



SHORELINES – July 2008

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The 2008 Hurricane Season

Ah.....it's that time of year again. You're thinking summer – right? Well not really; June 1st actually ushered in the often dreaded annual Hurricane Season, which will continue to run through November 30th.

Most experts agree the Atlantic Ocean basin is in the middle of a trend of heightened tropical cyclone activity, regardless of the root causes. Warming climate and seas may help produce larger numbers and more intense hurricanes over the next several years but the jury is really still out concerning these relationships. As of now, it appears there *may* be a positive corollary between global warming and the *intensity* of storms – the relationship between the *number (frequency)* of storms and warming climate appears to be further away from any type of consensus.

Regardless, it's important to remember that a **tropical cyclone** is a warm-core, atmospheric closed circulation rotating counter-clockwise in the Northern Hemisphere (that's us) and clockwise in the Southern Hemisphere. A tropical cyclone becomes a **tropical storm** when the maximum sustained surface wind speed ranges from 39 mph to 73 mph using the U.S. 1-minute average, and a **hurricane** is designated when the cyclone reaches a maximum sustained surface wind of 74 mph or more.

Also, most of us are familiar with the Saffir Simpson scale, which includes a 1 to 5 rating based upon wind speeds, again utilizing the U.S. 1-minute average. A category 1 hurricane has winds ranging from 74 to 95 miles per hour (mph), category 2 ranges from 96 to 100 mph, category 3 ranges from 111 to 130 mph, category 4 ranges from 131 to 155 mph, and a category 5 hurricane has sustained winds exceeding 155 mph. Category 3 or higher is classified as a major hurricane. Interestingly only three category 5 hurricanes have actually made a landfall in the U.S. – the Labor Day hurricane of 1935, *Camille* (1969), and *Andrew* (1992).

Before we dive into this year's hurricane season predictions, one important factor to discuss is the impacts of the *El Niño* Southern Oscillation (ENSO) that occur in the Pacific Ocean basin. ENSO "warm phase" or *El Niño* occurs once every 2 to 7 years and generally produces atmospheric conditions that suppress the formation of tropical cyclones in the Atlantic. Interestingly, the term "*El Niño*" means Little Boy or Christ Child, which was coined by South American fishermen noting the appearance of unusually warm water in the Pacific Ocean occurring near Christmas. As you may have guessed by now, "*La Niña*" (the girl child) is the "cold phase" of ENSO and tends to produce atmospheric conditions more favorable for tropical cyclone development. Traditionally, ENSO cycles are determined empirically based upon the difference in surface air pressure between Tahiti and Darwin, Australia. Currently, we are in a *La Niña* phase but this is predicted to weaken into a neutral condition in the next month or two (i.e., ENSO neutral – neither *La Niña* nor *El Niño*).



Also, there is also some rather new research also being conducted linking African dust levels in the atmosphere to tropical cyclone activity (more dust equals less storm development) but ENSO almost certainly has a larger imprint.

So what can we expect this year? My personal preference is to review the predictions produced by groups that make not just their prediction public, but verify their prediction skill in the public arena as well. This really leaves us with two groups - the Tropical Meteorology Project at Colorado State University, and the University College London, U.K. for Tropical Storm Risk. We'll add the National Oceanic & Atmospheric Administration (NOAA) to the mix because this is our Federal voice for climatology/meteorology matters. We then take these groups' last prediction as the hurricane season starts on June 1st and begin to crunch the numbers. As the accompanying prediction summary chart indicates, we could expect 15 total cyclones, 8 of which will generate into hurricanes, with 4 of these becoming major hurricanes (on average).

	NOAA (max.)	Colorado State University, US	University College London, UK	Average of Predictions	Average (1950- 2000)
Total No. of Named Tropical Cyclones	16	15	14	15	10
Tropical Storms	7	7	7	7	4
Hurricanes / Major	9/5	8/4	7/3	8/4	6/2
Accumulated Cyclone Energy (ACE) Index	160	150	131	147	96

Fig. 1 - Summary comparing publicly available pre-season predictions for the 2008 Hurricane Season with average activity.

One term we haven't discussed that appears on the prediction chart is the *Accumulated Cyclone Energy Index (ACE Index)*, which is simply a measurement taking a storm's wind speed strength for each 6-hour period of its existence into account. The larger the ACE Index value, the more active the season. This is actually one of the more revealing parameters in my humble opinion (and others) and likely serves as a better barometer of whether or not a hurricane season is truly "active" or not. Last year (2007) is a perfect example.

We had 5 more tropical cyclones than average, but most of the cyclones were very short-lived or rather weak, with the exception of two category 5 hurricanes that impacted Central America. The mood for most of Atlantic and Gulf States was that the hurricane season was very benign. The ACE Index for 2007 was 68 – the average is 96. The 2006, 2005, 2004, and 2003 Index figures were 79, 248 (highest on record), 225, and 175, respectively. This numbers are very consistent with the actual hurricane activity we had these years. For 2008, the average predicted ACE Index is 147. Again, 96 is considered as average.

Obviously, tropical cyclone forecasting can sometimes be as much of an art form as an applied science with *El Niño* conditions, local and regional weather patterns, sea surface temperatures, and a host of other variables complicating an expert's predictive capacity.



And finally, just remember that the predictions summarized this month reflect the proposed activity and intensity of the 2008 hurricane season, but in no way represent any type of landfall probabilities. As we all know, it only takes one cyclone to make or break a hurricane season, with 1992 being a perfect example – 7 named cyclones, 4 of which were hurricanes, with one of those classified as major, and a ACE index value of 75. Sounds like a very quiet year, except the one major hurricane was *Andrew*, which struck Florida and was the costliest natural disaster in U.S. history until *Katrina* in 2005.