Admittance signatures of rifted and transform margins: examples from eastern Canada

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SUMMARY
Examination of the gravity and bathymetry data across the rifted Scotian margin and the sheared Grand Banks margin, off the Canadian east coast, using a spectral analysis or admittance approach, yielded different results. The admittance for the Scotian margin best fitted a regional compensation model; in contrast, a local compensation mechanism reproduced the transfer function for the Grand Banks margin. The results for the longer wavelengths were verified using satellite altimetry data. The effect of a hidden or subsurface load was investigated for both margins and this was also found to differ. The differences in the compensation mechanism between rifted and sheared margins was attributed to their formation mechanisms. Rifted margins are formed by upper crustal faulting and lower crustal flow parallel to the spreading centre. These characteristics are compatible with thin plate flexure compensation. In contrast, transform margins are formed perpendicular to the spreading ridge and the isotherms are only slightly raised as the spreading centre migrates along the margin producing a weak suture which accommodates local compensation.

Key words: admittance, gravity, rifted margin, transform margin.

INTRODUCTION
Many passive continental margins display a free-air gravity anomaly that is positive along the edge of the shelf and negative over the slope (Sheridan, Grow & Klitgord 1988). In a previous study of the shelf edge gravity anomalies along the passive margins of eastern Canada, Woodside & Verhoef (1989) show that different shaped anomalies characterize the rifted and transform (or sheared or offset) segments of passive margins. On rifted margins, such as the Scotian margin (see Fig. 1 for location), a short-wavelength positive free-air anomaly is superimposed on a longer wavelength negative anomaly. In contrast, on the Grand Banks transform margin the gravity anomaly is more step-shaped. The difference in the anomaly character across rifted and transform margins is further illustrated by Karner & Watts (1982). Along the eastern North American margin they show 24 profiles, of which 23 are from the rifted margin and one is from the Grand Banks shear zone. The residuals between the observed and predicted gravity anomalies are greatest for the transform margin profile.

Here we plotted bathymetry and gravity profiles from the areas of the Scotian margin and Grand Banks identified in Fig. 1. Three equally spaced profiles perpendicular to the margins are shown in Fig. 2. The bathymetry profiles are clearly similar; in contrast, the gravity profiles are obviously distinct. The gravity peak on the Scotian margin is 30–50 mGal greater and narrower than that on the Grand Banks. This diagram verified to us that the rifted and transform margins of Atlantic Canada exhibited different gravity traits.

In this paper we examined high-quality gravity and bathymetric data sets across the rifted Scotian and the sheared Grand Banks margins using a spectral analysis approach. This technique assumes that the observed gravity anomalies are caused by the topography and its compensation. It calculates a transfer function that when convolved with the topographic profile produces the gravity signature of both the topography and its isostatic compensation. The transfer function or admittance was calculated from the cross-spectrum of gravity and topography divided by the power spectrum of the topography (Lewis & Dorman 1970; McKenzie & Bowin 1976). The observed admittance functions for the Scotian and Grand Banks margins were compared to local (Airy) or regional (flexural) compensation models. We showed that the results were distinctly different for both margins and discussed the consequences for the continent–ocean transition.
Figure 1. Bathymetry of the area. The bathymetry was obtained from a merge of the data from the National Geophysical Data Base and ETOPO5. The dotted lines illustrate the limit of the Canadian data. The boxes denote the location of the profiles selected for the admittance study. The first and last profile number is indicated in each box. The heavy lines denote the location of the seismic lines of Fig. 3. The bathymetry profiles run perpendicular to the margin.

Figure 2. Bathymetry and gravity data selected from the profiles used to calculate admittance. One from the beginning, middle and end of each data set.
SEDIMENTARY LOADING
Both the rifted Scotian margin and the sheared Grand Banks margin were formed as a consequence of the opening of the North Atlantic. Fig. 3 shows geological cross-sections of both margins, based upon seismic reflection and refraction, potential field data and well information (after Keen et al., 1990). The sedimentary deposits on the Scotian margin are both syn- and post rift; no clear breakup unconformity is observed on this margin. On the Grand Banks margin syn and post-rift sedimentary strata are distinguished by the breakup unconformity of Late Cretaceous and younger (Keen et al. 1990). Fig. 3 also illustrates that the shape of the mantle, the continent-ocean transition and the thickness of the sedimentary basins are different on the two margins. The shape of the mantle and the crustal transition are related to the different processes that produced the margins (Scrutton 1982). Fowler & McKenzie (1989) studied gravity data across two rifted margins, one that was starved of sedimentary deposition and the other blanketed. Their results indicate that crustal variations are produced when the margin is stretched and is hot and weak enough for isostatic compensation. Importantly, their results also showed that sedimentary accumulation had little effect on the flexural characteristics of the margin. Therefore, the assumption that the fundamental shape of the gravity profile across a margin is mainly due to the processes producing the margin and not significantly modified by post-rift sedimentation supports that the admittance technique is appropriate for examining the fundamental differences in the elastic character of the margins.

