

# Global warming: Shoreline changes as planet warms

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By Orrin Pilkey and Rob Young/ Star-Ledger Guest Columnist

Polls indicate an alarming percentage of Americans have doubts about global warming, even to the point of suspecting that scientists are lying about the data. Much of the bluster centers on whether or not it has been colder this year than last.

Instead of relying on thermometers, we should listen to Mother Earth. So let's take a trip around the northern half of the Western Hemisphere for real-world evidence that our planet is getting warmer.

The first stop on our trip will be to the Outer Banks of North Carolina. As we fly toward our destination, we see a fringe of dead trees stretching for miles in the water along the Albermarle Sound shoreline, a clear indication that sea level rise is drowning the forest edge.

Flying over the Outer Banks, we observe islands eroding on both the ocean and sound sides, another sign of sea level rise. The islands are thousands of years old, yet won't exist much longer with such erosion. In Rodanthe, the island is so narrow and low that it can be washed over by something as slight as a lunar tide. Sea level rise has clearly changed this shoreline.

Once we've landed at the Wright Brothers' airstrip, we drive to the Corps of Engineers research pier in the town of Duck. Because the pier extends into the open ocean and is made of concrete, the tide gauge here may be the best record of sea level rise on the East Coast. What it tells us is that sea level here is rising at a rate of one-and-a-half feet per century.

Satellites tell us this is very close to the rate of global sea level rise.

Next, let's head to Alaska, to Shishmaref, a small village of perhaps 550 Inupiat Eskimos located on an island just below the Arctic Circle. On the way up from the Lower 48 to Anchorage, we fly over the Canadian Rockies and its numerous mountain glaciers, all of which show clear signs of recent and rapid shrinking.

Flying over the village of Shishmaref, it is apparent there is a severe beach erosion problem. On a shoreline stretch of a few hundred yards, there are at least five different seawalls on the beach, each costing millions of dollars and each giving way to the sea. The erosion started suddenly a few years back when warming began to melt the permafrost every summer, loosening the beach sand and making it easy for waves to carry it away.

Adding to the shrinking permafrost problem is the shrinking sea ice. Today the sea in front of Shishmaref remains ice-free for a couple of months longer than it did 20 years ago — into the fall storm season, leaving the village unprotected from storms. Plans are afoot to move the village to the mainland within a decade, but the cost is huge, more than \$100 million for a tiny subsistence village.

For the final leg of our flight, we fly over the coast of Southern Greenland to observe what is happening on one of the world's great ice sheets. Spectacular calving glaciers line the coast, and their melting waters have added to sea level rise for decades. But the rate of melting began to accelerate sharply about 1995.

At the other end of the planet, the West Antarctic ice sheet began substantial melting around 2000 and the East Antarctic ice sheet began contributing to sea level rise around 2006.

The Earth has revealed undeniable evidence of sea level rise. It's all there for anyone to see.

The point is that our fascination with whether the atmospheric temperature is rising or not is misplaced. Clearly the globe is warming. The scientific and political argument over who or what is causing this warming should not be used as an excuse to ignore the fact that sea level rise (in particular) will have a major impact on our coastal communities.

We need to begin planning now for how we will respond to the very real changes that are occurring, and those that will happen in the future.

*Orrin Pilkey is the James B. Duke professor emeritus of geology at Duke University's Nicholas School of the Environment. Rob Young is director of the Program for the Study of Developed Shorelines at Western Carolina University. They co-authored "The Rising Sea" (Island Press).*