Profile of the Hudson River

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■ *In early April 1989, the R.V. CONRAD completed the first multichannel reflection profile ever attempted on the Hudson River. The profile began in the open ocean, about 75 km beyond the mouth of the river, and ended just south of Albany* ***(Fig. 1).***

The purpose of this NSF-supported experiment was to test the feasibility of MCS experiments in rivers and to learn more about the structure of the deep continental crust beneath the Appalachian Mountains. The experiment was not without difficulties. Near the start of the cruise a container ship cut the CONRAD'S streamer, resulting in a gap of 13 km from midtown Manhattan to Washington Heights. Even so, 94% of the planned seismic mileage was collected.

Although processing of the multichannel seismic data is still underway, we have enough information to make a preliminary interpretation, shown in the structure section in **Fig. 2.** This section was presented last fall at the annual meeting of the Geological Society of America by Gerard Bond, John Diebold, Nano Seeber and Peter Buhl of L-DGO and Steve Marshak and Istvan Barany of the University of Illinois. Beginning with line 846, along the offshore part of the profile, we have identified a zone of prominent, seaward-dipping reflectors (shown as discontinuous bold-face lines) that separate highly deformed allochthonous rocks (green and brown) from the Grenville basement (pink) that constitutes part of the North American continental crust. The zone of seaward dipping reflectors appears to be a profound structural boundary that probably coincides at the surface with Cameron's Line, a Paleozoic suture that has been mapped near the mouth of the River **(Fig. 1).** Inconformably overlying the allochthonous rocks are Cretaceous and Jurassic coastal plain sediments that were deposited on the modern passive continental margin. The steeply inclined bold-face lines cutting through the sediments are interfaces that offset reflective layers within the coastal plain sediments. These interfaces are faults related to the rifting event that formed the passive margin about 200 million years ago. Some of these faults, such as the New York Bight fault, offset strata that are only a few million years old, indicating that they remained active long after rifting ended. These long-lived faults may still be active (the resolution of the seismic data is not sufficient to test this), perhaps accounting for some of the current seismicity offshore south of New York City.

In line 847, along the Hudson River, the quality of the seismic data is not as good as that in the offshore segment, and it is difficult to interpret the profile below 2 or 3 kilometers. Also, because of the gap in the record where the streamer was cut, we cannot be certain how the interfaces observed in this profile are re-

Fig. 2