

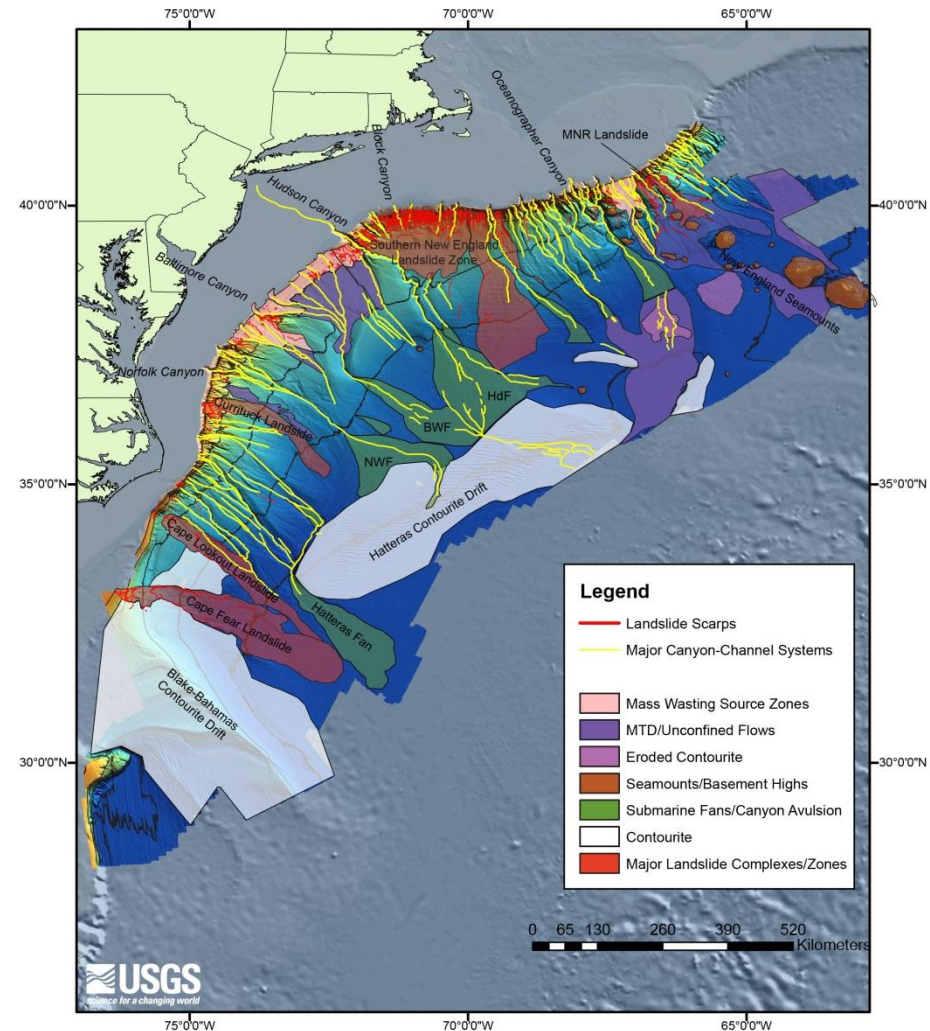
# **A Brief Overview of Geologic Processes in U.S. Atlantic Submarine Canyons**

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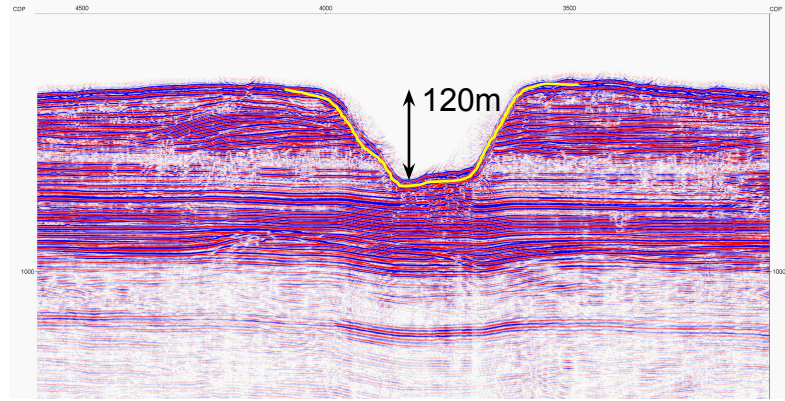
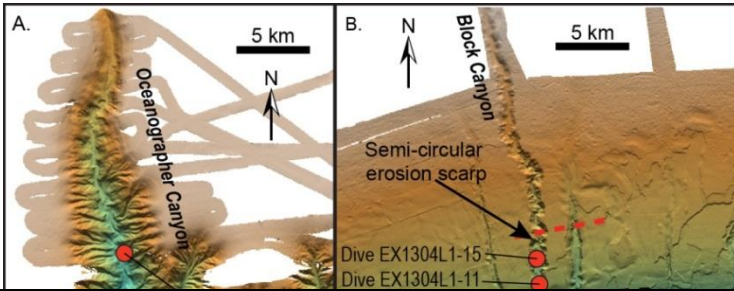
# Atlantic Submarine Canyons/Deep-Sea Channels

