



OUTER CAPE ENVIRONMENTAL AWARENESS NEWSLETTER



OCEAN e-newsletter is the environmental education publication of Safe Harbor. Our goal is to provide environmental links and share collaborative solutions among Outer Cape environmental groups, towns, students and residents. Collaborative efforts protect natural and financial resources. This issue explores links between world wide weather systems (Teleconnections) and extreme weather events. Thank you to our readers, who pass on this newsletter, supporting our efforts to protect our resources through education. A very special thanks to Whitney Johnson of London, England for her generous contribution of effort and talent in the formatting and production of OCEAN.

~ Gordon Peabody, Editor

ATMOSPHERIC INSTABILITY

Kevin Trenberth, chief of Climate Analysis at the National Center for Atmospheric Research in Boulder Colorado, has stated that preliminary studies suggesting it may take 30 years to confirm possible increases in **atmospheric instability** [and subsequent links to increased tornadoes] may be flawed and over simplified. Trenberth believes there is evidence of an increase in atmospheric instability happening now.

DISPATCH FROM VIVIAN, SOUTH DAKOTA

A severe storm on July 23, 2010 dropped hundreds of massive hailstones on the small town of Vivian, South Dakota. Local reports stated that every house in Vivian sustained some type of hail damage. One of the stones collected broke the U.S. record not only for the largest hailstone (in diameter) but also the heaviest. The stone measured 8 inches (20.3 cm) in diameter, 18.5 inches (47.0 cm) in circumference, and weighed 1.9375 lbs (0.89 kg). It was also reported that the hailstone was originally much larger, but the freezer it was stored in lost power for about five to six hours and the person who collected it kept opening the freezer door to

show friends and relatives. The world record for the heaviest hailstone belongs to Bangladesh, with a stone collected in April 1986 that weighed 2.25 lb (1.02 kg).



EARTH'S HOTTEST YEAR ON RECORD: 2010

Weather Underground reports unprecedented heat scorched the Earth's surface in 2010, tying 2005 for the warmest year since accurate records began in the late 1800s. Temperatures in Earth's lower atmosphere also tied for warmest year on record, according to independent satellite measurements.

Continued next page

EARTH'S HOTTEST YEAR ON RECORD: 2010

Continued

Earth's 2010 record warmth was unusual because it occurred during the deepest solar energy minimum since satellite measurements of the sun began in the 1970s. Unofficially, nineteen nations (plus the U.K.'s Ascension Island) set all-time extreme heat records in 2010. This includes Asia's hottest reliably measured temperature of all-time, the remarkable 128.3°F (53.5°C) in Pakistan in May 2010. This measurement is also the hottest reliably recorded temperature anywhere on the planet except for in Death Valley, California. The countries that experienced all-time extreme highs in 2010 constituted over 20% of Earth's land surface area.

RECORD YEAR IN GREENLAND ICE MELT

In 2010 melting in some areas of Greenland stretched 50 days longer than average, allowing for a record year in Greenland ice melt. The early melt onset in spring exposed more bare ice, therefore reducing the surface albedo. This means more solar energy was absorbed and therefore melting occurred on a larger and more rapid scale. A below average amount of summer snowfall also contributed to lessening albedo effects.

The total ice loss for 2010 was about 600 billion tons of ice mass loss. In 2010, the rate of area loss was 419 square km of ice, 3.4 times that of the previous eight years.



CAUSES OF OBSERVED CHANGES IN EXTREMES AND PREDICTIONS OF FUTURE CHANGE

William J Gutowski Jr, Iowa State University

This is a link (<http://www.climate-science.gov/Library/sap/sap3-3/final-report/sap3-3-final-Chapter3.pdf>) to a pretty sobering assessment, linking current changes to future changes, published recently by a research panel. We have included some of their scientifically careful comments:

Changes in some weather and climate extremes are attributable to human-induced emissions of greenhouse gases.

- Human-induced warming has likely caused much of the average temperature increase in North America over the past 50 years. This affects changes in temperature extremes.
- Heavy precipitation events averaged over North America have increased over the past 50 years, consistent with the observed increases in atmospheric water vapor, which have been associated with human-induced increases in greenhouse gases.
- It is very likely that the human-induced increase in greenhouse gases has contributed to the increase in sea surface temperatures in the hurricane formation regions.

