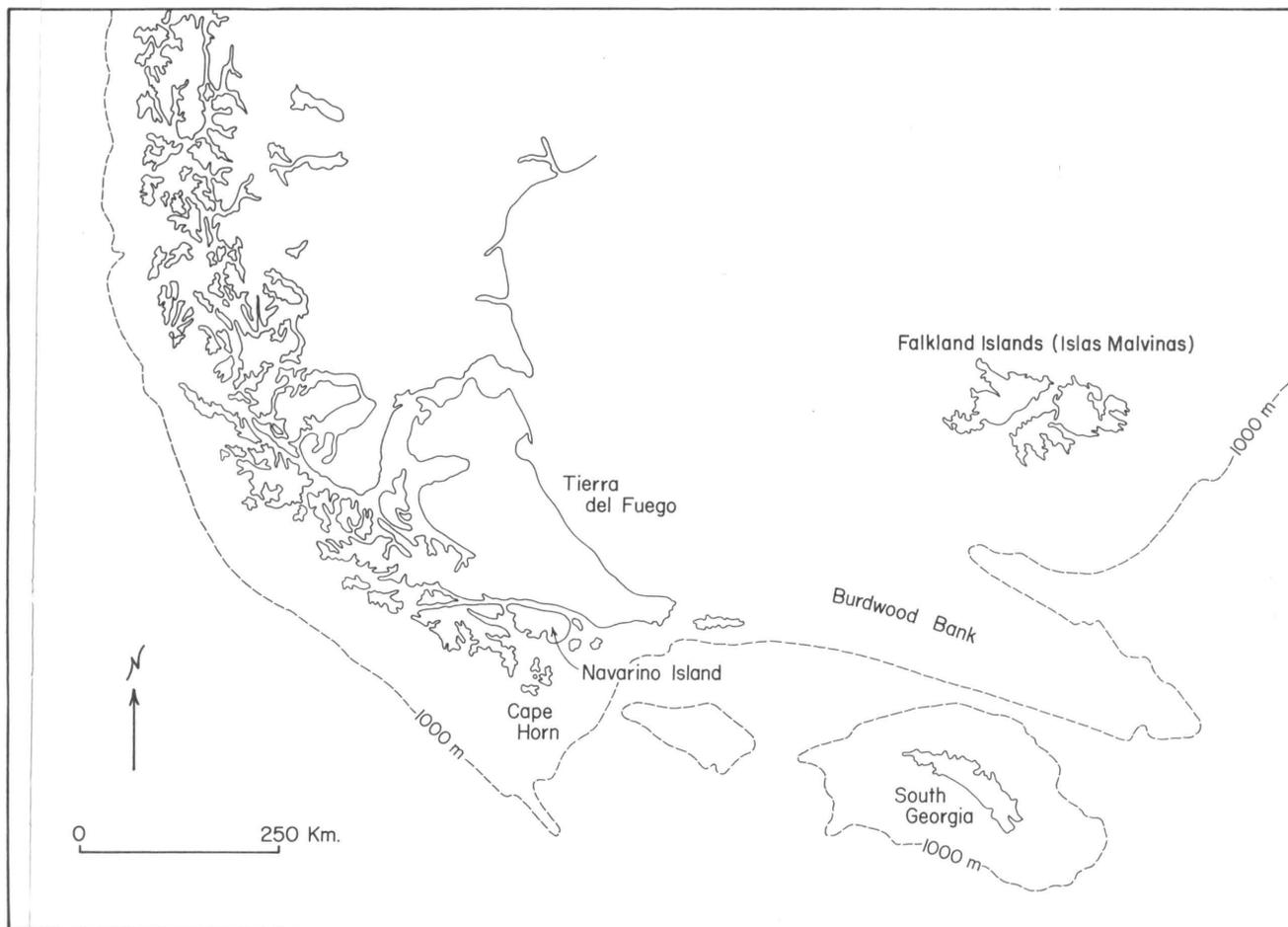


Figure 2. Map showing a paleogeographic reconstruction of the North Scotia Ridge (after Dalziel *et al.*, in press).

the rocks of Navarino and Hoste islands also are similar to those of South Georgia. In both cases they are tightly folded in the north but become much less folded southward. Structural observations by Drs. de Witt and Winslow and Mr. Bruhn also were extremely valuable for comparison with their work farther north in Tierra del Fuego.

Our field work in Chile during January, February, and March 1974 relied on the generous support of the ENAP. We are grateful to Sr. Eduardo Gonzalez P., then ENAP administrator in Punta Arenas, and to Sr. Raul Cortes R. Work from aboard *Hero* was assisted by Captain Norman Deniston and his crew. The Chilean navy was most helpful in providing sailing advice and some logistics support at Puerto Williams, Navarino Island. The excellent guidance and good company of our Chilean pilots, Lieutenant Luis Allamand and Captain Jorge Zamudio, also is warmly acknowledged.

This research was supported by National Science Foundation grants cv-19543 and cv-36656.

### References

- Dalziel, I. W. D., and R. H. Dott, Jr. 1973. Structure and sedimentology in the Scotia Arc: South Georgia and the southernmost Andes. *Antarctic Journal of the U.S.*, VIII(4): 152-154.
- Dalziel, I. W. D., R. H. Dott, Jr., R. D. Winn, Jr., and R. L. Bruhn. 1973. Tectonic relations of South Georgia Island to the southernmost Andes. Geological Society of America Annual Meeting, Dallas, Texas, November 12 to 14, 1973. *Abstract*: 590.
- Dalziel, I. W. D., R. H. Dott, Jr., R. D. Winn, Jr., and R. L. Bruhn. In press. Tectonic relations of South Georgia Island to the southernmost Andes—preliminary results. *Geological Society of America Bulletin*.