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Philippine typhoons, sources and the historian

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Abstract The pre-requisite for investigating the impacts of cyclonic storms and climatic change in Philippine history is adequate meteorological records and information on how weather and climate fluctuate and change in the Philippines across time. Reconstructing the history of the typhoon's impacts, climate variability and human-environment interactions on Philippine society and culture is difficult. The meteorological records to attempt such a reconstruction for the pre-instrument era are fragmentary. For the period prior to 1880, we have to rely on 'proxy records' to reconstruct the record of the weather and cyclonic storms over long periods, for example the records produced by provincial parish priests from as early as the seventeenth century, and the early histories and travel accounts of the Spanish friars. In order to trace climatic patterns and the impacts of typhoons, floods and storm surges in the era of pre-instrument observation, the historian must start with the Spanish records held in various civil and ecclesiastical archives and repositories in Spain and the Philippines. In the records of the Archivo General de Indias, Archivo Historico Nacional, Museo Naval, and the archives of the various religious orders—especially the Jesuits, given their unique role in pioneering the science of meteorology in the Philippines—can be found information in documents, letters and books about typhoons, and the colonization process . The catalogues, records and books held in the Philippine National Archive also contain invaluable information to help explain the long-term impacts of cyclonic storms and the ecological disadvantages confronting various typhoon-prone areas in the archipelago up until the end of the nineteenth century. Most importantly for the study of typhoons and human-environment interaction in the Philippines under American rule, the Bureau of Insular Affairs was the knowledge bank, regarding physical, cultural and geographical information about the archipelago. Under the auspices of the government, its staff archived, compiled and printed official data to supply the growing public demand for knowledge about the islands. As part of its range of activities the BIA undertook studies of important issues about the Philippines on behalf of the business sector and distributed

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thousands of printed documents relating to trade, agriculture, and, most importantly, aspects of the work of the Weather Bureau. There also exists an important oral and visual record of Philippine typhoons and detailed accounts of their impacts in nineteenth and twentieth century newspapers.

Keywords Philippine typhoons · Philippine meteorological records · Philippine missionary records · Philippine parish records · Jesuit sources and meteorology · Bureau of insular affairs and Philippine weather records · Oral history · Photography and typhoons · Newspapers and natural hazards

On sources: the typhoon and climate-human interaction

Obviously, the prerequisites for investigating the impact of cyclonic storms and climatic change in Philippine history are adequate meteorological records and information on how climates fluctuate and change and their impacts on human affairs in the archipelago. Reconstructing the history of the typhoon's impact, climate variability and human—environment interactions on Philippine society is difficult. The meteorological records to attempt such a reconstruction for the pre-instrumentation era are fragmentary and reliable instrument-based records date only from the final decades of the nineteenth century.

Hence, for the period prior to 1880 we have to rely on 'proxy records'[1] to explain about weather phenomena and when, where and why they occurred, and to reconstruct the record of cyclonic storms over long periods. Before the advent of official weather reports, we need to turn to: missionary records; the records produced by provincial parish priests and village chroniclers; the rare histories and early travel accounts of the friars; the colonial/civil records of the Spanish period; the Jesuit sources and the new scientific field of meteorology based at the Manila Observatory/Weather Bureau.

Oral history is also important, as elderly individuals, whose lives sometime span nearly a century can provide the type of local information required to examine the interface between the community, the environment and natural calamity. Some people lived through astonishing confrontations with nature on the rampage. But, despite a natural disaster like a typhoon inflicting a collective memory of tragedy on a community and people, the recollection of an extreme weather event, nevertheless tends to fade on an inter-generational basis with the passage of time unless the account was written down in the past. Many Filipinos can still recall the tragic Ormoc flood of 5 November 1991, and still others the great typhoon of 11–15 October 1970, but these events too will fade from the collective memory—as has already occurred with respect to the great typhoons and floods in Manila of 1931, 1882 and 1831. Each one of these storm events killed hundreds of people, flooded large sections of the capital and stranded tens of thousands of people—and, in the process momentarily fashioned apocalyptic landscapes and images across the city.[2]

Enormous difficulties face the historian, both with respect to the bewildering array and problematic nature of the sources; to reconstruct the past record of climate variability, and the impact of natural hazards the historian must be theoretically adept and insightful in order to see the connections and significance in such disparate sets of sources, and have the requisite skill to handle the monumental task of data collection in Spain, the United States

[1] Fagan (2000); on the reconstruction of the past record of climate see Lamb (1982).

[2] On collective memory and the eschatological consciousness see Hinton (1992), and Oliver-Smith (1994).

and the Philippines. The search for records to make effective linkages between climate, human-environment interaction and the Philippines on the one hand, and the impact of natural hazards on the other, is not new territory to environmental and social historians of Europe, particularly those concerned with the *Annales School*. Our knowledge of human-environment interactions has advanced considerably in the later twentieth century. H.H. Lamb and prominent French historians invoked climatic factors to explain major economic, social and cultural changes. Fernand Braudel and Emmanuel Le Roy Ladurie recognized climate change and natural hazards as prominent players on the world historical stage.[3] Previously discredited by climatic determinists, whose arguments emerged as poorly substantiated, Braudel and Ladurie devoted serious attention to properly documenting climatic shifts in specific historical situations over the past millennium affecting the course and development of human societies. Subsequent studies have also noted the significant influence of the Mediterranean climate and geographical factors on maritime conflict, seasonal patterns of trade and war, and their importance for identifying and documenting corsairing strike zones.[4]

To trace climate patterns and societal development across the centuries, and the impacts of typhoons, floods and storm surges in the era of pre-instrument observation, the historian must start with the Spanish conquest of the Philippines and the records held in various civil and ecclesiastical archives and repositories in Spain and the Philippines. The Spanish have left a rich, albeit uneven, record of their discovery, conquest and colonization of the Philippines from 1565. Though extensive at particular moments in place and time, the Spanish records are far from complete for reconstructing the past record of climate and human-environment interaction. Nevertheless, it is a documentary record that is sufficiently rich to enable the historian to attempt to reconstruct the past record of typhoons and the impact of climatic developments upon Philippine society and history.

