

# Climate-Related Disaster Diplomacy: A US-Cuban Case Study\*

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*This article traces the history of climate-related cooperation between the US and Cuba as a possible example of disaster diplomacy. It identifies and analyses the areas of present interactions and conflicts, as well as potential diplomatically-sanctioned cooperation between the two countries, with particular respect to the ENSO cycle (El Niño-Southern Oscillation cycle, which incorporates El Niño and La Niña), and the extreme meteorological events that it spawns. Currently, US and Cuban government disaster collaboration is limited to the hurricane season and to monitoring and forecasting the development of storms in the tropical Atlantic. Based on careful examination of extensive empirical material, the article concludes that while disaster diplomacy may be successful in some regions, it has little chance of success in the US-Cuban context in the absence of a rapprochement between the leaders of these two political systems.*

You don't need a weather man  
To know which way the wind blows

SUBTERRANEAN HOMESICK BLUES  
(Bob Dylan)

The idea behind the notion of 'disaster diplomacy' is to identify areas of diplomatic cooperation that might result between national governments in conflict from concern about natural disasters. Governments have no hesitation to respond to the pleas for assistance from governments with which they have good diplomatic relations. The picture changes, however, when a natural disaster affects a government which has hateful (*odioso*, in Spanish) relations with another government, as in the US-Cuba situation. The reality of providing any kind of disaster assistance in such a situation must overcome many obstacles, mostly political.

This paper seeks to analyse the existing forms of cooperation between the US and Cuba with respect to the ENSO cycle (El Niño-Southern Oscillation cycle which incorporates El Niño and La Niña) and the concomitant extreme meteorological events. However, in light of troubled, or even hostile, bilateral relations, the potential of disaster cooperation spilling over to a broader political understanding seems quite remote.

According to the *Oxford Dictionary*, diplomacy is 'the management of international relations by negotiation'. One can also refer to 'public diplomacy' which deals with 'dimensions of international relations beyond traditional diplomacy,' for example, 'the interaction of private groups and interests in one country with those of another country'.<sup>1</sup> In this paper, diplomacy is defined in the traditional sense as the official interactions (i.e., negotiations) between government representatives.<sup>2</sup>

## I. Defining 'Disaster Diplomacy'

According to the traditional definition of diplomacy, one can distinguish between disaster diplomacy and disaster-related cooperation. One can pursue the latter in the absence of the former. Disaster-related international cooperation can take various forms: direct involvement with government personnel helping their counterparts in the affected country to cope with the disaster's impacts during the emergency phase as well as in the post-disaster recovery, reconstruction, and transformation phases. It could also take the form of indirect assistance by a government sending funds or equipment, or just verbal offers of sympathy for the victims directly or through the media or a third party such as another government or a non-governmental organisation.

There are different levels of interaction: government to government, government agency to government agency (e.g., the National Hurricane Center (NHC) in the US and the National Meteorological Institute or Instituto de Meteorología (INSMET) in Cuba), group to group, and scientist to scientist. There are also different areas of interactions when it comes to El Niño and La Niña: monitoring, forecasting, impacts, recovery from adverse impacts, and research. Interactions could be direct or indirect, official or unofficial, and formal or informal. They could relate to El Niño, La Niña, hurricane seasons, or a specific tropical cyclone. There are regional and global organisations related to ENSO, hurricanes, and climate in general, which provide a venue where people from these two countries can interact.

## II. Natural hazards threatening the US and Cuba

### Tropical cyclones

The most significant natural hazard faced by both countries at the same time is the tropical cyclone in the Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico. Some storms develop into full-blown devastating hurricanes.<sup>3</sup> Not every hurricane that affects Cuba makes landfall on the US mainland, and vice versa. However, when Cuba is affected by such storms, the American territories of Puerto

Rico and the Virgin Islands are often affected to some degree. A subset of hurricanes that do form become 'shared' hazards. For example, in 1998 Hurricane Georges wrought heavy damage in Puerto Rico (on the order of a few billion dollars) and the Virgin Islands. After ravaging Cuba, it made landfall on the US Gulf coast from Louisiana to Florida as shown in Figure 1 indicating that it was a truly 'shared' hurricane.

Both the US and Cuba have long been aware of the threat of hurricanes. Reports about their devastating impacts go back at least a few centuries. They recognise that there is an officially defined 'hurricane season' from May to November. Records for hurricane seasons in the region are based on direct observations and on proxy (indirect) records as one goes back in time. The naming of hurricanes began in 1950, making it easier for record-keepers to keep track of their characteristics and their impacts.

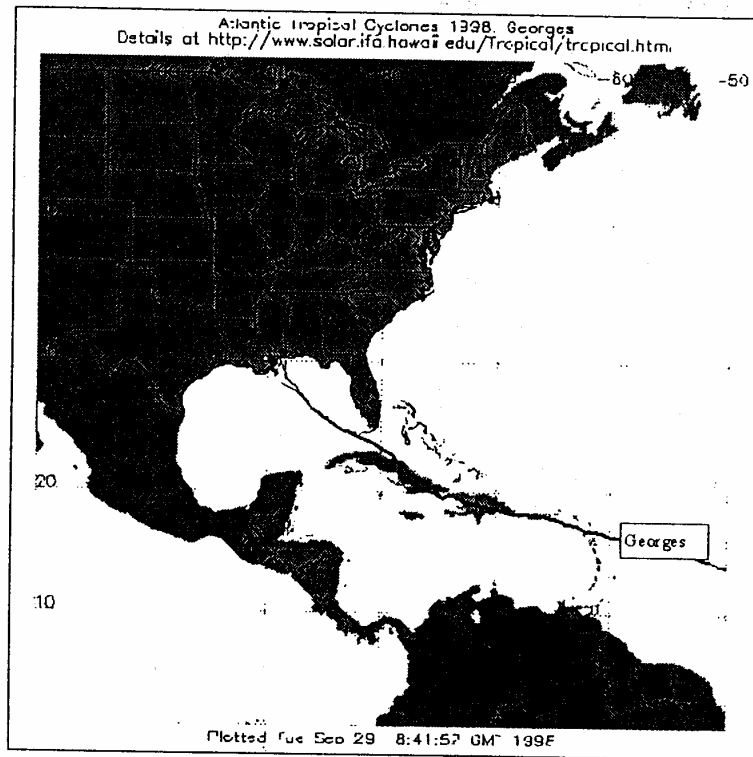


FIGURE 1: HURRICANE GEORGES' TRACK OVER CUBE AND HEADING TOWARDS THE US (adapted from [www.fema.gov/Im98/at10929.gif](http://www.fema.gov/Im98/at10929.gif))

### *El Niño-Southern Oscillation (ENSO) cycle*

The ENSO cycle encompasses the warm extreme (called El Niño), the cold extreme (called La Niña), and a range that can be defined as average (called normal). During La Niña, there is a pool of warm water in the western equatorial Pacific Ocean (called the 'warm pool') around Papua New Guinea, Australia, and the Philippines. Westward-flowing winds tend to push water from the eastern to the western Pacific basin. As a result, the sea level is higher in the west than in the east during La Niña. The central and eastern equatorial Pacific are dominated by cold water brought to the ocean surface by an oceanic process known as coastal upwelling. These cold, upwelled waters are rich in nutrients that are consumed by the lower levels of the marine food chain. Countries in the western Pacific receive their heavy rains, while those on the eastern side are rainless and arid. Many people consider La Niña as well as average conditions to be what they expect for their climate conditions, i.e., 'normal'.