Over the past 50 years there has been a strong statistical connection between tropical Atlantic sea surface temperatures and Atlantic hurricane activity as measured by the Power Dissipation Index (which combines storm intensity, duration, and frequency). This evidence suggests a human contribution to recent hurricane activity. However, a confident assessment of human influence on hurricanes will require further studies using models and observations, with emphasis on distinguishing natural from human-induced changes in hurricane activity through their influence on factors such as historical sea surface temperatures, wind shear, and *atmospheric vertical stability* [our italics].

WHAT ARE TELECONNECTIONS?

Multiple, worldwide scale, atmospheric systems may be linked and interact in ways we are only beginning to understand. The relationship of these systems to each other (**Teleconnections**), determine patterns of precipitation or the lack of it, storm tracks and long term weather patterns, not just for New England but all over the world. Teleconnections will become a critical tool for predicting Climate Change impacts.

HIMALAYAN CONNECTION

Teleconnections Research published in *Climate Dynamics* (April 2010) explored linkages between Pacific Ocean systems, the Himalayas, and the Indian Monsoon. Dr. Andy Turner said their work showed that in the absence of influence from strong Pacific La Niña or El Niño systems, there is an increase in Himalayan snowfall. This in turn creates increased reflection of sunlight, which is a cooling mechanism that results in weaker early season (June) monsoon. Nearly a third of the world's population is dependant on the monsoon for agriculture.

SNOWMAGEDDON

Teleconnections create “Upside Down Winter in New England”

The most extreme winter Arctic atmospheric circulation on record resulted in “Snowmageddon.” According to **Weather Underground’s Dr. Jeff Masters (December 2010 blog post)**, the atmospheric circulation in the Arctic “took on its most extreme configuration in 145 years of record keeping during the winter of 2009–2010.” The Arctic is normally dominated by low pressure in winter, and a Polar Vortex of counter-clockwise circulating winds develops surrounding the North Pole. However, during the winter of 2009–2010, high pressure replaced low pressure over the Arctic, and the Polar Vortex weakened and even reversed at times, with a clockwise flow of air replacing the usual counter-clockwise flow of air. “This unusual flow pattern allowed cold air to spill southwards” and to be replaced by

warm air moving poleward. Like leaving the refrigerator door ajar, the Arctic “refrigerator” warmed, and cold Arctic air spilled out into “living room” where people live. A natural climate pattern called the North Atlantic Oscillation (NAO), and its close cousin, the Arctic Oscillation (AO) were responsible. Both of these patterns experienced their strongest-on-record negative phase, when measured as the pressure difference between the Icelandic Low and Azores High. The extreme Arctic circulation caused a bizarre upside-down winter over North America—“Canada had its warmest and driest winter on record,” forcing snow to be trucked in for the Winter Olympics in Vancouver, but the U.S. had its coldest winter in 25 years. A series of remarkable snow storms pounded the Eastern U.S., with the “Snowmageddon” blizzard dumping more than two feet of snow on Baltimore and Philadelphia. Western Europe also experienced unusually cold and snowy conditions, with the UK recording its 8th coldest January. A highly extreme negative phase of the NAO and AO returned again during November 2010, and lasted into January 2011. Exceptionally cold and snowy conditions hit much of Western Europe and the Eastern U.S. again in the winter of 2010–2011. During these two extreme winters, New York City recorded three of its top-ten snowstorms since 1869, and Philadelphia recorded four of its top-ten snowstorms since 1884. During December 2010, the extreme Arctic circulation over Greenland created the strongest ridge of high pressure ever recorded at middle levels of the atmosphere, anywhere on the globe (since accurate records began in 1948). New research suggests that major losses of Arctic sea ice could cause the Arctic circulation to behave so strangely, but this work is still speculative.



TELECONNECTIONS CONTRIBUTE TO NEW ENGLAND WEATHER

The Pacific Ocean atmospheric system oscillates between two different phases (El Niño-La Niña). We are currently in the La Niña phase. While there seem to be trends linking this phase to New England's weather, our weather is actually more influenced by an Atlantic Ocean system (North Atlantic Oscillation) which has strong and weak phases. The NAO is not fully understood and can only be modeled for a few weeks at a time. Our winter predictions are therefore stated as "above, near or below normal temperatures and precipitation."

