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NOAA Updates Atlantic Hurricane Forecast

NOAA's team of hurricane experts issued an updated forecast for the Atlantic basin on August 8, 2002. As the hurricane season enters its peak period (mid-August through October), forecasters stated that an El Niño developing in the equatorial Pacific Ocean would likely exert a suppressing influence upon hurricane activity.

The remainder of the hurricane season, which ends November 30th, is expected to experience normal to below normal levels of activity. The updated forecast calls for the possibility of seven to ten tropical storms, four to six hurricanes, and one to three major hurricanes (category 3 [winds at least 111 mph] or higher on the Saffir-Simpson scale).

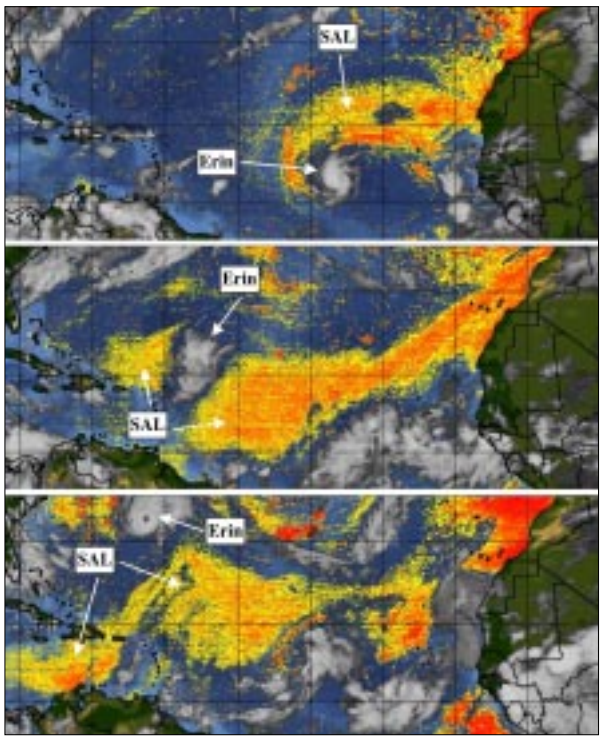
NOAA's seasonal forecast issued in May called for average to slightly above average levels of storm activity. The strengthening El Niño is attributed as the main reason for lowering the overall expected levels of activity in the August forecast. Despite the reduced threat, east and Gulf coast residents were urged to remain vigilant and continue their efforts to prepare for the possibility of landfalling storms.

The Atlantic hurricane season forecast represents the combined effort of scientists from NOAA's Climate Prediction Center, [AOML's] Hurricane Research Division, and the National Hurricane Center.

Saharan Air Layer Inhibits Tropical Cyclone Formation

Jason Dunion, Hurricane Research Division

Although the 2001 Atlantic hurricane season exhibited 150% more tropical cyclone (TC) activity than normal, no TCs reached hurricane strength in the tropical Atlantic south of 25°N and east of 65°W. This pattern of activity has occurred only 15 times since 1950. Of those 15 years, none saw as many tropical depressions or tropical storms struggle through the tropical Atlantic as did 2001. Several of the named systems that passed through this region in 2001 were clearly under the negative influence of the Saharan Air Layer (SAL). The high activity of 2001 appears to have been restrained by a succession of SAL outbreaks that surrounded many of the TCs that might have developed.



Time series of Hurricane Erin's interaction with the SAL using newly developed GOES SAL tracking satellite imagery for September 2-9, 2001. The yellow and red shading indicates likely SAL regions with increasing amounts of dust content and dry lower tropospheric air. Erin rapidly intensified to major hurricane strength after it emerged from the SAL's influence.

An elevated SAL occurs during the summer over extensive portions of the North Atlantic Ocean between the Sahara Desert, the West Indies, and the United States. It is associated with a low-level easterly wind surge centered near 700 hPa (3000 m) that can greatly increase the local atmospheric vertical wind shear. The SAL retains its Saharan characteristics of warm, stable air near its base and dryness and dustiness throughout its depth as it is carried as far west as the Caribbean Sea (~7000 km from the west African coast). It can cover an area of the Atlantic slightly larger than the 48 contiguous United States.

Geostationary satellites reveal that the combination of dry, stable air, and the SAL's low-level wind surge inhibit the occurrence of the deep atmospheric *(continued on page 2)*

(Continued from page 1)
convection that is essential to TC formation. When both developed TCs and weak African easterly waves, which are potential seedlings for ~65% of Atlantic TCs, are engulfed by the SAL, much of their deep convection dissipates. Consequently, these tropical disturbances can lose a major portion of their strength while still over the warm tropical Atlantic.

Current research includes using data from aircraft and multiple satellite platforms to investigate the mechanisms by which the SAL's embedded dust silicates, thermodynamic properties, and low-level wind surge affect Atlantic tropical cyclone genesis and intensity change.

Hurricane Forecasters Learn H*Wind Technology

Scientists from AOML's Hurricane Research Division (HRD) recently conducted a training session at the National Hurricane Center in Miami, Florida to begin the process of transferring H*Wind (Real-Time Hurricane Wind Analysis System), a new technique for measuring wind intensity and landfall characteristics of tropical cyclones, to operational use. The training was facilitated by the U.S. Weather Research Project's Joint Hurricane Testbed (JHT) program. The JHT provides a conduit for the transition of promising new technology to operations.