In the records of the Archivo General de Indias, Archivo Historico Nacional, Museo Naval, Archivo General de la Nacion Mexico, and the archives of the various religious orders can be found fascinating historical fragments of knowledge about society and major weather phenomena, and past information about typhoons. While there is useful information held in the Archivo General de Indias in Seville, much of the data for the seventeenth to nineteenth centuries about the causes of subsistence crises, rural unrest, and the impact of natural hazards, namely cyclonic storms, floods, and drought, must be searched for in the less well-organized sections and files of the civil and ecclesiastical records of the Spanish and Philippine archives. The catalogues, records and books held in the Philippine National Archive (PNA) and the archives and libraries of the Jesuit, Dominican, Augustinian, and Franciscan orders, contain invaluable information to help explain the long-term impacts of the typhoon and the ecological advantages and disadvantages confronting various regions in the archipelago up until the end of the nineteenth century.

To complicate matters, over the centuries the archival holdings of the Philippines have been repeated targets of typhoons, floods, fires and earthquakes, and, succumbed on occasion to the ravages of termites, rats, mould, rain and the depredations of war. In the past, in moments of crisis and dire need, official documents of church and state have also been used as fuel for bonfires and torches, and as wrappers for food and mats.[5] Furthermore, since 1901 the location of the National Archive has changed six times. On several occasions in the 1950s and 1960s, major typhoons hit Manila, delivering torrential downpours.

[3] Braudel (1996), Lamb (1982), and Ladurie (1972).

[4] Pryor (1988) and Guilmarten (1974).

[5] Francia (1972) and Perez (1962).

On such occasions the archive and its records were exposed to extensive flood damage with anything shelved less than one metre above floor level, left rotting in filthy water. The result is that the records of the Philippine archives have been damaged, scattered, albeit dispersed, and in many cases, separated from the record series to which they originally belonged with the passage of time.

In 1970, Dr Domingo Abella (the Director of the National Archives) and his staff took charge of over 1500 cubic metres of Spanish records, transferring them to the National Library building in Rizal. Since then, the archivists of the Bureau of Records Management have been cataloguing the documents in context and chronologically arranging them by subject matter.[6] These surviving records contain invaluable information about typhoons, floods, droughts, pestilence, settlement patterns, shipping news, disasters at sea, and many other relevant topics to advance our knowledge of the typhoon and its impact on the Philippines and the evolution of its economic and social development over the past five centuries.

Like Braudel and his *Annales* disciples, I prefer to utilize what exists in the archival record, rather than lament the lacunae. For this project, I have primarily used both Spanish state and church archives in the Philippines, especially the Jesuit records of the Manila Observatory, and newspapers, oral history accounts and photographs, to reconstruct the relationship between climate change and the impact of typhoons on human affairs and human history in the Philippines.

Colonial/civil records of the Spanish period

The civil and military documents and reports, which constitute a substantial part of the holdings of the PNA, invariably include information about climate, human-environment interaction, the impact of natural hazards, and disaster preparedness and management: typhoons, floods, droughts and locust plagues were all natural hazards that were officially classified as *Calamidades Publicas*. The annual, often fragmentary nature of these surviving provincial-level accounts comprise hundreds of seemingly disparate records that are uneven in terms of periodization, regions and thematic emphasis. Temporally speaking, the eighteenth and nineteenth centuries are most prominent in the records. Regionally speaking, it is no surprise that the typhoon and flood-prone areas of Luzon and the Visayas feature predominantly in most of the inventories.

In the PNA, in the mid-1980s, the archive staff reclassified a number of key record series according to particular sub-themes. Consequently, records pertaining to climate and the weather, and documents necessary for the study of typhoons (*baguios*), were sifted out, reclassified and brought together under the new headings of *Calamidades Publicas – Baguios* and *Erección del Pueblo*. There is also another series of records labelled *Naufragios* (shipwrecks), which contains correspondence relating to shipwrecks, abstracts from ships' logs and other records pertaining to typhoons and the loss of vessels and lives at sea.

To give an example of the scale and type of information contained under the record heading *Calamidades Publicas*, I refer here to the sixteen *Calamidades Publicas* bundles, *legajos* which often contain over five-hundred folio-size pages of tightly spaced handwritten official material. For example, among the many dozens of official reports in the *legajo* numbered 1845–1898, is a report by the political-military governor of Camarines Sur on the typhoons and floods that had struck the area. He details the damage caused to roads, houses, public buildings, livestock and crops, and the death of three adults and a child. Amid the

[6] On building a state archive and new directions see *Archivinia*, August 1972 and December 1972.

many other documents found in this particular bundle alone, are reports on drought, locust plagues, and requests for financial assistance and relief from 'tribute' payment.[7]

In the era prior to the telecommunication of real time events, it is often in the reports and memoirs of *alcalde mayores*, and the first-person accounts of *cabezas de barangay*, serving in areas devastated by typhoons, that the historian will find considerable detailed information about the nature of the storms and their impacts. The provincial governors frequently provided such information about the disastrous track of a particular typhoon, based on the accounts of eyewitnesses who had been on the spot when the storm broke.

By comparing letters from different *alcalde mayores* that mention the same disastrous event, it is occasionally possible to locate a relevant piece of previously missing information. Sometimes, however, there is not sufficient information to precisely date a typhoon in the era of pre-instrumentation. The significance of recording the exact time of the onset and passage of a storm, in the context of reliable typhoon forecasting is explicitly understood in the 5 February 1822 letter of the *alcalde mayor* of Samar. He notes the ominous appearance of cholera in his province the previous September, which soon developed into an epidemic that decimated his jurisdiction until the beginning of January 1822. The *alcalde mayor* then details the damage caused to buildings and fields by two successive typhoons, spaced just 12 days apart, that hit the island on 14 and 22 November respectively; he stressed in his report the dates of the disastrous impacts caused by the unpredictable timing of the rapid sequence of the tightly-spaced storms.[8]

I want to draw attention here to another important, neglected source of grassroots information. In central and southern Luzon and the eastern Visayas, the written chronicles of local communities are filled with meteorological observations and details about past typhoons, floods, earthquakes and, occasionally, drought; natural hazards and disturbances that left a profound impression upon the memories of people at the local level, at the time of the disaster, or event. Such original local documents can be extremely important, even if they are not considered by today's rigorous scientific standards to contain, what Brian Fagan terms 'an accurate meteorological record.'[9]