TELECONNECTIONS SHIFT JET STREAM STORM TRACK CREATING "UNPRECEDENTED DROUGHT"

May is typically the wettest month in Texas, when crops are planted but our nation's leading cattle state experienced the driest seven month span on record. This led to unprecedented wildfires across the state. The strong La Niña atmospheric system over the Pacific Ocean, which resulted in a cooling of the central Pacific, caused the Jet Stream to shift north above Texas. This resulted in unprecedented flooding in the Midwest and unprecedented drought in Texas, according to Mike Halpert, Deputy Director of the federal government's Climate Prediction Center in Silver Spring, Maryland. According to Bloomberg reporter Jeff Wilson (June 10, 2011): Corn surged to a record approaching \$8 a bushel on signs that global inventories will drop as adverse weather slashes acreage in the U.S., the world's top producer, and demand rise for livestock feed and ethanol. *The lack of employees to process ethanol because they are filling sandbags, as well as flood related late plantings and crop losses could mean 15% higher fuel prices, according to other articles.* [Our comments in italics.]

Worldwide stockpiles will be 111.89 metric million tons before the 2012 harvest in the Northern Hemisphere, the U.S. Department of Agriculture said yesterday. That was down from 129.14 million forecast in May and 117.44 million that the agency

says will be in storage by October 1. U.S. supplies before the 2012 harvest were estimated at the lowest since 1996.

Prices have more than doubled in the past year as wet weather limited the size of the 2010 U.S. harvest. Flooding in the past two months delayed planting and threatened this year's crop prospects. The rally is boosting expenses for meat producers including Tyson Foods Inc. and makers of grain-based ethanol such as Poet LLC. Global food costs climbed in nine of the past 11 months, reaching a record in February. "The USDA told the markets yesterday that corn supplies will stay tight for another year," said Brian Grete, the senior market analyst for the Professional Farmers of America newsletter in Cedar Falls, Iowa. "Now, we have a long-term story of tight supplies, and that means higher prices."



CALIFORNIA GARBAGE TRUCKS FUELED BY . . . GARBAGE

By Jason Dearen, Associated Press (January 7, 2010)

Livermore, CA: Hundreds of trash trucks across

Continued next page

CALIFORNIA GARBAGE TRUCKS FUELED BY . . . GARBAGE *Continued*

California are rumbling down city streets using clean fuel made from a dirty source: garbage. The fuel is derived from rotting refuse in the Altamont landfill. Since November, the methane gas created from decaying detritus at the 240-acre landfill has been sucked into tubes and sent into an innovative facility that purifies and transforms it into liquefied natural gas. "We've built the largest landfill-to-LNG plant in the world; this plant produces 13,000 gallons a day of LNG," says Jessica Jones, a landfill manager for Houston-based Waste Management. "It will take 30,000 tons a year of CO₂ from the environment."

About 50 percent of the gas emitted from landfills is methane. "Methane is the second most important greenhouse gas after carbon dioxide," Tom Frankiewicz, program manager for EPA's Landfill Methane Outreach Program in Washington, says in an e-mail.

CHINA FARMERS FACE 'EXPLODING' WATERMELON PROBLEM

Dispatch from eastern China May 17, 2011,
Associated Press

Farmer Liu Mingsuo: "More and more watermelons exploded." Farmers in eastern China have been left perplexed after their watermelons began to explode one-by-one. Farmer Liu Mingsuo told Xinhua that more than two-thirds of his crop had blown up. He said he had used chemicals to boost their growth on 6 May, and the following day more than 180 melons exploded. Mr Liu was reported to be the only farmer from the 10 households who used chemicals. Wang Dehong, who has been farming watermelons for 20 years, couldn't understand why his fruit also exploded as he had not used any chemicals.

An investigation by state media found farms in Jiangsu province were losing acres of fruit because of the problem. The overuse of a chemical that helps fruit grow faster was blamed in one report by China Central Television but agriculture experts

were unable to explain why chemical-free melons were exploding. They cited the weather and abnormal size of the melon as factors. China Central Television said farmers were over spraying their crops with the growth promoter, hoping they could get their fruit to market ahead of the peak season and increase their profits.