HRD scientists conducted one-on-one training sessions with personnel from the Tropical Prediction Center's (TPC) Tropical Analysis and Forecast Branch, focusing on how to enter storm position data and wind observations into the H*Wind program. Training also focused on how to use the H*Wind tools for graphics, interactive quality control, and objective analysis. Although still in the transitional stage, the newly-trained specialists will aid forecasters during the 2002 hurricane season by using H*Wind to perform real-time wind analyses.

H*Wind is scheduled to become fully operational by the National Hurricane Center during the 2003 hurricane season. It is anticipated that the H*Wind technology will improve forecasts for landfalling storms by nearly 15%. Additional information about H*Wind can be found at http://www.aoml.noaa.gov/hrd/data_sub/wind.html.

Leadership Changes in HRD

Kristina Katsaros, Office of the Director

Dr. Hugh Willoughby completed his tenure as Director of AOML's Hurricane Research Division (HRD) on July 15, 2002. AOML is grateful to him for his seven years of service and leadership. Hugh plans to continue studies of hurricane motion and intensification with his colleagues as a senior meteorologist with the Division. While serving as Director, he published several seminal papers on hurricane structure and dynamics.

During his term as Director, the Division advanced the practical application of field measurements to hurricane forecasting, especially for hurricanes near landfall. NOAA research aircraft now transmit data from Global Positioning System (GPS) dropsondes which, along with remotely-sensed surface winds and other available surface data, are assimilated in real time into the Division's H*Wind product. Forecasters at the National Hurricane Center use the analyses to determine the extent of hurricane watches and warnings.

The Division is pioneering the use of targeted observations and ensemble hurricane track forecasts and is working actively on statistical intensity and quantitative precipitation forecasts. The only skillful intensity forecast system (SHIPS) was developed and implemented while Hugh was Director. Advancements have also been made in Doppler radar and hurricane climatology. In addition, the Division has completed and is planning several more seasons of intense convection and air-sea interaction observations with partners in NASA, the Office of Naval Research, and academia.

The Hurricane Research Division lives on the edge, both in the sense of dealing with one of the most dramatic and powerful weather systems on Earth, and in conducting cutting-edge science. A search for a permanent director will soon be underway. In the interim, Dr. Frank Marks, Director of HRD's annual field program, will serve as Acting Director of the Division. Michael Black succeeds Frank as Director of HRD's field program. A formal announcement for the position will be made available in September and appear on the Office of Personnel Management web site (http//www.usajobs.opm.gov).

Russian Scientists Visit AOML

Dr. Alexander Suvorov and colleagues, Dr. Alexey Khaliulin and Mr. Eugeny Godin, from the Marine Hydrophysical Institute (MHI) of the Ukrainian National Academy of Sciences, Sevastopol, Crimea, visited AOML during the week of June 23rd. Dr. Suvorov is Deputy Director for Scientific Affairs at MHI and Head of MHI's Marine Information Systems and Technologies Department. The three divided their time in the United States between Miami, Florida and Silver Spring, Maryland. They worked with Dr. David Palmer of AOML's Ocean Chemistry Division and Mr. Sydney Levitus of NOAA's National Oceanographic Data Center on issues related to their joint, NOAA-funded, project, "The rescue of Black Sea hydrological data." During their week at AOML, Dr. Suvorov gave a presentation entitled "The Black Sea Component of the Global Oceanographic Observing System." Social activities included a large dinner party and trips to the Florida Keys and the Everglades.

Dr. Alexey Khaliulin, Dr. Alexander Suvorov, and Mr. Eugeny Godin of the Ukranian National Academy of Sciences.

Best Track Committee Findings:

- Hurricane Andrew was a category 5 storm over open water on its approach to South Florida.
- Hurricane Andrew was a category 5 storm on the Saffir-Simpson hurricane scale at the time of landfall, with category 5 winds occurring in a small area on the immediate coast having open exposure to Biscayne Bay.
- Winds at specific locations over land in Miami-Dade County are unknown due to remaining scientific uncertainties.

July-August 2002 Informal Research Reports*

July 30

Methyl Halides and Other Halocarbons in the Southern Ocean

Dr. Shari Yvon-Lewis
Ocean Chemistry Division

August 1

The Impact of the Saharan Air Layer on Atlantic Tropical Cyclone Activity

Mr. Jason Dunion
Hurricane Research Division

August 6

Eyewall Features/Creatures in Hurricanes Andrew and Bret

Mr. Peter Dodge
Hurricane Research Division

August 13

Ocean Acoustic Remote Sensing at Extremely Long Ranges

Dr. David Palmer
Ocean Chemistry Division

***Presentations begin at 3:00 p.m. in the first-floor conference room. Coffee and tea are served at 2:45 p.m.**

After 10 Years, Hurricane Andrew Gains Strength

In the record books, it's still one of America's costliest hurricanes, and today scientists announced Hurricane Andrew was even stronger than originally believed when it made landfall in south Florida 10 years ago this week. Based on new research, scientists upgraded the storm from a category 4 to a category 5, the highest on the Saffir-Simpson Hurricane Scale. In their re-analysis of Hurricane Andrew's maximum sustained surface-wind speeds, the NOAA National Hurricane Center Best Track Committee, a team of hurricane experts, concluded winds were 165 mph–20 mph faster than earlier estimated–as the storm made landfall. Herbert Saffir, a structural engineer who co-designed the Saffir-Simpson Hurricane Scale, joined the Committee as an observer and reviewed the team's results.

