# Finding the continental shelf – integration of geology and geophysics

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## Abstract

Article 76 of the United Nations Convention on the Law of the Sea (UNCLOS) specifies how the limits of the continental shelf beyond the 200 M Exclusive Economic Zone (EEZ) will be determined, but it is not clear how these limits will be established along complex margins such as those that typify the New Zealand region.

The seafloor around New Zealand is characterised by ridges and plateaus that reflect the complex tectonic history of the region. Rifting has resulted in crustal thinning and continental fragmentation, and subduction processes have led to continental growth by the accretion of terranes and the formation of island arcs.

Analysis of geophysical data reveals the geological and morphological connection of a large continental fragment, Gilbert Seamount, with the New Zealand landmass. The saddle between the seamount and the Challenger Plateau was formed by rifting prior to seafloor spreading in the Tasman Sea. Continental prolongation to Gilbert Seamount could form the basis for extending New Zealand's continental shelf beyond 200 M.

The Hikurangi Plateau was accreted to the New Zealand landmass more than 70 Ma. The geological and morphological connection extends along the length of the Chatham Rise. Identification of the boundary between continental and oceanic rocks along the northeast margin of the plateau requires integration of all the geophysical and geological data from the region. The Hikurangi Plateau is currently being subducted beneath the North Island, but the connection of the plateau with the Chatham Rise shows that a subduction trench/plate boundary does not necessarily define foot of slope positions.

The data collected as part of the Continental Shelf Project were not designed for resource assessment. However, they will contribute to clarification of responsibility for managing the resources in New Zealand's continental shelf, and several lines show sedimentary basins of exploration interest.

## Introduction

The United Nations Convention on the Law of the Sea (UNCLOS) came into force in November 1994. Article 76 of the United Nations Convention on the Law of the Sea (UNCLOS, 1983) describes conditions that allow maritime states to extend their legal continental shelf beyond their 200 nautical mile (M) Exclusive Economic Zone (EEZ). Essentially these conditions require the maritime state to demonstrate prolongation of the land territory, and Article 76 outlines several ways in which this can be done.

New Zealand signed the United Nations Convention on the Law of the Sea and began its Continental Shelf Project in 1996. The early phases of the project compiled and analysed existing data (bathymetry, seismic, gravity, magnetics, rock samples) in order to minimise the acquisition of new data. Analysis of these existing data included determining for each area which aspects of Article 76 were relevant, assessing if the quality of the existing data was sufficient to delineate New Zealand's continental shelf, and finally identifying where and what kind of additional data were required. Survey lines were located to complete determination of the 2,500 m isobath and bathymetric foot of slope positions at intervals of less than 60 M. They were also designed to demonstrate the relationship of the rocks on and beneath the sea floor to those onshore, and to find areas of significant sediment thickness beyond the foot of slope positions.

Understanding the project requires an understanding of Article 76, and how the complexities arising from New Zealand's location along an evolving plate margin affect the interpretation of the Article.

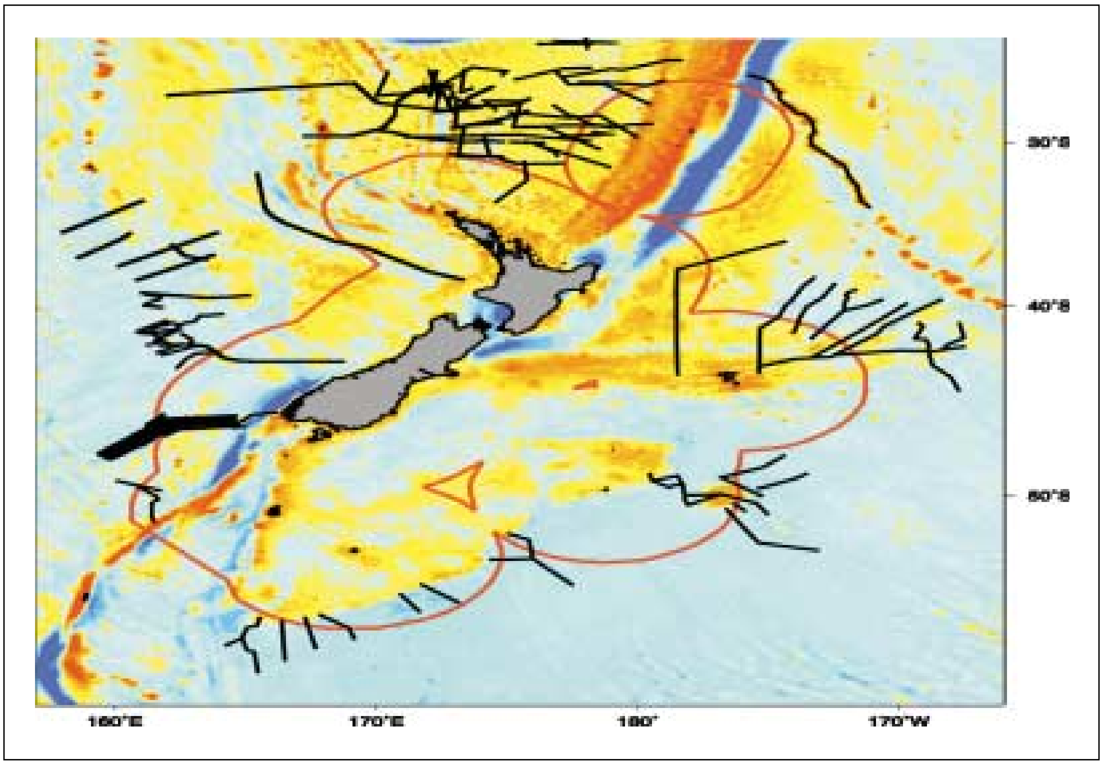


Figure 1: Satellite gravity map of the New Zealand region showing the 200 M EEZ and the location of surveys undertaken as part of the Continental Shelf Project.