According to the Xinhua news agency, 20 farmers in a village in Jiangsu province planted imported seeds from Japan, with 10 households saying their watermelons began exploding last month. Agricultural experts investigating the incident were unable to offer an explanation.

China has approved the usage of the growth



chemical under certain quotas. *So far*, tests show the chemical is safe, Xinhua reported. [Our italics.]

OCEAN ANNUAL AWARDS Homemade Electric Car Award



Creative Recycling Education Award



OCEAN ENVIRONMENTAL RECOGNITION AWARD

**Paul Morris, Director, Town of Truro,
Department of Public Works**



Paul prefers being a “behind the scenes” guy but he was one of the first to step up in support of our innovative restoration strategy for the eroding barrier dune system at Truro’s Ballston Beach.

Thank you to Paul and his Department.

OCEAN SPECIAL RECOGNITION AWARD

**Kristyna Smith, Safe Harbor Haiti Water
Project Coordinator**

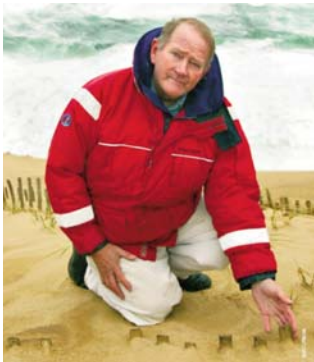


A Psychology Major at Framingham State College, Kristyna was working with Safe Harbor as a researcher. When she was researching advances in nano technology (the use of micro particles) in

water filters for us, something clicked and we asked her to locate a manufacturer, so we could send water filters to earthquake and hurricane hit areas of Haiti. Kristyna took on the role of Project Coordinator, ordering filters and recruiting couriers to bring the filters into Haiti. It began as a simple concept but required a lot of work. Thank you Kristyna.

CAPE COD NEWS

2011 Annual Issue of Cape Cod Life Magazine features Safe Harbor Director Gordon Peabody <http://capecodlife.com/life/stories/2011/01/wellfleet-cape-islands-voices/>



SAFE HARBOR’S HAITI WATER PROJECT REPORT

Last year we began sending innovative water filters to Haiti.



Kristyna Smith, Safe Harbor Haiti Water Project Coordinator, March 2011

It is amazing how our Haiti Water Project at Safe Harbor has progressed in just a few short months! When I was first introduced to the innovative new filters I never expected it to be more than just a research project, but before I knew it we had sent for our first order of filters. We were uncertain of the project’s future at this point as we hadn’t any idea whether or not we would receive donations. Uncertainty didn’t last long; generous donations



began pouring in to help send these filters to Haiti. It has been so great to be a part of this. I have had the opportunity to communicate and meet with so many generous people who actively participated in

Continued next page

Kristyna Smith, Safe Harbor Haiti Water Project Coordinator, March 2011 *Continued*

the relief efforts and rebuilding of the Haitian community. By spreading knowledge of this sustainable solution I know our efforts will make a difference.

Deborah Peabody, Safe Harbor Haiti Water Project Donations Coordinator, March 2011

I was painfully aware of the suffering in Haiti even before the devastating earthquake. Then the storms and floods began. When I began hearing



about the cholera outbreak it was enough to make me want to turn off the news, I felt so helpless and sad. Then my brother called. “Isn’t cholera transmitted by dirty water?” he asked. He told me that he had found some simple, effective, affordable water filters intended for use in rustic areas. He’d already ordered a case to be sent to Haiti and had found a way to get them there. “Seems to be a better investment than medicine,” he said. I contacted people I knew from each of three local churches and the word went out. The first church, the first week, got donations for an entire case of filters. From there the donations continued to grow. It seemed that anyone who heard about the effort wanted to buy at least one filter. I think they felt, as I did, such happiness at being able to do something so helpful for so little. I have seldom been involved in a project that did so much to restore my faith in people and gave me so much joy.

