



UNIVERSITY of CALIFORNIA • IRVINE

NEWS

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Contact: Janet Wilson
949-824-3969
janethw@uci.edu

UCI researchers chart long-shrouded glacial reaches of Antarctica Huge rivers of ice are found flowing seaward from continent's deep interior

Irvine, Calif. — A vast network of previously unmapped glaciers on the move from thousands of miles inland to the Antarctic coast has been charted for the first time by [UC Irvine scientists](#). The findings will be critical to tracking future sea rise from climate change.

“This is like seeing a map of all the oceans’ currents for the first time. It’s a game changer for glaciology,” said UCI earth system science professor [Eric Rignot](#), lead author of a paper on the ice flow published online today in Science Express. “We’re seeing amazing flows from the heart of the continent that had never been described before.”

Rignot, who is also with NASA’s [Jet Propulsion Laboratory](#), and UCI associate project scientists [Jeremie Mouginot](#) and [Bernd Scheuchl](#) used billions of points of data captured by European, Japanese and Canadian satellites to weed out cloud cover, solar glare and land features. With the aid of NASA technology, they painstakingly pieced together the shape and velocity of glacial formations, including the huge bulk of previously uncharted East Antarctica, which comprises 77 percent of the continent.

Like viewing a completed jigsaw puzzle, Rignot said, the men were stunned when they stood back and took in the full picture. They discovered a new ridge splitting the 5.4 million-square-mile landmass from east to west. They found unnamed formations moving up to 800 feet each year across immense plains sloping toward the Southern Ocean – and in a different manner than past models of ice migration.

“These researchers created something deceptively simple: a map of the speed and direction of ice in Antarctica,” said Thomas Wagner, a cryospheric program scientist with NASA’s MEaSUREs program, which funded the work. “But they used it to figure out something fundamentally new: that ice moves by slipping at its bed, not just at the coast but all the way to the deep interior of Antarctica.”

“That’s critical knowledge for predicting future sea-level rise,” he added. “It means that if we lose ice at the coasts from the warming ocean, we open the tap to the ice in the interior.”

The work was completed during a period called the International Polar Year, and is the first such study since 1957. Collaborators working under the aegis of the Space Task Group were NASA, European Space Agency, Canadian Space Agency, Japanese Aerospace Exploration Agency, as well as the Alaska Satellite Facility, and MacDonald, Dettwiler & Associates Ltd.

“To our knowledge, this is the first time that a tightly knit collaboration of civilian space agencies has worked together to create such a huge dataset of this type,” said Yves Crevier of the Canadian Space Agency. “It is a dataset of lasting scientific value in assessing the extent and rate of change in polar regions.”

About the University of California, Irvine: Founded in 1965, UCI is a top-ranked university dedicated to research, scholarship and community service. Led by Chancellor Michael Drake since 2005, UCI is among the most dynamic campuses in the University of California system, with nearly 28,000 undergraduate and graduate students, 1,100 faculty and 9,000 staff. Orange County’s largest employer, UCI contributes an annual economic impact of \$4.2 billion. For more UCI news, visit www.today.uci.edu.

About the European Space Agency: [The ESA](#) is Europe’s gateway to space. Its mission is to shape the development of Europe’s space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. ESA is an international organization with 18 member states. By coordinating the financial and intellectual resources of its members, it can undertake programs and activities far beyond the scope of any single European country.

About the Canadian Space Agency: Established in March 1989, the [CSA](#) was created through an Act of Parliament, proclaimed in December 1990. The CSA is committed to leading the development and application of space knowledge for the benefit of Canadians and humanity. Its mandate is to promote the peaceful use and development of space, to advance the knowledge of space through science and to ensure that space science and technology provide social and economic benefits for Canadians.

About the Japanese Aerospace Exploration Agency: Established in 2003 by a merger of the Institute of Space and Astronautical Science, the National Aerospace Laboratory of Japan, and the National Space Development Agency of Japan, [JAXA](#) is an independent administrative institution overseeing space development and utilization, and aviation research and development. Under its corporate message "Reaching for the skies, exploring space," JAXA strives to use its research and development missions to contribute to the peace and happiness of humankind.

About the Alaska Satellite Facility: The [ASF](#) of the Geophysical Institute at University of Alaska Fairbanks downlinks, archives, and distributes satellite data. ASF comprises a Satellite Tracking Ground Station as part of the NASA Ground Network system, the Synthetic Aperture Radar Data Center in support of NASA's Earth Science Data and Information System project, and the Americas ALOS Data Node established by JAXA in agreement with the National Oceanic and Atmospheric Administration (NOAA). ASF's mission is to promote, facilitate, and participate in the advancement of remote sensing in order to support national and international Earth science research, field operations, and commercial remote-sensing applications that benefit society.

About MacDonald, Dettwiler and Associates Ltd.: [MDA](#) was incorporated in 1969 by two British Columbia entrepreneurs, John MacDonald, and Werner Dettwiler with the objective of providing innovative electronic solutions for complex customer requirements. Over the past four decades MDA has created a highly skilled organization that provides advanced information solutions which capture and process vast amounts of data, produce essential information, and improve the decision making and operational performance of business and government organizations worldwide. The company delivers a broad spectrum of information solutions including complex operational systems, tailored information services and electronic information products.

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