DATA PREPARATION
The admittance function can be obtained from a correlation of topography and gravity along profiles (e.g. McKenzie & Bowin 1976) or from correlating gridded data sets (e.g. Dorman & Lewis 1970). As the results along profiles are easier to interpret, we have followed this approach. However, our input data consisted of several tracks that were not perpendicular to the margin. Therefore, we mapped the irregular tracks onto a 0.05° by 0.05° geographical grid.

The bathymetric and free-air gravity data were obtained from the National Geophysical Data Base in Ottawa (Earth Physics Branch 1986). Fig. 1 shows the bathymetry in the study area. Outside the polygon shown in Fig. 1 the digital bathymetric data from the ETOPOS (1986) data set was used. At locations where not enough data was available to fill all the grid cells, and along the edges of the polygon, gaps were filled in using a minimum curvature routine (Briggs 1974). Fig. 4 shows the gravity data in the area. For these data the same procedure was followed, except that in this case the gravity data obtained from conversion of SEASAT altimetry data (Haxby 1987) was used to complement our data.

From the gravity and bathymetry data sets values were obtained along several profiles perpendicular to the margins (for location see Figs 1 and 4). The profiles were sampled at an equidistant interval of 2 km using a linear interpolation scheme to obtain values from the surrounding grid values. Fig. 5 shows the profiles across the Scotian margin, while Fig. 6 gives those across the Grand Banks margin. For the Grand Banks margin 18 profiles were used in our admittance calculations; however, Fig. 6 only shows the odd numbered profiles.

RESULTING ADMITTANCES
The profiles of Figs 5 and 6 were used to obtain the transfer functions for both margins. We followed the standard procedure to obtain the results: the profiles were sampled to a power of two, the average value was subtracted and a full cosine taper was applied to the profiles before they were transformed to the Fourier domain using a standard Fast Fourier Transform routine.

Figs 7 and 8 display the different spectral parameters for the Scotian and the Grand Banks margins, respectively. The logarithm of the admittance showed a general decrease with increasing wavenumber for wavenumbers up to 0.4 km⁻¹ (15.7 km wavelength) and then remained roughly constant. On the Scotian margin this curve was relatively smooth out to wavenumbers ≈0.25 km⁻¹, which suggested that for wavelengths greater than 31 km the profile data was stable and consistent. On the Grand Banks, the logarithm of the admittance was more irregular with a comparatively smooth section for wavenumbers ≈0.25 km⁻¹, except for the dip between 0.04 and 0.06 km⁻¹ (wavelengths of 157–105 km).
Similar behaviour was observed between these wavenumbers for several of the parameters shown in Fig. 8. The linear decay of the log-admittance curve for larger wavenumbers $k$ corresponds to the $\exp(-kd)$ attenuation due to a water layer with thickness $d$. This part of the curve was used to obtain estimates for the average water depth and for the surface density (e.g. Karner & Watts 1982). The results are given in Table 1.

The coherence provides a method of estimating if a surface load adequately describes the loading process (Forsyth 1985). For the Scotian margin the coherence is high indicating top loading of an elastic plate is a sufficient

![Diagram](https://academic.oup.com/gji/article-abstract/105/1/229/668995)

**Figure 4.** Free-air gravity of the area. The data is a merge of the Canadian data (within the area denoted by the heavy line) and the gravity obtained from converted SEASAT altimetry (Haxby 1987). The boxes denote the location of the profiles which are perpendicular to each margin that were selected for the admittance study.

**Figure 5.** Profiles across the Scotian margin. These profiles were obtained from the gridded data shown in Figs 1 and 4. Displayed are the residual (calculated as the differences between the observed and the predicted gravity anomalies), observed gravity, filtered bathymetry (or predicted free-air anomaly), bathymetry and depth to basement (dotted where deeper than 12 km, where values have been inferred).
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Profiles across the Grand Banks margin. These profiles were obtained from the gridded data shown in Figs 1 and 4. Displayed are the residual (calculated as the difference between the observed and predicted gravity anomalies), observed gravity, filtered bathymetry (or predicted free-air anomaly), bathymetry and depth to basement (dotted where deeper than 12 km, where values have been inferred).