Satellite image of Hurricane Andrew on August 23, 1992 as it approached the southeast coast of Florida.

The upgrade makes Andrew only the third category 5 hurricane (wind speeds greater than 155 mph) on record to strike the continental United States. The other two category 5 storms were the "Florida Keys 1935 Hurricane" and Hurricane Camille in 1969. "There is always some uncertainty in determining the maximum winds in a hurricane, and Andrew is no exception," said Max Mayfield, Director of the National Hurricane Center. "Our previous estimate was 145 mph, based on the science available in 1992. With advanced research techniques and technology, we now estimate the winds were stronger."

The National Hurricane Center has had an ongoing program to review the historical record of all storms. Scientists and other researchers note that society needs an accurate account of the frequency and intensity of past catastrophic events to best plan for the future. "We have recently completed a review of a re-analysis of storms from 1851 to 1910," said Colin McAdie, Chairman of the Best Track Committee. This re-analysis effort was undertaken by a team led by Chris Landsea of AOML's Hurricane Research Division (HRD) and supported by a grant from the NOAA Office of Global Programs.

Hurricane Andrew is one of the most significant cases studied. According to McAdie, scientific understanding of the wind structure in strong hurricanes has significantly increased since 1992. For Andrew, the Best Track Committee considered input from scientists from HRD and the National Hurricane Center.

Since 1997, forecasters have used Global Positioning System dropwindsondes, a measuring device dropped from hurricane reconnaissance aircraft into the eyewall, the windiest part of the hurricane. The sonde system measures temperature, barometric pressure, water vapor, and wind data every 15 feet on its way down. This new method gave meteorologists an important glimpse into the true strength of these devastating storms. The analyses of the dropwindsonde data indicated that, on average, the maximum sustained surface-wind speed was about 90 percent of the wind speed measured at the 10,000-foot aircraft level flown as Andrew approached south Florida. In 1992, Andrew's wind speed was estimated at 75 to 80 percent of the aircraft observations. The research findings resulted in an increase in the estimated wind speeds of Hurricane Andrew from 145 mph to 165 mph.

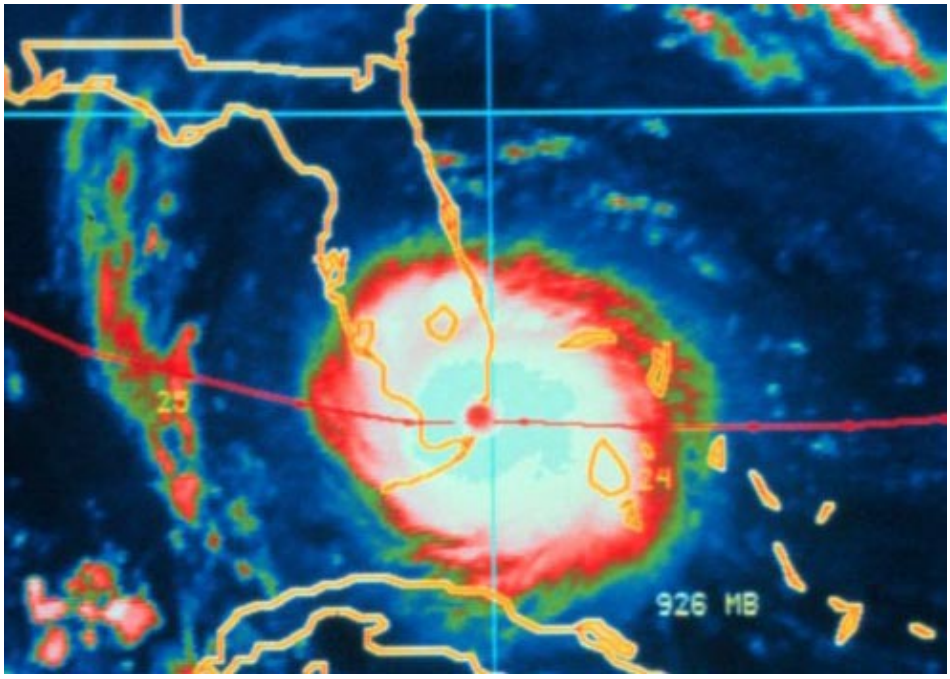
When Hurricane Andrew hit southeast Miami-Dade County, Florida on August 24, 1992, flying debris in the storm's winds knocked out most ground-based wind measuring instruments, and widespread power outages caused electric-based measuring equipment to fail. The winds were so strong many wind-measuring tools were incapable of registering the maximum winds. Surviving wind observations and measurements from aircraft reconnaissance, surface pressure, satellite analysis, radar, and distribution of debris and structural failures were used to estimate the surface winds.

Official NOAA press release of August 21, 2002. Contact: Frank Lepore (Frank.Lepore@noaa.gov or 305-229-4404).

Remembering Andrew

August 24, 2002 marked the 10-year anniversary of Hurricane Andrew's devastating landfall in southern Dade County, Florida. Andrew's powerful winds and rains resulted in damages estimated between 26-30 billion dollars. Andrew destroyed or damaged more than 135,000 homes, temporarily stranded 1.3 million people without electricity, and left 86,000 people jobless. Twenty-three deaths were directly attributed to Andrew, while another 25 lives were lost due to the indirect effects of Andrew. Ten years later, Andrew remains the costliest natural disaster in United States history.

