



News Articles Videos Images Books  Search

Health & Medicine Mind & Brain Plants & Animals Earth & Climate Space & Time Matter & Energy Computers & Math Fossils & Ruins

Science Video

[Share](#) [Blog](#) [Print](#) [Email](#) [Bookmark](#)

**Mysteries of Thunderstorms**  
**Atmospheric Scientists Link Lightning to Ice Particles In Clouds**

October 1, 2006 — Satellite imaging is now helping atmospheric scientists link the amount of charged ice in clouds to lightning activity. Ice particles in thunderstorms can help increase precipitation, the scientists found. Different-sized ice particles within a cloud also carry a positive or negative charge, and as the particles collide, that charge builds up, leading to lightning.

See also:

- Earth & Climate**
- Storms
  - Severe Weather
  - Atmosphere
  - Environmental Issues
  - Pollution
  - Climate

**Reference**

- Thunderstorm
- Precipitation (meteorology)
- Fog
- Rain

HUNTSVILLE, Ala. -- There's no mistaking the billowing clouds, the noise, the rain, and the lightning of a thunderstorm. But why do some dark and ominous clouds form into huge masses of rain and lightning while others just pass us by?

We'll likely see a big storm roll-in on warm days, but you might be surprised to learn thunderstorms are also filled with ice!

"Ice plays a big role in the amount of rain that you see," says Walter Petersen, an atmospheric scientist at University of Alabama, Huntsville.

He says ice in clouds is the key to really big electrical storms. Ice creates lightning and often heavy rain.

"A fair amount of rain that you see over continents actually is the result of melting ice that's created high up in the, high up in the development of thunderstorms," Petersen says.

Ice is vital to the development of lightning. Different-sized ice particles within a cloud carry a positive or negative charge. As the particles collide, that charge builds up. When the charge is released -- we see lightning.

Satellites watch lightning flashes from space, helping scientists to learn more about them.

"We know how much ice is associated with a given number of lightning flashes," Dr. Petersen says. "Then we can say something about the amount of rain that falls out of those clouds." Knowing the rain that falls was once ice above you - a heads up about what's really inside a thunderstorm.

**BACKGROUND:** Most people know that thunderstorms tend to form on warm days, but new satellite observations indicate that in order for lightning to form, thunderstorm clouds need to have a high content of ice.

**THE RESEARCH:** Walter Petersen, a meteorologist at the University of Alabama, Huntsville, analyzed observations of lightning and precipitation from 1998 to 2000 taken from the Tropical Rainfall Measuring Mission (TRIMM), launched in 1997. The relationship between the number of lightning strikes and how much ice crystals are present in clouds is the same regardless of different atmospheric environments over oceans, coasts, and continents. The relationship between rain and lightning, in comparison, does not show this same level of consistency. The results support previous assumptions about the basic physics of lightning and ice. As a result, the density of lightning in a storm could be used in the future to predict the amount of ice that is present.

**HOW STORMS DEVELOP:** Storm clouds form as moisture evaporates from the earth into the atmosphere, where the droplets jostle against each other. The air cools off rapidly with as it reaches higher altitude. Sometimes a cold front -- the boundary between where the cold air from one thunderstorm meets the air outside the storm for example -- will force the moist air upward into the colder air. This moist air cools off and the water vapor "condenses" into liquid drops, forming clouds. The process continues: more and more water vapor turns into liquid, and the moist air warms up even more and rises higher and higher. A thunderstorm results.

Ads by Google

Advertise here

**Phoebus Stage Lighting**

Theatrical, Video, Events, Truss Trade Shows, Design, Supplies  
[www.phoebus.com](http://www.phoebus.com)

**Covidien Healthcare**

Covidien Is At The Forefront Of Education & Research Worldwide.  
[www.Covidien.com](http://www.Covidien.com)

**Hiking Boots at Zappos**

Huge Selection of Hiking Boots. 365 Day Returns. Huge Selection.  
[www.zappos.com](http://www.zappos.com)

**Forensic Weather Experts**

Wx Records, Reports and Testimony Nationwide. Call For Price Estimate  
[www.WeatherConsultants.Com](http://www.WeatherConsultants.Com)

**Pfizer for Professionals**

Get Specialized Resources at The Official Pfizer Professional Site.  
[www.PfizerPro.com](http://www.PfizerPro.com)

**Related Stories**



**Bolts Of Blue Lightning Thrusting Upward And Other Weird Lightning Explained** (March 30, 2008) — The mechanism behind different types of

lightning may now be understood, thanks to a combination of direct observation and computer modeling. Most people see lightning strikes that go from clouds to ... [read more](#)

**New NASA Theory May Help Improve Weather Predictions** (November 27, 2002) — Less precipitation and more lightning eventually may be forecast as a result of a NASA study that shows that cloud droplets freeze from the outside inward instead of the ... [read more](#)