Profiles across the Grand Banks margin. These profiles were obtained from the gridded data shown in Figs 1 and 4. Displayed are the residual (calculated as the difference between the observed and predicted gravity anomalies), observed gravity, filtered bathymetry (or predicted free-air anomaly), bathymetry and depth to basement (dotted where deeper than 12 km, where values have been inferred).

Figure 6. Profiles across the Grand Banks margin. These profiles were obtained from the gridded data shown in Figs 1 and 4. Displayed are the residual (calculated as the difference between the observed and predicted gravity anomalies), observed gravity, filtered bathymetry (or predicted free-air anomaly), bathymetry and depth to basement (dotted where deeper than 12 km, where values have been inferred).

Admittance and related spectral parameters for the Scotian margin. (A) logarithm of admittance, (B) coherence, (C) phase, (D) logarithm of the power of gravity (continuous line) and bathymetry (dashed line), and (E) logarithm of coherent (continuous line) and non-coherent (dashed line) energy.

Admittance and related spectral parameters for the Scotian margin. (A) logarithm of admittance, (B) coherence, (C) phase, (D) logarithm of the power of gravity (continuous line) and bathymetry (dashed line), and (E) logarithm of coherent (continuous line) and non-coherent (dashed line) energy.

Figure 7. Admittance and related spectral parameters for the Scotian margin. (A) logarithm of admittance, (B) coherence, (C) phase, (D) logarithm of the power of gravity (continuous line) and bathymetry (dashed line), and (E) logarithm of coherent (continuous line) and non-coherent (dashed line) energy.

Admittance and related parameters for the Grand Banks margin. A-E: same as in Fig. 7.

The phase of the admittance should be close to zero when the gravity is due to surface loading, since the admittance is a real function (McKenzie & Bowin 1976). For the Scotian margin, this was the case; however, for the Grand Banks margin we observed a significant phase between wavenumbers 0.04 and 0.06 km⁻¹ (wavelengths of 157 to 105 km).

The log-power curves of gravity and bathymetry illustrate that their relative energy is similar for both margins. The similarity in the energy of the bathymetry for both margins indicated that the admittance values were not only due to the bathymetric shape of the margin but also to the deeper seated geologic surface loads.

The coherent and incoherent energy spectra are derived from the coherence and provided a useful evaluation of the admittance. The most reliable admittance values are for those wavenumbers where the coherent part dominates. On the Scotian margin the coherent energy was greater than the incoherent noise for wavenumbers smaller than 0.2 km⁻¹. On the Grand Banks margin the coherent energy was greater than the incoherent out to wavenumbers of ≤0.04 km⁻¹. The low in coherent energy on the Grand Banks margin between 0.04 and 0.06 km⁻¹ corresponds to the negative phase and low coherence values. This again suggests the gravity was not simply related to the bathymetry at these wavenumbers.

In order to show the part of the gravity anomalies that was contained in the admittance function, we calculated predicted gravity anomalies by convolving the bathymetry with the admittance functions. The results are shown in Figs...
Table 1. Parameters for admittance models.

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5 and 6, and labelled filtered bathymetry profiles. The difference between the observed gravity and the filtered bathymetry, the residual, is also given. The standard deviation of the residual was smaller than 15 mGal for 8 out of 11 profiles for the Scotian margin and for 12 of the 18 profiles across the Grand Banks margin. The residual anomaly, together with its implications will be discussed in a later section.

**Figure 9.** Admittance for Scotian margin, together with (a) models for elastic plate (regional) compensation and (b) for Airy compensation. The models were calculated with the parameters of Table 1. Open circles denote the results for the gravity obtained from satellite data (see text).

**Figure 10.** Admittance for Grand Banks margin, together with (a) models for elastic plate (regional) compensation and (b) for Airy compensation. The models were calculated with the parameters of Table 1. Open circles denote the results for the gravity obtained from satellite (see text).
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wavelengths larger than about 150 km (open circles in Figs 9 and 10) were in reasonable agreement with those obtained from ship-borne data. The values were in general too low, which might be caused by the processing of the satellite data. For wavelengths shorter than 150 km, the admittances obtained from the satellite data were much lower than those from ship-borne data. This was due to the fact that the gridded satellite data set did not contain enough short-wavelength information.

