Researchers link ocean organisms with cloud cover

Chemical emissions may influence climate change

John Toon
Research News

Atmospheric scientists have reported a new and potentially important mechanism by which chemical emissions from ocean phytoplankton may influence the formation of clouds that reflect sunlight away from our planet.

Discovery of the new link between clouds and the biosphere grew out of an effort to explain increased cloud cover observed over an area of the Southern Ocean where a large bloom of phytoplankton was occurring.

Based on satellite data, the researchers hypothesized that airborne particles produced by oxidation of the chemical isoprene — which is emitted by the phytoplankton — may have contributed to a doubling of cloud droplet concentrations seen over a large area of ocean off the eastern coast of South America.

The findings were reported in the online advance publication of the journal Science.

Using numerical models, they estimated that the resulting increase in cloudiness reduced the absorption of sunlight by an amount comparable to what has been measured in highly polluted areas of the globe. If confirmed by field studies, this connection between clouds and biological activity could add a critical new component to global climate models.

Many environmental scientists believe that increased cloud cover may be partially counteracting the effects of global warming by reducing the amount of energy the planet absorbs from the sun.

"Studies like this one may help reshape the way we think about how the biosphere interacts with clouds and climate," said Athanasios Nenes, an assistant professor in Georgia Tech’s School of Earth and Atmospheric Sciences and the School of Chemical and Biomolecular Engineering. "One of the largest uncertainties right now in climate models is the ability to predict how clouds would respond to changing particle levels — whether they originate from humans with air pollution or from biological activity. We can now see very strongly the influence of marine biology on oceanic clouds."

The researchers stumbled upon the phytoplankton-cloud connection quite accidentally. "While looking at the satellite pictures, I noticed that cloud properties over large phytoplankton blooms were significantly different from those that occurred away from the blooms," recalled Nicholas Meskhidze, formerly at Georgia Tech, now an assistant professor at North Carolina State University.

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Fifth Street bridge extension complete

The campus is invited to the Georgia Department of Transportation and Georgia Tech celebrate the grand opening of the new pedestrian bridge at Fifth Street over the downtown connector at 10 a.m. on Dec. 5.

The unique pedestrian bridge features an elevated park with trees, shrubbery and grass providing beautiful green space to seamlessly connect the main Georgia Tech campus with Technology Square in Midtown Atlanta. The bridge has wide sidewalks and is designed to block out views and dampen the noise of the interstate highway below.

By making the walk over the downtown connector more inviting, this new park and pedestrian bridge will help reduce traffic by encouraging more pedestrians to walk between the central campus and Technology Square.

Zoo Atlanta commemorates Maple’s legacy

In honor of his 18 years of service as president and CEO of Zoo Atlanta, School of Psychology Professor Terry Maple was presented with a commemorative portrait this month. The painting, which depicts Maple on safari in Kenya’s Tsavo National Park, now hangs in the Zoo's Ford Conservation Classroom. He stands here with Anderson Smith, Georgia Tech’s vice provost for Undergraduate Studies and Academic Affairs, and a former member of Zoo Atlanta’s board of directors.

Guest speaker Angelou caps Finding Common Ground

Michael Hagearty
Institute Communications and Public Affairs

Despite cold and soggy conditions, nearly 3,000 students, faculty, staff and friends turned out on Nov. 15 to hear renowned poet and activist Maya Angelou for an inspirational lecture on respect and dialogue.

She was invited to campus as the keynote speaker for Finding Common Ground, a student initiative designed to promote intellectual discussion and civility on campus. The address, held in Alexander Memorial Coliseum, turned on a metaphor of composition — those people and experiences that have shaped each individual — that became the foundation for her lecture that evening.

In his introductory remarks, President Wayne Clough offered a historical perspective, noting that centers of higher learning were originally created as centers of debate. He also cited another poet, Robert Frost, whose observation on education — the ability to listen to almost anything without losing one’s temper or self-confidence — seemed particularly relevant.

"If we want to have free speech, then we have to accept that as a result we will need to listen to things with which we may not agree," he said. "If we want others to listen..."
Athletics makes its pitch to student radio

David Terraso
Institute Communications and Public Affairs

Three groups have contacted President Wayne Clough with proposals that could have an impact on WREK radio operations. In addition to offers from the Georgia Tech Athletic Association and Georgia Public Broadcasting, Public Broadcasting Atlanta (PBA) sent Clough a letter outlining a discussion of its ideas for WREK, said Jim Fetig, associate vice president for Institute Communications and Public Affairs, at a meeting of WREK supporters last week.