Every four and a half years on average (but anywhere between two and ten years), El Niño episodes return. The winds that blow off the western coast of South America, westward along the equator, weaken. There is an invasion of warm water into the central and eastern equatorial Pacific, while the warm pool in the west cools. The rain-bearing cloud systems in the western part of the Pacific Basin follow the warm water into the central and eastern Pacific. As a result of the eastward shift in convective activity, droughts and forest and bush fires occur in Australia, Malaysia, and Indonesia, whereas the normally arid coast of western South America (e.g., southern Ecuador and northern Peru) is subjected to devastating flood-producing rains. The climates of different regions around the globe are often affected by climate anomalies with dry areas becoming wet and wet areas becoming dry. El Niño reduces the number of hurricanes in the tropical Atlantic and increases the number and changes the locations of cyclones (typhoons) in the Pacific.

### *ENSO-hurricane connection*

There is a statistically significant relationship between El Niño events and a below-average number of hurricanes in the tropical Atlantic. There is also a statistically significant increase in the number of hurricanes during La Niña events.<sup>4</sup> As suggested in Figure 2, the winds aloft during El Niño events tend to shear off the tops of convective cloud systems and, as a result, the tropical storms are unable to develop into hurricane systems.

During a La Niña event, the winds aloft allow for the formation of organised convective storm systems. Hence, forecasting El Niño and La Niña events can provide hurricane-prone countries with the earliest possible warning of devastating ENSO- and hurricane-related impacts on ecosystems and societies. They no longer have to wait until the middle of the hurricane season to determine the likelihood for an above- or below-average number of hurricanes. Decision-makers can use ENSO information to decide how best to prepare for the projected intensity of the hurricane season.

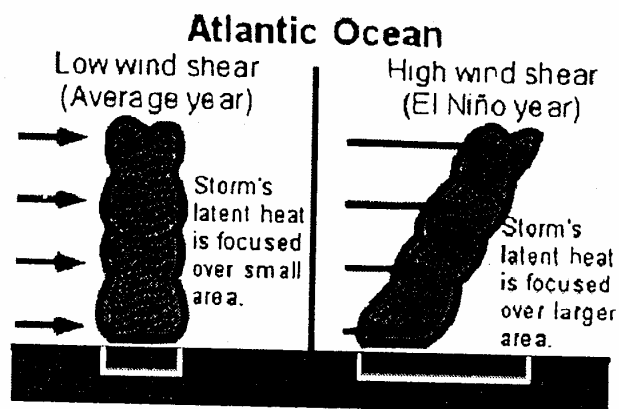


FIGURE 2: EFFECT OF EL NIÑO ON WIND SHEAR  
(adapted from [ww20lo.atmos.nino.edu/\(Gh\)/guides/mtr/hurr/enso.rximt](http://ww20lo.atmos.nino.edu/(Gh)/guides/mtr/hurr/enso.rximt))

El Niño and La Niña each spawn their own types of climate-related hazards in both the US and Cuba, only 145 km (90 miles) to the south. A major difference, however, is that the US economy provides considerable resources for the recovery from disastrous impacts such as landfall of a hurricane, e.g., Andrew in 1992 or Hugo in 1989. The Cuban economy, however, is considerably strained - in part as a result of the US embargo and in part as a result of the Cuban economic system - and is more likely to have to request assistance from the international community in the face of climate-related problems, such as hurricanes or droughts, as was the case in 1998.

As noted earlier, during El Niño events there tends to be fewer hurricanes in the tropical Atlantic, according to the records of the 20<sup>th</sup> century. However, this does not mean that there cannot be a 'blockbuster' hurricane that generates severe damage to life and property during an El Niño, as happened with Hurricane Andrew in August 1992 during ENSO's normal phase, or as happened with Hurricane Georges in 1998.

Cuban researchers know how ENSO's extremes can affect society and ecosystems in their country. For example, during El Niño events there is less rainfall and higher air temperatures in the normal rainy season (May to October). Droughts and floods may occur in different parts of the country at the same time and, as noted earlier, there is reduced hurricane activity. During the dry season (November to April), rainfall increases two to three times the average in some locations, adversely affecting weather-sensitive crops such as sugar cane. Also in this period, there are extremely strong winds, intense rains, hail storms, tornadoes, and coastal inundation. There is also an increase in non-infectious diseases and in acute respiratory illnesses. According to a report by INSMET, during El Niño events Cuba

has registered its most devastating meteorological events in its history.<sup>5</sup> The report also noted that during cold events (i.e., La Niña) there are adverse impacts such as 'the reduction in the amount of rainfall in the winter season and the increase in cyclonic activity in the typical hurricane season.'<sup>6</sup>

With regard to the US, El Niño often brings heavy rains in wintertime to southern California, dry conditions to the Pacific Northwest, a wet southeast, a warm northeast, and a reduced frequency of Atlantic hurricanes in the summer. La Niña, in general, has been associated with a cold and wet northern tier and a warm and dry southern tier of North America. As with Cuba, the US also benefits from a less threatening hurricane season during El Niño. Society in the US is only now taking the forecast of the possible impacts of El Niño or La Niña more seriously as a result of the devastating impacts of the 1997-98 event in the US.<sup>7</sup>

### III. Evolution of US-Cuba relations related to climate hazards

The interactions between Cuba and the US with respect to hurricanes go back more than a century. In fact, Cuban researchers were once ahead of their American counterparts with regard to research on hurricanes and their landfall. As early as the 1870s, Cuban Jesuit priest Padre Benito Viñes began to earn his stature as a meteorologist for his articles in the American journal *Monthly Weather Review*.<sup>8</sup> The US even developed a network to monitor severe storms similar to that established by Viñes.<sup>9</sup>