The mass destruction resulting from a remarkable typhoon and the rapid advance of a devastating cholera epidemic, for example, are conflated and tersely noted in passing in the combined 1882–1885 entry of the Chronicle of Balayan, Batangas. 'Cholera has appeared throughout the entire archipelago. A great typhoon struck Manila on the 20th of October, 1882.'[10]

In 1811, on the other hand, the chroniclers of Mahayhay recorded in some detail a large sluggish, rain-bearing typhoon that lingered; the rain came down in torrents, till the river rose and changed its course, toppling the bell tower; in 1816, another strong typhoon destroyed many houses; in 1831, a typhoon of great force and intensity stripped bark off trees, leaving them leafless as bare poles, and uprooted and toppled others; in 1839, an extremely strong typhoon lasted from 7 to 11 October and again changed the course of the river; while in 1847, D. Ludivice Vidal Juan duly noted a deadly, slow-moving typhoon that took nearly a week (7–12 November) to pass across Mahayhay.

These customary community-based entries from Mahayhay recorded between 1811 and 1847, chronicle the recurrent passage of strong, rapidly moving typhoons capable of

[7] Schurz (1939) and Lario (2008).

[8] Selga (1939).

[9] Fagan (2000).

[10] Archives of the Manila Observatory (AMO), Box 8, Selga Collection,' Accidentes Atmosfericas Consignados en los Libros Canonicos de la Iglesia y Legajos Historicos del Pueblo de Tanay, Rizal.

tearing down huge stands of trees, as well as the more routine, slow-moving, rain-bearing storms that invariably triggered floods. Three times in the space of thirty-four years (1811, 1839 and 1845), the town minutes of Mahayhay reveal that sluggish typhoons caused floods of such magnitude that the local river changed its course.[11] In the Philippines, where agriculture has been the principal source of livelihood, floods that damage or destroy crops, especially rice, have always been considered a nemesis, also triggering regional calamity at times in the form of starvation and famine. Hence, it made sense for the chroniclers, in regions vulnerable to typhoons and floods, to record in the minutes of their towns any remarkable flood events and storms that still remained alive in the folklore and memory of the town's inhabitants and history.

Missionary records

It is from parish records and the chronicles and memoirs of priests who served in the Philippines from the early seventeenth to the late-nineteenth centuries, that I have gleaned much of my information about countless typhoons and the destruction that frequently accompanied their passage across the archipelago.

Missionary work and the process of evangelisation among populations in regions vulnerable to typhoons and floods have a long history and the early Spanish missionaries produced valuable writings and correspondence—proxy records of climate and environmental and social changes—that can assist the historian today to reconstruct the past record of Philippine society in calamity.

Hence, from the edifying letters of the Jesuit missionaries, we know that, as early as October–November 1608, there were several remarkable typhoons that passed across the archipelago.[12] Two years later, the annual letter of the Philippine province, signed by Fr Gregorio Lopez on the first day of November 1610, mentions a typhoon that caused major destruction in the mountains of Cavite. Blaming the devil, Lopez describes what happened to the town of Silang on that fateful night. He states:

> The Jubilee was published in this town, on Sunday, the eve of all saints. On that night … when the enthusiasm of the people for the gaining of the jubilee was at its climax, the devil, jealous of the good to be expected from the jubilee, excited a terrible tempest of furious wind, a hurricane or baguio, as it is called in these islands, so strong that it destroyed more than 200 houses and caused injury to the rest.[13]

In another annual letter also recorded over the signature of Lopez, the historian learns that 1611 was a year marked by many cyclonic storms, which caused considerable hardship to the Jesuits, and their recent converts in the Visayan Islands. Referring to Loboc in Bohol, Lopez recounts that the year had been a painful one because

> a hurricane … made the river of Loboc rise so extraordinarily that ours were obliged to abandon their house and to seek shelter together with the seminarians and other people in a somewhat stronger dwelling situated in the highest part of the town. And most prudently indeed did they do this, for a short while after, the river driven by the

[11] Archives of the Manila Observatory (AMO), Box 20, Selga Collection, 'Datos Tomados De una Antigua Minuta De Mahayhay y Facilitados por el Sr. Tesorero Municipal D. Desiderio Espinosa.

[12] See Archives of the Manila Observatory (AMO), Box 17, Selga Collection, Selga (1937, 1972).

[13] Colin (1900).

> fury of the winds rose to such a height as to reach the very rafters of our house.…The church which was higher was also flooded; the water rose almost four yards and left nothing, neither altar nor pulpit, which it did not overturn; some things were carried off, others broken, and all soiled with mud. Not even the ornaments and other treasures of the sacristy were spared, nor were the images.[14]

But the worst was yet to come, as Loboc was hit by another rain-bearing typhoon in less than a week—a tightly spaced back-to-back pattern that would become commonplace in the eastern Visayas—particularly in the final decades of the twentieth century.

The lives of some these early missionaries were often cut short because they perished as victims of typhoons. The circumstances surrounding these deaths (martyrdoms) were often mentioned in the official letters and correspondence of the religious orders and the major histories written by the Jesuit and Dominican friars.[15] Their early letters and historical works described the cyclonic storms in some detail, and their chronic impact on the lives and property of the missionaries.

It is precisely because reconstructing the past record of climate change and natural hazards in the Philippines is difficult, that shipwrecks and deaths by drowning of Spanish missionaries are such an important source for this period. Annual letters like those written by the seventeenth-century Jesuit missionary Gregorio Lopez, or the work of the mid-eighteenth-century Jesuit historian Pedro Murillo Velarde, are invaluable for the snippets of information they contain about typhoons and other meteorological events that occurred at certain times at certain places in the archipelago. Other letters and histories tell us that some of these early Jesuit Fathers somehow managed, often miraculously, to survive such deadly storms.

