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SEISMIC REFLECTION, MAGNETICS, AND GRAVITY DATA ACROSS THE QUEEN CHARLOTTE FAULT AND DIXON ENTRANCE.

K.M.M. Rohr, C. Lowe, and P.D. Snavely Jr. (U.S. Geological Survey)

INTRODUCTION

Geophysical data across the northern Queen Charlotte Fault and Dixon Entrance (Fig. 1 and 2) are presented as a series of maps and seismic sections with coincident potential field profiles.

The seismic reflection data were collected in 1977 on a joint cruise by the U.S. Geological Survey and the Geological Survey of Canada on the *R/V S.P. Lee*; an interpretation of Line 5 was presented by Snavely, et al.(1981). Here, we present Line 5 plus three additional lines, which cross the continental margin (Fig. 6, 7, 8, and 9); gravity and magnetic data are presented as maps (Fig. 3, 4 and 5) as well as profiles (Fig. 6, 7, 8, and 9).

SEISMIC REFLECTION DATA

As described by Snavely et al., (1981) the streamer consisted of 24, 100 m long channels and the sound source was a five airgun array with a total volume of 21.73 L (1326 in^3) fired every 50 m. The seismic data were recorded at a 2 ms sampling rate with a 5-110 Hz filter, but were processed at 4 ms. Processing included spherical spreading loss corrections, velocity analysis, stacking and a band-pass filter. Navigation consisted of dead-reckoning supplemented with satellite fixes.

We also present an interpretation of Tertiary sedimentary basins in Dixon Entrance (Fig. 5) based on single-channel seismic reflection data collected by Pan-American Oil and the Geological Survey of Canada. These data image glacial sediments (Barrie et al. 1991; 1991a) as well as underlying Tertiary sediments and bedrock (Fig. 6). Their extensive coverage allows delineation of a series of en-echelon half-grabens all of which are bound on the west by a master fault (Rohr and Dietrich, 1992).

GRAVITY DATA

Fig. 3 shows the distribution of the 10,796 gravity measurements in the survey area. They were obtained during 19 individual surveys, undertaken between 1963 and 1988, by the Earth Physics Branch and the Geological Survey of Canada (Stacey et al., 1969; Earth Physics Branch, 1982; Currie et al., 1983; Seemann et al., 1988). Onshore, the station interval varies from 3 km to 12 km, averaging one measurement every 10 km. Offshore, measurements average 1.5 km along survey lines, and the separation of survey lines varies from less than 2 km in Dixon Entrance, to more than 10 km west of the Queen Charlotte Islands. Although survey methods and instrumentation varied from survey to survey, all measurements were reduced to the International Gravity Standardization Net (IGSN71) and the Geodetic Reference System (GDR67). Onshore, the average estimated horizontal and vertical errors in station positions are ±100 m and ±3 m, respectively. Offshore, the absolute accuracy of station positions is ±200 m. Free-air anomalies were calculated for offshore stations and Bouguer anomalies for those onshore. A standard density of 2.67 g cm^{-3} was used to calculate the simple Bouguer correction. Terrain effects were removed using a 1 km digital elevation file, out to a distance of 30 km from each station. The resulting complete Bouguer anomalies are considered accurate to ± 2 mGal, and the free-air anomalies to ±3 mGal. The data are available from the National Geophysical Data Centre, Ottawa.

MAGNETIC DATA

Magnetic data were collected on all the offshore lines shown in Fig. 3 (Currie et al., 1983). In addition, high resolution aeromagnetic surveys were flown in the regions labelled 1, 2, and 3. Areas 1 and 2 were flown under contract for the Geological Survey of Canada. Surveying in area 1 was undertaken in 1989. The flight altitude for the survey was 2897 metres above sea level. Flight lines were oriented east-west, and spaced 2 km apart. Area 2 was surveyed in 1985. The flight altitude was 610 m above ground level. Flight lines were oriented east-west, and spaced 1.5 km apart. The data in area 3 were supplied by Shell Canada Resources Ltd, and recompiled and leveled under contract by the Geological Survey of Canada in 1985. The flight altitude was 305 m above sea level, flight lines were oriented northeast-southwest and spaced 3 km apart. Compilation of all magnetic data, including removal of the International Geomagnetic Reference Field, and interpolation onto a 2 km grid was carried out by the Geological Survey of Canada, (see Dods et al., 1985 for details of reduction process). The data are also available from the National Geophysical Data Centre, Ottawa.