## Article 76

Within UNCLOS, Article 76 defines the continental shelf and outlines methods to delineate its outer limits where the shelf extends throughout and beyond 200 M from baselines of the territorial sea. Extension of the continental shelf gives the Coastal State responsibility for management of the natural resources on and beneath the seafloor within this region, including control over the exploration, exploitation, and conservation of resources. It does not include control of the resources in the water column.

Article 76 defines the continental shelf to consist of "the submerged prolongation of the land mass of the coastal state", specifically excluding the deep ocean floor with its oceanic ridges. The maximum limit of a claim cannot exceed 350 M from the coastal baselines or 100 M from the 2,500 m isobath, except along plateaus, rises, caps, banks, and spurs that are natural components of the margin. Within that limit, the factors governing the extent of the continental shelf beyond the 200 M EEZ are continental prolongation, the 2,500 m isobath, the foot of the continental slope, and the sediment thickness beyond the foot of slope. The continental shelf can be extended up to 60 M beyond the foot of the continental slope (the Hedberg limit), or to where the sediment thickness is at least 1% of the shortest distance to the base of the slope.

Article 76 uses a number of geologic and hydrographic terms to define the extent of the continental shelf, including *slope*, *rise*, *natural prolongation*, *submarine ridges*, and *oceanic ridges*. However, because these terms are used in a legal context, even this apparent clarity of terminology is not sufficient to encompass all aspects of the complex geologic features that characterise active continental margins such as those around New Zealand.

### New Zealand setting

The total land area of New Zealand is about 250,000 km$^2$. It is surrounded by large submarine plateaus, typically lying at depths of 500-2,000 m, and deep ocean basins 4,000-5,000 m deep. The 200 M EEZ covers an area of about 4,000,000 km$^2$.

New Zealand has had a dynamic geologic history, strongly affected by plate tectonic events for at least the last 230 Ma. As a result, the geology and bathymetry of the wider New Zealand continental region are complex, characterised by plateaus, ridges, troughs, seamounts, volcanic arcs, fracture zones and oceanic spreading centres (Figure 1). The continent is a complex amalgamation of rifted crustal plateaus, accreted terranes and volcanic arcs.

Three phases of plate convergence have affected the New Zealand region in the last 230 My. A major period of continental growth took place along the Gondwana margin from the Triassic to the Early Cretaceous (230-115 Ma) and these rocks form a major component of the basement rocks of New Zealand (e.g., Mortimer & Tulloch 1996). Accretion of the Northland Allochthon, of the order of 100,000 km$^3$, took place about 25 Ma (Isaac, et al. 1994), and oblique convergence is occurring along the modern plate boundary east of the North Island and southwest of the South Island.

The New Zealand continental block has been fragmented by at least two major phases of rifting over the last 120 My. Fragmentation of Gondwana began more than 80 Ma and

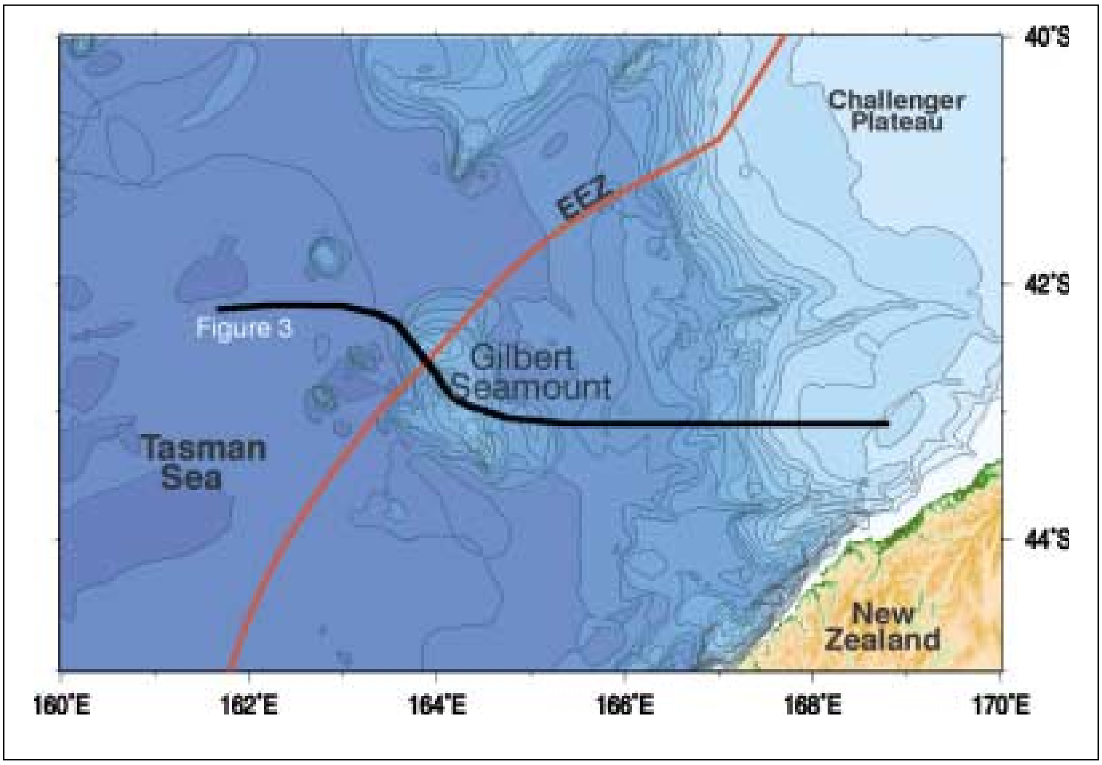


Figure 2: Map showing the bathymetry of the Gilbert Seamount region. The location of the profile in Figure 3 is indicated. Contour interval is 250 m.

resulted in widespread crustal thinning, basin formation and the separation of New Zealand from Australia and Antarctica. The modern plate boundary began to develop through New Zealand about 40 Ma. Evolution of this margin has involved rifting, large-scale transform faulting, and oblique subduction. Submarine plateaus surrounding New Zealand are demonstrably geologically related to the land territory, the difference in elevation primarily reflecting distance from the present plate boundary.

