

# **COASTAL & OCEAN** **RESOURCES INC.**

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## **SPECIALTIES:**

- **offshore geologic hazards**
- **marine geological studies**
- **seabed habitat**

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## **EDUCATION:**

- B.Sc. Earth Sciences, University of Waterloo (1967)  
M.A. Geology, Duke University, North Carolina (1970)  
Ph.D. Marine Geology, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution(1973)  
National Defence College of Canada, Kingston, Ontario (1990-1991)

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## **WORK EXPERIENCE:**

- May 2004 – Dec. 2010 **Project Scientist**, NEPTUNE Canada, University of Victoria  
January 1998-present **Vice-President**, Coastal and Ocean Resources  
January 1998 – present **President**, International Tsunami Research Inc.  
September 1988-present **Professor - Adjunct**, School of Earth and Ocean Sciences, University of Victoria, Victoria, British Columbia  
1977-1997 **Research Scientist**, Pacific Geoscience Centre, Geological Survey of Canada, Natural Resources Canada, Sidney, British Columbia  
1992-1993 **Director**, Canadian Global Change Program, Royal Society of Canada, Ottawa, Ontario  
1990-1991 **Participant**, National Defence College of Canada, Kingston, Ontario  
1988-1991 **Head**, Marine Geoscience Section, Pacific Geoscience Centre, GSC, Dept. of Energy, Mines, and Resources, Sidney, B.C.  
June 1988 **Consultant**, United Nations Development Program, Ministry of Geology (China), South China Sea, China  
1982-1983 **Visiting Scientist**, University of Perpignan, Perpignan, France  
1975-1977 **Research Scientist**, Terrain Sciences Division, Geological Survey of Canada, Ottawa, Ontario  
1973-1974 **Consultant**, Ontario Educational Communications Authority, TV Ontario  
1973-1974 **Lecturer**, Geology Department, University of Toronto, Toronto, Ontario

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## **GEOGRAPHIC EXPERIENCE:**

West and arctic coasts and offshore regions of Canada; North Pacific; West Africa; South Atlantic; east and west coasts and offshore regions of United States; Caribbean; Bahamas; Namibia; the Middle East; South China Sea; Huanghe Delta (China); Malvinas (Falkland) Plateau, Brazil.

## EXPERTISE

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### **Marine Processes (Submarine Slope Stability)**

Dr. Bornhold is a specialist in coastal and marine geological processes, and has brought innovation to research programs on submarine slope stability in various regions, especially Canada, Alaska, China, and the Middle East. He has carried out assessments of seabed geologic hazards as part of electrical transmission and telecommunications cable projects, and of gas pipeline corridor surveys.

**Engineering Design Support:** Dr. Bornhold has been involved with numerous geological engineering studies related to fibre-optic cable routing, pipeline routing, nearshore facility construction and dam development. These have included:

- desk-top studies of marine cable routings and shore-crossings in the Pacific Northwest and California (*360 Networks and International Telecom*).
- on-board, company representative in offshore northern Brazil fibre-optic cable routing survey (*360 Networks*)
- specialist consultant on Gulf of Aqaba hydro-electric cable routing and slope stability issues (*BC Hydro*)
- project leader on high-resolution seismic lakebed mapping effort in the Canadian Northwest Territories for the Diavik diamond mine project (*Diavik/SNC Lavalin*).
- specialist on coastal and nearshore slope stability failure at Skagway, as part of a multi-million dollar lawsuit associated with the complete loss of a cruise ship terminal at Skagway, Alaska.
- Assessment of substrate and slope stability problems along portions of the Vancouver Island Gas Pipeline (*Williams Gas*)
- Seafloor mapping and cable routing for electrical transmission cables, Juan de Fuca Strait (SeaBreeze Power)

**Marine Processes (Sedimentology)-** A primary focus for Dr. Bornhold has been marine sedimentology. Research topics related to submarine hazards, coastal zone and fjord processes, continental shelf history, ice-rafting processes, geochemistry and mineralogy, as well as placer mineral deposition and movement processes. Areas of study included: Northeast Pacific, China, West Africa, Arctic Ocean, and Arctic Island Channels.

**Coastal Research/Marine Geology** – Dr. Bornhold has conducted coastal and nearshore studies since 1971, with research projects on west and north coastlines of North America and offshore North Pacific, as well as the South China Sea. Research topics have included: sediment transport/deposition predictions and measurements, continental shelf and submarine slope stability surveys.