RESIDUAL ANOMALIES AND EFFECTS OF BASEMENT TOPOGRAPHY

The admittance functions of Figs 9 and 10 were obtained from the correlation between bathymetry and gravity. The occurrence of large sediment thicknesses at continental margins might significantly influence the results by causing gravity anomalies that have no bathymetric expression. In the next two sections we investigated effects on the admittance caused by additional loading, such as sediments or lateral density variations.

Figure 11 gives the depth to basement map, produced with seismic reflection lines, for the study area. This is a combination of published maps for the Scotian and Grand Banks margins (Wade & MacLean 1990) and for the area around Flemish Cap (Grant 1990). The hand-contoured maps were digitized, gridded, and filled using a minimum curvature routine (for a description of the compilations, see Oakey, Currie & Durling 1989). The depth to basement map shows a deep basin along the Scotian margin which narrows and shallows slightly where it continues along the Grand Banks margin. However, the basement beneath the thickest portion of the sedimentary basins off Nova Scotia has not been identified on seismic reflection profiles. Depth to basement greater than 10–12 km has been inferred on the basis of the expected stratigraphic section and regional considerations. Depth to basement values for the profiles across the Scotian and Grand Banks margins are shown in Figs 5 and 6, respectively.

Comparison of the residual anomalies with the basement
profiles across the margins showed some direct correlations. Across the Scotian margin (Fig. 5) a low in the residual corresponds with the deeper part of the basin for profiles 1–4. For profiles 5–11, however, a local high in the residual corresponded to the basement deep. On the Scotian margin, west of Sable Island where profiles 1–4 are located, the upper crust is cut by numerous faults and exhibits a broad hinge zone, but to the east the hinge line is sharper and a deeper sedimentary basin developed (B. MacLean, personal communication 1989). This suggested that the differences observed were real and related to the differing structural patterns in the upper crust. For the Grand Banks margin, at some places, the residual anomalies are directly related to basement topography. Examples are basement highs in profiles 3, 15, and 17. In general, for profiles 1–7 the residual is positive over the basement deep. For profiles 9–17 no clear picture evolves.

As a first attempt to quantify the correlations between the residuals and the basement topography, we calculated the admittance function between them. However, for the Scotian margin, the coherent energy of the resulting admittance function for wavenumbers less than 0.2 km⁻¹, was less than 5 per cent of the non-coherent energy. This result improved after calculating two separate admittances, one for profiles 1–4 and the other for profiles 5–11. Even in this case the coherent energy was only about 10 per cent of the non-coherent energy. Similar results were obtained for the Grand Banks margin. These results probably indicated that the (inferred) deeper part of the depth to basement profiles is too generalized to be used in frequency content studies. Although some correlations between the residual anomalies and the basement topography were observed, no quantitative result emerged.

**HIDDEN LOAD**

We already noted the anomalous values for the Grand Banks margin in the wavelength band between 100 and 150 km and the difference in coherence between the Scotian and Grand Banks margins. Forsyth (1985; see also McNutt, Diamant & Kogan 1988) shows that the wavelength band in which the coherence decreases from high to low values can be related to the rigidity of the plate, using a technique that allows for the presence of loads other than the topography.

The effects of an extra sediment load on the admittance can be illustrated as follows. Assume a topography \( b_1 \) (Fig. 12). We treated this topography as a visible load, which in the case of a flexural response, gives rise to a flexure \( w \). The usual treatment is to regard both the topography \( b_1 \) and the flexure \( w \) as the total load. However, in our case we still have an extra load, shown in Fig. 12 by the area \( b_2 \). This load is a ‘hidden or subsurface load’ (McNutt 1983; Forsyth 1985), and since it is not reflected in the topography, the admittance function will not incorporate it. As a matter of fact, effects of this hidden load are treated as non-coherent noise and show up in the residual. This subsurface loading can occur from above, as sketched in Fig. 12, or from anywhere inside or below the plate. Forsyth (1985) discusses effects of subsurface loading and suggests a way to recalculate the admittance in order to show its presence.

The standard way of calculating the admittance \( Z \) is

\[
Z = \frac{(GT^*)}{(TT^*)}
\]

where \( G \) is the Fourier transform of the gravity anomaly and \( T \), the transform of the topography. The asterisk denotes the complex conjugate (McKenzie & Bowin 1976), and the \( (\cdot) \) symbols denote the ensemble averaging over the different profiles. In this way we obtained an admittance, \( Z \), which is the optimum filter to predict gravity anomalies from topography. However, as pointed out by Forsyth (1985, cf. McNutt 1983), each component of \( Z \) is weighted by the power of the topography. This way of calculating an
Admittance favours anomalies related to topographic features.