Parish records

The Parish registers of the Roman Catholic Church are another important ecclesiastical source for reconstructing the history of climate variability, and, society in calamity, in the Philippine island world. The parish records, pertaining to births, deaths, marriages and the administration of a parish, some of which are still extant for particular localities, provide the basic building blocks for demographic and ecological analysis; innovative research about human densities and social and economic change similar to work in population and history pioneered in Europe and Latin America. However, these fascinating regional-provincial records kept by the Church have, until quite recently, been seldom used for reconstructing the evolution of Philippine demographic and social history across the centuries, and rarely utilized for the study of climate and history, especially tracing the Philippine population's vulnerability to natural hazards.[16]

The most complete sets of parish records for anywhere in Southeast Asia prior to the nineteenth century are found in places like Nagcarlàn in Laguna, a local church archive with more than two hundred thousand events recorded on more than 42,000 manuscript pages, as well as census-type civil records comprising another twenty volumes that have been compiled and maintained by the parish priests. Despite the difficulties entailed in using the records found in Nagcarlàn and in other neglected parishes across the

[14] Selga (1972).

[15] Report of the Philippine Commission to the President, vol. IV, paper no. 20, 'Religion,' p. 100; Scott (1994).

[16] Doopers and Xenos (1998).

archipelago, Peter Xenos, Daniel Doeppers, Linda A. Newsom, Michael Cullinane and Norman Owen have used such sources to better understand the character of demographic change, the impacts of infectious diseases, and patterns of crisis mortality, due in part to climate change and vulnerability to natural hazards.[17]

A seventeenth-century description of a canonical ritual begins the entry in the parish records and town chronicles of Tanay. On 28 December 1666, Archbishop of Manila, D. Miguel Poblete, administered the sacrament of confirmation and also blessed the church bell. He encouraged the local authorities to use the bell, not only for religious ceremonies and public functions, but also to warn the community against natural calamity, especially typhoons and fires.[18]

Indeed, three typhoons struck Tanay between 1830 and 1840. One of them, the super typhoon that struck Manila on the night of 22–23 October 1831 had, on the night of 19 October, already struck Tanay with such force that every dwelling was left destroyed or damaged, fields were flooded, hungry destitute families were forced to move, and poverty and disease followed in its wake.[19]

After two more typhoons the constant high humidity and the torrential rain driven by the typhoon winds seeped into the church's vestry closets and sideboards, causing the eventual ruin of church robes and other official vestments of the clergy. According to the parish records and the letter of an archbishop's envoy, most of the vestments of the parish priest, Francisco Amegol, were useless, having been either destroyed, or damaged beyond repair, by the climate and the relentless impacts of a decade of typhoons.[20] Hence, it is often due to entries about storm damage to the church and its contents, especially the ritual paraphernalia that the historian learns of the dramatic passage of a typhoon.

The account books of certain parishes also contain details of specific expenditures for labour and materials to repair damages caused by typhoons to churches, as well as other religious edifices, including the presbytery or priest's house, or a convent. In November 1885, an entry, recorded at the peak of the typhoon season, lists the costs of artisans and materials that were required to repair damage to the church of San Juan Bautista in Daet that had been hit once again by a typhoon:

> 619 pesos for the timber, galvanized iron, and stone masonry, and the sawyers, carpenters, masons and labourers employed to repair the damages caused by the typhoon of the seventh of this month to the bell tower and roof of the church, and to the parish house, for repair of the corridors and windows.[21]

In addition, in parish records there are other types of entries about death and dying which can also provide data to establish the existence of a typhoon and its impact on society. Sometimes the accounts in the register open with terse descriptions about either an individual or mass death caused by a typhoon and its aftermath. The entry pertaining to the following death copied from the parish books of Sariaya, discloses information about a typhoon that crossed Tayabas province in late 1752. The entry about a deceased person

[17] Doeppers and Xenos (2009), Newsom (2009), Owen (1986), and Cullinane (2000).

[18] Miguel Selga S.J., 'Accidentes Atmospfericas Consiguados en los Libros Canonicos de la Iglesia y Legajos Historicas del Pueblo Tanay, Rizal,' Archives of the Manila Observatory (AMO), Box 8, Selga Collection.

[19] Ibid.

[20] Ibid.

[21] Archives of the Manila Observatory (AMO), Box 10, Selga Collection, 'Datos que Recogi en Daet, cuando visite apuella estacion y examine los libros del archivo Parroquial.'

who could not receive the last rites was signed by Fr Miguel Garcia, who recorded that, 'on December 12, 1752, buried in this church of N.P.S. Francisco de Sariaya, was the body of Luis de Villanueva, *bagun tao* [bachelor] who died suddenly, having been caught inside a house that was demolished by the *baguio* and was unable to receive any sacraments.'[22] From a purely demographic standpoint, this 1752 example of a seemingly insignificant tragedy must be placed alongside other impacts such as food shortages, starvation and mass misery brought about by typhoons and flooding rain.

Historians can also obtain information about typhoons, floods and drought events, which frequently reduced or destroyed the normal supply of food, from a careful examination of entries about food and scarcity in early Spanish lexicons of Philippine languages. Malcolm Mintz, a linguist of the Bikol language, has used dictionary entries, primarily from Fr Marcos de Lisboa's *Vocabulario de La Lengua Bicol* (circa 1609), to glean important facts and insights about links between food scarcity and the impact of natural hazards.[23]

The Jesuit sources and the new field of colonial meteorology

The Jesuits were expelled from the Philippine archipelago in 1768. When their Order returned to the islands nearly a century later, the reinstated Jesuit fathers would help pioneer the theory and practise of the new science of meteorology, particularly the systematic study of cyclonic storms, weather models and reliable forecasting techniques for the Asia–Pacific Basin. By the end of the nineteenth century, they had managed to establish in Manila a central mission house and municipal school, the normal school and, most importantly, a world standard meteorological observatory.[24]

The Jesuits' Manila Observatory went through several transformations depending on the political masters in charge at any given time—the Spanish, the Americans and after World War II the Philippines Government. Three men were particularly important in the early work of the observatory. Father Fredrico Faura was founder and director of the Manila Observatory from 1865 until his death in 1897, during the Spanish period.[25] Father José Algué reorganised the meteorological service of the Philippines under American rule and was at the helm of the observatory from May 1901 until his retirement in 1925. The following year Father Miguel Selga took charge and developed a system that allowed for the tracking and forecasting of these deadly cyclonic storms with ever more accuracy and reliability.[26]

These men pioneered the collection of climate and weather data using scientific methods and the precision instruments that were at their disposal. The Jesuit meteorological records and scientific data rapidly accumulated across the years and the information collected became essential for reconstructing the long-term history of cyclonic storms. From the start, the Jesuit meteorologists codified and published their findings about typhoons and other natural hazards in scientific journals or monographs. Found in the observatory records are the macro-empirical data, the personal correspondence, files and published monographs, that link the unfolding history of the Manila Observatory with regional-local, social and environmental histories, patterns and trends.