A notable conflict of scientific views between the US and Cuba about the characteristics of a specific storm resulted in the deadliest hurricane ever to hit the US, in 1900 at Galveston, Texas. The US forecaster in Havana disagreed with the Cuban forecaster who believed that the US mainland was in danger of landfall of this major storm. The American's view prevailed and no warning was issued. On September 8, Galveston was destroyed. This deadly storm was a major example of the need for cooperation between these countries as opposed to conflict based on rivalry.<sup>10</sup>

Much has changed during the past 100 years. The political relations between the US and Cuban governments have gone from bad to worse, ever since Fidel Castro overthrew the Batista government and took power in January 1959. Since that time, the relationship has been stormy. The US backed the unsuccessful Bay of Pigs invasion by Cuban exiles in mid-April 1961, and the Soviet Union attempted to place medium-range ballistic missiles on Cuban soil in 1962. Attempts to improve relations have been on again, off again, sidelined by ideological and political differences throughout the Cold War. US policy toward Cuba has been heavily subjected to domestic political activities. Cuban exiles and refugees in southern Florida have become an effective anti-Castro lobby group. Cuban policy toward the US has been the result of Castro's distrust of US leaders and Castro's desire to export the Cuban revolution to other countries in Latin America and later in sub-Saharan Africa or, as Castro might phrase it, the Cuban support of revolutions in other countries. Many people within and outside of Cuba believe that the exiles in Miami have had an inordinate influence on US policy toward Cuba. They also believe, as I

do, that whenever there appeared to be a chance for rapprochement between the countries, Castro would manufacture a political crisis with his neighbour to the north to bring to an end any improvement in relations.

Today, there are three basic laws in the US that greatly restrict interactions with Cuba: the 1960 embargo on trade with Cuba, the 1992 Cuba Democracy Act to influence the behaviour of American allies toward Cuba, and the 1996 Helms-Burton Act, also referred to as the Cuban Liberty Act or the Democratic Solidarity Act. President Clinton signed this Act into law in mid-March 1996, primarily in order to discourage foreign investment in expropriated properties in Cuba.

In the last half of the 1990s, President Clinton has sought to allow increased interactions between individuals and groups in the US and in Cuba through public diplomacy. He has called for more scientific exchanges to take place between the countries, now allows any American (not just Cuban-Americans) to send money to Cuban citizens, and permits additional flights to Cuba from different US cities. In June 2000, the US Congress approved limited food and medical shipments to Cuba, a major breakthrough for those opposed to the US sanctions.<sup>11</sup> Despite these promising changes, it is still rather difficult for Americans to travel officially to Cuba and for Cubans to travel to the US.

Today, the US, Central America, and Caribbean countries gear up for the hurricane season. While it is not at all certain that major storms will develop or make landfall in any of these countries, the possibility always exists. The hurricane centres in those countries monitor conditions in the tropical Atlantic region, designated as Region IV by the World Meteorological Organization (WMO), a United Nations (UN) agency, in order to monitor tropical storm development. Interactions on this time scale - the hurricane season - is of a routine and generalised nature. When a tropical storm appears to have taken on threatening characteristics (direction, intensity), they monitor conditions more intensively. Satellites monitor the climate system, tropical storms, and other weather events. Forecasts are issued on different time scales and are readily available in real time on the radio, television, and the Internet.

When it comes to forecasting, monitoring, and early warning related to specific hurricanes, these countries work together. When it comes to providing early warning on hurricanes, or a hurricane season, or on El Niño or La Niña, there are not many secrets held by either of the countries. What might not be shared with other countries is information about the ways that data had been collected or the extent of damage that the ENSO warm or cold extreme caused.

The Internet, however, is a new communications tool that will have a tendency, over time, to level the playing field in terms of the types and timing of scientific and other information that governments might be able to tap for domestic policy-making needs. Thus, information of the type that existed in relatively hard-to-get printed form (e.g., reports referred to as 'grey literature') or on magnetic tape can now be found on the Internet. While officially, it might have taken a very long time, if ever, to meet an official request of a Cuban government agency to the US Government's National Oceanic and Atmospheric Administration (NOAA) for information related to ENSO or forecasts of ENSO, such information is now readily

available in real time for those in Cuba who have access to the Internet. The Internet is a place to exchange as much scientific information and data that a government is willing to share openly. Thus, anything that NOAA puts on the Internet goes to Cuba. The same is true for disaster-related information from other US agencies such as the Federal Emergency Management Agency (FEMA) and the US Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA). Thus, from the US side, scores of websites are focused on climate and weather in general and ENSO and hurricanes in particular.<sup>12</sup>

Perusing the Internet, one finds a few websites that discuss Cuban weather and climate either in real time,<sup>13</sup> or in terms of research findings.<sup>14</sup> For example, a recent issue of the society's bulletin carried specific articles on El Niño and on hurricanes.<sup>15</sup> However, it is important to note that there is a big disparity between these two countries with respect to citizen access to the Internet. While a large percentage of the US population has access to the Internet, the comparable percentage of the Cuban population is extremely small, because access to the Internet is restricted and, for the most part, controlled by the government for political reasons.

There is US support for expanding Internet access in Cuba. In a recent speech, the US Coordinator for Cuban Affairs Charles Shapiro underscored the importance of expanding Internet connectivity with Cuba. He noted that the US is 'studying the legality of a private sector initiative to lay a fibre optic cable across the Florida Straits that would provide greater Internet service to Cuba'.<sup>16</sup> Of course, this would not necessarily alter the Cuban government's restrictions on access to the Internet.

#### *IV. Aspects of US-Cuban cooperation related to climate disasters*

One way to bring some order to the various climate-related interactions between these countries is to rely on levels of social organisation: *government, individual, group, and international*. These categories are not necessarily mutually exclusive in the sense that an example might fit in 'group to group' as well as in 'people to people.' It is important to note that even in the absence of formal diplomatic relations, public diplomacy can be carried out with, as well as without, a government's blessing.

##### *Government to government*

As noted earlier, it is useful to distinguish between diplomacy at the government level and cooperation at that level. Diplomacy refers to politically directed interactions, whereas cooperation involves interactions that are positive but do not necessarily lead to direct political payoff to either party. So, one can pursue the latter in the absence of the former.

Possible areas of US-Cuban government-level cooperation related to El Niño- and La Niña-spawned hazards could be categorised in the following way: (1) forecasting; (2) monitoring; (3) impacts; (4) recovery; and (5) research and training. This categorisation provides a framework for identifying areas of present-day (actual as opposed to potential) cooperation between these countries. The identified activities noted are illustrative.