Many AOML staff members lived in south Florida in 1992 when the storm struck. The next few pages are dedicated to their stories, their memories of Andrew.



Hurricane Andrew began as a tropical wave that crossed from the west coast of Africa to the tropical North Atlantic Ocean on August 14, 1992. It became a tropical depression on August 16th. On August 17th, Andrew became the first tropical storm of the 1992 Atlantic hurricane season. By August 22nd, Andrew had reached hurricane strength, becoming the first hurricane of the 1992 season. Andrew continued to intensify and maintained its due west course for the next 2½ days. In the early morning hours of August 24th, Andrew made landfall in southern Dade County, Florida as a powerful category 4+ hurricane.

Hurricane Andrew – Eyes Outside

Robert Kenney, Office of the Director

When Hurricane Andrew struck south Florida, the disaster and its aftermath made national headlines in the media. For weeks afterwards, scenes of the devastation and suffering were broadcast into the living rooms of people thousands of miles removed from the point of landfall. Local newscaster Brian Norcross became, through the phenomenon of tape delay, as familiar to viewers as many network anchors of the period.

Amongst the terrible images were other, braver notes. The courage and fortitude of the inhabitants of the region, struggling out from the wreckage of their homes and neighborhoods to improvise, help one another, defend against marauders, and somehow manage to survive, despite the difficult limitations of the FEMA response, depicted a pioneer resourcefulness and a sense of community rarely found outside of historical accounts. It was all the more surprising in a cosmopolitan urban enclave which, to many Americans then, was composed of a melange of impressions from 1960s jet-set comedies and the then still widely re-run Miami Vice, neither of which helped to dispel a reputation for dilettante beach bums, sneering thugs, and doddering retirees.

For myself, then mired in the decaying ambiance of the San Francisco Bay area, thousands of miles to the west, beset by the congestion, skyrocketing basic costs and increasing alienation in the wake of the Silicon Valley boom, the coverage of the places and people of Miami, their resilience, cultural and social diversity, and indomitable fortitude in the wake of perhaps the most severe natural disaster in living memory, touched a chord. As, no doubt did many others, I determined that, whatever the economic or other costs, the place and people I had seen nightly struggling to rebuild their picturesque city atop the shattered rubble was where I was determined to spend the rest of my life.

It took nearly a decade, and the losses were, and are, considerable, but I have found Miami to be everything I had imagined and more, and after a lifetime spent on several continents, and dozens of countries and states, I can finally refer to somewhere as "home." Thank you, to all of the people who, by their example and determination, showed the rest of the country what built the legacy they share, and turned the flickering phosphors of the television into a beacon in the window, to guide me to where I belonged.

"Life Must Go On..."

Paul Dammann, Ocean Chemistry Division

Broad Channel Drive, before Hurricane Andrew.

Broad Channel Drive lies just one block south of Quail Roost Drive (S.W. 186th Street) on South Dixie Highway (U.S. 1) in the Bel-Aire section of Dade County. On the afternoon of August 23, 1992, this sleepy little community was waiting and watching as the first named storm of the hurricane season was headed our way. Some homes were shuttered in anticipation, some not. Andrew struck in the early morning hours of August 24, 1992. Our house was boarded up with plywood shutters placed inside the recesses of the windows. Inside were my wife Jackie, six months pregnant, my two-year-old daughter Laura, my mother (a native Miamian who had already been through all of the storms that had hit Miami from 1929 through 1949, Hurricane Donna in 1960, and a tornado in 1967), and me.

As the storm approached, the wind blowing through the screen door outside let out an eerie moan. When the northern eyewall of the storm passed over our neighborhood, the force of the wind and water on the front of the house began to bend the top of the front door in. Fortunately, I had a clear head, a hammer, and a box of 20d nails which I quickly used to secure the door into the jamb. As water began flowing under the door, Jackie and my mother began soaking it up with bath towels, wringing the water out in buckets, and pouring it down the bathtub drain. This kept us busy as the eyewall passed over us. Then the wind shifted away from the front of the house and the storm passed. Once the winds had subsided and daylight came, we ventured out.

Broad Channel Drive, after Hurricane Andrew.

Words cannot describe the feelings brought on by seeing your neighborhood ripped apart overnight. Suddenly, the world had changed. The things that you thought were solid and secure were gone. No matter how long it took to rebuild, no matter what you did to restore the buildings and landscape, you would never be the same inside. But standing amid the ruin, one realization came to mind. These were all just things, and things could be replaced. Life must go on.

One of the modern technological conveniences we just cannot seem to live without these days is communication. In the wake of Andrew, telephone lines were down and suddenly we were separated from the world. They say that "necessity is the mother of invention." Perhaps it was by fate that one of the telephone trunks in the neighborhood ran through the backyard of someone who knew how to test for a good connection. Our neighbor down the street spent a little time with his telephone test-set looking for a good pair of wires that were still connected to the phone system. When he found a good pair, it was no time at all before he had a telephone hooked up outside for all the neighborhood to use. People were eager to call loved ones who had heard the news of the storm and let them know they were safe.

The "phone booth."

One little minor technicality was overlooked though. That pair of wires that everyone in the neighborhood was using to call out on was still being billed to the person whose house they were connected to before the storm. The poor sucker whose phone number was being billed for all of those calls was me!