Forsyth (1985) calculates the reciprocal of the admittance as

\[ Q^{-1} = \frac{G^*}{G^*}. \]  

(2)

This function is the optimum filter to predict the topography from gravity anomalies and each component is weighted by the power of the gravity (Forsyth 1985). In the case of subsurface loading, the two resulting functions defined in (1) and (2) will not be reciprocal.

Figure 13(A) shows both \( Q \) and \( Z \) for the Scotian margin and we observed that the values of \( Q \) were in general higher than those for \( Z \). However, the shape of both curves was similar. The fact that the \( Q \) values are larger might be caused by the inherent downward continuation process involved in the prediction of topography from gravity (McNutt 1983; Forsyth 1985). For the Grand Banks, the results were completely different (Fig. 13B). Here the values for \( Q \) were much larger than those for \( Z \). Different compensation mechanisms cannot explain this difference, since they all result in admittances with values below 100 mGal m\(^{-1}\). Subsurface loading, however, will result in higher values. Following McNutt (1983), we calculated the admittance caused by a loading at depth. Fig. 13(B) shows results for two different plate thicknesses. [Note that since we are dealing with free-air anomalies, we added an extra term to equation (6) of McNutt (1983).] Simple Airy loading from below will not result in a different admittance (McNutt 1983), so we have to use a regional compensation model. From the results of Fig. 13(B), it seems plausible that the gravity anomalies on the Grand Banks are due in part to subsurface loading.

**CHARACTERISTIC GRAVITY ANOMALIES ACROSS RIFTED AND SHEARED MARGINS**

We have shown that the admittances over the Scotian and Grand Banks margins are different. This is again illustrated in Fig. 14(A), which compares the admittances obtained for the different margins. In this figure we also included an admittance estimate for the southern Flemish Cap margin (see Fig. 1 for location of the profiles). Fig. 14(A) also shows the wavelength bands where the admittances were significantly different, defined as outside each others standard deviation. This occurs in the wavelength band between 100 and 250 km, where the Flemish Cap margin gave values intermediate between those of the other two margins.

When comparing the bathymetry across the Scotian and the Grand Banks margins, we noted that they were similar. Therefore, the effect of the different compensation mechanisms for a rifted and a transform margin can be illustrated by convolving a typical bathymetry profile with the observed admittance function for the rifted Scotian margin, the Flemish Cap margin and the Grand Banks transform margin. The results (Fig. 14B) clearly show the difference in the gravity anomaly, with the typical flexural anomaly over the rifted margin. Again the Flemish Cap admittance shows some flexure but less than the Scotian margin.

**DISCUSSION**

Observational and theoretical studies of rifted margins are more numerous and detailed than those of transform margins (Scrutton 1982; Reid 1989); therefore, our understanding of this second type of margin is less advanced. Recent refraction programs across the transform margins of the Grand Banks (Todd, Reid & Keen 1988), Flemish Cap (Todd & Reid 1989), the Senja (Jackson, Faleide & Eldholm 1991) and Hornsund (Eldholm, Faleide & Myhre 1987) margins; and deep reflection profiling (Faleide et al. 1991; Keen, Kay & Roest 1990) provide better information on sheared margins. In addition, geodynamic models of transform margins have been developed (Reid 1989; Todd & Keen 1989). The present study, comparing the methods of isostatic compensation across rifted and sheared margins, complemented these
other investigations by providing further insights and constraints on their development.

Our observed admittance for the Scotian margin is similar to that reported by Karner & Watts (1982) for the east coast of the USA and the Scotian margin; however, our data were smoother. They obtain an elastic plate thickness of between 10 and 20 km, which is consistent with the 10 km value we used. Watts (1988), using gravity and seismic data calculates an elastic plate thickness of 15 km for the USA east coast in the Baltimore Trough area. After being refined by backstripping, his final model has an oceanic portion of the plate with an elastic thickness of 15 km and a continental elastic plate that is substantially thinner. In contrast, for the Grand Banks offset margin we suggested that a local compensation mechanism fitted the admittance curve.