The subduction system north of New Zealand has migrated east for about the last 20 My, forming a series of volcanic arcs that extend northward from the North Island (Figure 1). These arcs are tied to geology of the North Island, manifest in onshore features such as the Miocene volcanics in Northland and the formation of the Central Volcanic Region.

New Zealand has the unique situation of lying on both sides of the modern plate boundary. This means that in a sense New Zealand is being subducted beneath or accreted to itself. As a result, the plate boundary does not necessarily mark the termination of continental prolongation.

## Continental prolongation

This paper will discuss continental prolongation across New Zealand's dynamic continental margin. In particular, it will focus on two aspects of the margin: continental fragments and accreted terranes. It will discuss techniques that are used to demonstrate continental prolongation, and what impact these features may have on the extent of New Zealand's continental shelf.

As mentioned above, Article 76 specifies several criteria for determining the extent of the continental shelf. These criteria require knowledge of the seafloor shape (2,500 m isobath, foot of slope positions, morphological connection with the landmass) and subsurface structure (sediment thickness, geological connection with the landmass). Determination of seafloor shape and subsurface structure relies on analysis of swath/trackline bathymetry data, seismic reflection/refraction data, gravity data, magnetic data, and rock samples. All of these geological and geophysical tools are essential to determine the relationship of continental fragments and accreted terranes to the New Zealand landmass.

### Continental fragments from rifted margins

Rifted margins are often characterised by a transition zone between continental and oceanic crust that can contain fragments of continental rocks of varying size. Depending on the extent of rifting, these fragments can be integral parts of the continental margin with little morphological or structural expression, connected to the margin but with significant morphological or structural expression, or completely separated from the margin by spreading oceanic crust.

The two major aspects of these fragments relevant to the application of Article 76 are

1) Are they connected with the continental landmass? and
2) Can isolated 2,500 m isobaths on these fragments be used to extend the continental shelf cutoff beyond 350 M?

Gilbert Seamount is an example of a continental fragment, separated from the adjacent continental plateau by the Cretaceous break-up of Gondwana (Figures 2, 3). It lies

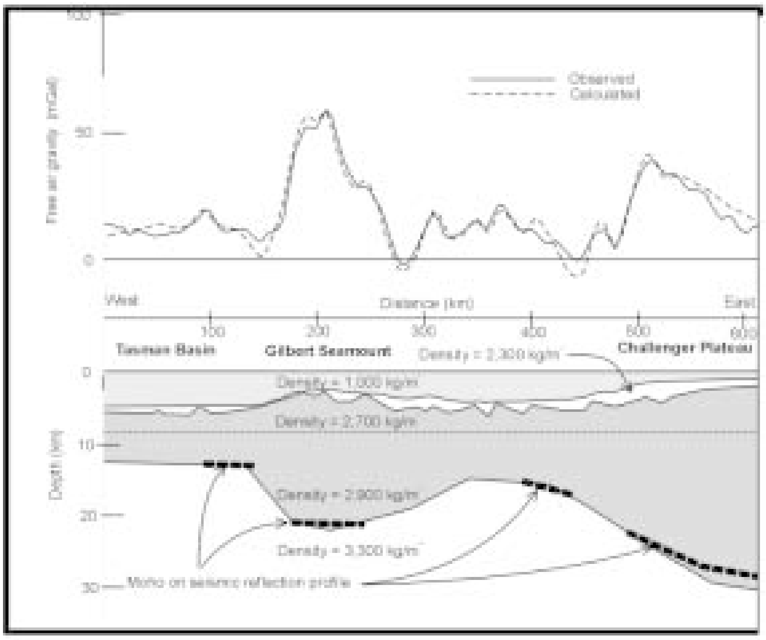


Figure 3: Interpretation of seismic and gravity data on line NZ-C across Gilbert Seamount and the Challenger Plateau margin (V. Stagpoole pers. comm. 2001).

450 km west of the South Island of New Zealand, and 250 km southwest of the Challenger Plateau. It has an area of about 11,500 km$^2$ and shallows to a water-depth of 2,400 m. The seamount is elongated northwest-southeast, parallel to the rift margin along the Challenger Plateau. Connection of the seamount to the New Zealand landmass relies on establishing a morphological connection using trackline or swath bathymetry data, or establishing a geological connection using seismic, magnetic and gravity data.

To the east, Gilbert Seamount is separated from the Challenger Plateau by a saddle whose maximum water-depth is about 4,400 m. This is relatively deep, but it is significantly shallower than the 5,000 m depth of the adjacent Tasman Basin (Figure 2). The sediments underlyingthe saddle are primarily Cretaceous rift sequences and coalescing fans deposited in the Neogene by the Haast and Hokitika canyons. These fans largely encompass the seamount. The morphological connection is not as strong as that of other seamounts in the New Zealand region, but it is supported by a well-established, continuous geological connection.

Gilbert Seamount is considered to be continental in origin, largely because of its elevation and proximity to the rift margin (Ringis 1972). Half grabens extend across the Challenger Plateau margin, Gilbert Seamount and the saddle between, showing that crustal thinning did not progress as far as the formation of oceanic seafloor (Figure 3). Interpretation of Moho reflectors on seismic reflection data and modelling of gravity anomaly data also show that although crustal thinning has taken place along the margin, there is still a continuous connection of continental rocks between the seamount and the New Zealand mainland (Figure 3; Wood & Woodward 1999, V. Stagpoole pers. comm. 2001). Continuity of continental rocks is supported by analysis of magnetic anomaly data in the region (e.g., Gaina et al. 1998). Seafloor spreading anomalies have been identified in the Tasman Sea adjacent to the Gilbert Seamount, but they have not been identified to the northeast, between Gilbert Seamount and the Challenger Plateau.

