Università di Trieste
LAUREA MAGISTRALE IN GEOSCIENZE
Curriculum Geofisico
Curriculum Geologico Ambientale

Anno accademico 2018 – 2019

Geologia Marina

Modulo 6.1 Offshore Research and Economic Activities

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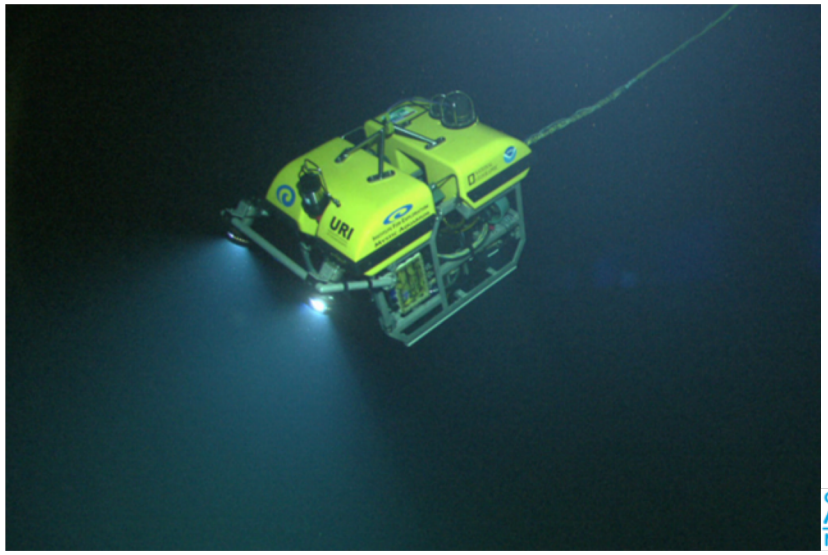
Con contributi di Daniel Praeg (Geosciences Azur)

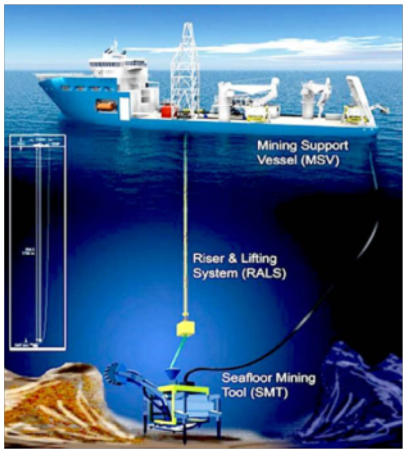
- **Average ocean water depth: 3,682.2 m**
- **Equivalent to a pressure of 36,121.3 kP, 361.21 bar o 356.49 atmospheres**
- **Light is rapidly absorbed in water. From about 100 m down there is absolute darkness**



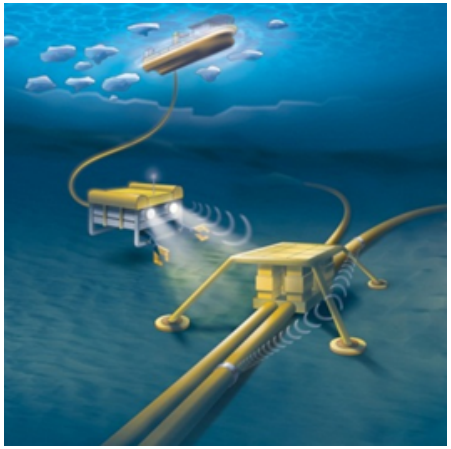
Less than 50% of the oceans have been explored

