



# Environmental Hydraulics Laboratory



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Our laboratory focuses on coastal and ocean research to improve our understanding of the physics of wind-driven waves and ocean-structure-seabed interactions. The research activities revolve around a large scale experimental wave flume facility and numerical model developments. One of the objectives is to develop sustainable approaches to control coastal erosion caused by climate change.

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CANADA

**INRS**  
UNIVERSITÉ DE RECHERCHE  
A RESEARCH UNIVERSITY

# ABOUT US

The research activities are based on large scale experiments and development of free-surface numerical models to study the physics of complex fluid mixing and structural response as coupled interactions.

## RESEARCH THEMES

### Fluid Dynamics

- Physics of fluids
- Fluid mixing
- Multiphase flows
- Numerical methods

### Coastal Processes

- Coastal erosion, scour & beach nourishment
- Nearshore hydrodynamics
- Storm surge and flooding
- Sediment transport
- Runup and overtopping

### Ocean & Atmospheric Sciences

- Air-sea interactions
- Wind-driven waves, tides and coastal processes
- Storm predictions

### Marine structures

- Force and impact on marine structures
- Debris flow (e.g., river jams of ice)
- Special structures (e.g., underwater vehicles)
- Structural dynamics, elasticity & vibration control

### Renewable wind, wave, tidal and offshore solar energy

## LARGE SCALE FLUME

The flume is 120 m long and has a 5 x 5 m cross section. The flume is designed for modeling the interactions of waves, tides, currents, and sediment transport. The wavemaker is a piston type with a maximum stroke length of 4 m and a maximum velocity of 4 m/s. It is also equipped with an active wave absorber. Various initial conditions can be set-up including regular and irregular waves and a host of user-defined functions, e.g. landslide and earthquake-generated tsunami. Large amplitude waves can be generated reaching the top of the flume walls with water depth ranging from 2.5-3.5 m with wave period of 3-10 s.



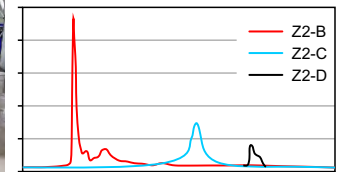
Wavemaker



Force and impact monitoring



4 m stroke - 4 m/s capacity



Coastal erosion studies



User-defined waves



Monitoring instruments

## CONTACT US

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