

# IODP Expedition 301 Juan de Fuca Hydrogeology: Hydrothermal circulation and the biosphere within the oceanic crust

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Integrated Ocean Drilling Program Expedition 301 is planned to evaluate the formation-scale hydrogeologic properties (permeability structure and distribution) within oceanic crust on the eastern flank of the Juan de Fuca ridge; determine the distribution of fluid pathways, establish linkages between fluid circulation, alteration, and microbiological activities; and determine relations between seismic and hydrologic anisotropy. During Expedition 301, we replaced one existing CORK (borehole observatory) that penetrates the uppermost oceanic crust of the Juan de Fuca and installed two new CORKs that penetrate to the depths as great as 583 meters below seafloor or 318 m into basement. We sampled sediments, basalt, fluids, and microbial samples; collected wireline logs; and conducted hydrogeologic tests in two basement holes. Shore-based studies will help us to learn where microbiological communities live in the crust and how these communities cycle carbon, alter rocks, and are influenced by fluid flow paths.