The continuous geologic connection with the New Zealand landmass means that the seamount is a natural component of the continental margin and not a submarine or oceanic ridge. Because of this, according to Article 76 its 2,500 m isobath could be used to extend the cutoff of the continental shelf beyond 350 M (although it is not an issue in this case as the 2,500 m + 100 M cutoff lies inside the 350 M cutoff).

Figure 4 shows the approximate location of the 2,500 m + 100 M cutoff, and the potential continental shelf area beyond the EEZ based on estimated foot of slope positions on Gilbert Seamount. The area of potential continental shelf is about 110,000 km$^2$.

## Accreted terranes at convergent margins

Terrane accretion along convergent margins has been a significant mechanism for growth of the New Zealand continent. Accreted terranes range in size from the very large, such as the Mesozoic basement terranes of the Eastern Province, to the relatively small, such as seamounts accreted along the modern plate margin (e.g., Collot et al. 1995). Demonstrating the connection between these terranes and the continental landmass is necessary in order to determine the extent of the continental shelf.

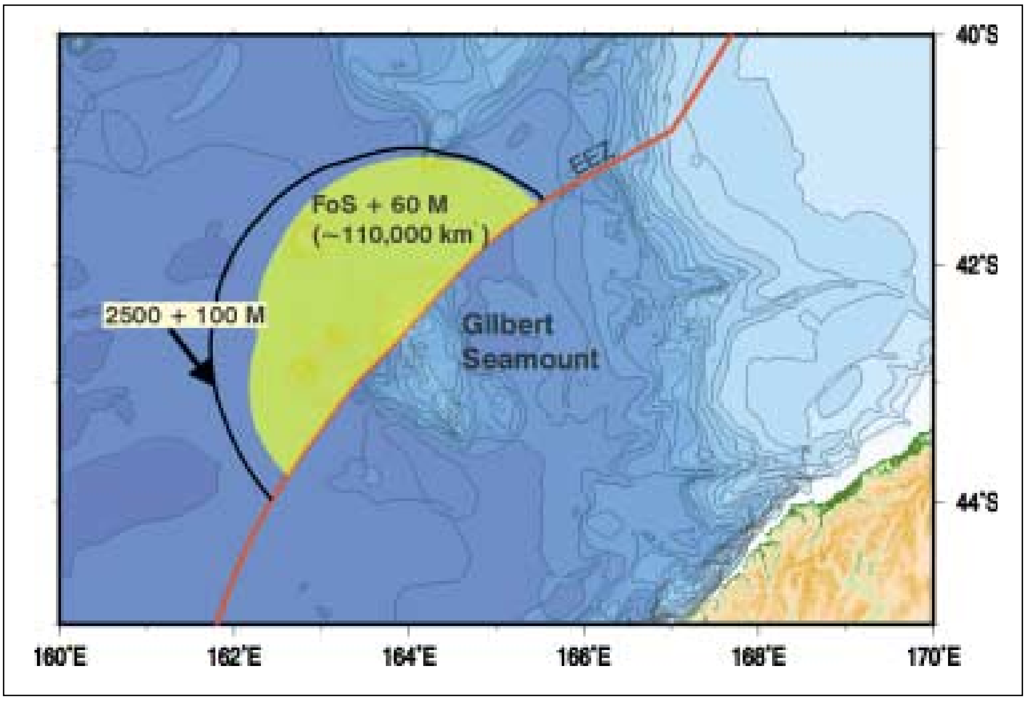


Figure 4: Map showing the approximate extent of the continental shelf beyond the 200 M EEZ in the Gilbert Seamount region.

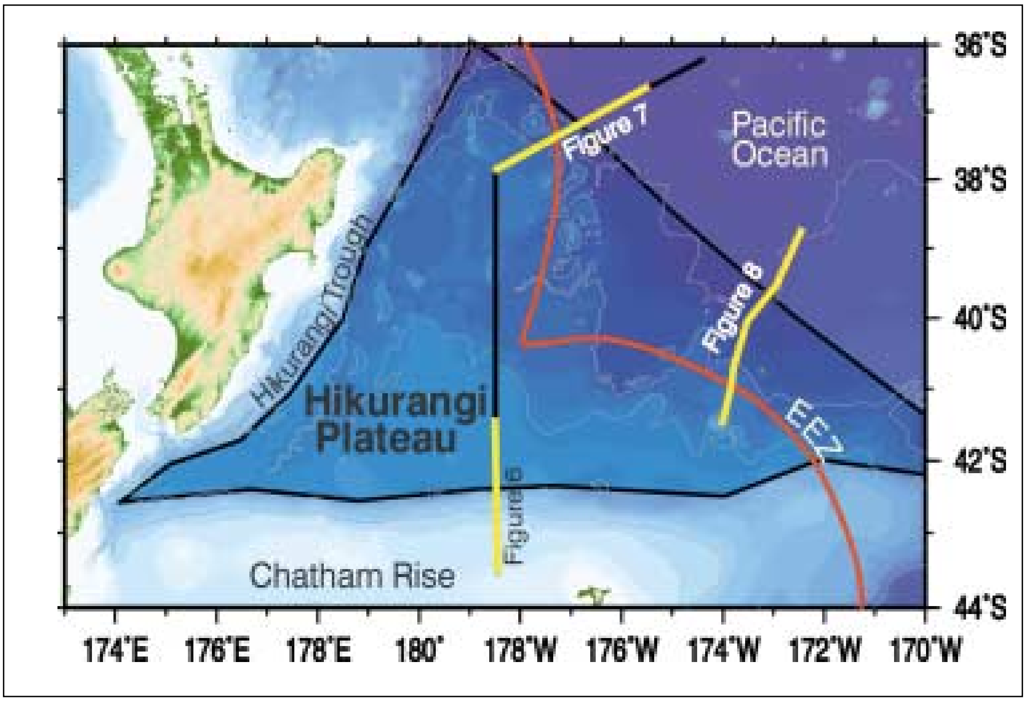


Figure 5: Map showing the bathymetry of the Hikurangi Plateau region. The locations of the profiles in Figures 6, 7, and 8 are indicated. Contour interval is 250 m.