DESPITE THE HOSTILE ENVIRONMENT, THE USE OF THE SEABED IS GROWING, AS THE BLUE ECONOMY IS GROWING

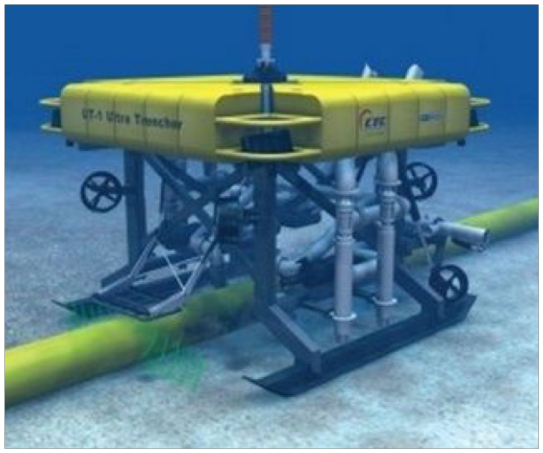
DEEP SEA MINING



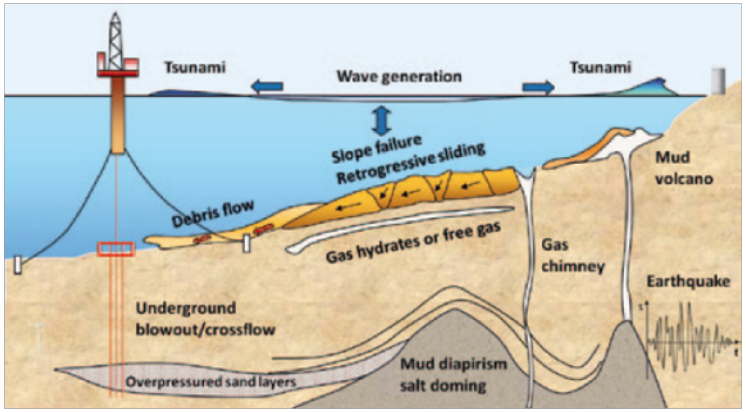
SUBSEA OIL & GAS TECHNOLOGY



COMMUNICATION CABLES



KNOWLEDGE GAP:



- **IN THE WATER COLUMN**
- **ON THE SEABED**
- **BELOW THE SEABED**

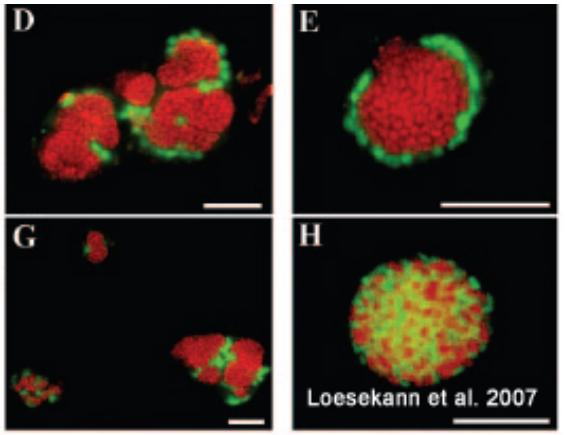
NOT ONLY:

Oceans represent a resource to e discovered for new chemical and biological products with a potential use in pharmaceutic industry

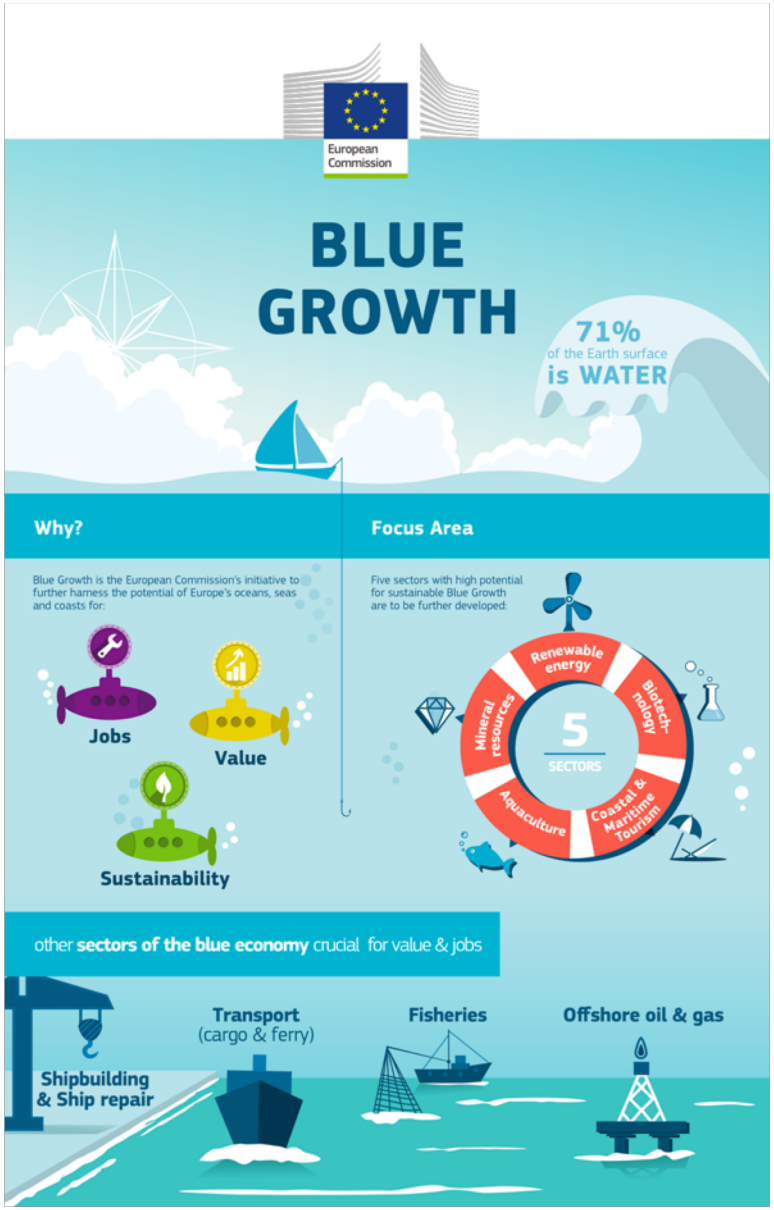
Monsoons to Microbes: Understanding the Ocean's Role in Human Health.