**Forecasting:** NOAA has several groups involved in forecasting that relate to tropical storms and hurricanes. For instance, it is the responsibility of the NHC to deal with this particular extreme event. Much of the data collected by aircraft used to monitor hurricanes is sent to NOAA's National Centers for Environmental Prediction (NCEP) in Maryland, where forecasts are then produced using sophisticated computer models. Forecasts are also issued by other researchers such as Professor William Gray at Colorado State University.<sup>17</sup>

Cubans have their own forecast methods, some of which are empirical and some of which are based on computer modelling. Thus, in Cuba, seasonal hurricane forecasts are developed in a similar way to those produced in the US and the quality of their results is comparable to those produced by US methods. INSMET, responsible for hurricane forecasting in Cuba, has a relatively high degree of autonomy (but not independence) from political interference by Cuban government officials in this area. With regard to hurricane forecasting in a given season, there is a considerable exchange of information and cooperation.

**Monitoring:** The monitoring of tropical storms in the Atlantic is perhaps the strongest connection between these two countries, with regard to the ENSO cycle. It is in the interest of both countries to cooperate when tropical storms are moving westward toward the Antilles and the US southeast and Gulf of Mexico states. The monitoring activity is where information is exchanged as a result of various levels of interaction. Individual researchers and forecasters are in contact with their colleagues and with government agencies responsible for monitoring. INSMET has access, albeit monitored by the government, to the Internet and to NOAA's satellite imagery of the tropical Atlantic.

NOAA aircraft collect data critical for hurricane reconnaissance, climate and global change, and air quality. The pilots often fly through the eyewall of hurricanes. The aircraft crew also collect data over Cuban airspace where US military aircraft are prohibited to fly.<sup>18</sup> In March 1999 a goodwill 'awareness' tour was taken in the Caribbean and Central American regions by the US NHC members. For the first time ever, the US hurricane reconnaissance aircraft was allowed to land at the José Martí International Airport in Havana, as part of that awareness tour. While in Havana, the director of the NHC noted that 'When a hurricane is over you (in Cuba), it is coming towards us (in the US). So we use information coming from Cuba.'<sup>19</sup> In fact, NOAA's hurricane aircraft flew over the eye of Hurricane Georges when it was over Cuba's territorial waters.

**Impacts:** The interactions between these governments have probably been weakest in the area of impact assessment and in emergency relief operations. This is in part the result of domestic policy (staunchly anti-Castro) of the US government which inhibits any increase in open and legal interaction between these countries. Another factor contributing to this weakness is the anti-US government sentiments within Cuba's government.

**Recovery:** An example to indicate that disaster diplomacy does not seem to work in the context of existing US-Cuban ideological and political differences relates to the severe drought that took place in eastern Cuba in 1998. This drought, Cuba's worst in fifty years, created a situation of food insecurity in several of Cuba's

eastern provinces. As a result, Cuban leaders turned to the UN's World Food Programme (WFP) to seek emergency food aid. WFP issued an appeal from prospective donors in the international community. When learning about the severe food shortages and requests for assistance to Cuba, the US officials did not respond immediately but instead noted that they would review and consider WFP's request.

For Cuba's part, its government spokesperson said that Cuba would not accept any aid that obviously came from the US, arguing that food aid was needed in the first place as a result of the US embargo and not because of the drought alone.<sup>20</sup> In the words of a spokesman from Cuba's Foreign Ministry, 'Humanitarian aid from the U.S. government is humiliating, hypocritical and unacceptable while they maintain the economic, commercial and financial blockade against Cuba for nearly four decades'. He went on to say that 'without Washington's 36-year embargo on Cuba... we would not need any humanitarian aid anyway'.<sup>21</sup>

On this issue, Richard Olson, a disaster specialist in political science, in a personal communication to me, noted the following: 'One of the reasons that you see so little relief/recovery "disaster diplomacy" in US-Cuban relations is that such cooperation is above the (political) waterline. Moreover, at some levels in the US government, there is appreciation that disaster losses can destabilise regimes, so why help the Castro regime stay in place? Of course, the US no-aid stance helps Castro as well in the "blame diffusion" game'.

**Research and Training:** Research interactions take place on a scientist-to-scientist basis either as cooperative efforts at workshops and conferences or by way of third-country assistance in a multinational effort. There are restrictions on Cuban visitors to the US and US visitors to Cuba, although exceptions are explicitly made in general for scientific exchanges between these countries. These research and training exchanges apply to forecasting, monitoring, and modelling.

An example of official US-Cuban networking in these areas is the interaction between forecasters from the US NHC and Cuba's INSMET. NHC monitors hurricanes in the Atlantic, Caribbean, Gulf of Mexico, and the eastern Pacific from 15 May to 30 November. Its staff prepares and disseminates hurricane watches and warnings for the public. Also, 'During the "off-season" the NHC provides training for US emergency managers and representatives from many other countries that are affected by tropical cyclones'.<sup>22</sup> Nonetheless, scientists from governmental agencies in both countries must run through a diplomatic and bureaucratic gauntlet as they seek permission to leave one country and permission to enter the other. There is no assurance that those permissions will be granted, even to scientists.

Furthermore, Cubans do not have direct access to new computer programmes or new models. However, in many instances computer programmes or atmospheric models that cannot be obtained directly from US sources, because of the high cost or because of the embargo-related restrictions, can often be found by Cuban researchers in countries other than the US.

### *People to people*

At the people-to-people level, there are interactions and cooperation between American and Cuban scientists. Cubans are allowed to visit US colleagues and US scientists are allowed to visit Cuban researchers, but they must get permission and visas from their government and the other country as well. This is a costly and time-consuming process with no assurance that the visit will materialise. Such visits are too numerous to mention and their success may be related to the lack of explicit attention drawn to them.

However, two major workshops were held at the US National Center for Atmospheric Research (NCAR) in Boulder, Colorado, one on El Niño and the second on La Niña. The first - 'A Systems Approach to El Niño' - was held in July 1997. A Cuban researcher was at the workshop and presented a review of El Niño's impacts on Cuban society. The following year a 'La Niña Summit' was convened by the United Nations University and NCAR, and a Cuban study on La Niña's association with hurricanes and other weather extremes was presented.<sup>23</sup>

According to one US government official, 'Expanding people-to-people [interactions] is not about encouraging tourism or business but allowing the Cuban people to learn from their US counterparts so they can prepare for their future'.<sup>24</sup> More recently, Fidel Castro's views on people-to-people diplomacy were reported as follows: 'The theoreticians and advocates of the imperial policies still dream that the revolution [...] might be subverted with such appealing methods as the one they have called the policy of "people-to-people" contact'. Castro said he did not mind the contact - 'but they should play fair'.<sup>25</sup>

Clearly, such interactions among individuals create an informal network of people interested in climate-related problems. In the event of a major policy shift and diplomatic breakthrough between these governments, an informal network would serve as the core of a more inclusive network. However, given the long period of hostile bilateral relations, it seems highly improbable that such an informal network would spark a diplomatic breakthrough, without other changes.