**Documenting A Paradox: Smoke Decreases Rainfall But Ultimately Increases Its Intensity** (February 27, 2004) — Air pollution and smoke suppress rainfall, but cause the remaining rain amounts to fall in greater intensities, with lightning and hail, says a researcher at the Hebrew University of ... [read more](#)

**How Do Thunderstorms Create Lightning? High-Energy Particles From Space Used To Probe Thunderstorms** (June 3, 2009) — Scientists have developed a new technique to remotely measure thunderstorm electric fields on the ... [read more](#)

**Where Lightning Strikes: New Maps From Orbiting Sensors Reveal Where On Earth The Powerful Bolts Will Most Likely Strike** (April 22, 2002) — Lightning. It

**Just In:**

Ice and Rock Mix Inside Saturn's Titan

**Science Video News**



**Lightning: Fact or Fiction?**

To study lightning, scientists use rockets connected to the ground by wires. They fire the rockets into clouds, triggering electrical discharges, and. ... [full story](#)

Students Help Meteorologists Make Sense of Satellite Radar Data

Food Chemists Use 'Edible Antifreeze' To Make Smoother Ice Cream

Space Physicists and Atmospheric Scientists Can Now Predict Disruptions Caused by the Sun's Coronal Mass Ejections

[more science videos](#)

**Breaking News**

... from NewsDaily.com

Scientists find "mother" of all skin cells



"Personal" study shows gene maps can spot disease

SpaceX aborts rocket engine test

Scientists say UK risks losing innovation edge

Big Bang experiment may reveal dark universe: CERN

[more science news](#)

**In Other News ...**

Billionaire Pinera takes power as quakes rattle Chile

Biden appeals for Mideast peace talks without delay

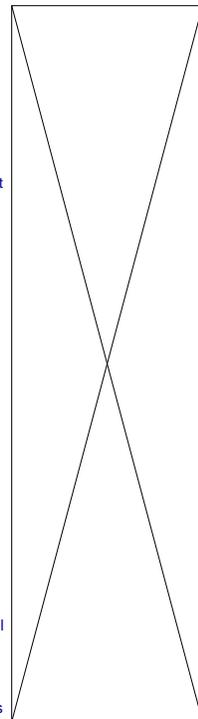
Iraq results trickle out, Maliki rivals cry fraud

Jobless claims fall, trade gap narrows on oil

Chile lifts tsunami alert on coast after tremors

Financial reform deal fails, hopes for 2010 dim

Police clash with protesters as Greeks fight cuts



positively charged. Eventually the growing negative charge becomes so intense that electrons on the Earth's surface are repelled and burrow deeper into the Earth. The Earth's surface becomes positively charged, and hence very attractive to the negative charge accumulating in the bottom of the cloud. All that is needed is a conductive path between cloud and Earth, in the form of ionized air.

Number of stories in archives: 44,032

... from ScienceDaily

The American Meteorological Society contributed to the information contained in the TV portion of this report.

**Note:** This story and accompanying video were originally produced for the American Institute of Physics series *Discoveries and Breakthroughs in Science* by *Ivanhoe Broadcast News* and are protected by copyright law. All rights reserved.



Get the latest science news with our free email newsletters, updated daily and weekly. Or view hourly updated newsfeeds in your RSS reader:

- [Email Newsletters](#)
- [RSS Newsfeeds](#)

**Feedback** ... we want to hear from you!

Tell us what you think of the new ScienceDaily -- we welcome both positive and negative comments. Have any problems using the site? Questions?

Your Name:

Your Email:

Comments:

Click button to submit feedback:

Find with keyword(s):

Enter a keyword or phrase to search ScienceDaily's archives for related news topics, the latest news stories, reference articles, science videos, images, and books.

Ads by Google

[Advertise here](#)

**AMITIZA® (lubiprostone)**  
 Official web site for AMITIZA. Get the product profile and more...  
[www.amitiza.com/HCP](http://www.amitiza.com/HCP)

**TRADD Storm Chasing Tours**  
 Tours are booking fast. Voted #1 in 2008. Very safe and exciting.  
[www.traddstormchasingtours.com](http://www.traddstormchasingtours.com)

**BFGoodrich® Winter Tires**  
 State-of-the-Art Winter Traction w/ Exceptional Stability & Control.  
[www.BFGoodrichTires.com](http://www.BFGoodrichTires.com)

[About This Site](#) | [Editorial Staff](#) | [Awards & Reviews](#) | [Contribute News](#) | [Advertise With Us](#) | [Privacy Policy](#) | [Terms of Use](#)  
 Copyright © 1995-2009 ScienceDaily LLC — All rights reserved — Contact: [editor@sciencedaily.com](mailto:editor@sciencedaily.com)  
 Part of the **iVillage Your Total Health Network**