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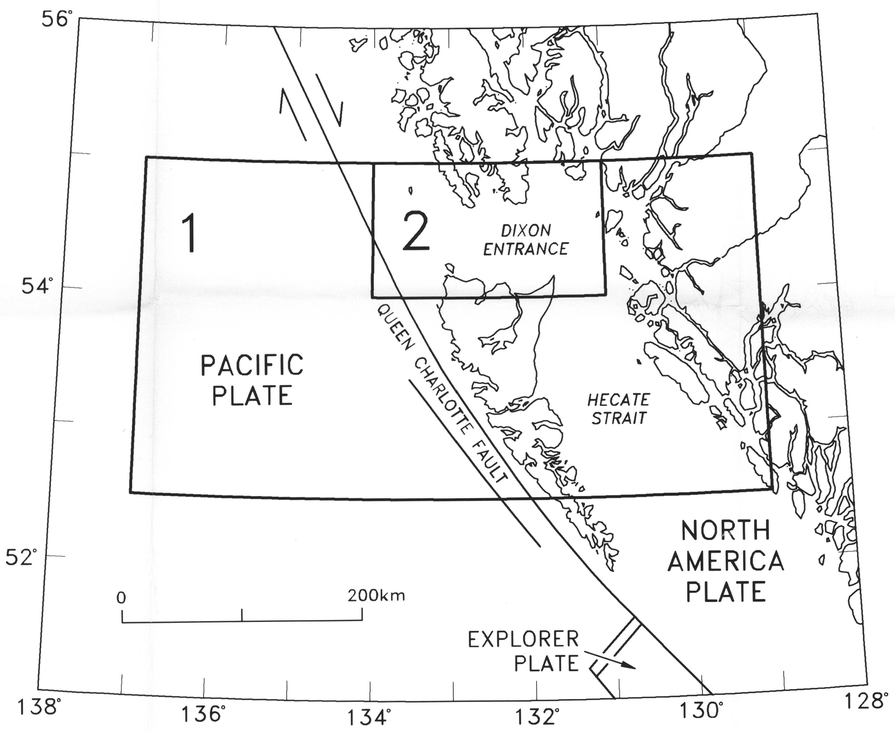
Figure 1.

Regional tectonic setting. The Queen Charlotte Fault and Dixon Entrance study areas are labelled 1 and 2, respectively.



