

Shifting atoll shorelines revealed through remote imagery

Historic and recent DigitalGlobe imagery provides unique and powerful insights into the behavior of vulnerable atoll shorelines.

Atoll islands are widely considered to be among the most vulnerable landforms on earth with respects to the impacts of climate change. Of the suite of climate change impacts accelerating sea level rise is widely expected to destabilize island shorelines, leading to widespread erosion, threatening the long-term habitability of the islands. However, despite these concerns there have been few attempts to monitor the dynamic changes of atoll island shorelines. Using historic aerial photos dating back as far as WWII and modern IKONOS, GeoEye-1, WorldView-1, and WorldView-2 satellite imagery Dr. Murray Ford from the University of Auckland, New Zealand is mapping shifting shorelines throughout the Pacific.

“Atoll islands are generally isolated, difficult and expensive to reach. As a result, I rely heavily on the rich archives of high resolution imagery in my research. For many islands there is now a 10+ year of record of archive imagery. When coupled with historic aerial photos, these high resolution images provide powerful insights into the behavior of island shorelines.”

—DR. MURRAY FORD, UNIVERSITY OF AUCKLAND

With support of the DigitalGlobe Foundation Dr. Ford has mapped changes taking place on a number of atolls in the Republic of the Marshall Islands, a chain of 34 atolls in the central Pacific. Early results indicate that these islands have changed quite considerably over the last 70+ years.

“The results have been quite surprising; islands are much more active than I expected to see. Some islands are growing, some are eroding. Ultimately, trying to understand the long-term fate of these islands is my goal. Having a better understanding of which islands, or sections of islands, are most susceptible to change will allow for well-informed adaptation and hazard mitigation throughout the region.”

—DR. FORD

Dr. Ford’s work is on-going, with the goal to provide regular monitoring of a number of atolls across the Pacific.

“With a growing constellation of high-resolution sensors there is now the ability to resolve impacts of short-term events such as storms, as well as seasonal climatic processes such as the El Nino Southern Oscillation, on island shorelines. I’m excited about the potential for frequent revisits now possible due to the sheer number of sensors now in orbit. Likewise the removal of ground sampling distance restrictions and the launch of WorldView-3 provide us a much greater confidence in the ability to accurately interpret changes on the ground.”

—DR. FORD

