

National Geographic DRAIN THE OCEAN notes

<http://channel.nationalgeographic.com/episode/drain-the-ocean-3639/Overview>

MYSTERIOUS WATERS

Below the surface of the Earth's oceans lies a mysterious and relatively unknown world. With an enormous diversity of life, the ocean remains one of the world's largest ecosystems, though we still know very little about what lives in its great depths. Go beneath the water and learn more surprises of the sea:

- * Water covers more than three quarters of the globe.
- * We know the surface of Mars or Venus better than Earth's ocean floor.
- * Only about 5% of the global ocean floor has been mapped in detail.
- * Average ocean depths are approximately 2.2 miles, nearly 12,000 feet, deep.
- * The mid ocean ridges of the world are so long they could go right around the Earth one and a half times.
- * Overall, the diversity of the deep sea rivals that of rain forests on land.
- * There are up to 100,000 underwater mud volcanoes on continental slopes and abyssal plains – formed by gas escaping from some underground source under high pressure.
- * There are between 70,000 and 100,000 sea mounts more than half a mile tall in the world's ocean and as many as one million features over 328 feet tall.
- * The Mid Oceanic Ridge is the world's longest mountain chain being more than 35,000 miles, running along the center of the ocean basins and joining up around the globe like the seams on a basketball.
- * Iceland is one of the few places where you can stand on the Mid Atlantic ridge on dry land

Read more: <http://channel.nationalgeographic.com/episode/drain-the-ocean-3639/Overview#tab-facts#ixzz0OPflclWU>

Monterey Bay Canyon

300 miles long and a mile deep

Autonomous Underwater Vehicle AUV which uses sonar to map the seafloor

Grand Canyon is a similar size, formed by river erosion
formation of Monterey Bay ?

Remotely Operated Vehicles ROV use tools to study the sea floor
eg vibrating **core sampler**
cores show variety particles which indicate a major disturbance
underwater avalanches (turbidity currents) probably formed the canyon

Sidescan sonar measures time it takes for sound to leave the sound generator, bounce off
of the bottom and return
Mowing the lawn
Only small areas of the ocean have been mapped

Surface bouys connected by fiber optics to permanently operating
science stations placed on the sea floor, with power and connection to shore

bioluminescence

Johnson Sealink submarine with a clear sphere to hold scientists

Hawaii

a hot spot under the big island of Hawaii builds the island
4,000 feet taller than Mt. Everest
Loihi seamount growing near Hawaii

The Hawaiian island chain is formed by the entire ocean plate moving onto and past hot
spots

Pisces submersibles go to one mile down

Monk Seals with “**Sealcams**”

Straights of Florida

huge coral seamounts

the surface of the ocean waters mimic the surface of sea floor below
3,000 ft mountain causes only a 3 foot rise in sea surface
but **satellites** can measure to ½ inch
so the entire seafloor has been mapped, not as detailed as sonar can

Mid-Ocean Ridge

40,000 miles long and hundreds to thousands of miles wide
like the seams on a baseball
they are the edges of the tectonic plates of the Earth

appears above the surface in Iceland
maybe Iceland is above a hot spot in addition to being at the juncture of the
North American plate and European plate

mid Atlantic ridge moves about 1 inch per year

at **transform faults** the ridge slides sideways

on land

eg. the San Andreas Fault

underwater

the romanche fracture zone - 200 miles long 20 miles wide 4 miles deep

East Pacific Rise

spreading so fast (6 inches per year) that a ridge like the Mid Atlantic Ridge does not
have time to build up, it spreads quickly to form a much flatter rise

have **Hydrothermal Vents** can be as high as a 20 story building

seawater seeps down cracks and hits magma, superheats and dissolves minerals, shoots
out into the water

Tag Mound on the Mid Atlantic Ridge

Alvin a submersible capable of diving 15,000 feet

Abyssal Plain cover as much of Earth as all of the land on Earth

mud volcanoes over 100,000, as large as 800 feet high and 3 miles across

tar also rises to the sea floor

other chemical seeps

The Great Bahamas Bank

seafloor structure made by skeletons of coral animals with the help of symbiotic alga

Seamounts

most are volcanic seamounts

most concentrated in the Pacific (15,000 there)

some are formed by massive landslides, they are associated with earthquakes, some of
which caused massive tsunamis

Deep Ocean Trenches

where seafloor plates formed at the mid-ocean ridge collide with another plate, they are
subduction zones

Trieste submarine only submersible ever to visit the 7 mile deep Mariana Trench