



PHOTO PROVIDED

Martin Sexton plays Wednesday.

**CONCERT:** Show launches festival's annual series

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at concerts ranging from collaborating with John Mayer to the jam scene working with Peter Dinklage, to the Newport Folk Fest, Bonnaroo, and the New Orleans Jazz Fest. Promotion of the 2017 tour states: "Remember that mix-tape your friend made you way back when — the one that's etched in your soul? Martin Sexton's new album, *Mixtape*

of the Open Road, is that musical cross-country trip, blazing through all territories of style as you cruise through time and place. This record is a charm bracelet of 12 gems all strung together with the golden thread of what *Rolling Stone* calls a "soul-marinated voice." Tickets can be purchased at [www.sistersfolkfestival.org/tickets](http://www.sistersfolkfestival.org/tickets) or by calling 541-549-4979. Series passes are \$55 for adults, \$40 for youth 18 and under. Tickets are also available for individual shows. All shows are at Sisters High School Auditorium at 7 p.m.

## Scientists study ancient ocean temperatures

By Mark Floyd  
Correspondent

CORVALLIS — During the last major interglaciation period, when ice sheets in Greenland and Antarctica were smaller than today resulting in a global sea level that was 20 to 30 feet higher, scientists believe ocean temperatures were warmer than at most times in the Earth's recent history.

However, those estimates of ocean temperatures show a high level of uncertainty, making it difficult to accurately project warming into the future and its impacts on sea level rise.

Now a team of scientists has assembled data from around the world in a comprehensive analysis of global ocean temperatures during the interglaciation period from 129,000 to 116,000 years ago. The team found that global average ocean temperatures were roughly half a degree (Celsius) warmer during that period than during pre-industrial times and nearly identical to the average temperature over the last 20 years.

Results of the study, which was supported by the National Science Foundation, appear this week in the

journal *Science*.

"Half a degree may not sound like very much, but in terms of average global ocean temperature, it actually is quite substantial," said lead author Jeremy Hoffman, who led the work as a doctoral student at Oregon State University, and is now a staff scientist with the Science Museum of Virginia. "The problem is that computer models have not been able to simulate this amount of warming for the last interglaciation. Because these are the same models used to project future temperatures, this suggests that they may be missing important processes that would result in even warmer temperatures than now considered."

The last interglaciation period was one of the warmest periods on Earth in the last 800,000 years. A previous study by Oregon State researchers — published in *Science* — documented the higher sea levels and scientists have hypothesized that warmer ocean temperatures have been part of the process.

Peter Clark, an Oregon State climate scientist and co-author on the study, said one reason for warmer temperatures during the last interglaciation, and the decline of

the Greenland ice sheet, was a shift in Earth's orbit around the sun.

"Although carbon dioxide levels then were comparable to the pre-industrial era, solar insolation in the northern hemisphere during the summer was much higher," said Clark, who has the title of distinguished professor in OSU's College of Earth, Ocean, and Atmospheric Sciences. "This more intense solar insolation contributed to the warmer temperatures."

The researchers believe the melting of the Greenland ice sheet weakened the Atlantic Meridional Overturning Circulation, or AMOC, a system of currents that usually brings warmer water from the tropics to the south. As it weakened, sea-surface temperatures rose in the southern hemisphere, also contributing to warmer global temperatures.

"It was a double-whammy," Clark said. "Solar insolation warmed the northern hemisphere, a weakened AMOC warmed the south."

Earth's orbit around the sun is different today, resulting in less solar insolation. The planet has warmed by about one degree (Celsius) since 1750 because of human influence.

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