When the phone company finally got the lines back up in September, the neighborhood phone booth was closed. The phone bill we got for the months of August -September 1992 came to about $1500. I had no idea that our neighborhood was so international until I saw calls to Scotland, Spain, Israel, and Turkey, not to mention all of the U.S. cities called, all on my phone bill!

The billing department for BellSouth is located in Arizona. It was comical when the billing agent made the statement to Jackie "But ma'am, our records show that you had no telephone service to your home when those calls were made." Jackie's answer was "That's what I've been telling you. Haven't you been watching the news? We were hit by a hurricane." They dropped the charges.

"Prior to and during Andrew, a group of AOML oceanographers were aboard the *Malcolm Baldrige* participating in a survey of the subtropical western Atlantic. My most vivid memories were of the telephone conversations with my wife [Pat] at $10/minute. It seems that we were getting more frequent updates of the projected storm track than those on shore. In one particular conversation, Pat asked me about '25-40,' as she kept hearing it on the TV and didn't know what the numbers signified. I had to tell her that was the exact latitude of our house on Key Biscayne and that the storm was heading directly at it. We continued talking as the storm got closer (I think the final bill was over $600), and I kept urging her to evacuate. Those of you who know Pat can guess what kind of success I had. She wanted to stay until every last window and door was boarded not only on our house, but on my mother's apartment, her friends' apartments, etc. I did have one piece of good news for her, however, just before she left at about 1 a.m. We received a forecast that indicated the storm was (or had, I don't remember) to take a dog-leg as it crossed the Gulf Stream and would hit farther south (obviously, this was not good news for those who lived to the south). We diverted the ship to San Juan and the Miami contingent got off and got back to Miami some three days after the storm hit. My first faux pas was saying that our house didn't look too bad, to which Pat replied, 'Of course not, I've spent three days cleaning the mud out.' Since then, Pat has not allowed me to leave Miami in the summer without her. She claims since I work for NOAA I knew about Andrew and all future hurricanes." *Robert Molinari, Physical Oceanography Division*

"We had three weeks without electricity. Standing in long lines for ice every day was a major inconvenience. Water pressure was low, but we had natural gas to boil it with, and we could cook. Fresh food was a problem, but we had ample canned foods for five days, after which we drove to Miami Lakes for additional supplies. The storm toppled all of our major trees and removed many shingles, but we suffered no broken windows or other damage other than from water blown under the front door, which stained and mildewed our carpet. No one was injured. We lived in the city of South Miami, so we were fortunate to have been outside the eyewall and the maximum winds that are found there." *Robert Black, Hurricane Research Division*

What's the Big Deal? Andrew!

Gail Derr, Office of the Director

I had lived in Miami for 18 years without experiencing a hurricane. Although there had been a few close calls, there had never been a direct hit. When the news reports began mentioning that Andrew might be headed our way, I wasn't concerned. I was certain the threat was overrated, no big deal, nothing more than another media extravaganza. Surely this storm would change direction and become somebody else's nightmare...didn't they always?

In case I was wrong, however, I took all the necessary precautions to protect my townhome, bought extra emergency supplies, and filled up my gas tank. It was quite a chore getting everything done, and I wondered if Andrew would turn out to be another false alarm.

Within a very short time period, however, it became apparent that Andrew was on a collision course with south Florida. The storm had rapidly intensified and seemed bound and determined to continue its westward movement. There would be no reprieve, no 11th hour miracle, to spare Miami. We were about to be slammed by a category 4+ hurricane and there wasn't anything anybody could do about it.

My father was very ill at the time. I was worried about him and decided to "ride out the storm" with my parents at their home in Perrine. My parents had pulled down the shutters, duct taped the glass doors, and brought in the patio furniture. Together we placed a mattress in the main hallway of the house where we would go when the storm approached. With flashlights, snacks, and a battery-powered radio we waited for Andrew to arrive.

My parents in the driveway of their home in Perrine.

We knew the storm was near when the wind started howling. As the storm grew stronger and closer, blasting gusts of wind shook the house. Soon the house was shaking so violently that I feared it would break apart and blow away. Then the electricity cut off. In darkness and stifling heat, we could do nothing but sit and listen to the shrieking wind. Loud, screeching, booming sounds of things being ripped and wrenched apart, crashing, exploding, and shattering added to the strain and anguish we experienced.

When it was finally over, we went outside. What once was a street with neatly manicured lawns now resembled the chaotic aftermath of a war zone. It was simply amazing! The damage stretched in every direction without relief. Nothing had escaped the wrath of Andrew.

All I wanted was to crawl into bed, sleep, and forget Andrew ever happened. Like it or not, however, our lives had all suddenly turned a page and there was no going back. Andrew obliterated the path.

In a matter of hours we went from a "normal" existence to living with no electricity, no running water, no communication with the outside world, and only limited supplies of food and water. The weather was blistering hot, the lush tropical canopy was gone (every leaf had been stripped away), and the task of having to clean up the damage was overwhelming.

Time, lots of time, is what it took to recover. Ten years later only traces remain of the devastation everyone living in south Florida once endured. Newcomers to the area might not even realize a catastrophe ever occurred. For me, I will never forget that long summer night spent sitting in the dark with my parents as Hurricane Andrew raged all around us and forever changed the course of our lives.

Andrew: Journal Excerpts

David Enfield, Physical Oceanography Division

View of the living room.