Seismic data across rifted and transform margins show a substantial difference. For example, beneath the rifted margin of the USA east coast a deep crustal layer with a velocity of 7.2 km s⁻¹ is observed that is continuous from under the shelf to beneath the rise (LASE Study Group 1986), that is, from continental to oceanic crust, whereas, refraction experiments across transform margins (Todd et al. 1988; Todd & Reid 1989; Jackson et al. 1990) show no evidence of this layer. The transition from oceanic to continental crust is broader on rifted than on transform margins (Scrutton 1982). The seismic evidence supports the result from admittance studies that the continent-ocean transition at rifted margins is better welded than on transform margins.

Parallel to the rifted margin, the initial rift developed through stretching and thinning of the lithosphere which causes upwelling of the asthenosphere and partial melting which results in continental lithosphere rupture to form the ocean crust. The upper crust thins by faulting and the lower crust of rifted margins is thinned by ductile flow perpendicular to the margin (Montadert et al. 1979), such crustal characteristics are compatible with isostatic compensation being accomplished with flexure of a thin plate. On transform margins the rift migrates perpendicular to the margin allowing only a brief interval when hot oceanic crust and lithosphere are adjacent to the continental crust which forms the boundary between two plates. The non-welded shear zone creates a broken plate and allows Airy-type compensation. In addition, as the continental and ocean crust mechanically shear along each other there is the opportunity for lower crustal continental material to be displaced laterally along the margin (Reid 1989). The southwest Newfoundland Ridge offset from the Grand Banks sheared margin and the Yermak Plateau offset from the Hornsund transform margin of Svalbard are cited as possible evidence of laterally displaced continental crust. The replacement of this displaced material may be the origin of the hidden load on the Grand Banks.

Although the differences between rifted and transform margins, as observed from gravity data, seem to be confirmed by seismic evidence, some uncertainties in the transform margin results need to be dealt with. The depth to basement along the Grand Banks margin (Fig. 11) shows that its western part (roughly west of 53°W) is characterized by basins, which are not observed along the eastern part of the margin. This has lead to the suggestion (C.E. Keen, personal communication 1989) that the western part of the Grand Banks margin is not a true transform margin, but also has a rifted component. In order to test this, we calculated the admittance for the western nine profiles across the margin and compared it with the one obtained for all profiles and with the one of the eastern nine profiles. Although differences were found, both the eastern and western admittances showed values well below that of the Scotian margin in the wavelength band between 100 and 150 km. Therefore, the admittance showed no systematic difference in the compensation mechanism along the Grand Banks margin.

We also calculated the admittance from formula (2) for the parts of the Grand Banks. Again no systematic differences were found. The suggestion that part of the gravity anomalies on the Grand Banks are caused by loading from below, is in agreement with results of Keen, Kay & Roest (1990), who could not fit the gravity anomalies over the Grand Banks in their modelling and suggest 3-D effects as the cause. Our results were only an indication of a possible deeper cause and we did not try to obtain best fitting curves in Fig. 13(B), which should be obtained from a combination of loading from above and below. A next logical step is to study this part of the Grand Banks in 3-D.

An interesting case could be made when comparing the results for the admittances Z and Q for the Grand Banks: is it possible to have a combination of loading from above and below, such that the compensation mechanism for the margin is regional? In other words, are the low results for Z in the wavelength band 100–150 km, largely caused by some deeper phenomenon, and at the same time, is this typical for a transform margin or is the Grand Banks region an exception? Gravity anomalies across other transform margins (Scrutton 1976; Horn et al. 1984) seem similar to those across the Grand Banks margin, but equivalent studies need to be undertaken before we can be sure whether or not our results across the Grand Banks margin can be generalized.

CONCLUSIONS

Our principal conclusions are that the admittance functions along the rifted Scotian margin and the sheared Grand Banks margin are different. A regional isostatic model best fits the Scotian margin in contrast to a local compensation model for the Grand Banks margin. The observed admittance comparison is done with satellite data along the same profiles and similar results are obtained for the long wavelengths. When the bathymetry is convolved with the admittance functions λ, filtered bathymetry profiles with small residuals compared with the observed gravity are obtained for both margins implying that satisfactory theoretical admittance functions have been derived. Typical distinctive gravity profiles for rifted and sheared margins are produced.

Following a suggestion by Forsyth (1985), we calculated the inverse admittance and found that for the transform margin part of the gravity anomalies seem to be caused by subsurface loading. Further investigation of other transform margins is necessary to demonstrate whether or not the results across the Grand Banks margin are truly representative for a transform margin.
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