

Sidescan Sonar Imaging of Probable Active Faults on the  
Juan de Fuca Plate Adjacent to the Central Oregon  
Continental Margin

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In August 1989, a SeaMARC-IA sidescan sonar survey was conducted on the abyssal plain of the subducting Juan de Fuca plate immediately seaward of the continental slope. The survey was conducted as part of an Ocean Drilling Program regional study of the Cascadia subduction zone. Subduction-related deformation extends 13-15 km seaward of the main deformation front located at the base of the continental slope (Appelgate et al., this volume; Kulm et al., this volume). Preliminary observations of the sidescan images show that numerous surficial NW-trending fault scarps and less numerous N-trending fault scarps occur on the abyssal plain between 44°32'N and 45°12'N latitude. Several faults are downthrown to the southwest and west, respectively. A high-resolution 3.5 kHz seismic record across one of these surficial NW-trending faults, located 13 km seaward of the main deformation front (44°51'N, 125°31.5'W), displays about 25 m of vertical separation and is downthrown to the southwest. An attempt will be made to date the most recent fault movement using sediment cores. A major NW-trending linear fault scarp near 45°10'N latitude (Appelgate et al., this volume) extends 17 km across the abyssal plain. A N-trending deep-sea channel, which crosses the fault, is displaced left-late rally 150 to 200 m. This fault displays many of the characteristics of a strikeslip fault, and it intersects the steep 800 m-high deformation front at the base of the continental slope in a complex manner. These and other regional structures will be analyzed in a forthcoming study of the neotectonics of the Cascadia subduction zone of Oregon and Washington.