WREK-FM currently broadcasts a mix of mostly classical music and news and is a National Public Radio affiliate. The details of PBA’s proposal were not discussed at the meeting, but one proposal was presented by Athletics Director Dan Radakovich.

He proposed that Tech explore converting WREK’s noncommercial Federal Communications Commission (FCC) license into a commercial radio operator’s license. That would allow ISP Sports, the multimedia rights holder for Georgia Tech athletics, to broadcast games on an FM frequency. Currently, ISP broadcasts in Atlanta on AM 790 The Zone, but FCC regulations require some AM stations to reduce their power output at night, significantly reducing the station’s reach.

“One of the first complaints that I had gotten from our fan base is really the very weak radio coverage we have, especially after six o’clock, when the sun goes down,” Radakovich told the audience.

ISP has explored paying current commercial FM stations to carry Tech games, but so far has been unsuccessful, he added.

The biggest concern expressed at the meeting was how turning commercial would affect the rest of WREK’s programming and the ability of students to control the station and benefit from the opportunities it provides.

Colleen Terrell, WREK faculty advisor, expressed concerns.

“I have extreme reservations about taking the station commercial. I think there will always be pressures for the students to remain in control of it.”

Hans Nien, former WREK faculty advisor, expressed concern that changing the station’s license might not even be possible under FCC regulations. Radakovich said that discussions with a consultant indicated there is a process for changing licenses.

Many questions still need to be investigated regarding the commercialization of WREK, said Fetig. Among them are whether WREK would become a taxable entity; how it might change the way WREK is financed; what would happen to the profits that WREK might make; and if the station’s technical requirements would change.

The next step, said Fetig, is to bring the matter before the Radio Communications Board (RCB) so they can decide whether they want to be involved in investigating the three proposals. But if the board votes not to participate, he said, the proposals will still have to be reviewed at the president’s request.

“I want to make this as inclusive as possible; there are a lot of people who have an interest in this,” said Fetig. “I want this out in the light of day so that people can see the facts.

I expect that we will have an opportunity for student comment.”

Student Matthew Minton operates the sound board at WREK. Georgia Tech administrators are listening to several proposals that could impact the station’s programming.

Climate, cont’d from page 1

conditions during the seasons in which phytoplankton blooms appear. “This seems to be one of those rare regions in the globe where the biology really takes over,” Nenes explained.

Atmospheric scientists believe that by blocking sunlight, increased cloudiness has up until now partially mitigated the effects of global warming. The role of oceanic biology on cloud formation could therefore be a major factor in controlling global climate, and the new mechanism identified by Nenes and Meshedzadeh may make it even more important. This effect needs to be better understood. Nenes noted, because anything that can change global clouds can dramatically alter the impact of greenhouse gases on our changing climate.

“It shows that there is still a lot we need to explore to better understand the delicate balance in nature,” said Meshedzadeh.
AAAS taps four faculty as fellows

Because of their scientifically or socially distinguished efforts to advance science or its applications, four Georgia Tech faculty members have been awarded the distinction of American Association for the Advancement of Science (AAAS) Fellow. They are:

- Professor Evans Harrell (Mathematics), for contributions to the study of spectra associated with partial differential equations, particularly gaps and lower bounds for eigenvalues of Schrödinger operators;
- Professor Nancy Nersessian (Computing), for shaping our understanding of scientific creativity and developing new methods for analyzing historical accounts of scientific innovations;
- Associate Professor Boris Mizaikoff (Chemistry and Biochemistry), for building bridges with industry through his academic research in sensors and for facilitating technology transfer between academia and industry; and
- Regents’ Professor Z.L. Wang (Materials Science and Engineering), for seminal contributions to the discovery, synthesis, understanding, and applications of novel one-dimensional nanomaterials. His work has impacted materials science, microscopy, and nanotechnology.

Election as a fellow is an honor bestowed upon AAAS members by their peers. This year 419 members have been awarded this honor by AAAS. New fellows will be presented with an official certificate and a gold and blue (representing science and engineering, respectively) rosette pin during the 2006 AAAS Annual Meeting in February. All 2006 AAAS Fellows will be announced in the News & Notes section of the Nov. 24 issue of Science.

New computing center to focus on multi-core processors

The College of Computing has announced its designation as the first Sony-Toshiba-IBM (STI) Center of Competence focused on the Cell Broadband Engine (Cell BE) microprocessor. The companies selected to partner with the College of Computing to build a community of programmers and broaden industry support for the Cell BE processor.