The Hikurangi Plateau is a large igneous province lying east of the North Island and north of the Chatham Rise (Figure 5; Wood and Davy 1994, Mortimer and Parkinson 1996). It has an area of about 350,000 $km^2$ and lies at an average water depth of about 3,000 m. It has a complex structure, but most seismic lines show several kilometres of sediments overlying basement, comprising probably volcanic rocks (Wood and Davy 1994). Gravity modelling indicates that its crust is 10-15 km thick, compared to 5-7 km for the oceanic crust to the northeast (Davy & Wood 1994).

The age of the volcanic basement rocks of the plateau is unknown, but they are older than 70 Ma (Strong 1994). They may be similar in age to other large igneous provinces in the Pacific (115-125 Ma; Mortimer and Parkinson 1996), or possibly more than 160 Ma, the age of compressive deformation along the Chatham Rise that may have been associated with the collision of the Hikurangi Plateau with the New Zealand sector of Gondwana (Davy 1992).

In the west, the Hikurangi Plateau is currently being obliquely subducted beneath the North Island along the Hikurangi Trough

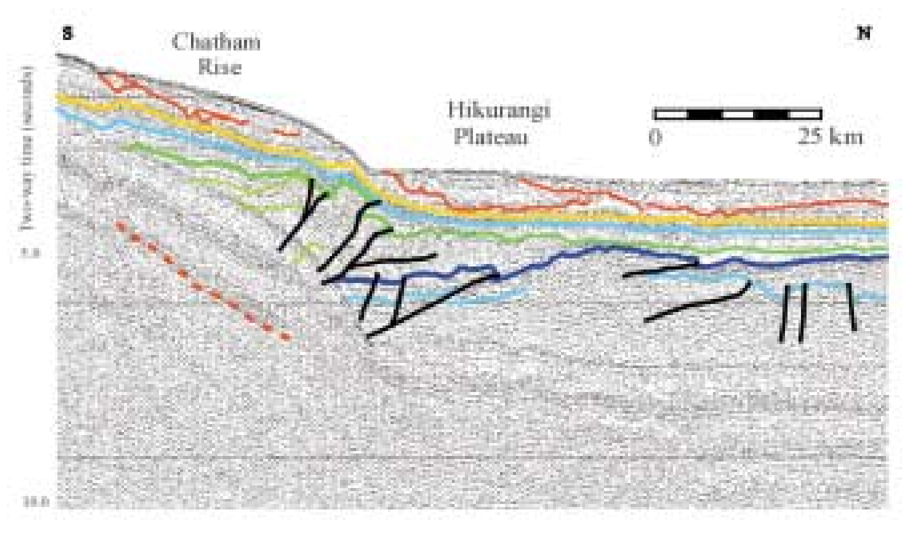


Figure 6: Seismic line OCR-5 across the Chatham Rise – Hikurangi Plateau margin showing deformation associated with accretion of the Hikurangi Plateau.

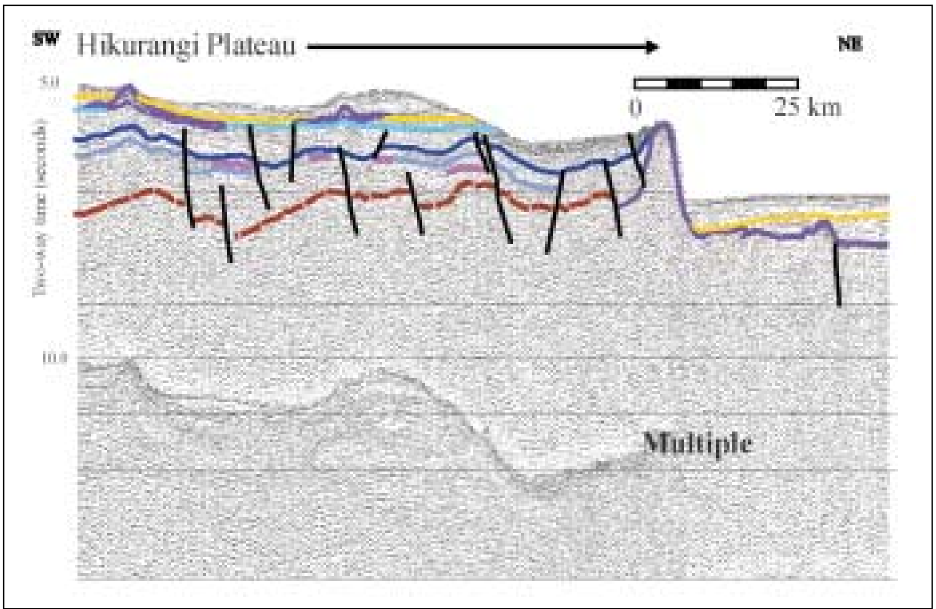


Figure 7: Seismic line HKDC-1 across the Hikurangi Plateau margin showing the scarp from the plateau down to oceanic crust to the northeast.

