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Aquarius Aquanauts Explore Phenomenon of Florida Keys Cold Water

Key Largo, Florida – Earlier this summer an unusually intense and persistent subtropical high-pressure ridge affected weather in south Florida. As a result, winds affected ocean currents and cold deep water was moved closer to the surface off the east coast of Florida. For example, last July ocean temperatures dropped into the 60s and 70s off Daytona Beach, considerably below normal. This phenomenon, where cold deep ocean water is brought to the surface, is called “upwelling.” The latest mission of the Aquarius Undersea Laboratory gets underway today with a six person crew studying the effects of a special type of upwelling that frequently brings cold deep water onto coral reefs in the Florida Keys.

The principal investigator for the mission is Dr. James Leichter, of Scripps Institute of Oceanography. He is joined by scientists Dr. Dale Stokes and Michael Murray, also from Scripps, and Carla Zilberberg a Brazilian scientist with the Instituto de Biologia, Universidade Federale do Rio de Janeiro. Habitat technicians Mark Hulsbeck and Hal Letts will operate the underwater laboratory for the ten-day mission. Surface-based support is provided by staff from the Univesrity of North Carolina at Wilmington (UNCW).

Owned by the National Oceanic and Atmospheric Administration (NOAA) and operated by UNCW, Aquarius is a unique national asset – it is the only undersea research platform of its kind in the world. It rests 63 feet underwater and 3.5 miles offshore at Conch Reef in the Florida Keys National Marine Sanctuary. Aquarius "aquanauts" live and work on the seafloor for extended periods using a special diving technique called saturation diving.

Dr. Leichter’s team is using Aquarius to investigate how cold, upwelled water interacts with the topography of the reef (topography is the technical term for roughness) and how the cold water (which contains high concentrations of nitrogen and phosphorous) affects important members of the reef community, particularly benthic macroalgae, or seaweeds. The team of aquanaut scientists will map topographic features of the reef in detail and they will sample the distribution and tissue chemistry of seaweeds in a variety of reef habitats. Using a custom designed network of oceanographic sensors, including more than 100 individually placed temperature sensors, the scientists will monitor the upwelling events on the reef in unprecedented detail.

Putting the mission in context, Dr. Leichter explained, “If you could take a slice of the ocean and see it in three dimensions, from the surface to say 1000 feet deep, you

would be amazed at how things like temperature, dissolved nutrients, currents, and life itself, changes as you go from shallow to deep. And the changes are sometimes all mixed up and not easily explained by just looking at the slice. Physical and biological oceanographers spend much of their time trying to understand all the variable properties in the ocean, how they change with depth, over time, how they affect what lives in the ocean, and ultimately how this affects everything from the fish we eat to our climate and weather.”

Commenting on the mission, NURC/UNCW Director, Dr. Steven Miller noted, "Dr. Leichter really takes advantage of what Aquarius has to offer. His team is always among the leaders in using all their available bottom time working out on the reef, they push the envelope in terms of technology that drives their experiments, and they also take time for educational events." Aquarius manager Jim Buckley added, “This is mission number 73 for Aquarius, which makes it the second longest running underwater habitat program ever. The longest running habitat program was Hydrolab, which was also owned by NOAA.”

There are two significant educational events scheduled during the August mission. On August 16, at 6:00pm EDT, Aquarius aquanauts will use video conferencing technology to connect with an audience at the Tech Museum of Innovation in San Jose, CA. On August 17, six lucky Girl Scouts, winners of a national competition, will have the opportunity to visit and meet the aquanauts inside Aquarius.

During each Aquarius mission, anyone with Internet access can watch live web cameras, read expedition journals from the aquanauts, view project summaries and pictures, and much more at the NURC/UNCW Aquarius website: www.uncw.edu/aquarius.