The Cell BE processor is a breakthrough design featuring a central processing core, based on IBM’s Power Architecture technology, and eight synergistic processors. Cell BE “supercharges” compute-intensive applications, offering fast performance for computer entertainment and handheld, virtual reality, wireless downloads, real-time video chat, interactive TV shows and other computing environments.

“The College of Computing firmly believes that the Sony-Toshiba-IBM Cell BE processor represents the future of computing using heterogeneous multi-core processors, and we are pleased to work with three leading technology companies in a broad collaboration that will demonstrate the extreme performance of Cell,” said David Bader, associate professor and executive director of High-Performance Computing in the College of Computing.

Directed by Bader, the new STI Cell Center of Competence has a mission to grow the community of Cell BE users and developers by performing research and service in support of the Cell BE processor, and further enable students at the College to grow their skills and experience around Cell BE technology to apply in future career opportunities. The award from Sony-Toshiba-IBM will support the Center’s activities and research efforts in support of broadening Cell BE’s impact into multiple sectors and industries, including scientific computing, digital content creation, bioinformatics, finance, gaming and entertainment.

Common Ground, cont’d from page 1

respectfully when we present our point of view, then we need to become respectful listeners to the perspectives of others.”

Drawing upon experiences from her own life, Angelou used humor to tackle a serious topic, using simple terms to disavow the marginalization of people or opinions.

“In minor ways, we are different. In major ways, we’re the same,” she said, encouraging her audience to look past the superficial labels of human existence to resolve conflict and dispute.

Doing so will require courage, she said, but without it, practicing any other virtue consistently is impossible. She asked students to take responsibility for developing their own courage.

“I am a human being. Nothing human can be alien to me,” Angelou said. In praise of her beloved uncle Willy, whose “spirit is the soul of every spring,” she urged the crowd to become the “inspiration to those who may not look like you.”

When we came to it
We, this people, on this wayward, floating body
Created on this earth, of this earth
Have the power to fashion this earth.
A climate where every man and every woman
Can live freely without sanctimonious piety
Without crippling fear

—Maya Angelou, excerpted from “A Stone and a Shaking Truth”

IN BRIEF:

Nominations sought for newly endowed chair

Georgia Tech announces the creation of an endowed chair in energy to foster a seminal research and instructional program in the emerging energy area. This newly created position comes with an endowment of $1.5 million.

The energy field is broadly defined as encompassing areas where energy conversion, distribution and efficient utilization, and the underlying technologies. It is envisioned that the chair holder will initiate new programs in energy science and technology while enhancing the energy initiatives currently under way.

Applications and nominations are now being accepted.

A highly significant feature of this position is the commitment to provide a fully competitive academic salary from Institute funds, enabling endowment funds to be utilized by the chair holder for program development.

Resumes with at least five references and nominations should be submitted to: Julie Dawkins, 225 North Avenue, Atlanta, GA 30352-0325. She may also be contacted by e-mailing julie.dawkins@vps.gatech.edu or by calling 404-227-3976.

Don Broatcher Human Relations Award

Realizing the need for and importance of cultivating an environment where everyone can thrive, the Office of Diversity Programs and the Office of Diversity Management is accepting nominations for the Don Broatcher Human Relations Awards, honoring members of the community who are engaging in exemplary human relations work.

The award will be granted to one faculty/staff member. A highly significant feature of this position is the commitment to provide a fully competitive academic salary from Institute funds, enabling endowment funds to be utilized by the chair holder for program development.

To nominate a faculty or staff member, or a student, visit www.obr.gatech.edu. All nominations must be submitted by Jan. 10, 2007. For questions or additional information, e-mail stephanie.ray@vpss.gatech.edu.

CEE awards second endowed chair

Raymond A. Jones Jr., an alumnus of Georgia Tech, has given $1.5 million to fund the School of Civil and Environmental Engineering’s second endowed chair. Bruce Ellingswood, a distinguished professor in the school, has been appointed to the chair.

The Raymond Allen Jones Endowed Chair is awarded to an individual who demonstrates excellence in teaching, research and scholarship; a track record of leadership in the profession; and a commitment to the highest moral standards. Preference is given to an individual whose past and future contributions and interests are influential to the construction industry.

School of Civil and Environmental Engineering Chair Joseph Hughes said, “Dr. Ellingswood epitomizes all of the attributes and distinctions that the Jones endowed seeks, and his work will continue to influence not only the construction industry, but the engineering profession as a whole.”