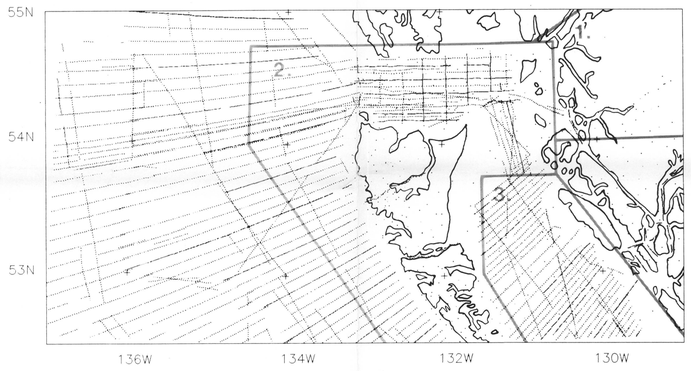
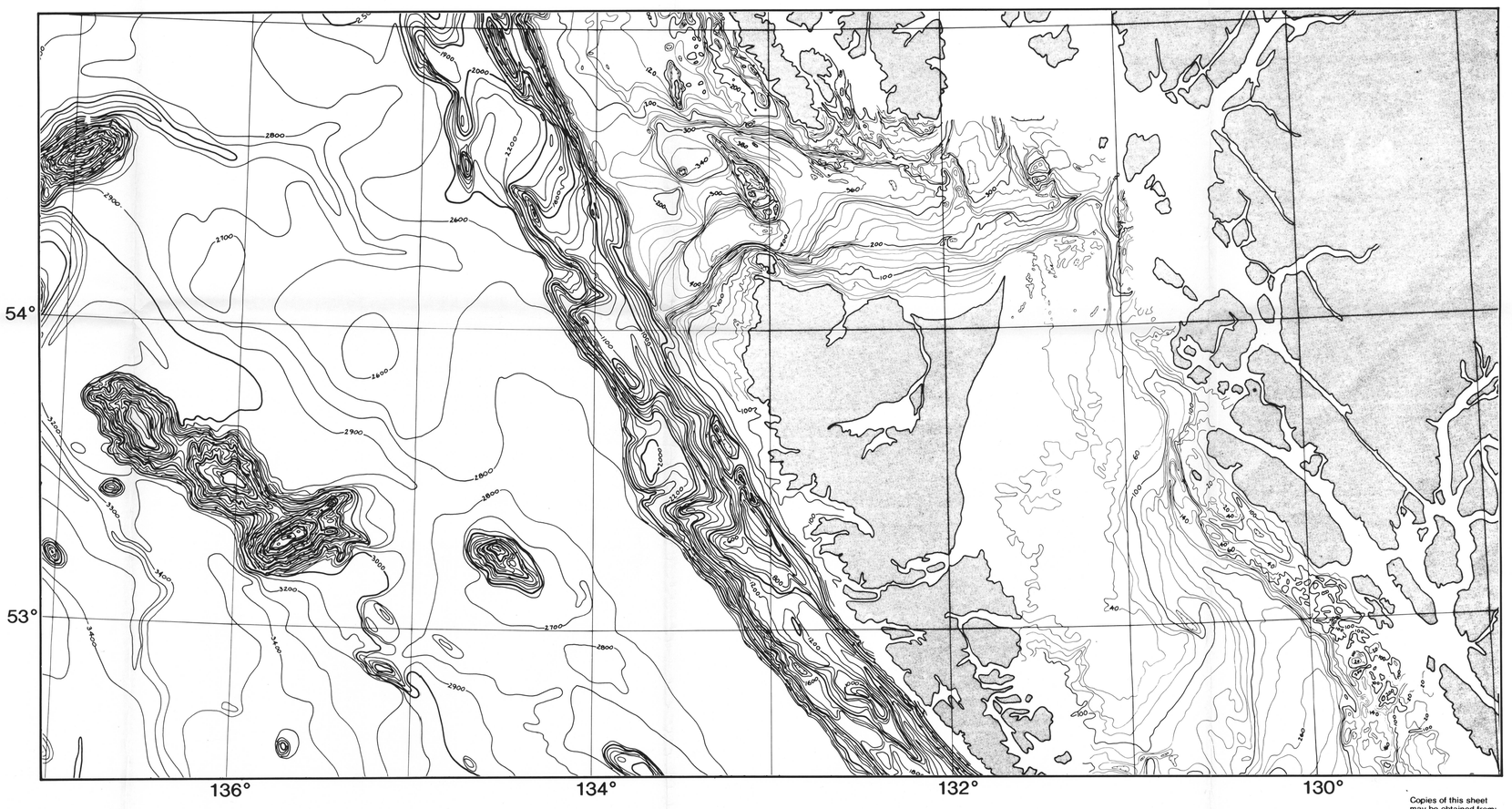


Figure 3.

Distribution of gravity and magnetic data in survey region (see text for details).

Figure 2.

Bathymetry (after Seemann, 1982).



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