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January 13, 2014

Mathematician combines love for numbers and passion for sea ice to forecast melting

New mathematical methods can be applied

RELATED MULTIMEDIA

broadly to climate, medicine, aircraft design and more

People don't usually think of mathematics as an occupation that requires survival skills, but they might change their minds if they saw Kenneth Golden and his daring research team in action!

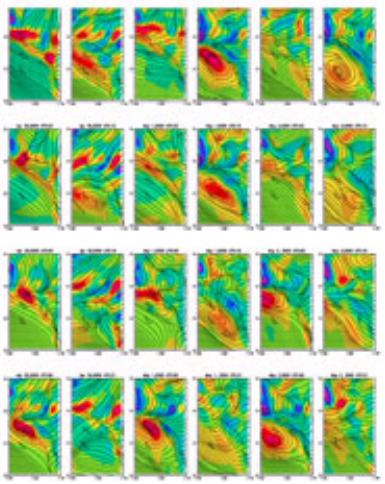
The mathematician has spent the past 40 years studying sea ice in the north and south Polar Regions. With support from the National Science Foundation (NSF), he and his team at the University of Utah are developing mathematical formulas to help scientists make more accurate predictions about how quickly sea ice will melt as our planet continues to warm. And, the mathematical methods developed from the research in these rugged places can be applied broadly, from designing stealthier planes to practicing better medicine.

The research in this episode was supported by NSF award #1009704, Phase Transitions in Composite Media; NSF award #0940249, Collaborative Research: Mathematics and Climate Research Network; and NSF award #0934721, COLLABORATIVE RESEARCH: Mathematics and Electromagnetics for Monitoring Transport Processes in Sea Ice and funded through the American Recovery and Reinvestment Act of 2009.

Miles O'Brien, Science Nation Correspondent
Marsha Walton, Science Nation Producer

Enlarge image

Despite the rapid retreat of Arctic sea ice in recent years, the ice may temporarily stabilize or somewhat expand at times over the next few decades, recent research indicates. A computer modeling study reinforces previous findings by other researchers that the level of Arctic sea ice loss observed in recent decades cannot be explained by natural causes alone, and that the ice will eventually melt away during summer if the climate continues to warm. Read more in this news release.
Credit: NOAA



Enlarge image

Atmospheric prediction has improved immeasurably. Whether you're interested in tomorrow's high or the global heat index a decade from now, forecasters can now predict the climate with far greater accuracy. Masao Kanamitsu, a veteran of the atmospheric modeling world and a leading researcher at Scripps Institution of Oceanography, and his colleagues in the atmospheric community use a method called "downscaling" to improve regional predictions. The technique takes output from a global climate model and adds information--at scales smaller than the grid spacing--to resolve important features like clouds and mountains. Find out more in this discovery.
Credit: Courtesy of Masao Kanamitsu, Scripps Institution of Oceanography

Related Links

Mathematical Sciences (DMS)
The Division of Mathematical Sciences (DMS) of the Directorate for Mathematical and Physical Sciences supports a wide range of projects aimed at developing and exploring the properties and applications of mathematical structures. Most of these projects are those awarded to single investigators or small groups of investigators working with graduate students and postdoctoral researchers. Programs such as Mathematical Sciences Infrastructure handle activities that fall outside this mode.

Powerful mathematical model greatly improves predictions for

species facing climate change
University of California, Los Angeles, life scientists and colleagues have produced the most comprehensive mathematical model ever devised to track the health of populations exposed to environmental change.

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