

**04/01/2010 05:00 PM****Climate Catastrophe****Part 5: The Reality of Rising Sea Levels**

They could have been scenes from a horror film: New York's skyscrapers jutted out of the ocean like reefs, while cities like Hamburg and Hong Kong, London and Naples had been flooded long ago. Entire countries had been swallowed up in other places. Denmark, the Netherlands and Bangladesh had ceased to exist.

A quarter of a century ago, climatologists grabbed the public's attention with such horrific visions. At the time, the experts calculated that the sea level would rise by more than 60 meters (197 feet) if the greenhouse effect caused all of the Earth's ice to melt.

No one talks about such nightmare scenarios today. None of the current simulations involves the complete melting of the Antarctic ice sheet. On the other hand, hardly any glaciologists doubt that sea levels will be significantly higher along coastlines by the end of the century. But how much higher, exactly? Estimates range from 18 centimeters (7 inches) to 1.90 meters (6' 3").

**Hard to Calculate**

"Of course, this isn't a satisfactory statement for coastal planners and politicians," admits Peter Lemke, chief climatologist at the Alfred Wegener Institute for Polar and Marine Research in the northern German port city of Bremerhaven. "But we can't sell something as certainty if we don't know exactly what it will be."

The current IPCC report mentions a relatively conservative range of 18 to 59 centimeters. "Most experts consider this estimate to be too small," says Lemke.

Two factors influence the sea level. The first one affects it directly: When water heats, it expands. This warming effect, which can be calculated with relative precision, is expected to cause the sea level to rise by about 22 centimeters by 2100.

Another effect that is not as easy to calculate is the melting of mountain glaciers and inland ice in Greenland and Antarctica. Most of the melting today is happening in mountain glaciers, from the Andes to the Himalayas. According to IPCC calculations, this melting activity contributes 0.8 millimeters a year to the rise in sea level. Greenland and Antarctica each contribute another 0.2 millimeters.

**Quicker Melting**

Meanwhile, satellite observations indicate that the rate at which the ice is melting has increased. Glaciologists speculate that parts of the Western Antarctic and, to a greater extent, Greenland, are melting more quickly than initially assumed.

But many scientists are reluctant to make new predictions, because the inner processes in the gigantic ice caps remain insufficiently understood. Reliable data on the behavior of calving glaciers has only existed for about 10 years. Greenland's glaciers are currently spitting a particularly large amount of ice into the ocean. After such a phase, however, many ice flows become dormant again for a longer period of time.

Lemke, like most of his fellow scientists, expects the sea level to rise by somewhere between half a meter and one meter.

Build dikes or get out of the way -- this is the principle coastal residents have applied for years to defend themselves against the forces of nature. In Hamburg in northern Germany, storm surges are now more than half a meter higher than in the 1960s. This is not the result of climate change, however, but of the narrowing of the Elbe River. Nevertheless, the port city is not as threatened as it once was, thanks to improved flood protection.

But storm surges aren't just caused by rising sea levels. Another factor that is at least as important is the wind, which pushes large amounts of water against coastlines.

Can we truly expect to see stormier times in a greenhouse climate?