Using Geospatial Technologies to Explore the Deep-Sea at Multiple Scales **Application to Cold-water Coral Habitats in Canada** Vincent Lecours • Ph.D. Candidate • Marine Geomatics Research Lab • Memorial University of Newfoundland

Abstract

This project uses geospatial technologies to study the deep-sea chemical and physical environments at multiple spatial scales.

Objectives:

- Identify the characteristics of the environment that can be used as surrogates for the presence of biological organisms
- Identify at which spatial scales these surrogates are meaningful

The approach is applied to cold-water coral habitats in Canada.

Glossary

Benthic habitats	Geomorphometry	Surrogates
Physically distinct	Science that	Measurable
areas of seabed	quantitatively	entities that can
that are associated	measures terrain	substitute for a
with the occurrence	morphology using	more complex
of a particular	Digital Elevation	element that is
species ^[1]	Models (DEM);	more difficult to
	terrain analysis ^[2]	measure; proxies ^[1]

Introduction

Context

While oceans constitute about 90% of the habitable area for life on Earth, little is known on deep-sea ecosystems. Combining recent technologies such as Remotely Operated Vehicles (ROV) and multibeam echosounders enables exploration of the deep-sea at scales that were previously impossible.

Research Problem

Since the seafloor is increasingly impacted by human activities, such as fishing and hydrocarbon drilling, research on near-bottom environments and their biota is essential.

Owing to their remoteness, deep-sea habitats are difficult to sample and study. This creates a need to **define surrogates** of biodiversity that can be easily sampled.

Issue of Spatial Scale

One of the most critical aspect in habitat mapping, scale is also one of the most misunderstood^[3]: no single scale can explain all ecological problems. While the scale of analysis should always match the scale of the ecological process under investigation, the latter is often unknown. To identify the scales over which surrogates are meaningful, an approach exploring their effect on **a continuum of scales** is needed.^[4]



Application

2010, Harvard University Press. [6] Edinger et al., 2011. Cont. Shelf Res. 31: S69-S84