National Research Council (US) Committee on the Ocean's Role in Human Health. Washington (DC): National Academies Press (US); 1999.

- **The Marine Environment as a Source of Chemical Diversity**
- **The Discovery and Development of Marine Pharmaceuticals: Current Status**
- **Marine Microorganisms as a Novel Resource for New Drugs**
- **The Marine Environment as a Source of Molecular Probes**
- **The Ocean as a Source of New Nutritional Supplements**



https://ec.europa.eu/research/environment/pdf/deepseefrontier.pdf



Blue Growth is the long term strategy to support sustainable growth in the marine and maritime sectors as a whole.

Organisation for Economic Co-operation and Development (OECD)

Ocean industries bear a potential of an **important contribution to employment growth**, which could result in the creation of approximately 40 million full-time equivalent jobs globally in 2030

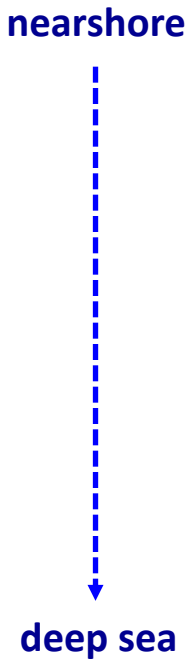
http://bluegrowth.inogs.it/

Offshore (geo-) economic activities

- Submarine cables & pipelines
- Renewable energies (wind farms)
- Seabed mapping (a service industry)
- Nearshore sand and gravel mining
- Deep sea mineral mining
- Bio-prospecting (sub-seabed)
- Hydrocarbon exploration
- Methane hydrates