- The U.S. Atlantic margin is tectonically passive, but still active in terms of ongoing sedimentary processes
- Canyons/Channels are complex systems that link the land and continental shelf to the deep ocean.
- Canyons cutting the margin are the latest manifestations of such systems that have been shaping the region since the Miocene (~ 20 Million years ago).
- Modern canyons became “less” active when sea-level began to rise at the end of the Last Glacial Maximum ~ 19,000 years ago.

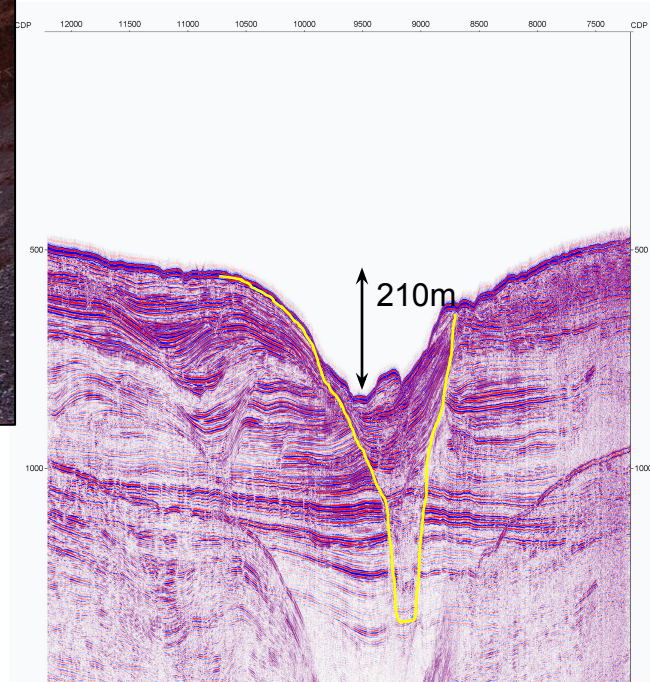




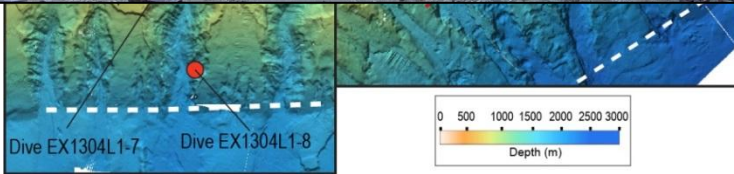
# Submarine Canyon Geology and Geomorphology



