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The storm itself was 500 miles away but areas of the Marshall Islands are so low that rough waters -- known as storm surge -- that reached the islands caused flooding last December. This industrial area is bordered by the ocean at the top and the lagoon at the bottom, muddied by the flooding.

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UW students to learn firsthand of culture, corals, islands threatened by sea level rise

By **Sandra Hines**

News and Information

Given projected sea level rise, the Marshall Islands in the tropical Pacific Ocean are expected to be underwater in 90 years.

The republic's 1,225 islands and islets are found near the equator about halfway between Hawaii and Papua New Guinea. Some of its atolls, such as Kwajalein and Enewetak became familiar names during World War II fighting. After the war, Enewetak and Bikini were used extensively by the U.

S. for nuclear testing.

And in a country where the largest island consists of a narrow ring of land around a lagoon -- some places being so narrow it's possible to walk from the lagoon to the ocean shore in a matter of minutes -- it's easy to foresee ever-greater flooding during high tides and storms. At the same time ocean acidification and coral bleaching, the result of excess carbon dioxide in the atmosphere and global warming, will begin exacting a toll on the reefs on which the republic makes money selling fishing rights to other countries.

Just how will the citizens cope with the coming changes? What steps might they take?

"And just how can this country of 60,000 people be heard on the world stage, especially since what's happening to their country is the result of two centuries of industrial activities that they've neither contributed to nor benefitted from in any substantial way?" asks Julian Sachs, a UW associate professor of oceanography who studies how climate change affects rainfall.

Sachs, as part of his National Science Foundation-funded work on rainfall in the tropical Pacific, has offered the citizens of the Marshall Islands his help to understand what a rise in global sea levels might mean for them specifically.

As part of that effort, Sachs is leading a UW Exploration Seminar class of 20 undergraduates to the Marshall Islands this summer. On the main island, the Majuro Atoll where half of the country's people live, the students will work 3 weeks to:

- Conduct water surveys of species diversity at key reefs that can serve as a baseline for monitoring future changes.
- Evaluate what coral diseases are present and which corals are being affected.
- Remove as many crown-of-thorns starfish as possible -- students already are learning about the handle-with-care rules concerning these spiny animals that are an invasive species that devour corals.
- Census the population of Tridacna, giant beautifully colored clams that can weigh more than 440 pounds and measure 4 feet across.
- Learn about the culture and history of the country and meet tribal leaders, artisans and citizens.
- Interview Marshall Islands officials and tribal leaders concerning their planning efforts and hold citizen round table discussions about global warming and its effects.

In a country with virtually no government scientists, the intensive sampling and data collection by UW students will be an important addition to the limited research on the reefs of the Marshall Islands and the impacts and adaptations to climate change.

Sachs has worked in the Marshall Islands, Galapagos, Palau, Christmas Island and other atolls and islands in the

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Republic of Marshall Islands/UW FAA

The road leading to the airport can be impassable during storms and high tides and it's not hard to imagine problems for a runway so closely bounded by the ocean on one side and the lagoon on the other. This is the airport on Majuro, where half the republic's population lives.

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Julian Sachs shows a sediment core and the set-up to collect samples of sediment from lakes, peat bogs and lagoons to reveal the historical rainfall in the region.

tropical Pacific for five years to discern historical patterns of rainfall. Some places get more than 200 inches of rain a year, which makes that wide swath of the ocean "the most prominent rainfall feature on the planet," says Sachs.

He collects sediment from lakes, peat bogs and lagoons and looks for telltale hydrogen-isotope changes in lipids made by plants and algae that reveal variations in the amount of rainfall.

His latest work concerning how climate change might be affecting rainfall in the tropical Pacific, and the specific ramifications for the Marshall Islands, was submitted by the country's Office of Environmental Policy and Planning Coordination for consideration during the Copenhagen Climate Congress. The congress brought together 2,000 scientists, including Sachs, last month to develop a "comprehensive picture of the status of world climate science before another set of delegates meets in December to hammer out a follow-up to the 1997 Kyoto Accords, which expire in 2012," according to a news story in the March 20 *Science*.

That same news story said, "The conference included dozens of sessions on how scientists are helping countries begin to adapt to climate impacts."

Sachs is among those scientists and starting last fall he began meeting with government officials, tribal leaders and citizens.

For the Marshall Islands the challenge is that much of its land is already at sea level. The land averages less than 7 feet above sea level. The airport runway on Majuro, for example, sits only 6 feet above sea level and is on an area barely wide enough for the runway and a two-lane road. Immediately to one side is the ocean, and to the other, the lagoon.