STATEMENT OF
MS. ROSALINA DE GUZMAN
(Chief, Climate and Agrometeorology Data Section
Philippine Atmospheric Geophysical and Astronomical
Services Administration)

I was invited by Ms. Veronica Cabe, a petitioner in the human rights and climate change case, to act as a resource person for the petitioners to share the highlights of a peer-reviewed research I co-authored entitled, "*Long-term Trends and Extremes in Observed Daily Precipitation and Near Surface Air Temperature in the Philippines for the Period 1951-2010*" and latest PAGASA information on climate change impacts in the first public hearing of the case on March 27-28 at the Commission on Human Rights in Quezon City, Philippines.

I accepted the invitation and I am available on 27 March 2018 hearing. Copies of the study and my *Curriculum Vitae* are appended to this statement as **Annexes** "**A**" and "**B**."

I recalled that Ms. Desiree Llanos-Dee of Greenpeace Southeast Asia (Philippines), one of the petitioners in this case, visited me sometime last year in my office at Philippine Atmospheric Geophysical and Astronomical Services Administration in Quezon City inviting me also to be a resource person for the petitioners. She was, at that time, accompanied by the legal representatives of the petitioners, Attorneys Zelda Soriano and Hasminah Paudac.

On 09 March 2018, Attorney Paudac went to see me at my office, together with Ms. Cabe, requesting for a statement for the March public hearing. I briefly described to Attorney Paudac and Ms. Cabe the study we had regarding the long-term and current observed trends of the Philippines' climate and our vulnerabilities to the impacts of climate-related hazards.

I explained that since 1950s, the Philippine climate, like the rest of the world, is warming. From 1951-2010, there has been an increasing trend in annual mean temperature by 0.65 ^{o} C. Daily temperature extremes reveal more hot days and fewer cold nights. This observation was based on the trends in the frequency of days with minimum temperature below the 1st percentile (cold nights) and the trends in frequency of days with maximum temperature above the 99th percentile (hot days).

With regard to trends in extreme daily rainfall, majority of the weather stations all over the Philippines showed increasing trend in the number of days with extreme rainfall events. Rainfall trends in some synoptic weather stations show a significant increase in both intensity and frequency, particularly in the cities of Laoag, Infanta, Tacloban, Iloilo, and Cotabato.

Extreme rainfall intensity is the mean intensity of events greater than or equal to the 99th percentile each year, while extreme rainfall frequency is the mean frequency of events greater than or equal to the 99th percentile each year.

I also briefly explained El Niño and La Niña phenomena, such that El Niño normally brings dry weather and droughts, but could also bring extreme rains that could trigger floods and landslides in some parts of the country like the 2009 flood in Luzon brought by tropical storm Ondoy and the 2004 landslides in Real, Infanta and Generak Nakar, Quezon. La Niña, on the other hand, stands for rainy weather and floods. Example of this episode which exacerbated flooding was what happened in Camarines Sur during typhoon Loleng in 1998. Also, in 2006 which caused a landslide in Guinsaugon, Southern Leyte and deaths of at least 1,000 residents after strong rains for days. The rain was enhanced by the northeast monsoon affected by the 2006 La Niña episode.

I also had a brief discussion on monsoons. Based on historical records, the worst flood events were also due to southwest monsoons. Recently, however, northeast monsoons also caused severe flooding.

Philippines has seen several climate- and weather-related events, like tropical cyclones and monsoon rains, that have triggered hazards (floods and storm surges), which proved disastrous. We recently had typhoons Yolanda (Haiyan), Sendong (Washi), and Pablo (Bopha). These typhoons caused the highest number of damages to properties and casualties.

Since the topic is really data-driven and technical, I agreed to the legal representatives' concern that interviewing me and documenting my answers in a question and answer format may prove difficult due to the data and science involved, thus, I provided them with my PowerPoint presentation (**Annex** "**C**"), which I promised to present and elaborate on the day of the public hearing.

For added clarity, however, I am quoting below an excerpt or abstract of our study "*Long-term Trends and Extremes in Observed Daily Precipitation and Near Surface Air Temperature in the Philippines for the Period 1951-2010*":

> "Observed daily precipitation and near surface air temperature data from 34 synoptic weather stations in the Philippines for the period 1951–2010 were subjected to trend analysis which revealed an overall warming tendency compared to the normal mean values for the period 1961–1990. This warming trend can be observed in the annual mean temperatures, daily minimum mean temperatures and to a lesser extent, daily maximum mean temperatures. Precipitation and temperature extremes for the period 1951–2010 were also analysed relative to the mean 1961–1990 baseline values. Some stations (Cotabato, Iloilo, Laoag and Tacloban,) show increases in both

frequency and intensity of extreme daily rainfall events which are significant at the 95% level with none of the stations showing decreasing trends. The frequency of daily temperature maximum above the 99th percentile (hot days) and nights at the 1st percentile (cold nights) suggests that both days and nights in particular are becoming warmer. Such indicators of a warming trend and increase in extreme events in the Philippines are discussed in the context of similar national, regional (Asia Pacific) and global studies. The relevance of such empirically based climatology studies, particularly for nations such as the Philippines which are increasingly vulnerable to the multiple impacts of global climate change, is also considered."

Nothing further.

Rosalina De Guzman
16 March 2018