# Leg 210

## Final Ocean Drilling Program Expedition Investigates Continental Rifting That Formed the Atlantic Ocean

**September 4, 2003** After drilling at 650 sites around the world during the last 18 years, the *JOIDES Resolution* will complete its last Ocean Drilling Program (ODP) journey when it arrives in St. John's, Newfoundland on September 6. Since 1985, ODP has conducted 110 scientific expeditions in all oceans except for the ice-covered Arctic.

This final leg, known as Leg 210, examined the separation of Europe and North America millions of years ago. Staff scientist Adam Klaus (Texas A&M University, USA) explained, "Imagine jumping in your car in St. John's, Newfoundland for a morning drive and arriving in Lisbon, Portugal for dinner later the same day. This was once possible, albeit 145 million years ago, when North America and Europe were joined together as one large landmass and the Atlantic Ocean did not yet exist. Of course this ignores the minor detail that homo sapiens and cars had not yet appeared on Earth!"

To study this separation, the *JOIDES Resolution* departed Bermuda on July 11 and has spent the last two months drilling a hole 4600 meters (m) beneath the waters off the Grand Banks east of Newfoundland. This drill hole penetrated nearly 2000 m below the seafloor and is one of the deepest holes ever drilled in the deep ocean.

Chief scientist Brian Tucholke (Woods Hole Oceanographic Institution, USA) described the science behind the cruise: "Leg 210 aimed to study the continental breakup of North America (Newfoundland) from Europe (Iberia) and constrain models of continental rifting. The primary objective of Leg 210 was to drill a single deep hole that would allow scientists to sample the deepest sediments and crustal rocks related to the breakup of the European and North American continents."

"We have a pretty good idea of what happened on the European side because ODP conducted four previous drilling expeditions

off the coast of Spain and Portugal (Legs 47, 103, 149, and 173)," said chief scientist Dr. Jean-Claude Sibuet (IFREMER, France). "However, there are two sides to every breakup and the Leg 210 drilling location off the Newfoundland coast has been carefully selected to be on the exact opposite side to the Iberian drill sites. We expect the drilling results off Newfoundland to give us the other half of the continental breakup story between Europe and North America".

Drs. Tucholke and Sibuet led the international team of scientists, laboratory technicians, and drilling engineers to tackle the scientific and drilling challenges. The scientists ranged from senior research scientists to an undergraduate student and represent 9 of the ODP members (Canada, United States of America, Japan, United Kingdom, France, Germany, Ireland, Sweden, and China-Taipei).

Once they leave the *JOIDES Resolution* in St. John's, scientists will continue to study the cores to learn more about the separation. Although the drilling phase of ODP is coming to a close, research on cores will continue. Scientific ocean drilling will also continue, as the Integrated Ocean Drilling Program will begin on October 1. This program will use multiple vessels to explore areas that were previously inaccessible, and answer questions about the Earth and its history.

ODP is an international partnership of scientists and research Institutions organized to study the evolution and structure of the Earth. The U.S. National Science Foundation provides the funding, with substantial contributions from its 21 international partners. The Joint Oceanographic Institutions manages the program. Texas A & M University is responsible for science operations, and Lamont-Doherty Earth Observatory of Columbia University is responsible for logging services.

Photographs from Leg 210 are available on the web at http://www-odp.tamu.edu/public/life/leg210.html.

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