If one were to undertake a quick search on the Internet to identify people-to-people interactions between the US and Cuba, one would be very surprised to see the scores of activities that do exist, most of which are unsanctioned by the US government. For the most part, they relate to human health issues<sup>26</sup> and to ending the US embargo of Cuba. There are also several sister-city projects between US and Cuban cities. When a city in the US links in this way to a city in Cuba, individuals in those cities interact on a variety of issues and in a variety of ways. Among those concerned about the poor health status of the young and the elderly in Cuba are religious groups and individuals who seek to send medical and food supplies to Cuba by way of Mexico. When there is a drought or some other disaster, these groups intensify their ongoing assistance to Cuba.

### *Group to group*

An example of group-to-group interaction is the *Usable Science Workshop* held in Havana in mid-January 1996 by the United Nations Environment Programme

(UNEP) and NCAR. The workshop focused on the linkage of ENSO to extreme events, especially hurricanes, and involved scientists and policy makers from North, South and Central America and the Caribbean region. In addition to Cuban meteorologists, there were many observers from various Cuban organisations interested in climate impacts such as from the water, agriculture, health, and energy sectors. Because the US embargo does not permit US travel agents to discuss, let alone make, reservations or issue airline tickets, even for legitimate UN-related trips to Cuba, US travel and financial restrictions on allowing US dollars to be spent in Cuba made it difficult to convene this meeting.

On 24 February 1996, several weeks after the *Usable Science Workshop* ended, the Cuban Air Force shot down two civilian planes piloted by anti-Castro Cuban-Americans (members of *Brothers to the Rescue*) based in Miami. The pilots were returning from a flight to drop anti-Castro leaflets over Havana. This incident put a damper on follow-up activities after the workshop and led to the strengthening of anti-Castro legislation, and suggests that non-disaster events impact US-Cuba relations far more than disasters.

Another example is the International Hurricane Center (IHC), a research centre at Florida International University which is Florida's official hurricane research centre for the state's university system.<sup>27</sup> IHC focuses on multidisciplinary research efforts to understand and identify ways to mitigate the exposure and vulnerability to hurricanes of people along the US East and Gulf Coasts and in the Caribbean islands, including Cuba.

### *International organisations: global and regional*

There is one main international organisation - the World Meteorological Organization - and numerous regional ones - the Inter-American Institute, the International Research Institute for climate prediction, and the Pan American Health Organization - in which the US and Cuba maintain membership.

**World Meteorological Organization (WMO):**<sup>28</sup> Because both the US and Cuba are located in Region IV, collaboration is required for the monitoring of tropical storms in this region. In this situation, they share information directly with each other and with others in the region. WMO provides support for hurricane-related training workshops held at the US NHC for participants from the region. The participants are selected by WMO personnel, and Cubans have been invited to attend and have, in fact, participated each year.

**Inter-American Institute (IAI):**<sup>29</sup> IAI is an intergovernmental organisation supported by eighteen countries in the Americas dedicated to fostering an increased understanding of global change phenomena and their socio-economic consequences in the Americas. IAI's mission is to develop the human capacity in Latin America to understand the integrated impact of present and future global changes on regional and continental environments in the Americas and to promote collaborative research and informed decision-making at all levels.

Cuba and the US are signatories to the IAI agreement. Cuban researchers as well

as researchers in other countries submit proposals for financial support of multidisciplinary and multinational projects. However, in the case of Cuban proposals, funding must be provided indirectly through other non-US (i.e., third party) research groups participating in the proposed project. Nevertheless, funding for projects which involve Cuban researchers is still very difficult to obtain. It is also difficult to arrange for the participation of Cuban researchers in climate-related meetings that are sponsored by or convened in the United States.

*International Research Institute for climate prediction (IRI):*<sup>30</sup> Another scientific organisation of note is IRI at Columbia University in New York. This organisation brings together forecasters from various countries in the Caribbean, Central America, and the US in order to produce seasonal and inter-annual climate forecasts for the region, based on scientific consensus. In mid-1998 a Climate Outlook Forum for the Caribbean region was held in Jamaica. Meteorologists, hydrologists and disaster preparedness officials from the region (including Americans and Cubans) produced by consensus a forecast for the June-August period. A second forum was convened in Barbados in April 1999, co-sponsored by US and Caribbean agencies. Both Cuban and US forecasters participated. A third such forum was held in the Dominican Republic in May 2000, and US and Cuban forecasters, among others, were present.

*Pan-American Health Organization (PAHO):*<sup>31</sup> Another regional organisation that deals with climate-related disasters is PAHO. As its name states, it covers human health issues in the Western Hemisphere. Both the US and Cuba are members, and both have direct interest, such as the regional health effects of extreme meteorological events like El Niño or La Niña, as well as the health effects of global warming. PAHO convened a Central American workshop in early November 1997 on the health impacts of the El Niño phenomenon.<sup>32</sup>

### V. Other shared climate-related issues with disaster diplomacy implications

This section presents a few climate-related issues (past, present, and potential) that should serve to encourage cooperation, if not diplomatic efforts, between the US and Cuba. Each issue has a 'shared disaster' aspect. This suggests that both countries would likely benefit from a normalisation of relations, at least with regard to climate-related issues.

#### *Seeding tropical storms and hurricanes*

At the height of the Cold War, and especially in the 1960s and early 1970s, there was considerable interest in seeking ways to reduce the intensity and to change the direction of hurricanes.<sup>33</sup> Scientists believed that, by seeding tropical storms with silver iodide (a nucleating agent), there would be a way to 'control' hurricane wind intensity, pressure, and possibly the location of hurricane landfall. Being able to do so would reduce the adverse impacts of winds and storm surges, by far one of the most damaging aspects of hurricane landfall.

However, a controversy developed over this scientific effort with such a seemingly positive objective, that is, to control one of nature's most destructive hazards. Robert Fleagle and colleagues noted that 'alteration of a few degrees in the path of a hurricane may result in missing a certain area (heavily populated, perhaps) and ravaging, instead, a different one [...] The modification of hurricanes conceivably may result in after-effects greater than the intended direct effects'.<sup>34</sup>

Aside from the many uncertainties surrounding the scientific capability to modify a hurricane's characteristics, Central American and Caribbean countries argued that their water resources were dependent on the rainfall that accompanied tropical storms and hurricanes. To tamper with this aspect of the regional hydrologic cycle was questioned on political, legal, ethical, and social grounds, even if the technology proved feasible from an operational perspective.