Gordon Peabody, Director, Safe Harbor Environmental

Because it has always been available to us, we rarely



pause to consider how critical water is or what it would be like to live without safe drinking water. I believe drinking water will become a more expensive commodity, as multi-national corporations engage in efforts to control our source aquifers. When I became aware of how much bottled water was being shipped to Haiti and how expensive it was to ship the water, I felt that we should explore a more sustainable alternative, such as sending water filters. A gallon of water costs approximately \$4-\$8 to ship to Haiti (in pallets of 1,700 half liter bottles). This does not reflect the costs of bottling, handling, distribution or disposal of plastic bottles or the carbon footprint of bottling, shipping and distribution. We researched new nano-technology, which makes use of micron sized particles and discovered a filter, produced by a church organization in Texas, that cost approximately \$20. We realized that for what it would cost to ship 5 gallons of water to Haiti, we could send a filter that could produce up to 70 gallons of clean drinkable water per day, for up to a year. Each day of use would save \$280 in shipping costs. Over the course of a year, the savings could be better spent on other relief supplies. Sending cases of filters could provide enough savings to rebuild schools. We ordered our first case. Probably the biggest surprise for us was that there was no way to ship filters directly to Haiti. I tasked Kristyna to recruit couriers from aid organizations and churches active in relief work where people had been hit by the earthquake and the hurricane. In order to keep these precious filters from getting into the black market, they had to be

Continued next page

**Gordon Peabody, Director, Safe Harbor
Environmental *Continued***



smuggled into the country in luggage. I am very grateful to the Outer Cape Community, to the churches and individuals that stepped up to become part of this new idea. The photo shows Belle Vue Haiti, one of the 17 villages where your filters are in use. We will make our connections available to any group wishing to continue this effort. <http://www.wickedlocal.com/provincetown/features/x1145374490/Local-water-filter-project-aimed-at-helping-Haitians> <http://www.wickedlocal.com/wellfleet/features/x1651493005/Water-filters-make-their-way-to-Haiti-as-part-of-Outer-Cape-fundraising-effort#axzz1aPmigTiQ>

**BALLSTON BEACH BARRIER DUNE
COMMUNITY RESTORATION PROJECT
Safe Harbor strategy uses storm winds to
restore eroded coastal barrier dunes**



Over wash is a fact of life for coastal dunes, even barrier dunes such as the one at Ballston Beach in



Truro on Cape Cod. Two factors brought this particular barrier dune system to our attention: first, the fresh water marsh ecosystem behind the dune was the headwaters for Truro's Pamet River and second, the dune had been so impacted by pedestri-



an traffic over the years that storm over wash events were becoming more frequent, degrading the diversity and water quality of the marsh, as well as flooding adjacent roads. This Community Restoration Project partnered: the Cape Cod National Seashore; Truro Conservation Commission; Truro Beach Commission; Truro Department of Public Works and Safe Harbor. Donations for materials were supported by additional partners: Friends of the Cape Cod National Seashore; Truro Non



Continued next page

BALLSTON BEACH PROJECT *Continued*

Resident Taxpayers Association; Mac's Seafood and countless community donations. Safe Harbor



designed and installed low-cost modifications to standard sand fencing, in a low-impact matrix intended to capture sand from winter storm winds. When storm winds blew last winter, instead of eroding the dune, they built up nearly five feet of new sand. On two days last spring, community volunteers showed up to plant beach grass. In about four years, the grass will become sustainable and fencing will no longer be needed. Pedestrian access is now zig-zag, to prevent re-occurrence of shotgun

blowouts. Safe Harbor will continue working on this 4 year project and regular reports will be available on our website www.SafeHarborEnv.com.

Friends of the Cape Cod National Seashore (FCCNS) is collecting the donations for materials for the Ballston Beach Dune Restoration Project. To donate, send a check payable to FCCNS and write "Ballston Beach" on the memo line to:

Friends of the Cape Cod National Seashore
P.O. Box 550
Wellfleet, MA 02667

People wishing to volunteer should contact gordonpeabody@gmail.com. For a few articles on the project, go to:

http://safeharborenv.com/wp-content/uploads/2011/02/CHA_Summer11_BallstonBeachArticle.pdf

<http://www.wickedlocal.com/harwich/features/x698067004/Students-pitch-in-to-help-prevent-beach-erosion#axzz1SknZpTE1>

<http://macsseafood.wordpress.com/2011/03/14/shoring-up-the-dunes-ballston-beach-food-chain/>