Limited infilling



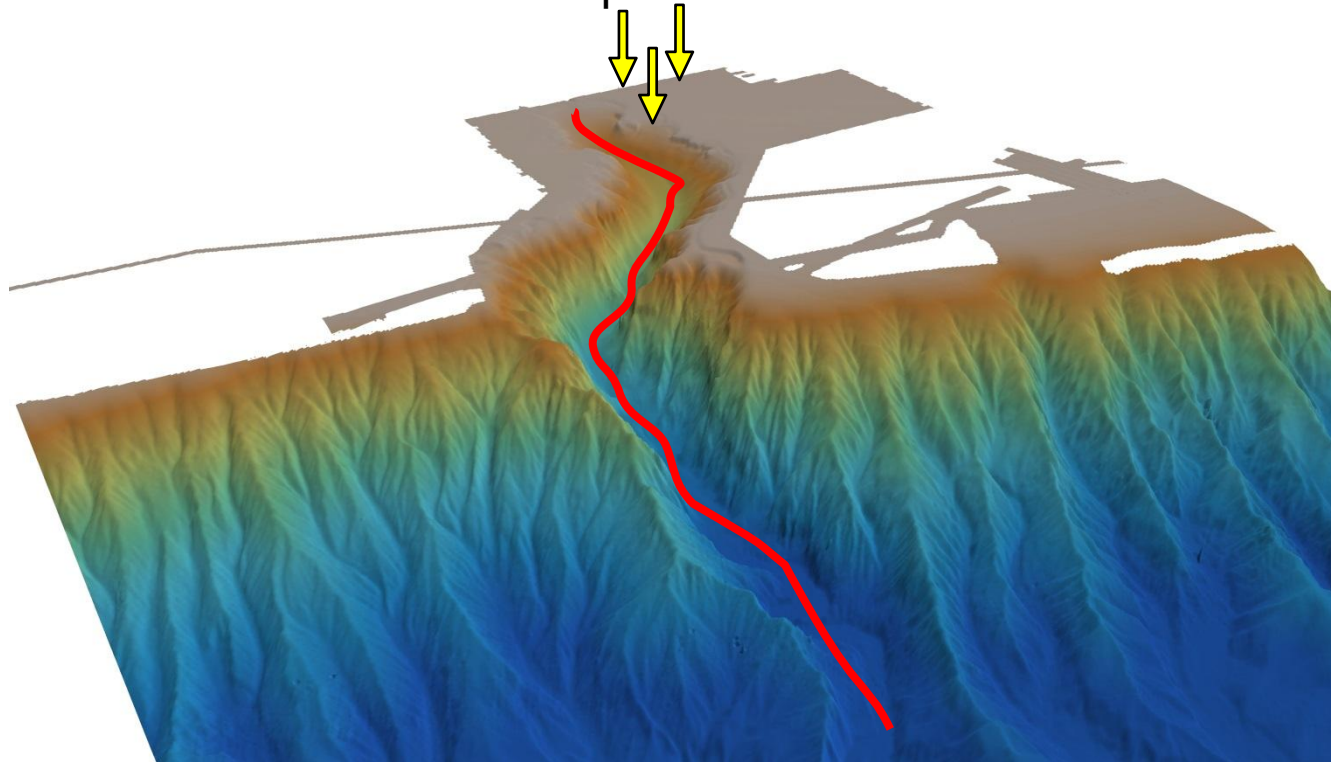
Extensive cutting & infilling



# Sediment Transport in Canyons – Mechanisms and Disturbance

Hemipelagic/pelagic sedimentation – Background processes

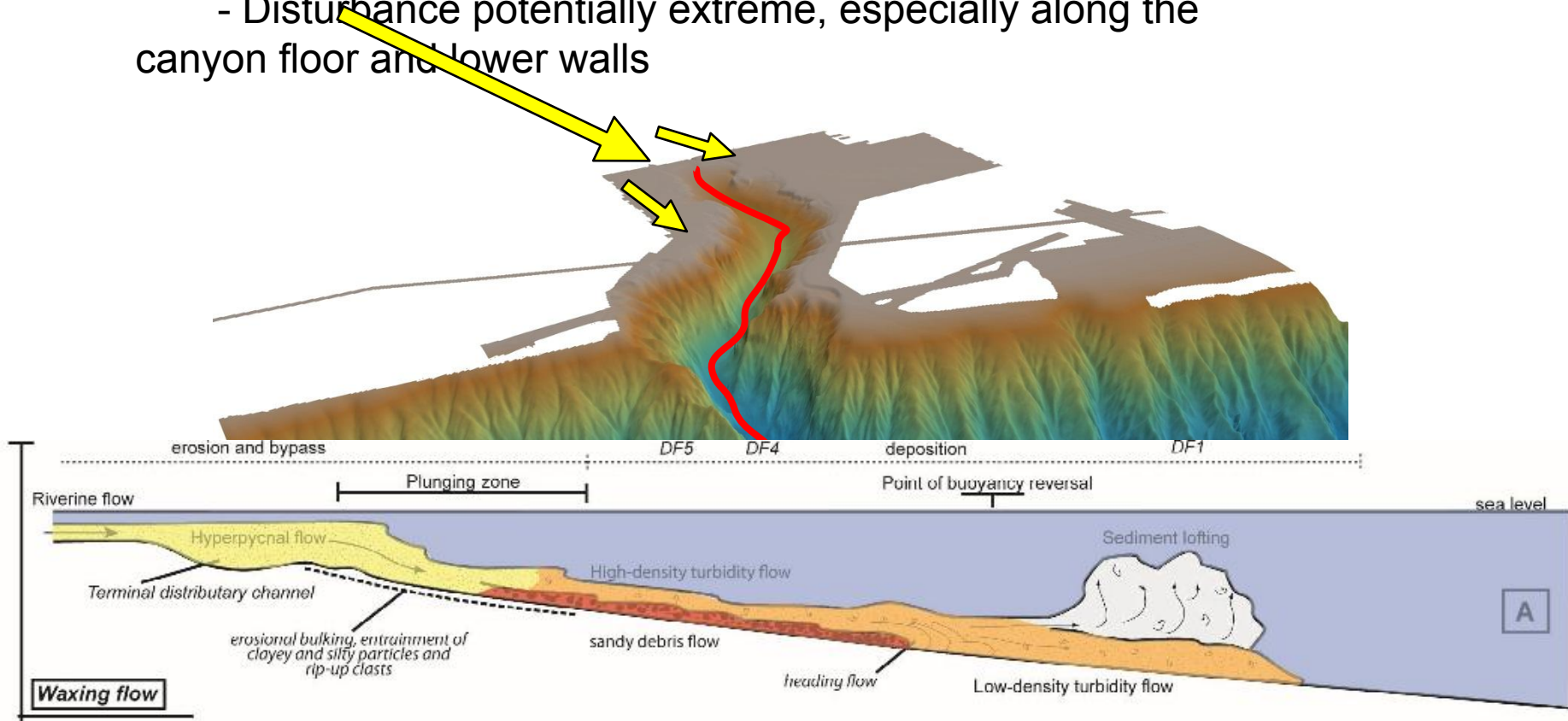