[22] Archives of the Manila Observatory (AMO), Box 17, Selga Collection, Miguel Selga SJ, 'First Catalogue of Philippine Baguios,' no. 59, 1752.

[23] Mintz (2002, 2004).

[24] Defensor (1960).

[25] Hennessey (1960).

[26] Hidalgo (1967).

In particular, the works of Algué and Selga are critically important for the study of weather patterns in the Philippines. Algué's contributions included, *Baguios ó Ciclones Filipinas* (1897), *El Baguio de Samar y Leyte 12–13 de Octubre de 1897* (1898) and *The Cyclones of the Far East* (1904).[27] Selga maintained a prolific output of scientific and historical writings—essays, reports, and notes—about virtually every aspect of climate and history in the Philippines. His catalogue of tropical cyclones from 1348 to 1934 (*Primer Catalogo de Baguios*) was a major achievement for the study of Philippine cyclonic storms in the pre-instrument era.[28] Other personnel of the Weather Bureau also contributed important reports and scientific papers. One was written by Fr José Coronas SJ who meticulously recorded and analysed Philippine weather data for over three decades to produce, *Climate and Weather of the Philippines, 1903–1918* (1920).[29] In 1948, Fr W.C. Repetti, published *The Manila Observatory: Manila Philippines*—another important text for use by those interested in studying typhoons in the Philippines.[30]

The publications of the Weather Bureau after 1902 also included the monthly *Weather Bulletin*s and the first in a series of pamphlets on theoretical and practical meteorology, entitled 'rain' (*la lluvia*).[31] The *Weather Bulletin* was published in English and Spanish for the benefit of commercial, agricultural and political circles within the Philippines, and for neighbouring countries. Its standard contents included general notes on the weather, magnetic disturbances, earthquakes, crop service, entomological notes with illustrations, and a review of the meteorological observations made in the Central Observatory.[32] These published Jesuit meteorological reports, and the monthly *Weather Bulletins* are a treasure trove.

The Manila Observatory, the forerunner of the current weather bureau, was the final repository for the Philippine weather records before the Second World War. Tragically, in 1945, much of this macro-empirical data was lost when the Observatory was totally destroyed in the bitterly contested battle to liberate Manila. Despite the enormous loss, the Jesuit staff of the Manila Observatory managed to save a small cross section of pre-war records that are of considerable historical value. This priceless collection, which contains some of Fr Selga's papers that survived the fire and destruction, was painstakingly salvaged and assembled in part from among the ruins of the Observatory. These fragments—letters, notes, reports—pieced together as a discrete collection were all that remained from the unparalleled set of records compiled and collected for the pioneering establishment of modern meteorology and the wealth of other scientific, technological and social data accumulated by the Jesuits over the previous 80 years.

American colonial and post-war Philippine weather records

When the United States acquired the Philippines as a result of the Spanish-American war, it created an agency of governance, the Bureau of Insular Affairs (BIA),[33] which became the repository of all records relating to the American civil administration of the Philippines

[27] Algué (1897, 1898, 1904).

[28] Selga (1935).

[29] Coronas (1920).

[30] Repetti (1948).

[31] Report of the Philippine Commission to the President, the Civil Governor, 1900–1903, 'The Weather Bureau,' p. 605.

[32] Report of the Director of the Philippine Weather Bureau to the Department of the Interior, 31 August 1904.

[33] Maxwell (1971).

that did not remain in the islands. These records included interpretations of orders, laws and rulings, and decisions by the Secretary of War on civil questions concerning the governance of the islands. Most importantly for the study of typhoon and human-environment interaction in the Philippines, the Bureau was the knowledge bank regarding physical, cultural and geographical information about the archipelago. Indeed, the Annual Reports of the Governor General of the Philippine Islands often provide detailed information about the impact of locust plagues, the scourge of rinderpest, the lack of decent roads and bridges, and the estimated damage caused to property by natural disasters. The correspondence and reports of the Bureau are stored in several major record series of which the most important for the study of the typhoons and their impact on Philippine society are the general classified files in the United States National Archive.[34]

Climate and weather reports, and meteorological instrument records were considered by members of the Philippine Commission—both military and civilian—to be vitally important sources of information for farmers, fishers and especially for ship captains and merchants. The weather reports and related statistics were also considered critical for solving complex economic and environmental problems, and predicting future economic growth to be achieved through agricultural and commercial development. Given that the scientists of the Manila Observatory had been compiling an immense store of scientific and meteorological data since 1859, the information would help frame and establish a new scientific, social, and technological 'future'; one based upon an era of progress and stability, and predicated upon the principles and values of American governance and the seeming superiority of a modern rational economic and scientific approach.[35] The Weather Bureau, under Algué's leadership, with the Manila Observatory as the central office, was established by the second Philippine Commission in May, 1901.[36]

The weather bureau

The Weather Bureau was located within the typhoon belt of the western Pacific, hence the instrumental data, which the Jesuit meteorologists recorded and readily made available, proved of inestimable value to the American colonial administration, commercial interests and the public at large.

Quantitative and qualitative data was collected by the new Weather Bureau on the tracks and monthly distribution of cyclonic storms and their impact on typhoon-prone regions. In compiling their statistics the Jesuit meteorologists utilized the data of the meteorological observatories of Tokyo, Zikawei (Shanghai) and Hong Kong, as telegraphic communication was established across Northeast Asia. To establish each typhoon track, the Weather Bureau made use of at least ten, sometimes up to twenty or more reports received from ships and the network of observation stations scattered throughout the islands.[37] The late nineteenth-century trends in the historical record tended to confirm the patterns emerging in the instrumental data compiled by the recently established Weather Bureau; patterns which graphically depicted typhoon tracks for both month and year spans, as well as normal deviations and rogue tracks, during the half century of American rule.[38]

[34] United States National Archive, Record Group no. 350, File 2711-1, 'Hurricanes in the Philippines.'

[35] See McCoy and Scarano (2009).