Seabed installations, old & new

Natural resources, nearshore to deep-sea



Working at sea is expensive

survey vessels cost 10,000-100,000€/day

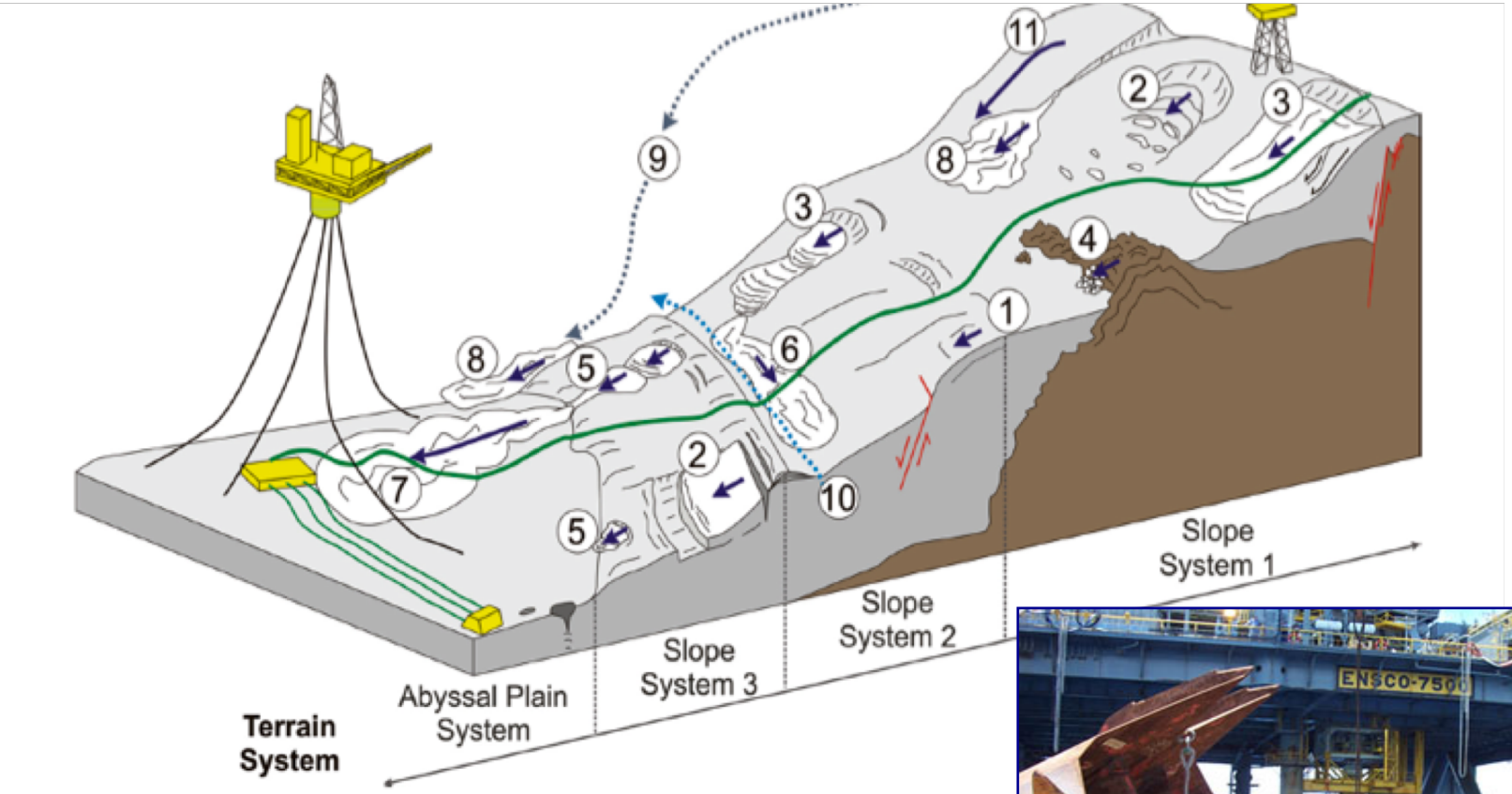
Drilling vessels for hydrocarbons can cost more than 500,000 €/day