- Rates somewhat consistent over short time scales
- Disturbance potential low





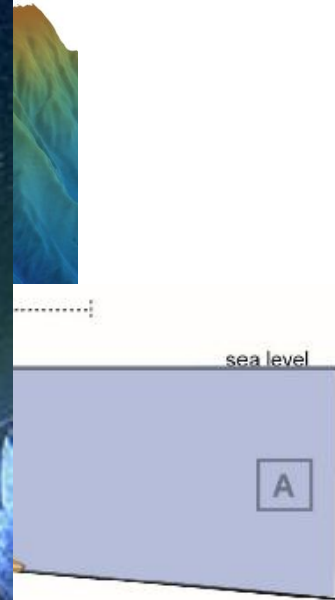
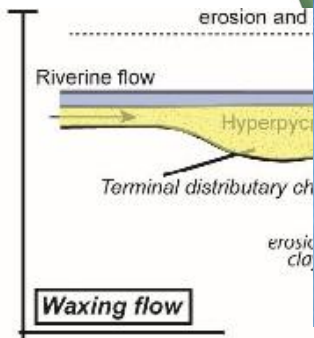
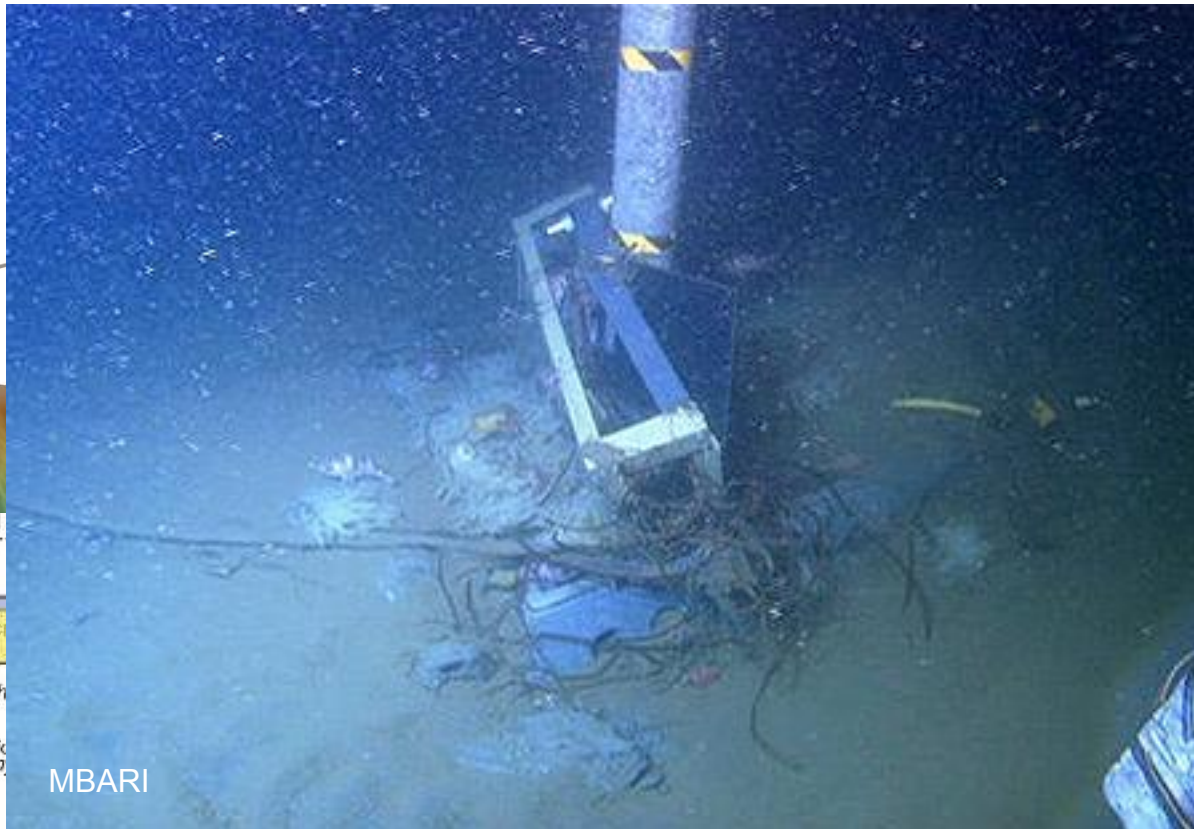
# Sediment Transport in Canyons – Mechanisms and Disturbance