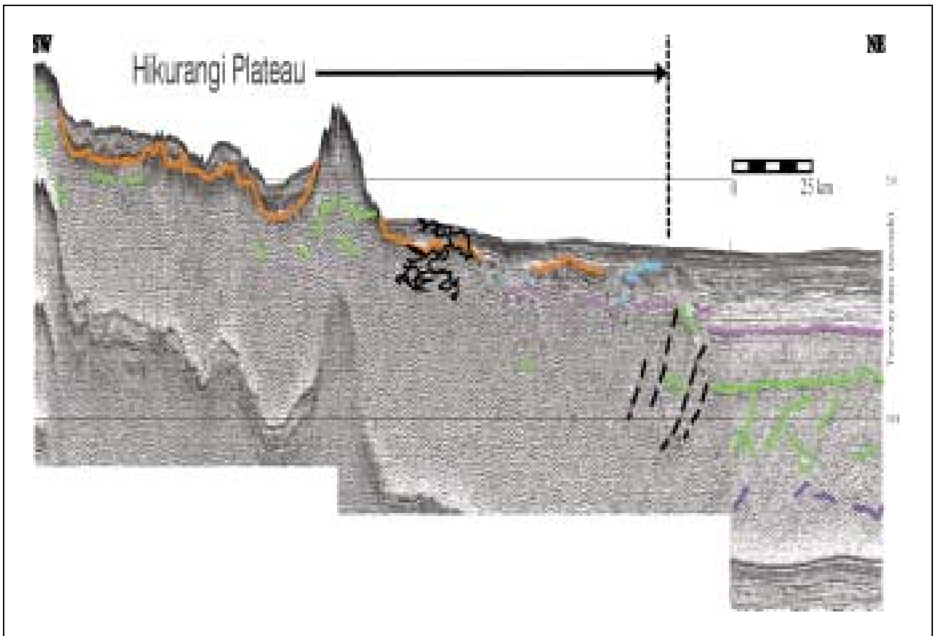


Figure 8: Seismic line HKDC-4 across the northeast margin of the Hikurangi Plateau. The boundary between the Hikurangi Plateau and oceanic crust to the northeast lies near the northeast end of the line.

(Davy 1992). The trough is 2,500-3,500 m deep, significantly shallower than the adjacent (> 6,000 m deep) Kermadec Trench to the northeast. Seamounts on the plateau have been subducted along the Hikurangi Trough (Collot et al. 1995), and possibly accreted to the overlying plate (and thereby to the New Zealand landmass). Nevertheless it might be difficult to argue continental prolongation to the entire Hikurangi Plateau across the subduction margin.

However, a morphological connection between the New Zealand landmass and the Hikurangi Plateau exists to the south, along the Chatham Rise. The Chatham Rise is a large plateau extending for over 1,000 km east of the South Island. It has an average water depth of about 400 m. The Hikurangi Plateau abuts the continental rocks of the Chatham Rise, and by extension the rocks of the South Island landmass (Figure 5). There is a break in slope along the base of the Chatham Rise (Figure 6), but Figure 7 shows that this is only an intermediate drop to 2600 m before the final steep descent from the Hikurangi Plateau at about 4,000 m depth to the deep ocean floor, 5200 m below sea level. The morphologic foot of slope lies seaward of the scarp along the northeast margin of the Hikurangi Plateau. In this regional context the change in seafloor gradient at the base of the Rapuhia Scarp is the true outer morphological foot of slope, and the other is only an intermediate inflection in the continental slope.

The boundary of the Hikurangi Plateau, however, does not always coincide with a pronounced morphologic boundary. At the eastern end of the boundary the scarp is buried by sediment, and lies about 90 km seaward of the morphological foot of slope (Figure 8). In this area the subsurface structure needs to be considered in order to establish the full extent of continental prolongation.

Seismic lines recorded across the margin show that the rocks of the Hikurangi Plateau have been part of the New Zealand continent for at least 70 My. Volcanic basement of the Hikurangi Plateau can be traced beneath the northern margin of the Chatham Rise and deformation of the Mesozoic basement rocks on the flank of the rise appears to be related to collision of the plateau. There has been no significant deformation after that event. Dating of foraminifera and correlation of seismic reflectors (Strong 1994, Wood & Davy 1994) shows that the collision of the Hikurangi Plateau with the Gondwana margin occurred at least 70 Ma.

The basement rocks of New Zealand are characterised by a number of terranes accreted to the Gondwana margin during the period 230-115 Ma (Mortimer & Tulloch 1996). The Chatham Rise is part of the old Gondwana margin, and the Hikurangi Plateau is probably the last of these terranes to be accreted (Davy 1992). There are no known outcrops of Hikurangi Plateau rocks onshore, although Mortimer & Parkinson (1996) speculated that similar volcanic rocks in Northland and East Cape could be derived from obduction of the Hikurangi Plateau.

The basement rocks of the Hikurangi Plateau are one of New Zealand's basement terranes, and therefore tied to the landmass. Continental prolongation extends to its boundary with the oceanic crust to the northeast.

The Hikurangi Plateau is a natural component of the margin and not a submarine or oceanic ridge. Because of this, seamounts that are part of the plateau and shallow to less than 2,500 m could be used to extend the cutoff of the continental shelf beyond 350 M. Several of these seamounts will be surveyed in 2002 by a vessel with a multibeam swath bathymetry system in order to better establish their connection to the Chatham Rise and the South Island.

Figure 8 shows an estimate of the potential continental shelf beyond the EEZ, based on preliminary foot of slope positions along the Hikurangi Plateau. The area is limited by the 2,500 m + 100 M and the 350 M cutoffs. The area of potential continental shelf in the region covered by Figure 8 is of the order of 210,000 km$^2$.

## Significance for resource exploration

Little is known about the resource potential of New Zealand's EEZ beyond the area of historic petroleum exploration activity, and almost nothing about the area beyond the EEZ that may be included in the continental shelf. Non-living resources that could occur in these regions include hydrocarbons (oil, gas, and gas hydrates), authigenic deposits such as manganese and phosphorite, and hydrothermal mineral deposits containing precious metals. Valuable living resources may also occur, but even less is known about what these might be and where they might be found. The data collected as part of the Continental Shelf Project will help identify areas with resource potential, but are unlikely to define exploration prospects.

Perhaps the greatest long-term benefits of the Continental Shelf Project in terms of resource exploration will be the clarification of management responsibility for the seafloor and sub-seafloor beyond the EEZ, and the increased awareness of the importance of New Zealand's marine estate.

Identification of resource management responsibility will reduce the risk of developing marine resources beyond the EEZ. Areas that are deemed to lie within New Zealand's continental shelf will be managed by New Zealand. Areas outside the outer legal continental shelf boundary of Coastal States will be administered by the International Seabed Authority. The increased awareness of New Zealand's marine opportunities and responsibilities may lead to a more systematic survey of the continental shelf to determine any resource potential.