Monday, August 24th*: *Circa noon: Returning to our Palmetto Bay house from the storm shelter. Judging from last night's news reports, the north eyewall must have gone over the house. How did it fare? Whew…what a night! You think you're better off at a shelter than in your house, but is that the case when the wind lifts the roof off and sends 1,500 souls scurrying in the night looking for a makeshift bunker? On the other hand, if our house is as badly trashed as these streets…My God! What a huge puddle, and a downed electric wire right in the middle of it. Okay, let's go back and look for another way…

One hour later: Almost there, I think. Is this Galloway? I'm not sure, there aren't any street signs and it's almost unrecognizable! No, wait, yes, this is it, but shouldn't we be seeing the tall Norfolk pine in front of the house from here? If not, then…no, don't even think about it! Can't see the house yet…should be just around the corner but we're going to have to stop here and hoof it past that downed power line that's blocking our street. The right front tire went flat! Thank God it got us this far.

First view of the house: Gees…guess that's why we didn't see the pine, huh? At least it didn't crash down on the roof, but looks like it got close enough to bash in the storm panels on the living room window. Yeah, roof's gone off the front, sheathing and all; wind probably got in through the living room. Garage door bashed in on Don's car; roof gone there too. And what the hell, took out those designer blocks on the front lattice? Shouldn't be a problem to get in, I guess, the front doors to the Florida room are completely gone!

View of the patio and back yard.

Entering the house: Wow! Look at that piece of plywood stuck in the front door frame! And really stuck, I can't budge it. Oh, man! Look at the patio! There are the front doors; almost wound up in the pool along with all that other junk. Okay, wait…here on the right, the sliding glass door to the living room is gone, completely broken. How could that happen? The wind wasn't even coming from this direction. And look at that mess in the living room! Oh, God…forget it, the furniture is history: all the roof insulation came down on it, just one huge soggy mess, and three inches of rainwater on the floor. Nena, look, don't cry, the ceramic clown is still standing on the desk in the corner! He should be in a thousand pieces…seems to be laughing about it all. Maybe we should too.

Wednesday, August 26th*: *Mid-morning: Warren, Michelle and two other guys from the lab [AOML] showed up in a government van with lots of useful goodies. Water, for sure… there's just a trickle from the tap and we can't trust drinking it anyway. And batteries, visquine to cover the roof, nails, tar paper… What a Godsend, the closest Home Depot open must be in North Miami Beach.

Saturday, August 29th*: *Noonish: The kids came down today to help with the cleanup. We've both been in a complete funk because the magnitude of this looks impossible to deal with. I'm totally depressed about it, I can't get up the enthusiasm to do anything. Maybe we should just punt the whole thing and move into a hotel, let State Farm deal with it. Anyway, it felt good to start doing some significant cleanup. We started with the pool–no, the "Black Lagoon"! Makeshift pump arrangement to get the eutrophied water out. Making a debris pile in front of the house for eventual trash pickup. The back yard will take days, first I've got to buck up the tree trunks with the chain saw, cart them out to the trash pile, then start to remove the roof tiles and other shards that are all over the landscape. Only then – maybe – I can start to think about mowing it.

Cleaning the "Black Lagoon."

Sunday, August 30th*: *Mid-morning: Our good friend Alfonso came over today to check on us after dealing with his own mess. He said "Dave, we have to do something about your roof, the weather forecasters are saying this dry spell is going to end." I'd been in denial about the roof, didn't really want to deal with it. But he was right, and he got me out of my funk. We scrounged the neighborhood and found enough plywood panels to re-cover the gaping holes, removed the old nails, and then put a makeshift covering of AOML's tarpaper and visquine on top. None too soon because it rained like hell last night. Having done that and starting with the cleanup has put us in a new frame of mind. I now actually believe we can do this. No hotel. Let's just camp out here and take care of our house and ourselves for whatever time it takes.

In the Eye

Michael Shoemaker, Ocean Chemistry Division

Front view of my Mother's home in Naranja Lakes.

The afternoon before Andrew made landfall, I helped prepare three buildings to hopefully withstand the onslaught of a hurricane: the AOML facility, my home near Coconut Grove, and my mother's house just west of Homestead Air Force Base in Naranja Lakes. Because of my occupation as an electronics technician with the Ocean Chemistry Division, I was also preparing my home for an extended three-month absence due to an upcoming oceanographic cruise. Needless to say, I had no provisions or hurricane supplies. I decided to weather the hurricane at my mother's house in Naranja Lakes; her condominium is barely a quarter of a mile inside of the flood zone east of U.S. 1.

At about 3:30 a.m., the wind and rain noises from outside were becoming extremely loud, and my mother and I decided it would be prudent to move to the center hallway of the house. Immediately after we were setup in the hall, the electricity went out. We sat with two flashlights, one battery-operated radio, and a gallon thermos of coffee. At about 4:25 a.m., my mother and I began to feel a slight vibration or rumbling from the walls we were leaning against. As the rumbling became audible, I heard a loud ripping noise coming from the kitchen area. I crawled towards the kitchen with a flashlight looking for the source. The corner of the ceiling that abuts the firewall between my mother's condo and the neighbor's was lifting and tearing from the interior wall. I yelled for my mother to get into the bathroom. I scuttled there just in time to lie down atop my mother before hearing explosive and successive snapping sounds and felt debris fall on my lower back and legs.

Close-up view of the front entrance.