- Terrestrial Inputs - Hyperpycnal flows, river flood inputs
  - Episodic (no recorded events along Atlantic margin)
  - Disturbance potentially extreme, especially along the canyon floor and lower walls



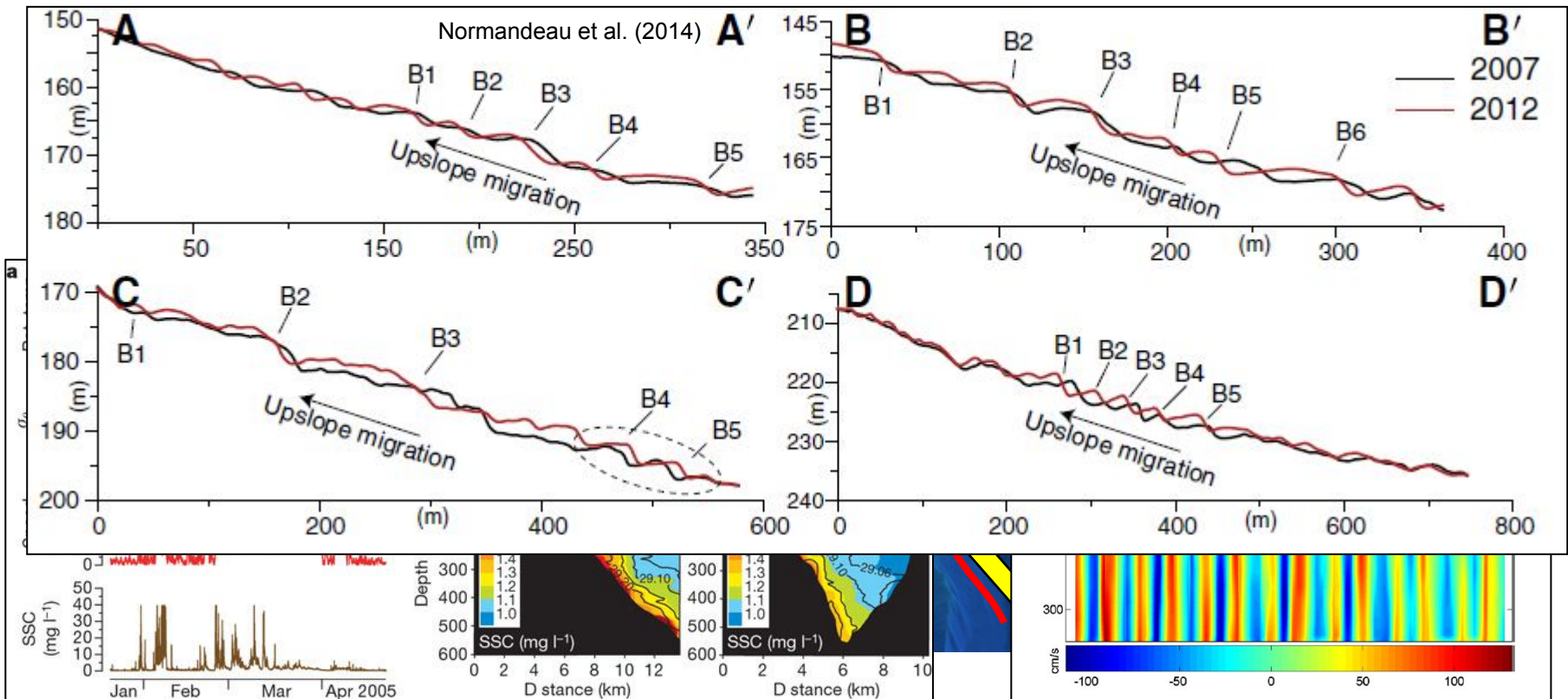
# Sediment Transport in Canyons – Mechanisms and Disturbance

