New Study: Long-term global warming may be tough to reverse

by Mark Floyd

CORVALLIS, Ore. â€“ A sophisticated new climate model simulation of long-term global warming suggests that even if greenhouse gas emissions are reduced, the planet will continue to get warmer for 100 to 200 years.

The delay would be caused by a warming of the worldâ€™s oceans, which would increase biological productivity as well as limit the oceansâ€™ ability to absorb atmospheric heat and carbon dioxide, according to Andreas Schmittner, an oceanographer at Oregon State University and lead author of the study.

Results of the research were just published in the journal Global Biogeochemical Cycles.

â€œThe results of the model are somewhat alarming because it shows that we cannot wait until we are in danger before beginning to address global warming,â€• Schmittner said. â€œWe need to be ahead of the curve.â€•

Schmittnerâ€™s model is one of the few long-term climate simulations to include carbon uptake by the oceans and land in looking at global warming scenarios. Most previous models have focused solely on estimates of future climate without projecting interactions between the carbon cycle and the Earthâ€™s biological components.

Research has shown, however, that as the oceans warm, phytoplankton blooms will increase and that additional production could exacerbate global warming projections.

In one simulation, Schmittner projected a gradual increase of greenhouse gas emissions until the year 2100, then reduced those emissions to virtually zero. His model showed that the climate would warm four degrees (C) by 2100, then another 4-5 degrees over the next 200 years.

Computer modeling of global warming has become a critical area of research and scientists are continually refining models in an attempt to improve their accuracy. They often test their models by looking at historic data, then projecting it ahead and comparing it to what actually happened.

But projecting into the future is more difficult, Schmittner said, because human-caused disruptions to the natural systems are unprecedented since the end of the last ice age.

â€œFor the past 10,000 years, atmospheric CO2 had not changed much,â€• Schmittner said. â€œIt stayed more or less at 280 parts per million until about (the year) 1850. Weâ€™re already up to 380 parts per million right now and that much input, in such a short time, has upset the equilibrium between the oceans and the atmosphere.

â€œTrying to predict exactly what will happen to the biological cycle through global warming is tricky,â€• he added. â€œThere may be some surprises â€“ and they could go either way.â€•

For example, Schmittner said, his model suggests a higher degree of warming than most computer simulations because he incorporated an increase in biological activity into his projections. Yet increased ocean acidification might decrease the rate of warming.

â€œCertainly, the increase of phytoplankton and calcium carbonate-shelled organisms will change the chemistry of the oceans and could lead to more CO2 â€˜out-gassingâ€™ from the oceans to the atmosphere,â€• he added. â€œBut there is a lot we donâ€™t yet know about the biology of the oceans.â€•

New Study: Long-term global warming may be tough to reverse by Mark Floyd