As we lay there, my mother repeatedly asked when the eye of the hurricane was coming. I reassured her it would be just a few more minutes. During this time, I was able to look over my shoulder and ascertain that the debris that had fallen on me was mostly dry wall material and insulation. At about 4:50 a.m., the wind seemed to be diminishing. I risked rolling over to look up and see what kind of damage there was. The sight that greeted me was truly awe-inspiring: the roof was totally gone and the bathroom wall above me was swinging unsupported from the top. But the most amazing sight was to be able to see the inside of the hurricane's eyewall with this churning mass of clouds lit from half of the sky full of stars. It almost seemed as bright as twilight.

When I was fully satisfied that the wind had died down sufficiently to be safe, I said to my mother "Let's get the hell out of here!" We stood up and started to negotiate our way down the hall towards the front door, only to be blocked by a grandfather clock embedded in the wall. I levered the clock out of the way, and we entered the foyer. We were greeted by what seemed to have been an explosion: furniture strewn about, wall decorations smashed, and the entire front wall of the house lying in the living room supported by the crushed baby grand piano. Amazingly, the wrought iron security door was still standing but the front door was down, partially supported by broken furniture. My mother and I used the front door as a springboard to climb up on the fallen exterior wall and slide down it to get outside.

View of the kitchen.

Directly across the courtyard was an identical set of condos that had part of the east roof missing but all of the exterior walls still standing. The second condo on the west end of the building was rented by an Air Force Sergeant and his family who were friends of my mother. We ran directly over and knocked on the door. My mother and I soon learned that we were not the only ones seeking refuge at Carl's house. There were at least 10 people already in his bathroom, and Carl had his family in the central hallway under an oak table carried there from the kitchen. That left the living room to my mother and me. We opened Carl's fold-out sofa bed and placed the foot of the bed against an interior living room wall; the sofa back faced the sliding glass doors.

At or about 5:15 a.m., we were all in our protected positions when the back side of the storm slammed into the condo and blew the south facing front door off of its hinges and into the kitchen. As my mother and I lay underneath the sofa bed, she said, "I think we're losing our second roof of the night Michael." I replied, "Just keep your head down Mom."

My next recollection is opening my eyes to dawn and lying on a rain-soaked carpet while my mother chuckles about how tired I must be because of my snoring. It took us three days to dig out the cars and repair all the flat tires so that my mother and I could drive to my home in Coconut Grove, all the while trying to feed, water, and shelter the 15-odd survivors in my Mother's courtyard...but that's another story.

It's a Boy!

Dr. Molly Baringer, oceanographer with AOML's Physical Oceanography Division, gave birth to her second child, a son, John Warner O'Neil Baringer, on July 12, 2002. Mother and son are doing well.

Congratulations

Silvia Garzoli, Director of AOML's Physical Oceanography Division, was elected to serve as a member of the Scientific Advisory Committee (SAC) of the Inter-American Institute for Global Change Research. Dr. Garzoli's three-year term with the SAC began in June 2002.

Ramon Hurlockdick, computer specialist with the Administrative Group of the Office of the Director, received a M.S degree in Management Information Systems from Florida International University in June 2002.

Sonia Otero, a CIMAS associate with the Hurricane Research Division, received a M.S. degree in Computer Science from Florida International University in July 2002.

Diversity Seminars

China and Taiwan

July 30, 2002
12 Noon

Judy Gray, Qi Yao,
Jia-Zhong Zhang,
and Tsung-Hung Peng

Travels in Ecuador

August 15, 2002
12 Noon

David Enfield

First-floor Conference Room

Welcome Aboard

Christopher Meinen joins the staff of the Physical Oceanography Division as a CIMAS assistant scientist. Meinen received a doctoral degree in physical oceanography from the University of Rhode Island and has served as a post-doc with Dr. Michael McPhaden at NOAA's Pacific Marine Environmental Laboratory in Seattle, Washington. For the past year, he worked as an affiliate researcher at the University of Hawaii. His main research interests relate to observational oceanographic studies of large-scale ocean circulations and the impact of the oceans on climate.

Happenings

Erica Van Coverden, outreach coordinator with AOML's Office of the Director, participated as an instructor in the Presidential Classroom Media and Democracy Program in Washington, D.C. on June 15-22, 2002. Erica was selected from a competitive pool of applicants and joined 11 other volunteer instructors to help prepare high school juniors and seniors for responsible citizenship.

Presidential Classroom volunteer instructors. Erica Van Coverden appears second from the left in the back row.

Discussion and debate centered on a framework of issues related to the federal government, Washington culture, and democracy. Instructors also facilitated group discussions on topics such as juvenile justice, human rights, and the role of the media in the political process.The Presidential Classroom is a nonprofit, nonpartisan civics education organization in its 35th year. More than 100,000 top high school students from the United States and abroad have participated in its programs.

David Palmer, physicist with the Ocean Chemistry Division, recently made an invited presentation to Miami-Dade County school teachers and counselors at the Marjory Stoneman Douglas Biscayne Nature Center on Key Biscayne. The Center is dedicated to promoting environmental education and encourages citizen participation in protecting south Florida's unique natural environment. Dr. Palmer's presentation was entitled "The effects of underwater sound on cetaceans."

Farewell

Anjali Sardeshmuchk, a University of Miami student and technician with the Ocean Chemistry Division, departed AOML on August 10, 2002 after serving three years as a laboratory assistant for Dr. Kelly Goodwin. Anjali has traveled to northern India where she will perform community service for the period of a year.