Of more direct interest to the hydrocarbon industry, is that the data collected by the Continental Shelf Project will significantly expand knowledge of the New Zealand tectonic framework. These data have usually been collected in areas largely unaffected by the modern plate boundary and therefore contain information about the tectonic and environmental history that is often missing or difficult to find onshore. Details about the evolution of New Zealand – the breakup of Gondwana, the development of the plate boundary through New Zealand, the paleoenvironment of the Southwest Pacific – are necessary to assess New Zealand's resource prospectivity, on scales ranging from basin analysis to prospect risk assessment.

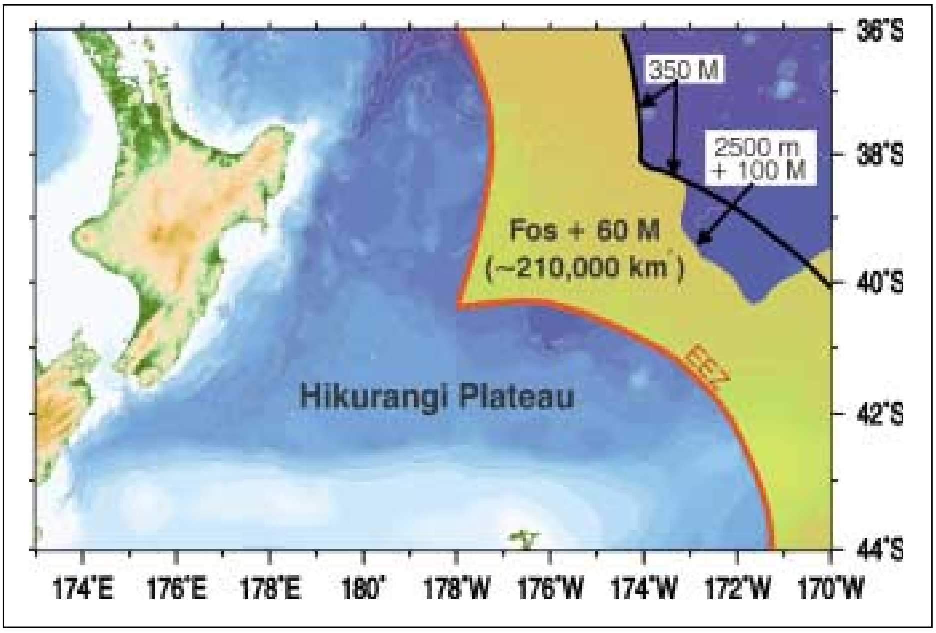


Figure 9: Map showing the approximate extent of the continental shelf beyond the 200 M EEZ in the Hikurangi Plateau region.

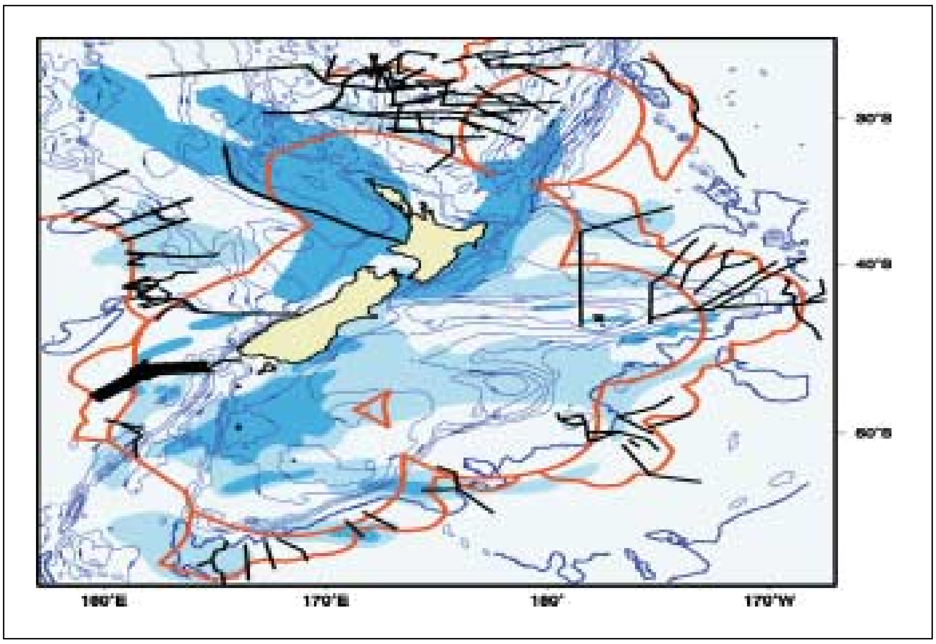


Figure 10: Map showing the location of sedimentary basins (mid-blue) and areas that may have sediments thick enough to generate hydrocarbons (dark blue) (after Uruski 2000). Surveys undertaken as part of the Continental Shelf Project are shown in black. The EEZ and an estimate of the extent of the continental shelf are shown in red.