A more sinister motive was attributed to US attempts at cloud seeding. In the late 1960s and early 1970s, the US government was engaged in 'meteorological warfare'<sup>35</sup> against Vietnam by cloud seeding in an attempt to produce more rainfall. In theory, this action was supposed to hinder the flow of troops and war materiel along the Ho Chi Minh Trail from North Vietnam to South Vietnam. Cuba was perceived to be another possible target. This Cuban fear served to reinforce the distrust between US and Cuban authorities. In this early period, collaboration between the meteorological agencies in these two countries was practically absent.

Political repercussions, coupled with the scientific uncertainty stemming from the proposed experiments to control hurricane behaviour in the region, ended attempts at experiments designed to influence hurricane behaviour. If such a research experiment were for some reason to be resurrected in the future, clearly US, Cuban, and other governments would have to work together to evaluate the need for, as well as the costs and benefits of, the impacts of such an experiment.

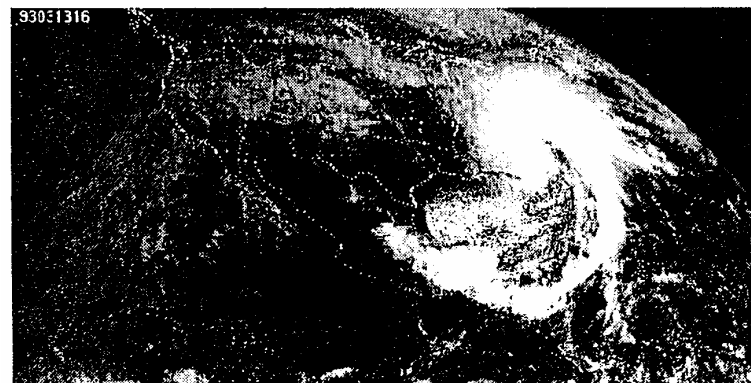


FIGURE 3: SATELLITE IMAGE OF SUPERSTORM 1993  
(adapted from [ww2010.atmos.ninc.edu/\(Gh\)/arch/cases/930312/sat/us.r.xml](http://ww2010.atmos.ninc.edu/(Gh)/arch/cases/930312/sat/us.r.xml))

### Superstorm 1993

A large-scale, rapidly moving storm, now called the *Storm of the Century* or *Superstorm '93*, plagued the eastern half of the US as well as Cuba and Canada from 12-14 March 1993 (Figure 3). It unexpectedly spawned tornadoes, wind storms, ice storms, rough seas, coastal flooding, and blizzards in various locations in a short time. The storm is estimated to have cost these countries billions of dollars and was responsible for more than sixty deaths.<sup>36</sup> The atmospheric science research community and the media in the US and Cuba have written extensively about that storm.<sup>37</sup> Those concerned with the possible effects on the frequency and intensity of extreme events of global warming in the 21<sup>st</sup> century suggest that *Superstorm '93* provides an example of what might occur more frequently in the future.

### Global warming

Current research supports the possibility, if not likelihood, that human activities such as tropical deforestation and the burning of fossil fuels release greenhouse gases into the atmosphere. These activities set into motion processes that can lead to a human-induced global warming of the earth's atmosphere. Global warming is likely to alter the characteristics of ENSO events. Thus, according to some scientists, El Niño will increase in intensity, frequency, and impacts on ecosystems and societies. Cuban and American scientists are researching the climate change issue within their countries and as members of international research efforts, such as the Intergovernmental Panel on Climate Change (IPCC) process, but do not work bilaterally. The IPCC process involves more than two thousand scientists from around the globe and produces, every five years, a state-of-the-science report on climate change.<sup>38</sup>

### Climate fluctuations on the decadal scale

While there is considerable discussion about global warming of the earth's atmosphere and its impacts on global and regional climate regimes, it is important to remember that climate varies on all time scales. So, in addition to the possibility of long-term climate change, one must also consider climate fluctuations (trends)

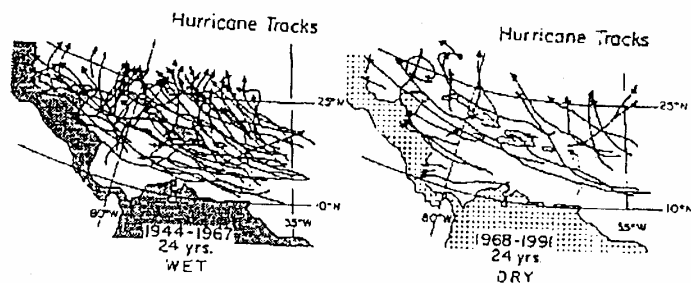


FIGURE 4: HURRICANE TRACK DENSITY 1944-1991  
(from Gray *et al.* (see endnote 4))

that can last for decades at a time. For example, Professor William Gray does not support the view that human activities are raising the global average temperature of the atmosphere. However, he does believe that the 1960-95 period had been a quiet one from the standpoint of frequency and intensity of hurricanes in the tropical Atlantic. He believes that the hurricane regime of that period will be replaced by one similar to that which existed from 1930-60, a period with considerably more hurricane activity than in recent decades (Figure 4).<sup>39</sup>

If Gray is correct, it will become more important for these two countries to cooperate more closely than they have since Castro came to power in 1959. And, if Gray's views are considered plausible, the best time to broaden cooperation - diplomatic or otherwise - on all aspects of hurricanes (monitoring, forecasting, impacts, recovery, and research) would be now - before the onset of a more active hurricane regime.

### Climate change and hurricanes

Today, researchers are modelling how a global warming of the atmosphere by a few degrees Celsius might affect weather and climate extremes, one of which is the hurricane. Articles have appeared suggesting the possibility of 'supercanes' or hurricanes with an intensity several-fold greater than those we have witnessed in the past. Various researchers and popular writers<sup>40</sup> have pointed to highly destructive 'blockbuster' hurricanes in recent times, such as Hugo (1989), Bob (1991), Andrew (1992), Georges and Mitch (1998), and Floyd (1999), that could serve as a glimpse of the changes in intensity we might expect in future decades - and possibly with greater frequency.

Related to climate change issues is the view that there would likely be more El Niño events of greater frequency and duration in the future with a global warming. However, the number of hurricanes during El Niño events is lower than the number that occur during La Niña events. The question then becomes - all things being equal - can you really have more hurricanes *and* more El Niños, or is it either one or the other?

