Exploring the earth under the sea

Environment, Earth

Before the DSDP has begun, we haven’t had an effective way to study samples to learn more from deep ocean rocks and the oceans crust. So, when the DSDP (Deep Sea Drilling Project) started in 1964 by JOIDES (Joint Ocean Institution for Deep Earth Sampling), United States oceanographic institution scientists and along with other scientist all over the world. In 1968, the Glomar Challenger, an odd-looking ship equipped with a large drill structure in the middle of the vessel was initially tested by the DSDP. The capability of this ship was astonishing, able to drill 2, 500ft into the around in about 20, 000 feet of water. The potential the ship had to explore where we were unable to before seemed unheard of before. This testing and planning of where the JOIDES wanted to drill and of the Glomar Challenger was a part of phase 1. Then began phase 2, what was done aboard this ship was constant seismic and magnetic surveys of the surface below and analysis of the cores that they found below. The amount of success was known almost instantly. From what the scientists analyzed, they found that ocean basins are fairly new. They’ve also supported aspects of the ocean such as the theory of seafloor spreading. Seafloor spreading is the theory of oceanic crust forming along underwater mountain areas, then spreads out laterally away. Most of the drilling done by the DSDP included a large variety of different oceans all over the world. What they discovered on the Mediterranean seas is thick bedded salt layers from cores, indicating that the sea was dried up completely 5 to 12 million years ago. What is the most interesting discover to me, the Glomar Challenger drilled down 17 holes in over 15 locations, core samples retrieved from the drilling provided factual proof of continental drift. Therefore, this then strongly supported the theory

of Pangea, a single land mass from millions of years ago. There was also evidence found that Antarctica was covered up for 20 million years. More discoveries that the Glomar Challenger found during its exploration was also the discovery that the ocean’s floor was only about 200 million years old.

Overall the work that the scientist did aboard the Glomar Challenger drastically helped us understand more about our planet as a whole. The samples that were taken from deep blue the ocean is still used today by scientist all over the world who seek to understand more about various studies, such as plate tectonics, the history of the earth, Geography and marine biologist. Not only was the work done by the scientist a huge step for science of our Earth. The ship itself was a huge Engineering feat itself for the ship to dig through solid rock thousands of feet under water. The process to drill the core then extract samples was an in depth process. This processing method is called the punch core-rotary drilling method. This process involved lowering the drill itself to be lowered on a drill string all the way to the ocean floor. From there the drill is rotated and drilling fluid is forced down the drilling pipe. Then the materiel that is drilled away is then mixed with ocean water (which is also the drilling fluid). Then once an area of core is reached sampling is done but by using enough force to cut core into small cylinder shapes and is stuffed into what is called a core barrel, the sample is then sent to the surface.

After about 600 holes being drilled all across the world, the ship was finally docked for the last time in 1983. With it being docked, after the Deep Sea Drilling Project, the Ocean Drilling Project (ODP) began exploration in 1985. Larger and more advanced vessels were being manufactured around this

time, so there was much more potential to explore area’s that was areas where older ships couldn’t before. As was the DSDP, the ODP was largely supported by nations all over the world, and was led by the United States. With this new program, they brought on a drillship called the JOIDES Resolution, or JR for short. A lot like the Glomar Challenger, the JR was used collect and study core samples, the use these to understand more about climate change, geology and also the Earth’s History. As it may seem, with a more large and advanced ship did much more than what was previously capable. With the ship going on over 110 journeys and drilling down a total of 1, 797 holes. Discoveries made by this vessel were impressive. Areas that can now be drilled included continental margins and also ocean trenches.

Along with the research that the JR accomplished, it was also used to assist in making a global seismic network project, that is able help scientist predict and study seismic activity that causes earthquakes and tsunamis. Soon after this, a new program was developed in 2003 called the Integrated Ocean Drilling Program (IODP). This new program is led by the United States National Science Foundation, Japan and many other nations such as China and New Zealand. The main research vessel of the IODP is a Japanese ship called the Chikyu. This vessel allows for scientist to drill at revolutionary depths. In fact, in areas by the shore this ship is able to drill past the Oceanic plate level and all the way to the Upper mantle of the Earth’s core. The ability to accomplish feats like this push for breakthroughs on research of a plethora of things. Much of the research that currently goes on with the Chikyu involves studying and monitoring Earthquakes in highly devastating

areas. Some of their findings involved knowledge on how Earthquakes are initially triggered and how it’s related to the behavior of the Oceanic plates.

Other research that is being conducted involves life itself. When life was young on Earth, it started in a high temperature and high pressure environment. This kind sort of environment is much like how it is deep below the Earth’s surface. In fact, while the Chikyu was digging down, they discovered microorganisms living under the Earth’s crust. With these creatures living in this environment, they’ve adapted much differently compared to life above. Much of their genetics have never been before in the world of science.

A major focus and the future of the Chikyu is it was being developed was to drill into the Mantle while not having to be close to the shore. The ship itself has this capability, involving new drill techniques the ship can reach 7, 000 meters below the surface. But a major challenge of this is temperature, since at that depth temperatures can reach about 250 Celsius. Much of this level of the Earth is still a huge mystery for scientist. Much Earth’s changes are thought of to be the cause of its Mantle, such as continental drift. With this goal in mind and technology constantly evolving, Ocean Drilling has been pushing the boundaries of what we know about our Planet and us as humans since the DSDP started in 1964.