MOST COMMON USES OF THE SEAFLOOR

- SUBMARINE CABLES
- PIPELINES
- PLATFORMS FOUNDATIONS and SUBSEA INSTALLATIONS
- DEEP SEA MINING

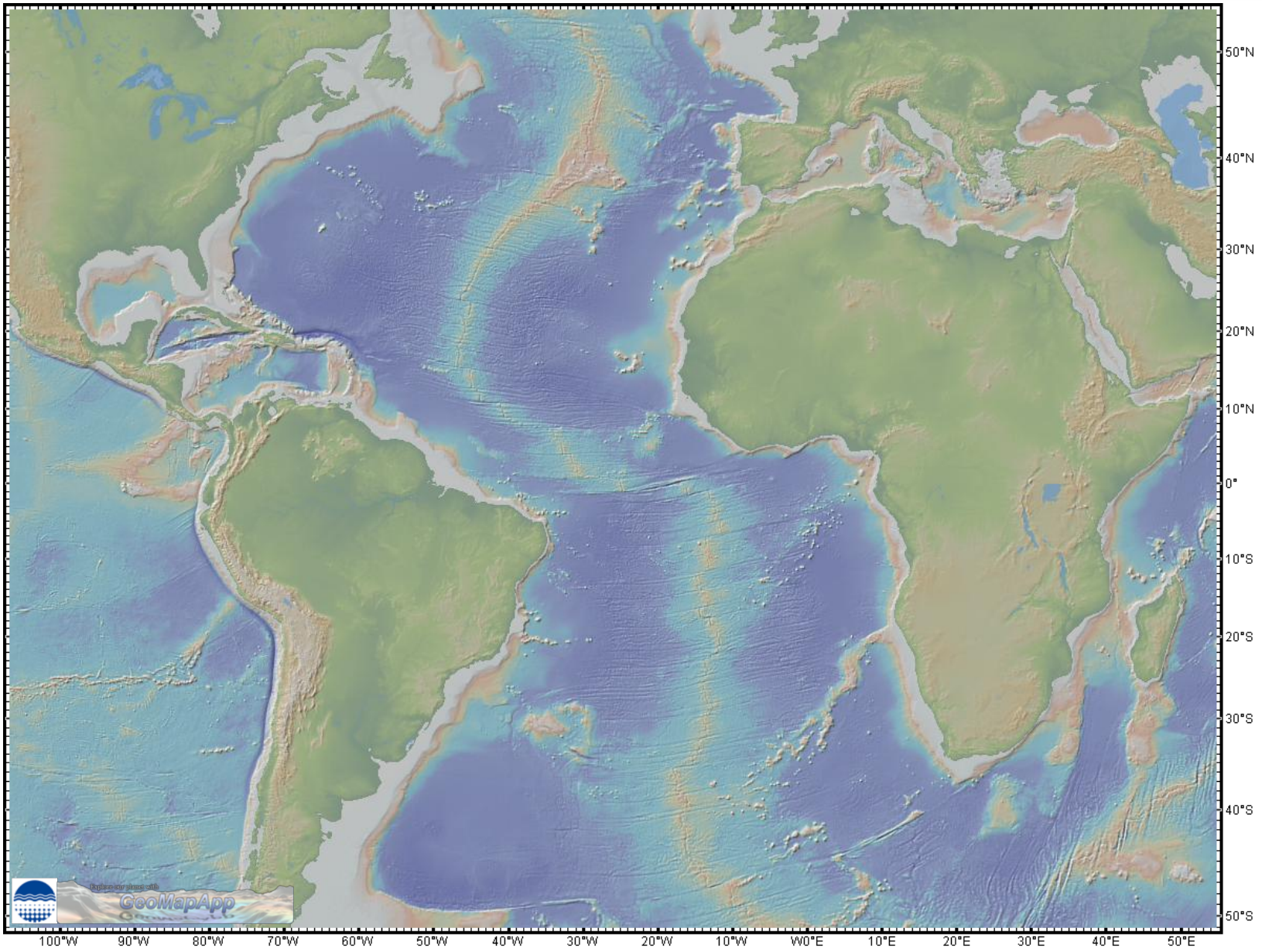
GEOLOGICAL COMPLEXITY OF CONTINENTAL MARGINS

Concern for safety of economic activity



Mosher, 2010.