The Hurricane Research Division had a retreat in August to discuss and formulate future directions for research. Here is their first attempt at self-description:

The Hurricane Research Division's Unofficial Mission Statement:

We are the rowdiest bunch of hurricane flyin', sonde droppin', chili pepper eatin', doppler unfoldin', surface wind analyzin', precipitation particle imagin', hoop shootin', boundary layer probin', geriatric computer resuscitatin', BT launchin', Saharan Air Layer delimitin', article writin', Oktoberween festin', hurricane season forecastin', air sea interactin', travel arrangin', conference goin', tropical precipitation ground truthin', rabid raccoon feedin', dirt poor, FTP slot starvin' loose cannons that you EVER SAW!! ...**Hoooyaaaahh!**

Travel

David Enfield attended the Southeast Regional Fire and Climate Workshop in St. Petersburg, Florida on June 25-27, 2002.

Robert Molinari attended a meeting of the Atlantic Panel of the International CLIVAR Program in Bermuda on July 10-12, 2002. He also attended a Climate Observing Systems Council meeting of NOAA's Office of Global Programs in Washington, D.C. on July 29-30, 2002.

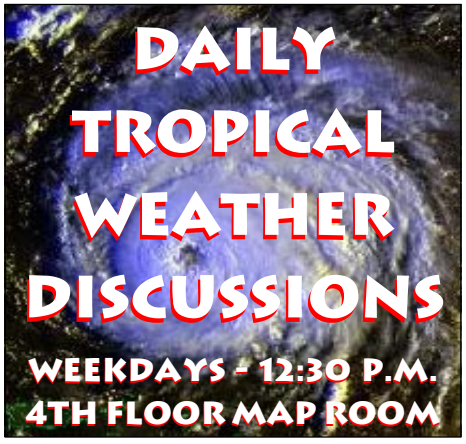
Joyce Berkeley, Gloria Lockett, Judy Gray, Reyna Sabina, and Sandy Taylor attended the Federally Employed Women's 33rd National Training Program in Orlando, Florida on July 22-26, 2002.

Kelly Goodwin participated in the visiting scientist program aboard the Royal Caribbean Cruise Lines ship *Explorer of the Seas* on August 3-10, 2002.

Maria Bello, Monika Gurnee, Robert Kohler, Alejandra Lorenzo, and Joaquin Trinanes attended the Office of Oceanic and Atmospheric Research's Webshop 2002 Conference in Longmont, Colorado on August 5-9, 2002.

Kristina Katsaros presented a series of lectures about satellite remote sensing at the Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (CICESE) in Ensenada, Mexico on August 6-9, 2002.

Silvia Garzoli, Gustavo Goni, Robert Molinari, and Derrick Snowden attended the CLIVAR-sponsored Workshop on Circulation and Variability of the Tropical Atlantic in Kiel, Germany on August 19-22, 2002.



Project INSTAR Students Study Tropical Meteorology

Approximately 50 Miami-Dade County science teachers participated in the fifth successful year of Project INSTAR (Investigating Nature through Science Teacher Active Research). The intensive, eight-day teacher development course, taught by scientists from the University of Miami's Rosenstiel School and AOML, enhanced teacher knowledge and understanding of marine and atmospheric science through a series of lectures, laboratory exercises, and field trips. Through involvement in Project INSTAR, teachers become more knowledgeable, enthusiastic, and better prepared to convey the basic concepts of science to their students, ultimately inspiring them to greater academic achievement.

Project INSTAR 2002 Tropical Meteorology Instructional Staff: Mark Tohulka, Shirley Murillo, Erica Key, and Evan Forde.

For the second consecutive year, the Project INSTAR curriculum included a tropical meteorology theme, co-developed and instructed by AOML oceanographer Evan Forde and Shirley Murillo, a meteorologist with AOML's Hurricane Research Division (HRD). The instructional staff also included Mark Tohulka, a nationally certified and award-winning teacher from the MAST Academy, and Erica Key, a Ph.D. candidate at the Rosenstiel School's Division of Meteorology and Physical Oceanography.

Students were introduced to basic meteorological principles, the dynamics of tropical weather systems, the role of the tropics in general atmospheric circulation, and the impact of weather upon coastal communities such as South Florida. Guest lectures presented by several HRD meteorologists capitalized on the wealth of expertise at AOML. "We are blessed to have some of the world's best and most enthusiastic hurricane research scientists right here at AOML. Guest lectures by recognized experts help makes the tropical meteorology theme unique," said Evan Forde.

Students also participated in weather forecasting, satellite weather imaging, and computer hurricane modeling training sessions. Field trips included visits to the National Hurricane Center, the Miami National Weather Service office, and a two-hour session with Roland Steadham (a local NBC television station meteorologist). Upon successful completion of course requirements, INSTAR students receive three graduate-level credits from the University of Miami.

Murillo and Forde, both native Miamians and products of the Miami-Dade County public school system, are regular participants in numerous community outreach and educational activities. They are enthusiastic promoters of science education and NOAA research in the south Florida community.

An eight-foot crocodile was sited in the mangrove that surrounds AOML on the afternoon of August 22nd. There have been no further sitings and, fortunately, no close encounters of the reptilean kind.

View *Keynotes* online: http://www.aoml.noaa.gov/keynotes

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