### Nuclear fallout from the proposed Jaragua Nuclear Plant

The US government has been concerned about the construction in Cuba of a nuclear power plant. Construction of such a plant began in the early 1980s by the Soviet Union. When the Soviet Union collapsed in the early 1990s, it no longer provided oil to Cuba at heavily subsidised prices. Soviet construction of the Jaragua nuclear facility in Cienfuegos in the south-central part of the island came to a halt. The concrete skeleton of what had been constructed until that time remains. Because Cuba is energy deficient, nuclear power has been viewed as one of the ways to alleviate at least some of the increasingly frequent power shortages.

In the mid-1990s the Cuban government, aided by Russia, sought to renew construction of the plant. The US opposed its construction and several reviews were undertaken by the US General Accounting Office to assess the soundness of the plant's construction.<sup>41</sup> The reports also considered the potential impacts of a nuclear accident, if the plant were to be completed.



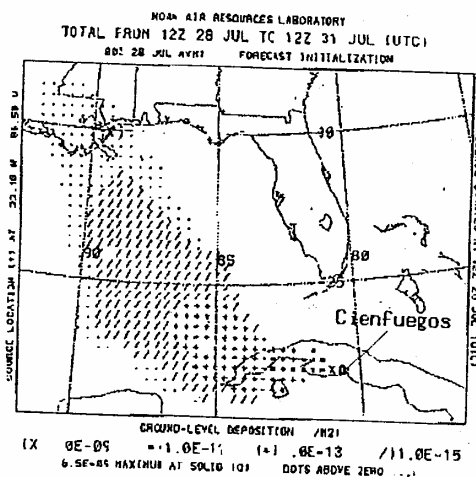


FIGURE 5: POTENTIAL FALLOUT PATH FOLLOWING A NUCLEAR ACCIDENT AT CIENFUEGOS (modified from [gus.arlhq.noaa.gov/ss/transport/cienfuegos.html](http://gus.arlhq.noaa.gov/ss/transport/cienfuegos.html))

A study by NOAA researchers assessed the meteorological aspects of a nuclear accident at a hypothetically completed Jaragua plant, only 290 km (180 miles) from Key West, Florida.<sup>41</sup> They concluded that there would be a threat of nuclear fallout, based on season and wind direction, to the US mainland as well as to Caribbean islands, in the event of a nuclear accident (Figure 5).

While the cause of such a nuclear accident may have little, if anything, to do directly with the ENSO cycle, its impacts are affected by atmospheric patterns in the Caribbean and Gulf of Mexico regions, patterns that involve both countries and are affected by El Niño and La Niña. In fact, the meteorological data used for this simulation was that for the 1991-92 period. This period was one in which a moderate El Niño occurred. Thus, a modelling experiment has already been performed that suggests what the impacts of a nuclear accident in Cuba might be in North America during an El Niño event.

### VI. Concluding comments

The hope with respect to operationalising the notion of 'disaster diplomacy' is that, if some elements of cooperation were to develop during times of disaster, then those focused and *ad hoc* areas of cooperation might be maintained in the future. More important to the notion is that cooperation might be expanded (i.e., spill-over) to encompass other areas that would benefit both governments (if not countries) from increased interaction and cooperation. In the US-Cuban situation, spill-over has not yet occurred. US-Cuban interactions related to hurricanes - hazards which are specific, direct, and traceable threats to both countries in space

and time - are fruitful for a variety of reasons. However, those interactions are encapsulated - bounded by *realpolitik*.

While I like the idea of trying to explore the utility of the notion of disaster diplomacy, I am not yet convinced that *ad hoc* disaster support in any form will lead to sustained and improved diplomatic relations between states with deep animosities toward one another any more than, say, 'baseball diplomacy' has. The few officially sanctioned interactions that do exist, however, can eventually serve as a foundation on which these countries can later improve their relations. That would likely occur only when political relations at the highest level of government improve.

The animosity between these two political regimes centres on the US dislike of Fidel Castro as much as on the dislike of Castro's political ideology. Cuban leadership, for its part, distrusts US motives behind any attempt to improve relations. Their relationship, based on hatred, has had forty years to fester and ossify. Neither side at the highest political levels has done much to reduce the existing animosity. Changes in the views of the respective public in each of these countries about the other country has had little positive impact on policy changes to date. The US embargo and the Helms-Burton Act of 1996 has put a damper on improved relations from the American side, but has not blocked it completely in the areas of various scientific, cultural, and humanitarian activities. Despite American wishes and policies to the contrary, Castro will neither renounce his ideology nor relinquish control over Cuban society.

In November 1999, American fishermen discovered a five-year old Cuban boy (shortly to turn six), Elfan González, strapped to a rubber inner-tube floating in the sea between the US and Cuba. The boy, whose mother and stepfather were drowned when their boat sank, was one of a few survivors from a group who had attempted to flee Cuba, and he was put into the care of distant relatives in Florida. After several months, the boy's father flew to the US to take him back to Cuba. However, the hatred of Castro was so strong in Miami's neighbourhood known as 'Little Habana' that a custody battle ensued, pitting the distant relatives against the US government, Castro, and the boy's father.

The Elfan González issue had a majority of the American public supporting the common US and Cuban government position of having the boy returned to his father. US and Cuban officials were thus, for a time, on the same side of a very contentious domestic political issue in the US in the year of the 2000 presidential election. President Bill Clinton supported the return of the boy to his father, whereas Vice President Al Gore, courting the Cuban-American vote, supported providing the boy with American citizenship and keeping him in the US. The Elfan González situation indicates how a seemingly non-political, straightforward, custodial care issue became, for a short period of time, an international crisis between the two countries, a crisis in which the two protagonists were on the same side of the issue! Once the González issue was resolved and the boy was returned to Cuba in mid-2000, the US House of Representatives approved a bill allowing US firms, through sales, to provide limited food and medicine to Cuba.<sup>43</sup> Given the influence of this non-climate-related situation, it would be risky to assume that the

threat of climate-related disasters will provide improvements in diplomatic relations between the US and Cuba.

Natural factors also conspire to weaken US-Cuban interactions on ENSO. For example, La Niña events - and the associated more active hurricane seasons that accompany them - occur years apart. As a result of the intermittent nature of this ENSO extreme, maintaining a government's sustained interest in the phenomenon is a very difficult task. Thus, the shared US-Cuban concerns about hurricanes (and hurricane seasons and ENSO warm and cold extremes) show no signs at present of leading to higher or broader levels of diplomatic cooperation in other areas.