R. Craig Shipp, Shell International E&P Inc. IODP Geohazard Workshop, Portland 2008


50°N
40°N
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40°S
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100°W
90°W
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60°W
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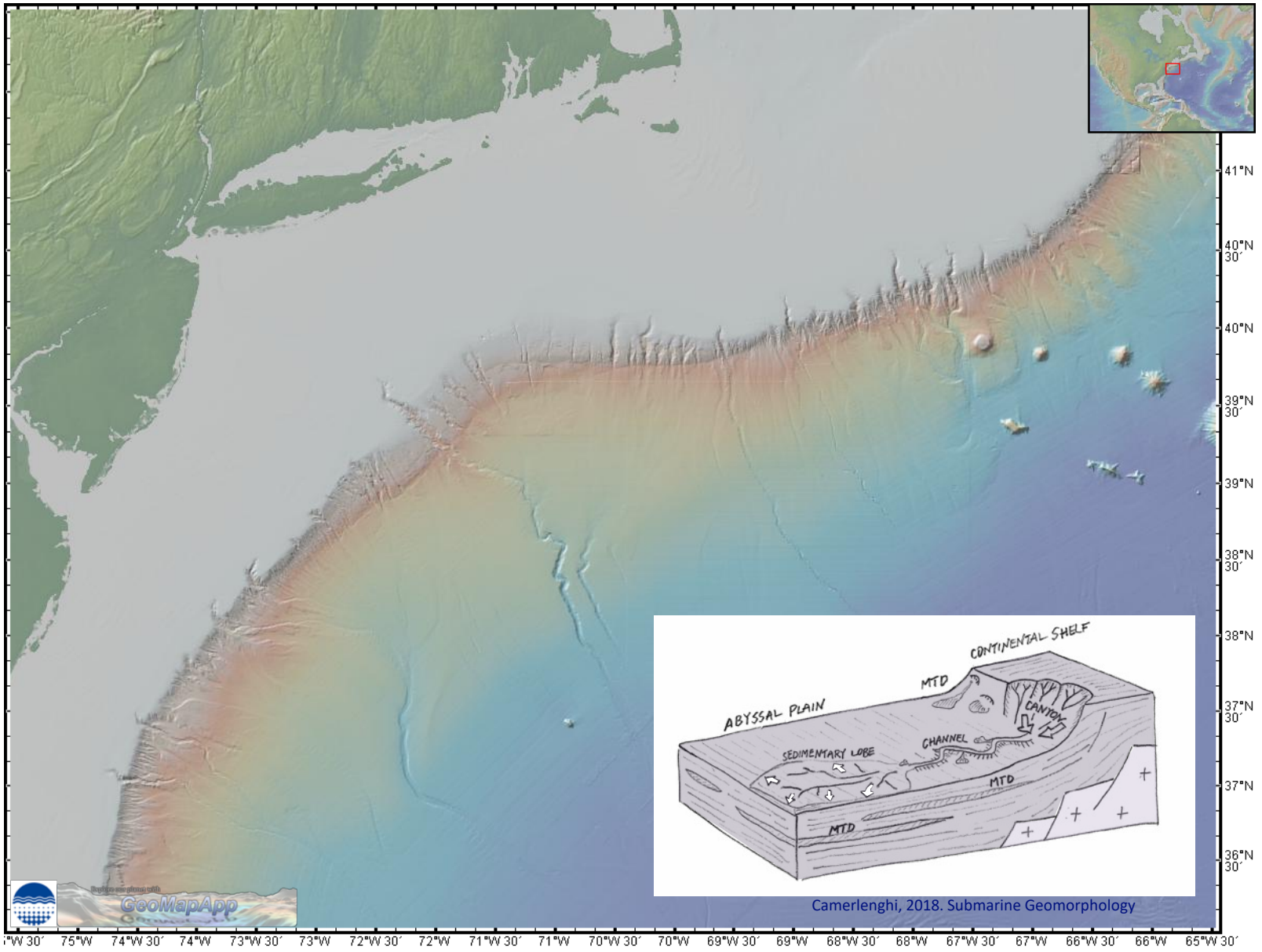
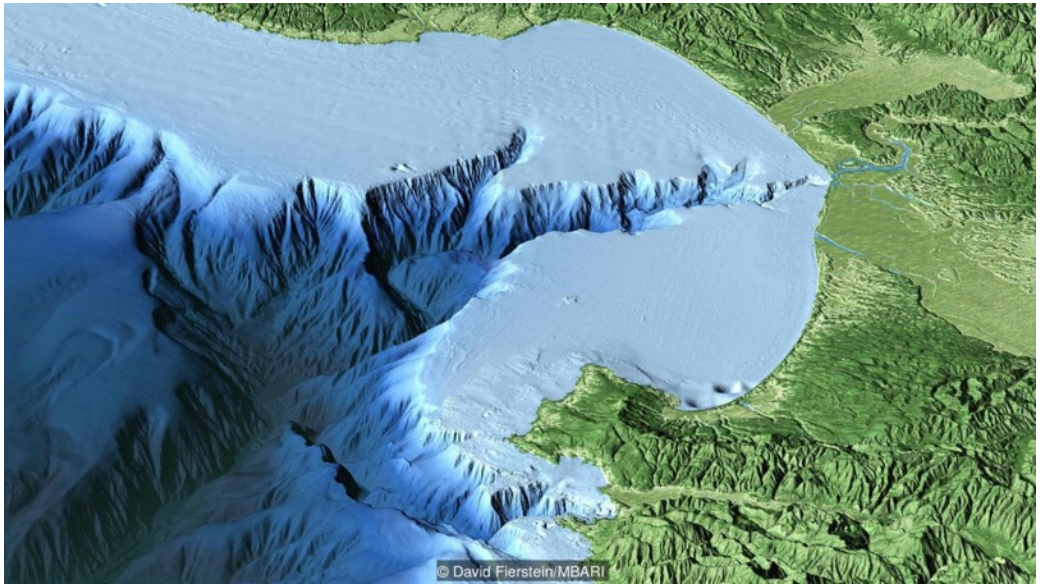
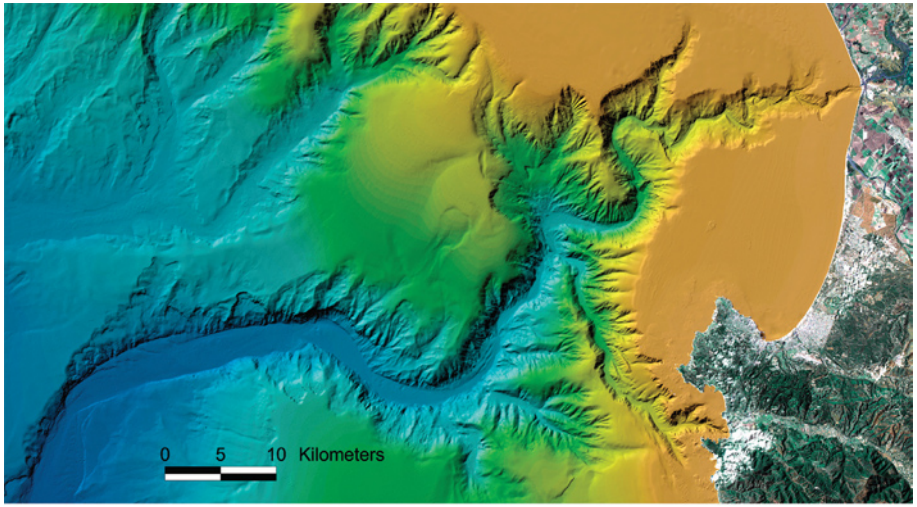
30°E
40°E
50°E
GeoMapApp