[36] Repetti (1948).

[37] Louis Froc (1920).

[38] Ibid.

However, important sources of instrumental and observational data for the study of typhoons and related weather phenomenon in the post-Second World War era are fragmentary. In part, this lack of information is due to the harmful development-from-above strategy imposed on the post-war Philippines and the resulting social costs and struggle for the environment that led to more foreign control over resources, and dictatorship.[39]

In the post-war era, in the year of the Manila Observatory's Centennial in 1965, meteorologists were still frequently unable to reliably forecast when a particular typhoon might cross the islands. Philippine meteorologists in the 1960s, like their Jesuit predecessors, did not yet possess the appropriate technology and models of cyclone evolution to detect well in advance the formation of a distant typhoon and always accurately select its track, or possible course.

More recently, the appropriation of the weather, namely the reliable monitoring and forecasting of typhoons, tsunamis, floods and droughts is done by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), while seismic activity—earthquakes and volcanic eruptions—are the administrative and scientific responsibility of the Philippine Institute of Volcanology and Seismology. Both agencies enjoy the same kind of high credibility and authority that was reserved for the Jesuits in the first half of the twentieth century.[40] In December 1978, PAGASA published a brief, useful summary on tropical cyclones that had developed within or entered the Philippine area of responsibility during the period 1948 to 1978—a period of 31 years. Since then it has produced annual Tropical Cyclone Summaries. These provide information on the maximum wind speed, the 24 hour rainfall recorded, the minimum sea level pressure, the areas affected and, sometimes, the estimated damage to life and property. PAGASA reports on the annual rainfall data gathered from 1950 to 1990 reflect the trend of rainfall distribution on the 'onset, during, and after the ENSO' (El Niño Southern Oscillation).[41]

When major typhoons strike, PAGASA goes into action helping government agencies, non-governmental organisations, and the military to assist stricken communities rebound from such terrible events. By the end of the twentieth century, the Philippines were considered an 'old hand' in Asia when it came to the state coordinating the response for disaster relief operations and humanitarian assistance. Hence, the fragmentary post-Marcos era documents consist of the Disaster Coordination Council's typhoon impact records linking national, provincial and *barangay* levels, the reports of NGOs on the effectiveness of humanitarian assistance during such times of calamity, the files containing the disaster response reports of the Philippine branch of the Red Cross, and the documents of the Office of Civil Defence (OCD) and the armed forces of the Philippines. These disparate records scattered in various locations are an invaluable source for attempting to reconstruct the processes of how a disaster-prone society has responded in more recent times to typhoons and nature's rampages.

[39] See Bello et al. (1982) and Broad and Cavanagh (1993).

[40] See the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) website, online: http://www.pagasa.dost.gov.ph/. PAGASA is the Government agency for weather forecasting, flood control, astronomical observations and time service.

[41] Benson (1997).

Voices of the past: oral history

Filipinos, prior to the Spanish conquest, were acutely aware of how the climate fluctuated and changed, especially with respect to variations in the wind, cloud formations and ocean currents, when forecasting destructive tropical cyclones. Annually, different parts of the pre-Hispanic Philippines experienced a potentially dangerous typhoon season. The wind wanted to speak and the coastal populace had to learn how to listen. There was no illusion of safety along the coastal stretches of eastern Luzon, Samar, Leyte and northern Mindanao. The fishers and farmers subsisting in these vulnerable areas, places frequently hit by typhoons, floods and storm surges, often survived because they knew how to listen, and how to observe changes in the sky and sea from telltale meteorological signs. However, they believed that death and destruction wrought by natural calamity were an inevitable part of life. To live, stay alive, get through one extreme typhoon and then the next, one flood season and then the next one; this was the age-old Tagalog-Visayan mandate. In such circumstances, especially during severe storms that still came annually and evoked the past, all Filipinos could try to do was to pass on to their children their local knowledge, memories and experiences about the social construction of a pre-Hispanic meteorology. Fr. Selga would find in the early twentieth century that some of these traditional beliefs and practices that still held true in daily life were found to have genuine scientific value in the construction of a modern meteorology. These storytellers and chroniclers were the caretakers of a peasant meteorological tradition—the carriers of an oral culture that once covered the coastal fringe of the Philippines.[42] It is not surprising then that in recounting important events in their lives the most destructive typhoons and floods were often not forgotten on an intergenerational basis in various areas—local traditions, history and folklore filled with detailed accounts of past storms and floods, demonic winds and rampaging waters.

Peter Hinton argues that disasters, irrespective of their scale, retain a relative power over the cultural imagination and memory. He maintains that although some cyclonic storms caused no deaths and probably were not even reported outside a country like the Philippines, they still share similar features with larger disasters. 'These include the reminder of ultimate vulnerability … the fact that the storm destroyed a great deal of property; and the reasonable expectation that it will long be remembered and increasingly mythologized as memories are passed on.'[43] Pre-Hispanic Filipinos could not afford to forget their fear of the wind and the sea. If they did so, they were ready to die. The presence of such eschatological memories compels the environmental historian to search for deeper meanings underpinning natural disasters, and to seek answers to the way the imposition of colonial ideas of rationality and science, 'may have reduced the capacity of disasters to exercise our imagination for they have deluded us into believing that the human race is immortal, that we can handle any obstacle that nature—or our own miscalculations—might place in our way.'[44]

Hence, for Filipinos, 'meteorology counts,' living from one typhoon season to the next, and one harvest season to the next, was a simple but effective method of reckoning time; it was also a way of life. When a remarkable typhoon occurred in a particular year it was remembered and later, under Spanish rule, was recorded in a parish chronicle or town

[42] See Archives of the Manila Observatory (AMO), Box 22, Socorro Policarpio, 'Facts on Tagalog meteorology.'

[43] Hinton (1992).

[44] Ibid.

minute. Typhoon strikes were a routine hazard in many parts of the Philippines for as long as people could remember. Hence, the social dimensions of the memory of such a chronic natural hazard could not be readily suppressed or lost under normal circumstances. The typhoon, precisely because of its recurrent nature, became a significant part of the lived experience and collective memory of the islands' inhabitants in regions and areas historically hit by storms, across time.