**Technical Expert Services** – Dr. Bornhold has acted as a technical expert in several legal cases (PARN Dock collapse, Skagway Alaska; Tsawwassen First Nations suit regarding the Roberts Bank causeways; NOAA litigation regarding a fibre optic cable off northwestern Wash. State). As well he has testified in National Energy

Board hearings for the GSX gas pipeline to Vancouver Island and B.C. Utilities Commission for electrical transmission cable routes.

**Paleoenvironments** - Since 1973, Dr. Bornhold has been closely involved with large, multidisciplinary studies of paleoclimates and paleoceanography. These ranged from Quaternary climate and oceanographic change in the Southern Atlantic and Northeast Pacific to socioeconomic implications of global environmental change. Dr. Bornhold has been involved in paleoenvironmental legs of the Deep Sea Drilling Project and Ocean Drilling Program in the South Atlantic and west coast of Canada. Recently, he was Chief Scientist for the Saanich Inlet leg of the Ocean Drilling Program.

**Training**-Through his experience as lecturer and professor, Dr. Bornhold is very familiar with all aspects of training procedures, and will provide additional expertise to CORI training programs in coastal processes, marine geology, seabed habitat, and submarine slope stability. He continues to supervise graduate students at Masters and Ph.D. levels engaged in research related to sedimentary processes and coastal environmental geology.

**Project Management** Dr. Bornhold has managed diverse multi-disciplinary projects. As Director of the Canadian Global Change Program for the Royal Society of Canada, he was responsible for: fundraising; publication of technical and popular documents on global environmental change; organization of technical and public symposia; creation of expert panels in scientific, socioeconomic and policy areas; provision of secretariat services to expert panels; preparation of strategic planning documents, briefing notes, press releases and various reports to funding agencies; complete financial management; publication of a quarterly newsletter (circulation ~9,000); and operation of Canadian Secretariat for the International Geosphere-Biosphere Program. As Head of the Marine Geoscience Section at the Pacific Geoscience Centre, he oversaw general marine geoscience activities, project planning, financial management, and manpower supervision. As the Scientific Co-ordinator for the Ocean Drilling Program Leg 169S (Saanich Inlet), Dr. Bornhold coordinated all aspects of the project: planning, logistics, technical requirements, field program, and overall management. As Project Scientist for the NEPTUNE Canada Project, he was responsible for organization of the scientific community in Canada and abroad to formulate and install scientific experiments on the NEPTUNE observatory.

- Bornhold, B.D.**, Thomson, R.E. and Mazzotti, S., 2009, Projected relative sea level changes for British Columbia during the 21<sup>st</sup> Century. *Innovation*, 13, 30-33.
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- Thomson, R.E., **Bornhold, B.D.** and Mazzotti, S., 2008, An examination of the factors affecting relative and absolute sea level in coastal British Columbia. Canadian Technical Report of Hydrography and Ocean Sciences 260, 49 pp.
- Bornhold, B.D.**, Harper, J.R., McLaren, D. and Thomson, R.E., 2007, Destruction of the First Nations village of Kwalate by a rock avalanche-generated tsunami. *Atmosphere-Ocean*, 45, 123-128.
- Skvortsov, A. and **Bornhold, B.D.**, 2007, Numerical simulation of landslide-generated tsunami in Kitimat Arm, British Columbia, Canada, April 27, 2005. *Jour. Geophysical Research*. Volume 112, Issue F2, CiteID F02028
- Good, T.M., Barrie, J.V. and **Bornhold, B.D.**, 2005, Impact of offshore aggregate extraction in the Prince Rupert area of British Columbia, Canada. In: *Marine Geological and Benthic Habitat Mapping*, Todd, B. and Greene, H.G. (eds.), Geological Association of Canada, Special Paper 4.
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- Bornhold, B.D.**, Rabinovich, A.B., Fine, I.V., Kulikov, E.A., and Thomson, R.E., 2004, Landslide-generated tsunamis and their risk in coastal areas. *Proceedings GeoQuebec*, Canadian Geotechnical Society, 28-33.
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- Skinner, M.R. and **Bornhold, B.D.**, 2003, Slope failures and paleoseismicity, Effingham Inlet, southern Vancouver Island, British Columbia, Canada. In *Locat, J and Mienert, J. (Eds.) Submarine Mass Movements and their Consequences*, 375-382. Kluwer Academic Publishers.
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- Blais-Stevens, A., **Bornhold, B.D.**, Kemp, A.E.S., Dean, J.M. and Vaan, A.A., 2001, Overview of Late Quaternary stratigraphy in Saanich Inlet, British Columbia: results of Ocean Drilling Program Leg 169S. *Marine Geology*, 174, 3-26.
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