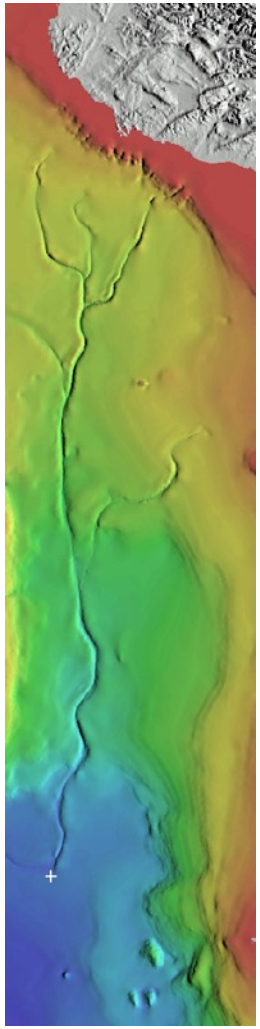


Camerlenghi, 2018. Submarine Geomorphology

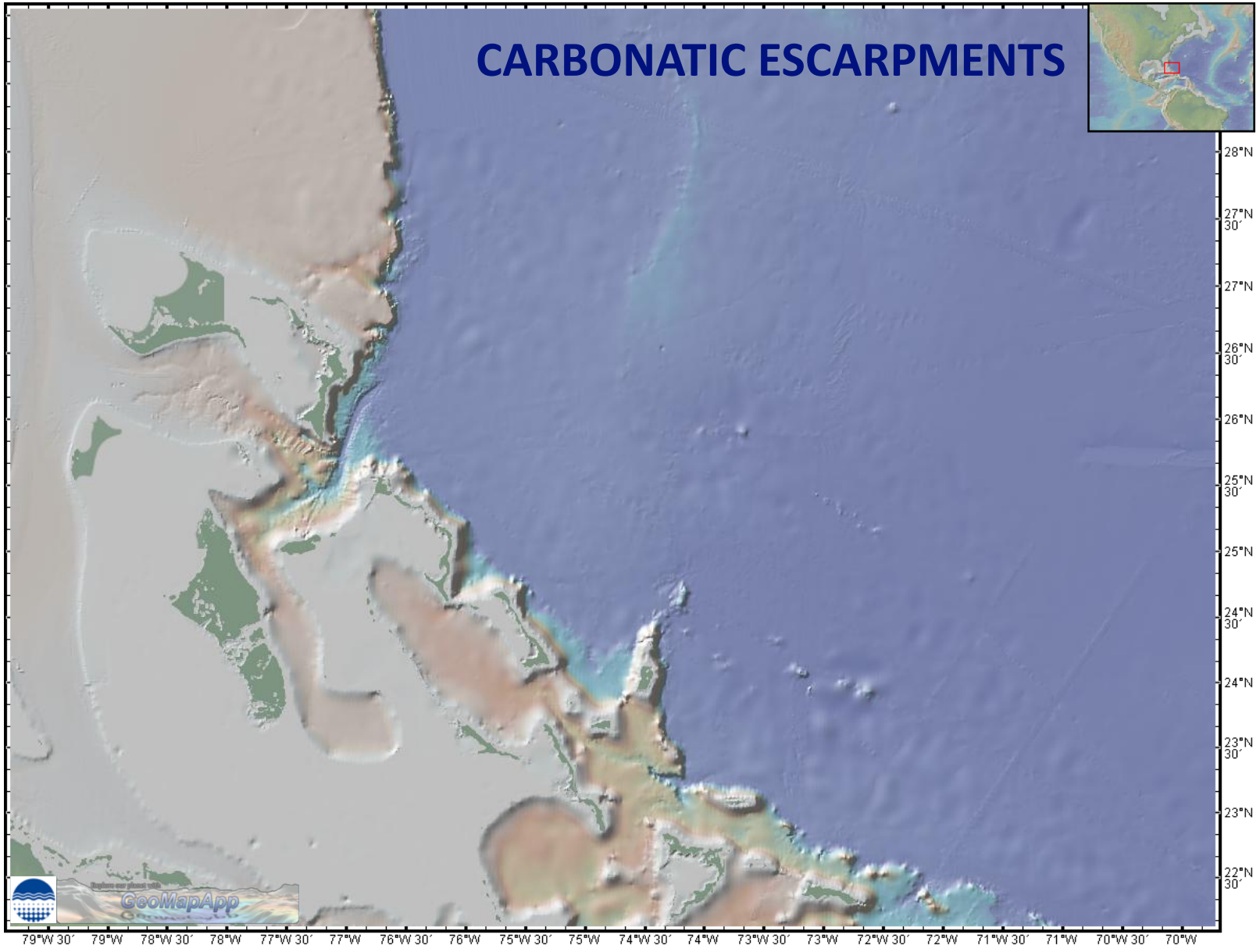
Submarine canyons and deep sea channels



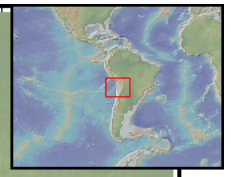


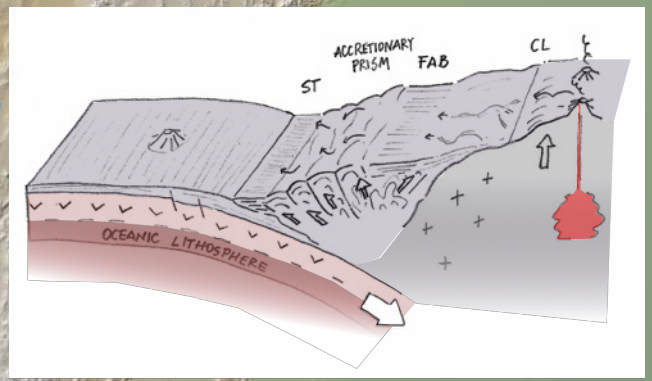


CARBONATIC ESCARPMENTS



SUBDUCTION ZONES

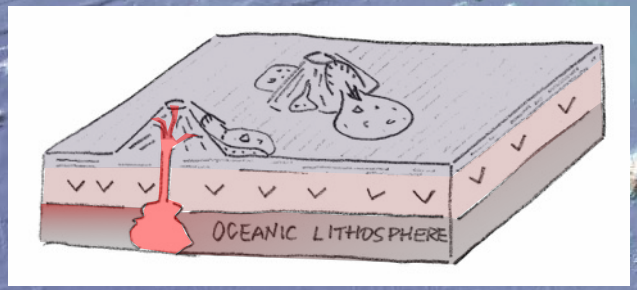




16°S 17°S 18°S 19°S 20°S 21°S 22°S 23°S 24°S 25°S 26°S 27°S 28°S

80°W 79°W 78°W 77°W 76°W 75°W 74°W 73°W 72°W 71°W 70°W 69°W 68°W 67°W 66°W 65°W 64°W 63°W 62°W 61°W

VOLCANIC ISLANDS



GLACIAL MARGINS