Such oral traditions about weather events can be used to help reconstruct climatic trends and patterns and for comparative purposes. For example, owing to the lack of detailed reports about the birth of Philippine typhoons in the Marianas islands, a series of items published in 1870 by a resident of many years on the islands, was of inestimable value to Jesuit efforts to forecast, far enough in advance, the onset and track of remarkable typhoons. Speaking about local knowledge, based on oral traditions, concerning the cyclical pattern of the cyclonic storms of the Marianas—the nursery of Philippine typhoons, the long –standing resident states:

> During the 20 years and over I have lived in this island of Guam, I knew of but one typhoon or rather violent hurricane, which was on September 23, 1855, and caused horrible havoc, blowing down all the houses of wood, and some others of stone, many trees, and some of them over a hundred years old.… According to what I have heard from several old natives, these hurricanes occur every 18–22 years. Except for this, I have seen various baguios or collas in the following months: February, about two; April, 2 or 3; June, 1; September, several; and November, various.[45]

It is from a clear understanding of the past workings of the weather expressed through such memories that the historian of climate variability can begin to trace the actual impact typhoons have had on social structure and societal shifts, and how the mechanisms and patterns of traditional social systems have coped under stress with natural hazards.[46] Local memories of storm events were rarely chance occurrences, or based on retrospective accounts. The trauma of such events faded far more slowly from human consciousness because the recurring presence of typhoons made a deep impression both individually, at a particular place and moment in time, and collectively, across time.

Fr Selga's perceptive pioneering work on typhoons, memory and oral traditions made extensive use of the spoken words of elderly local people, as well as those noted down in the parish chronicles and town minutes based on earlier oral accounts. He was able to capture from terse recollections and memories the tragedy, tensions and pathos that resulted from the sudden destruction of a community—the loss of lives, crops and livestock, as well as the memory of a collective trauma triggered by an extreme typhoon strike that lingered far longer than the pain and suffering surrounding the event itself.

The structure, thought and reality of remembering a particular typhoon event was achieved by memorizing several lines, or a paragraph of an informal oral tradition, recalling a particular typhoon that occurred in a period of time before the memory of people still living and then elaborating on the received tradition, which could invariably result in further information being recalled that had been passed down from an earlier generation, while the words and the structure of the narration have not.[47]

[45] 'Typhoon, September 23, 1855,' in Selga, Charts of Remarkable Typhoons in the Philippines, 1902–1934.

[46] Torry (1979).

[47] On the problems of recording and analyzing formal traditions, informal traditions and personal recollections see Vansina (1965).

Selga's research demonstrates that Filipino memories of unusual weather events, especially of remarkable typhoons, did not necessarily fade with the passage of time. Filipinos could recall memories and the trauma of such events especially in what they considered one of the most dangerous sets of months in the typhoon season, October–November. For example the enormously destructive typhoon that hit the provinces south of Manila in mid-November 1844 destroyed more than ten thousand houses in Camarines Norte and Tayabas; displaced more than fifty-thousand people; sank some inter-island ships; killed more than five hundred draught animals at Boac; demolished five churches; ruined thirteen parochial houses; and badly damaged thousands of old-growth trees. Except for the typhoon of 1811, 'the people of Tayabas did not remember any stronger typhoon than this one.'[48] According to the Governor of Camarines Sur, this typhoon, which lasted almost 24 hours, was stronger than 'the great one' that had devastated Manila in 1831. The continuity of the collective memory of such harrowing events, stretching right across the decades and landscape of Luzon, is also confirmed for posterity by the following 1845 entry in the books of the parish archives of the town of Imus, Cavite: 'On November 3rd, 1845, a baguio caused considerable destruction to the houses. There were no personal casualties, but the water was higher than that of the terrible storm of October 22, 1831, which the natives declared was unequalled in fury by any they have yet seen.'[49]

The historian of climate and society must employ oral history to resurrect the local knowledge and experience of Filipinos and their communities that annually faced typhoons. The advantage in the telling and recording, both past and present, is that by listening carefully to ageing informants an 'inside' view of the lives of fishers and farmers emerges within a visitable past; a worldview revealed reminding us about the inner workings and details of their daily lives, and the very real dangers of natural hazards, such as typhoons and floods threatening livelihoods, their long-standing impacts and the vulnerability of particular areas. In view of the loss and destruction of official documents about climate and weather in the Philippines over the centuries, and the paucity of personal written records of ordinary people, it is difficult to write a history of environment-human interaction in the Philippines without encountering some political or administrative bias. The evidence from oral history helps the historian make better use of existing documents by paying close attention to the authentic and compelling expressions of human experience that are often enmeshed in the details of everyday life and which are apt to be inadvertently or deliberately overlooked in the official record.[50]

It is also important to give primacy to the role of oral traditions and memory with respect to the recollection of typhoon-induced floods. Filipino elders had developed indigenous methods for the forecasting of floods that often followed in the wake of cyclonic storms. These inhabitants realised that the security and welfare of the present and future generations rested in part on reliable extrapolations from the flood record of the past that had been built up over the centuries. Generations of indigenous peoples had spent many lifetimes developing an intimate environmental knowledge of the Philippine Island world as a dynamic ecological system. By way of contrast, the Spanish and Americans had occupied the archipelago for only a few centuries, too short a span of time to completely understand the natural rhythms of past-future climatic developments and environmental

[48] 'Typhoon, November 13, 1844,' in Selga, Charts of Remarkable Typhoons in the Philippines, 1902–1934, Catalogue of Typhoons 1348–1934.

[49] 'Typhoon, November 3, 1845,' in Selga, Charts of Remarkable Typhoons in the Philippines, 1902–1934, Catalogue of Typhoons 1348–1934.

[50] Warren (2003).

change. Here the classic assumption that living in the present moment was the essential key to understanding changes in climate and weather proved to be a dangerous fallacy for both the Spanish and American colonizers in the late nineteenth and early twentieth centuries. Rather it was the flood memories and stories of elderly Filipinos utilized in combination with Jesuit science in the 1920s and 30s that established the foundations for a reliable ecological history of the areas and regions most likely to suffer widespread flooding, economic damages and loss of human lives.