Nevertheless, each new contact either for a Cuban scientist or an American researcher leads to an exchange of information that may be of value intellectually on an individual basis and adds to the general body of knowledge of their respective organisations (and governments). A climate-related network will be in place when political relations between these governments change for the better. That unofficial network is constantly being expanded by the interactions, informal as well as formal, electronic as well as face-to-face, between groups, NGOs, and even government agencies that have had to interact over the years under an umbrella of very strained political relations. So 'public diplomacy' by itself should not be expected to lead to 'regular diplomacy' in the absence of political rapprochement at the highest levels of government in these countries.

If there is to be an improved, long-lasting, mutually beneficial interaction between the US and Cuba with regard to the ENSO phenomenon, i.e., free flow of scientists and open access to information between them, it will have to come as the result of some sort of broad political rapprochement between the two governments at the highest levels. Such a broad-ranging rapprochement is not likely to result from a specific response to a climate-related problem.

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<sup>1</sup> *The Compact Edition of the Oxford English Dictionary*, vol. 1, Oxford, Oxford University Press, 1984, p. 734.

<sup>2</sup> For numerous definitions of diplomacy, see C.W. Freeman, Jr., *The Diplomat's Dictionary*, Washington, DC, United States Institute of Peace, 1997.

<sup>3</sup> A hurricane is a tropical cyclone in the Atlantic, Caribbean, or eastern Pacific in which the maximum average wind speed near the centre - or eye - exceeds 119 km/h (74 mph). In the western Pacific, including the Philippines, such systems are called *typhoons*; near Australia, *willy willy*; and in the Indian Ocean, *cyclones*. The winds of tropical cyclones rotate around a region of low pressure and the storms are given names for easier identification and tracking. Information

from [www.cdera.org/hurfacts.htm](http://www.cdera.org/hurfacts.htm)

- <sup>4</sup> W. Gray, J.D. Shaeffer, and C.W. Landsea, 'Climate Trends Associated with Multidecadal Variability of Atlantic Hurricane Activity', in H.D. Diaz and R.S. Pulwarty, eds., *Hurricanes: Climate and Socioeconomic Impacts*, Berlin, Springer, 1997, pp. 15-53.
- <sup>5</sup> P.A. Cardenas-Perez, *Sistema de Vaisos del ENOS y Predicción de su Impacto en el Clima*, Havana, Instituto de Meteorología, Ministerio de Ciencia, Tecnología y Medio Ambiente, República de Cuba, 1999, p. 19.
- <sup>6</sup> Cardenas-Perez, *Sistema de Vaisos*, p. 4.
- <sup>7</sup> See, for example, S. Changnon, 'Impacts of El Niño-Generated Weather in the United States', *Bulletin of the American Meteorological Society*, vol. 80, no. 9, 1999, pp. 1819-1827.
- <sup>8</sup> J.J. Fernández-Partagás, 'El Padre Viñes en el *Monthly Weather Review*', from the J.J. Fernández-Partagás Collection, 1996, Box 3, Folder 43, Cuban Heritage Collection, Otto J. Richter Library, University of Miami, Coral Gables, Florida.
- <sup>9</sup> S. Johnson, *The Social Consequences of Hurricanes in the Caribbean*, paper presented at the workshop *Hurricanes through Time*, held 18 February 2000 at the Smithsonian Institution in Washington, DC.
- <sup>10</sup> E. Larson, *Isaac's Storm: A Man, A Time, and the Deadliest Hurricane in History*, San Diego, California, Crown Publishers, 1999.
- <sup>11</sup> E. Pianin, 'Deals on Cuba Would Ease US Sanctions: Food, Medicine Sales Allowed', [www.washingtonpost.com](http://www.washingtonpost.com), 28 June 2000.
- <sup>12</sup> For example, [www.nhc.noaa.gov](http://www.nhc.noaa.gov), [www.coaps.fsu.edu](http://www.coaps.fsu.edu), and [www.esig.ucar.edu/signal](http://www.esig.ucar.edu/signal).
- <sup>13</sup> For example, Radio Habana Cuba, RHC, at [www.radiohc.org](http://www.radiohc.org).
- <sup>14</sup> For example, The Cuban Meteorological Society at [www.met.inf.cu/sometcub/default.htm](http://www.met.inf.cu/sometcub/default.htm) and INSMET at [www.met.inf.cu](http://www.met.inf.cu).
- <sup>15</sup> *Boletín de la Sociedad Meteorológica de Cuba (SOMETCUBA)*, vol. 4, no. 1, Enero 1998.
- <sup>16</sup> Shapiro gave this speech at Queens College and Graduate School, University of New York, on 27 October 1999. From [www.state.gov/www/policy\\_remarks/1999/991027\\_shapiro\\_cuba.html](http://www.state.gov/www/policy_remarks/1999/991027_shapiro_cuba.html).
- <sup>17</sup> His forecasts and updates are disseminated on the Internet at [tropical.atmos.colostate.edu/forecasts/index.html](http://tropical.atmos.colostate.edu/forecasts/index.html).
- <sup>18</sup> B.J. Taylor's testimony to the US Subcommittee on Energy and Environment's Science Committee, Washington, DC, US House of Representatives, 15 April 1999.
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- <sup>22</sup> From the Tropical Prediction Center's website, [www.nhc.noaa.gov/aboutintro.html](http://www.nhc.noaa.gov/aboutintro.html), 1999.
- <sup>23</sup> Reports have been prepared for both workshops. Both are available in hard copy and on the Internet. *El Niño-Southern Oscillation: A Systems Approach to ENSO*, prepared by M.H. Glantz, Environmental and Societal Impacts Group, NCAR, Boulder, CO, 1997, [www.esig.ucar.edu/enso](http://www.esig.ucar.edu/enso), and *A La Niña Summit: Report of the Workshop*, prepared by M.H. Glantz, Environmental and Societal Impacts Group, NCAR, Boulder, CO, 1998, [www.esig.ucar.edu/laNina](http://www.esig.ucar.edu/laNina).
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- <sup>25</sup> Anon. 'Castro: More contacts amount to "seduction"', *Sunday Camera*, Boulder, CO, 30 July 2000, p. 14a.

- <sup>26</sup> From Peter Fletcher 'Cuba Tests U.S. Vaccine Device in Rare Cooperation', 17 December 1998, [www.fiu.edu/~fcfcubatestsvaccine.html](http://www.fiu.edu/~fcfcubatestsvaccine.html)
- <sup>27</sup> IHC should not be confused with the US government's National Hurricane Center (NHC).
- <sup>28</sup> [www.wmo.ch](http://www.wmo.ch).
- <sup>29</sup> [ww2.iai.int](http://ww2.iai.int).
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