

Sea-floor bedrock geology, Inner Scotian Shelf south of Halifax Interpreted from EM100 swath bathymetry and magnetics

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High resolution sea-floor bathymetry is as useful for bedrock mapping beneath the ocean as air-photo or satellite imagery on land. Within our test area south of Halifax, marked contrasts in local relief and bottom roughness can be used for geological interpretation. Two principal sedimentary bedrock domains are distinguished, both characterized by sets of closely parallel bedding plane ridges. The inshore domain east of Ketch Harbour and south of Pennant comprises relatively thinly stratified and tightly folded rocks, cut by minor faults and fractures, interpreted as interbedded slates and wackes typical of the younger parts of the Meguma Group. In the offshore domain in the southeastern part of the survey area, similar bottom features are more widely spaced and individual ridges are less continuous. This is interpreted as the expression of a thickly bedded, greywacke-dominated Meguma Group.

An area of approximately 80 km² lying 10 to 20 km south of Sambro defines a third bedrock domain. Bathymetric data show a rough pattern of intersecting sub-linear relief elements; the parallel ridges characteristic of the other domains are absent. Both magnetic and bathymetric data show that this domain cross-cuts structures in the Meguma rocks. Magnetic data show a body of low magnetisation, a feature typical of granitoid intrusions in the Meguma Terrane. Magnetic data delineate the boundaries of major slate units with remarkable precision in onshore areas and, by inference, in this contiguous marine survey. Thus the combination of magnetic and bathymetric data can be used to map major structures and to tentatively distinguish between major slate and greywacke units. With this technology, geological mapping of the inner continental shelf is feasible.