

## N531: Mitigating Geohazards in Seafloor Settings

Instructor(s): Lesli Wood

## Format and Duration

Classroom - 2 Days

Virtual - 4 Sessions

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### Summary

The course is aimed at geologists, geophysicists, engineers, and managers working in areas where seafloor bottom processes and deposits impact design and maintenance of emplacements. Through a combination of lectures and case studies, the participants are exposed to many of the aspects that influence design and maintenance of seafloor emplacements with emphasis on predicting, mapping, and quantifying substrate character and predicting variables that influence shelf geomorphology.

**Business Impact:** This course will provide critical understanding and hands-on skills for participants working in areas where shelf processes and deposits impact the **design and maintenance of wind energy and communications emplacements** or **success in drilling exploration and development wells**.

### Learning Outcomes

Participants will learn how to:

1. Interpret a variety of different types of data (i.e. seismic, core, samples, strength data, etc.) and integrate those data to derive the condition and state of shelves.
2. Translate depositional form into process, then process into sedimentology, and create a risk matrix to assess the implications to business objectives.
3. Differentiate tectonic structure from depositional architecture.
4. Apply the tools of observation, annotation, and interpretation of various scales of seascape morphology, including regional and localized features.
5. Define and justify critical criteria for assessing hazards in a shelf setting and translate those assessments to map exclusion zones.
6. Estimate risk, uncertainty, and bias in data interpretation, and utilize this knowledge to make decisions.

### Training Method

This is a classroom course comprising a mixture of lectures, discussion, exercises, and case studies. We will work with seismic data, downhole borehole data, and high-resolution sonar and sub-bottom profiler data.

### Who Should Attend

The course is aimed at geoscientists, geophysicists, engineers, and managers who are planning and constructing emplacements in marine settings.

### Course Content

The lecture content provides a summary of the fundamentals of marine seafloor systems. The principal goal of the course is to provide geoscientists and engineers with methodologies and hands-on experience in seismic, logs, and core interpretation of these deposits, as well as a background in the variables that influence the marine shelf and deepwater setting.

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The course is intended to generate instructive discussion among experienced professionals, moderated and guided by the tutor. Exercises will be assigned each day to reinforce the lectures and class participants will complete exercises in class or overnight. Results will be reviewed by participants and instructor in class or prior to the next morning's lecture. Lectures are in 3, 4.5-hour blocks each day, and the instructor will be available informally to answer questions throughout the day.

The following indicates the planned content of the course.

### DAY 1 Depositional Processes and Deposits in Global Marine Settings

- Meet and Greet, Intro and Structure of the Course
- Course Introduction to Seafloor Systems and Processes
- Background in Seafloor Physical Processes and Deposits
- EXERCISE Mapping Shelf Tidal Architectures
- Structure of the Seafloor

### DAY 2 Interpreting Seafloor Character

- DAY 1 Review
- Tools and Tool Resolution for Interpreting the Sub-Seafloor
- Interpreting the Geomorphology of Submarine Substrates
- A Stratigraphic Framework for the Shelf, Slope, and Deepmarine
- EXERCISE Mapping Young Sequences

### DAY 3 Hazards Recognition and Assessment

- DAY 2 Review and Q and A
- Forces Acting on Seafloor Emplacements
- Shallow, Water Flows, and Overpressure
- EXERCISE: Interpreting Shallow Threats

### DAY 4 Submarine Mass Failures, Exclusions Zones, and Risks

- REVIEW Day 3 Exercise
- Submarine Mass Failures
- EXERCISE Seismic Morphology of Submarine Mass Failures
- Review Exercise
- Currents in the Ocean
- Exclusion Zones Map (EZM) Construction
- WRAP UP