The press and the human face of tragedy

In terms of the sources and comprehensive coverage of the impact of natural hazards upon the Philippines, the detailed accounts of personal suffering and material devastation recorded in the nineteenth and twentieth century newspapers often related to the calamity caused by extreme typhoons and floods. The lengthy graphic articles, which the major Manila and regional newspapers published about the huge scale of the losses caused by particular typhoons and floods across the decades, enable the historian to focus on the human face of calamity, as well as investigate at point-blank range the economic impact and trauma that resulted from such disastrous events. The newspapers highlighted the tensions, contradictions and changes caused by the linked processes of human-environment interaction and colonisation, economic development and modernisation, the accelerated rhythms of life, increasing population densities, pell-mell urbanisation, complex networks of communication, and the search for more reliable methods to forecast and appropriate the weather. The post-war Philippine press has shown a tenacious sense of social responsibility reflected in their persistent damning criticism of major environmental issues and problems, despite the press censorship of the Marcos years. In recent years the press has delivered a harsh prophetic, albeit apocalyptic, narrative of wholesale environmental destruction created by the accelerating unfettered dynamics of urbanisation, development and mineral and resource exploitation.

These up-to-date investigative journalistic accounts bring to life an intense struggle over the future of the environment and attempt to explain when, where, and why a so-called ‘natural’ disaster has occurred. A mortal conflict between those perpetrating environmental destruction, and those struggling to cope with its damaging economic impacts and social consequences, was exacerbated in no small measure by recent extreme weather. Some of the 1990s newspaper articles would transform the question ‘Why is there so much disaster relief activity?’ into the truly important and disturbing one, ‘Why is there so little real disaster mitigation?’

Photography and images

There also exist important visual records of typhoons in the Philippines in archives and libraries that are increasingly made more accessible through on-line databases. The most important pictures are found in the United States and the Philippines from the photograph collections of the weather bureaus, aid agencies, private libraries and foundations, the photo files of newspapers, and in books, periodicals and magazines. Intrepid photographers with unwieldy equipment and glass plate negatives were already taking important photographs of good quality at the time a super typhoon hit Manila in October 1882. It is

images of the destruction wrought by these earlier typhoons on bygone Philippine society that remain to haunt the Philippines in the present; the photos bear witness to a past marked by the increasing intensity of cyclonic storms and extreme weather over the course of the twentieth century.

Especially during the second half of the twentieth century, when many Filipinos lived in appalling social and economic conditions, the sensitive photographer sometimes simply could not get it all in the frame: the site of the destructive impacts of a remarkable typhoon resembling a war zone: limbs deadened by pain, bloated bodies and carcasses of farm animals strewn everywhere, the stench of death, and the worn, weather-beaten faces of farmers and fishers resigned to displacement and division, because of the sudden destruction to the community caused by the devastating impacts of a cyclonic storm and flood. Similarly, for a historian attempting to reconstruct the climate variability of the past century in the Philippines, the published up-to-date images of the impacts of extreme weather invariably still do not do justice to the grim reality—like, for instance, when typhoon Sening mauled Manila between 11 and 15 October 1970. The published images, no matter how good, simply cannot capture the sense of what it is like to walk through a devastated area after such a devastating typhoon.

However, a careful 'reading' of the photographic record of images of typhoons is important to recount the full story of Filipino society in calamity. A thoughtful analysis of a series of photographs can provide compelling information about a catastrophic moment in time; reveal something about the character of a people themselves—the physical scale and details of the damage caused by a particular typhoon—and, in the aftermath of a major storm, the unfolding nature of a characteristically ravaged environment in transition and transformation. However, to realize their true potential as a historical source it is important not only to consider empirical questions about what was being recorded in the eye of the camera, but also to approach the analysis of such photographs as 'texts' in order to ask: how was that weather phenomena framed, or 'constructed,' and recorded by the person using the camera?

In 1981, Roland Barthes stated: 'It is the advent of the photograph … which divides the history of the world.'[51] The philosopher Max Wartofsky, in a provocative series of essays about the fields of proxemics and pictorial analyses, further clarifies Barthes' observation about the visual posture common in early twentieth century western photographs of colonial sites, particularly that of the 'detached spectator'—the viewer who is relatively distanced or detached from what is being framed or observed—a term based on a metaphor of the eye as a camera.[52] Wartofsky emphasises that pictorial or photographic representations of, for example, a natural hazard (typhoon, flood, storm surge, famine), or disaster damage depicting the vulnerability of society, are culturally creative acts with a historical basis, that are 'not given but achieved, made, not discovered.'[53] Hence, in a colonial city like Manila, Spaniards and Americans sometimes took photographs of people's calamitous experiences after the destructive passage of a cyclonic storm or flood. These pictures were taken as a way to partially understand, appropriate and disarm nature on the rampage- the terrifying natural 'other' and its impacts on landscapes and human experience, while set against a background of the strength of imperial conviction, political machinations and the face of collective trauma. While the contents of these photographs were either about vulnerable areas or people chronically exposed to typhoons and floods in the Philippines,

[51] Barthes (1982).

[52] Wartofsky (1979, 1980a, b, c).

[53] Wartofsky (1979).

the forms of the photographs remained explicitly western, signifying an affirmation of the rationality of economic and scientific progress under colonial rule.

These photographs cannot give Filipinos and the Philippines back what has been lost and destroyed due to the workings of the weather and climate and the interactions of humans with their environment. Nevertheless, they depict comprehensively the recurring role that typhoons have played since the advent of the camera in Philippine history—nationally and locally; photos visually representing both presidents and peasants under duress bound together as product and fate by recent extreme weather, while also drawing attention to the increasingly precarious lives Filipinos have led in the latter half of the twentieth century, confronting ever more intense cyclonic storms and widespread flooding on an annual basis.

Conclusion

In this paper I have explored some of the archives, repositories and sources that historians need to utilize when they set themselves the task of investigating the workings and impacts of climate and weather, particularly typhoons, on Philippine society and history. I began by discussing the various types of sources that are available to describe and analyse the typhoon's impacts and climate-human interaction over the longue durée. I have focussed my attention upon the Spanish colonial and civil records; various religious records; the particular importance of the Jesuit-run Manila Observatory and the Manila Weather Bureau; as well as records created by the United States administration during the American half century. I have also mentioned some of the historians and social theorists who have been particularly important in guiding my thinking and analyses about typhoons and the study of the history of Philippine society, weather and climate over the longue durée.

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