- Surface Waves
  - Storm induced turbidity currents, storm induced shelf, sediment resuspension, long-shore transport
  - Episodic to continuous processes
  - Disturbance potentially extreme (turbidity currents)



# Sediment Transport in Canyons – Mechanisms and Disturbance

- Oceanographic Processes - Cascading shelf water; Internal waves/tides
- Persistent to episodic
- Disturbance possible, but localized



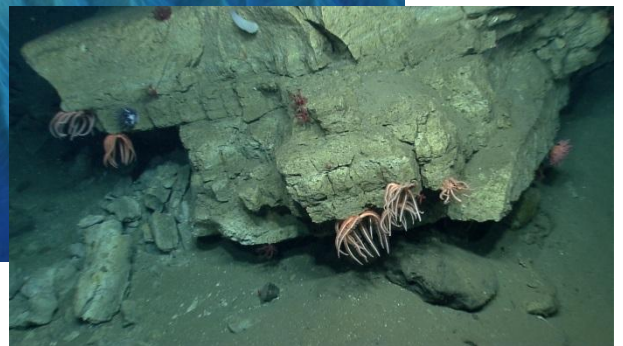
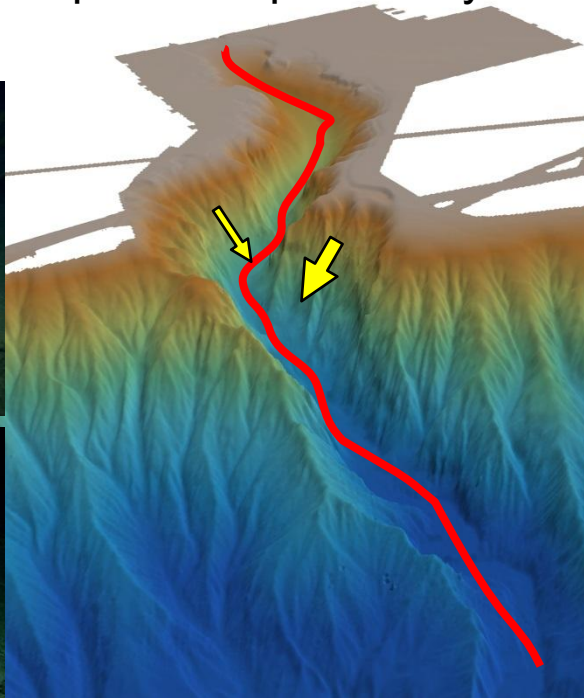
Canals et al. (2006)

Gaoping Canyon; Lee et al. (2009)



# Sediment Transport in Canyons – Mechanisms and Disturbance

- Slope Stability
- Canyon wall failure; bioerosion; large-scale slope failure
  - Variable rates, with larger scale events occurring over time scales of tens of thousands of years and bioerosion a persistent process
  - Disturbance infrequent but potentially extreme system wide



All from NOAA OER