



NREL's
Teresa
Alleman



Research Highlights . . .

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Prelude to an earthquake?

A geophysicist at DOE's [Lawrence Berkeley National Laboratory](#) has identified possible seismic precursors to two recent California earthquakes, including the 1989 Loma Prieta earthquake that wreaked havoc throughout the Bay Area. After sifting through seismic data from the two quakes, Valeri Korneev found a spike in the number of micro-earthquakes followed by a period of relative calm in the crust surrounding the quakes' epicenters—months before the quakes occurred. Although more work needs to be conducted to determine whether other large quakes are foreshadowed by a similar rise and subsequent decline in small-magnitude tremors, [Korneev's analysis](#) suggests that these peaks may be indicative of the total set of geological stresses that affect the timing and location of large earthquakes.

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EISRG provides energy crisis support

When major power interruptions threaten the U.S., questions about where the impact will be felt quickly arise. Through its Energy Infrastructure and Security Research Group, DOE's [National Energy Technology Laboratory](#) works in partnership with other national laboratories to supply critical answers. With access to comprehensive data on nationwide energy systems and GIS capabilities, [EISRG](#) provides vital pre- and post-event analyses when energy supplies are compromised, as was the case during the devastating hurricane season of 2005. Mapping critical components of the existing energy infrastructure and determining affected areas, EISRG will help DOE headquarters determine actual and potential outages and plan restoration efforts when future energy crises strike.

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Trees may warm the planet

Planting trees across the United States and Europe to absorb carbon dioxide emitted by the burning of fossil fuels may outweigh the positive effects of sequestering that CO². Using climate models, researchers from DOE's [Lawrence Livermore National Laboratory](#) and the Carnegie Institution Department of Global Ecology found that forests in the mid-latitude regions of the Earth tend to warm the planet in the long run. The darkness of these forests absorbs abundant sunlight, warming the land. While the darkness of the forest lasts forever, the effect of the forest sequestering carbon dioxide slows down over time as the atmosphere exchanges CO² with the ocean. However, tropical forests help keep the Earth cool by not only absorbing CO², but by evaporating plenty of water as well.

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Going mobile with climate research

Beginning this month, scientists will begin taking data from [Los Alamos National Laboratory's](#) Atmospheric Radiation Measurement Mobile Facility (AMF) deployed in Niger, West Africa at the Niamey International Airport. Los Alamos engineers and technicians are responsible for deploying the AMF and operating the facility during its 6 to 18 month deployment. The purpose of AMF is to collect atmospheric information in climatically important regions that are presently under sampled. Sponsored by DOE's Office of Science and managed by the Office of Biological and Environmental Research, the ARM Program is designed to advance our understanding of global climate by providing data for advanced climate models.

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DOE Pulse highlights work being done at the [Department of Energy's](#) national laboratories. [DOE's laboratories](#) house world-class facilities where more than 30,000 scientists and engineers perform cutting-edge research spanning DOE's science, energy, national security and environmental quality missions. *DOE Pulse* (www.ornl.gov/news/pulse/) is distributed every two weeks. For more information, please contact Jeff Sherwood (jeff.sherwood@hq.doe.gov, 202-586-5806).

Labs help Russian Federation open new nuclear security training center

Russian Federation Navy officials and security managers now have a new curriculum of courses and a new training center to assist them in providing stronger protection for the Russian navy's nuclear materials.

The upgraded security training, accomplished through Russian and U.S. efforts under the [National Nuclear Security Administration's](#) (NNSA) Material Protection Control and Accounting (MPC&A) Program, has involved work by employees from DOE's [Lawrence Livermore](#) and [Oak Ridge national laboratories](#).

Known as the Kola Technical and Training Center, the new facility represents a unique training complex for nuclear security professionals, established cooperatively by the Department of Energy, NNSA and the Russian Ministry of Defense.

"Our goal has been to work with the Russian Navy to assist them in developing an upgraded security infrastructure for protecting their weapons-grade materials," said Livermore's Mary Elliott, the Kola training program lead.

"This is about international security. The NNSA has installed these systems to keep those who shouldn't have nuclear materials from obtaining them, but without regulations, procedures and training, the systems won't operate as designed," Elliott added.

The latest chapter in the four-and-a-half year project working with the Russian Navy came Sept. 30 when Ambassador Linton Brooks, administrator of NNSA, and Russian leaders dedicated a new training center in northern Russia.

Located in Severomorsk, about 400 miles northeast of Moscow on the Barents Sea, the Kola Technical and Training Center will serve as a security training hub for the western third of Russia, including 11 Navy bases and sites.

About 400 Russian Navy security managers, system operators and others are expected to receive training on MPC&A security systems at the Kola center in fiscal year 2006 and at least 600 more annually in future years, Elliott said.

To date, about 30 courses have been developed to address security areas such as console operations, badging, access control, alarm systems, management training, and the design and maintenance of security systems. Ten more courses are due to be developed to complete the project.

Built with U.S. funds, the \$9 million Kola Technical and Training Center has almost 30,000 square feet that includes space for offices, classrooms, conference rooms, and maintenance and testing workshop areas.

The Russian government acquired the land, cleared the building site, provided transportation and lodging for the construction workers, and supplied the training instructors.

Construction on the Kola center started in March 2003 and was completed in June of this year, with the Kurchatov Institute serving as the project's construction manager and Russian firms doing the building.

Submitted by DOE's [Lawrence Livermore National Laboratory](#)

NREL ENGINEER SPREADS THE BIODIESEL WORD

A recent trip to the Philippines gave Teresa Alleman, an engineer with the [National Renewable Energy Laboratory's](#) Center for Transportation Systems and Technologies (CTTS), a unique opportunity to talk to government officials about a project that may one day influence the production of domestic biodiesel. During her visit, Alleman met with Philippines Secretary of Energy to talk about the technical assistance NREL



Teresa Alleman

lent to his country for a study of biodiesel made from coconuts.

"Having the opportunity to talk to Secretary Raphael Lotilla about the study results is something I'll remember for the rest of my life," Alleman said. "It gave me the chance to talk to people outside of my peer group and to teach politicians about the science that will help them make better decisions for their country."

Alleman supports the CTTS' Fuels Performance Group by working on advanced and alternative liquid fuels, such as biodiesel and Fischer-Tropsch diesel, for buses, delivery trucks and other heavy duty vehicles. She came to NREL in 2000 after working as a research associate for the Colorado Institute for Fuels and High Altitude Research at the Colorado School of Mines (CSM). Alleman earned her bachelor's and master's degrees in chemistry at CSM.

"I always knew I'd pursue a technical career because my dad is an engineer, but I didn't plan to go into heavy duty engine research, that just happened," Alleman said. "However, I think it's a good fit because in fuels work my chemistry background is an important tool I use almost daily."

Looking ahead to 2006, Alleman will continue to monitor the Philippine biodiesel project as well as support DOE's Vehicle Technologies Fuels Technology subprogram on biodiesel related projects.

Submitted by DOE's [National Renewable Energy Laboratory](#)