

## *Reflections on a Storm*

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**T**yphoon Yolanda struck the Philippines in November 2013 . For the island of Leyte, the fact of a tropical cyclone was not news. This part of the country is quite familiar with tropical storms. Yet this storm was different. Not only was it with a strength never before seen in the whole world, but it also followed a path which caught the island peoples off guard. Once the storm with its over 300 km/hr gusts has passed south of the principal city of Tacloban, the stage was set for disaster. The winds now were not from the east and, in that sense, manageable as familiar but they now roared in from the south. This meant they brought with them storm surges, huge waves several meters in height and with a volume of water commensurate with that height. In short, devastation to all the shoreline structures and people along the coast. But this was a principal element of the city of Tacloban. All was blown away, drowned by the storm. The city was obliterated.

Was this avoidable? Are we to point the finger at mismanagement or unreadiness or failure of governance? Or should we take this as an “act of God” and look for meaning there?

For my part, I prefer to avoid the finger pointing and would rather suggest that we look at the big picture. The first scene in this picture is that of a world’s climate no longer consonant with the pre-twenty-first century scenario with regard to weather. Our climate has more energy now than in the 100 years previously experienced. The atmosphere hold more energy than ever before in human history. Hence, the potential for different weather is with us now.

This new atmosphere is due to the warming gases the industrialized or modern countries of the world have generated by their steps toward “modernization.” Since there is only one atmosphere, this new energy in turn has generated new weather not any longer familiar to the planet’s inhabitants. We are told there will be more storms and larger storms. Yolanda thus is but the fulfillment of the prophecy.

Should we have been prepared therefore? Did we not have a warning?

Again, to answer we must make some distinctions. The major unpreparedness was due, I feel, to the lack of familiarity with a category five storm. The Visayas area is very familiar with tropical cyclones. They are visited by many, over a dozen in times past and more recently closer to twenty per year. Thus, they are familiar with an “ordinary” storm. By ordinary I mean the rain, the winds and the turbulent sea waters. But a category five storm required some deep understanding. Let me explain.

The Manila Observatory since 1999, under a grant from United States Agency for International Development (USAID), took up the question of climate change for the country. The work required developing several areas of expertise. Thus were born the Geomatics Division of the Manila Observatory (MO) and the regional Climate Change Division. Along with these, the local Atmospheric and Instrumentation Division became more focused so as to assist in the work of climate change studies.

All of these divisions required capacity building in the area of staff and hardware so as to adequately make a contribution to what was happening and could happen to the country due to climate change. A key component in this work was the link of the MO scientists with the Physics Department of Ateneo de Manila University (ADMU). Because of this link, the scientists working at MO had a stable or tenured position at the university and a research locus for their scientific interest. This capacity building developed over many years with young Bachelor of Science graduates in Physics often coming to MO divisions looking for research opportunities. Many of them stayed on and eventually became key players in the Climate Change agenda of the MO.

However, it should be pointed out that two very important contributors to the MO Climate Change thrust did not follow this development model. These two fully formed scientists came from other institutions not in the ADMU campus. Dr. Anglo and Dr. Estoque came from higher learning institutions precisely because they were looking for opportunities to do research in this area of meteorology. Their contribution has been most valuable as both are well versed in tropical cyclone research.

Let us look at a wider, bigger vision in this matter of climate change, tropical cyclones and the Philippines. The fact of climate change is slowly gaining ground in the popular mind and these storms, such as Yolanda, have been predicted for some time. The added energy in the atmosphere—global warming—has been in the popular press for some time. It is this energy which fuels the newer, stronger tropical cyclone phenomena.

Such awareness should allow us to be ready and prepared at the local level. We need not simply sit back and accept. Our God-given intelligence would demand that we make use of the knowledge we have about such weather phenomena and be prepared. Such preparation I have in mind is not just at the National Disaster Risk Reduction and Management Council (NDRRMC) or its namesake in each municipality and city but something more creative, even at the Provincial level. The idea here is to realize that we need not wait passively for disaster to occur but can be proactive in preparing to deal with its impact. With the help of science, we can act so as to be better ready for the tropical cyclone which we know is coming but “we know not the time nor the hour,” so to speak.

This temporal dimension of preparedness is but one of the factors that disaster management must attend to. Any hazard has three parameters which need to be forecasted for effective prevention. We need to know when it will happen, where it will happen and how strong or large will the hazard be. These three parameters allow for effective management of the hazard and so a first attempt at risk management. Science can do fairly well at answering the questions raised when it comes to tropical cyclones. Modern satellite tracking of storms system and the world wide web allow for quite reasonable

estimates of where and when a storm will happen. Even the magnitude can be narrowed down using similar methods.

But let me comment a bit more on this last parameter. The strength of a tropical cyclone comes from the energy it receives from the warm ocean waters. Thus, it can change its strength simply by encountering in its travel throughout the tropical ocean patches of warmer water. This then is one of the reasons for the unpreparedness in the case of Yolanda and its predecessor in southern Mindanao, Pablo of December 2012. In both cases an appreciation of this fact of sea surface temperature and storm strength understanding would have made a large difference for the communities.

A final note. My plea for a more scientific awareness in the community where tropical storms are potential hazards is partially being answered today. Here in southern Philippines, the Ateneo de Davao University (ADDU) has an institute called Tropical Institute for Climate Studies (TropICS) which is engaged in such education of communities. The institute both researches tropical meteorology generally, and the environment of the island of Mindanao more particularly. Through its outreach programs and academic research, it wants to bring science more effectively to the hazards posed by the new weather.