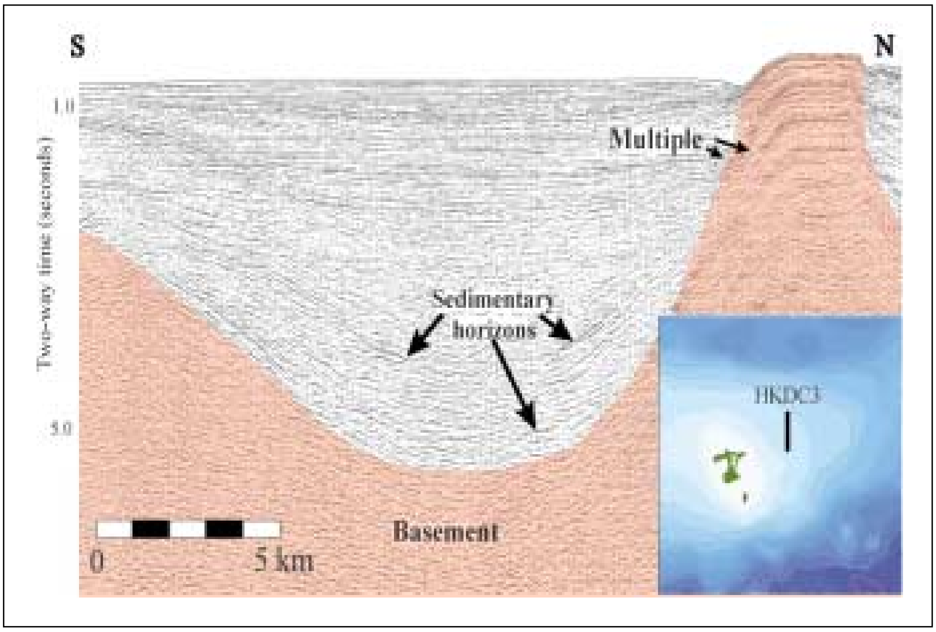


Figure 11: Seismic line HKDC-4, northeast of Chatham Island, showing a basin containing more than 5 km of sediments.

Finally, these data contain some information about hydrocarbon prospectivity beyond the areas of current interest. Figure 9 shows the distribution of seismic data collected by the Continental Shelf Project and the distribution of known sedimentary basins around New Zealand. Preliminary assessment of these data shows that although few of the seismic lines cross areas of significant petroleum potential, several of them are of exploration interest.

Acquisition of seismic line TL-1 along the axis of the New Caledonia Basin, however, led to the identification of the deep-water extension of the Taranaki Basin (Uruski 2000), an area of current exploration interest. Seismic line HKDC3, recorded east of the Chatham Islands, shows a basin with over 5 km of sediments (Figure 10). This is the extension of the sedimentary basin beneath the Chatham Islands whose resource potential could previously only be inferred from data collected in the 1970's and 80's (Wood et al. 1989).

## Conclusions

According to Article 76, paragraph 1, "The continental shelf comprises .. the natural prolongation of its land territory". The key factor for determining the extent of the continental shelf, therefore, is the relationship of the seabed and subsoil to the landmass. This relationship can be demonstrated on the basis of the geology of the rocks and the morphology of the seafloor.

Complexities associated with rifting, convergence and transcurrent plate motion along continental margins highlight uncertainties in the interpretation of Article 76. Rifting can lead to the fragmentation of the continental margin and the structural and morphological isolation of continental blocks. Convergence can lead to continental growth by the accretion of terranes and the formation of island arcs, resulting in a landmass composed of rocks from a number of origins.

Gilbert Seamount is an example of a continental fragment along one of New Zealand's rifted margins. Analysis of the data from the region demonstrates how natural prolongation between elevated fragments of continental crust and the landmass can be determined. In this case, the morphological connection is supported by geophysical data that show a continuous geological connection between Gilbert Seamount and the New Zealand landmass.

The Hikurangi Plateau is an example of an accreted terrane along one of New Zealand's convergent margins. It is geologically and morphologically connected with the New Zealand landmass, although it is also being obliquely subducted beneath the North Island along the modern plate boundary. This shows a situation in which a subduction trench/plate boundary does not necessarily define foot of slope positions.

The data collected as part of the Continental Shelf Project were not designed for resource assessment. However, they will contribute to clarification of responsibility for managing the resources in New Zealand's continental shelf, and several lines show sedimentary basins of exploration interest.

## Acknowledgements

This paper is based on the work of a large team involved with New Zealand's Continental Shelf Project. It has benefited greatly from discussions with my colleagues, particularly Bryan Davy, Ian Wright, Rick Herzer, Phil Barnes and Jerome Sheppard. The thoughts expressed do not necessarily reflect those of the New Zealand government.

The diagrams presented in this paper show preliminary interpretations of bathymetry and geophysical data collected as part of the Continental Shelf Project. Processing of these data is not complete and their interpretation may change following their integration with all the data in the regions. The bathymetry in some of the figures is from the NIWA regional bathymetry compilation (CANZ 1997).

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## Appendix - United Nations Convention on the Law of the Sea (UNCLOS, 1983)

### Article 76 - Definition of the continental shelf

1. The continental shelf of a coastal state comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.

2. The continental shelf of a coastal State shall not extend beyond the limits provided for in paragraphs 4 to 6.

3. The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.

4. (a) For the purposes of this Convention, the coastal State shall establish the outer edge of the continental margin wherever the margin extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by either:

(i) a line delineated in accordance with paragraph 7 by reference to the outermost fixed points at each of which the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of the continental slope; or

(ii) a line delineated in accordance with paragraph 7 by reference to fixed points not more than 60 nautical miles from the foot of the continental slope.

(b) In the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base.

5. The fixed points comprising the line of the outer limits of the continental shelf on the seabed, drawn in accordance with paragraph 4 (a) (i) and (ii), either shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured or shall not exceed 100 nautical miles from the 2,500 metre isobath, which is a line connecting the depth of 2,500 metres.

6. Notwithstanding the provisions of paragraph 5, on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured. This paragraph does not apply to submarine elevations that are natural components of the continental margin, such as its plateau, rises, caps, banks, and spurs.

7. The coastal State shall delineate the outer limits of the continental shelf, where that shelf extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by straight lines not exceeding 60 nautical miles in length, connecting fixed points, defined by coordinates of latitude and longitude.

8. Information on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured shall be submitted by the coastal State to the Commission on the Limits of the Continental Shelf set up under Annex II on the basis of equitable geographical representation. The Commission shall make recommendations to coastal States on matters related to the establishment of the outer limits of their continental shelf. The limits of the shelf established by a coastal State on the basis of these recommendations shall be final and binding.

9. The coastal State shall deposit with the Secretary-General of the United Nations charts and relevant information, including geodetic data, permanently describing the outer limits of its continental shelf. The Secretary-General shall give due publicity thereto.

10. The provisions of this article are without prejudice to the question of the delimitation of the continental shelf between States with opposite or adjacent coasts.

## Author

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