



# The Study of the Unusual Development of the Super Tropical Storms Surrounding Indonesia Maritime Continent Area in March 2018



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## Introduction

Based on the operational notes in relation with the tropical cyclones or storms development over Indonesia Maritime Continent area, it can be stated that surrounding the area to be easily developed with the highest frequency of occurrence over Northwest Pacific Ocean. Besides in this area, there is South China Sea and North Indian ocean which have potentiality for development tropical storm. In this area generally start developing in the middle of the year and last till-end of the year. In other words, most of the Northern Hemisphere area of Indonesia Maritime Continent have period activities. Reversal condition persists over Southern Hemisphere of Indonesia Maritime Continent with period tropical storm activities. On March 2018, there was unusual development of the super tropical storms in both areas of Southern and Northern Hemispheres. In those areas in the year 2018 super tropical storm "Marcus" developed over Southern area that had activity period from middle till end March 2018 and super tropical storm "Jelawat" with activity period starting March end till April beginning over Northern area.

Those super tropical storms development of Indonesia Maritime Continent as unusual super tropical storms, because these tropical storms developed fast into severe storms with maximum 80 knots in the center. These were classified as Willy-Willy and Typhoon which were tropical cyclone over Northern Hemisphere and the super tropical cyclone over Southern Hemisphere of Indonesia Maritime Continent respectively. Another physical aspect with regard to global scale of atmospheric dynamic existing especially with some features from the meteorological disturbances in the global and regional scales. From observation in the global aspect of the tropical wave, pulse the Madden Julian Oscillation was weak. And from the global phenomena of the El Nino and La Nina episodes Information from World Meteorological Organization source, the global scale condition would be the normal condition. It stated that during March 2018 to be in the normal condition without any activities of the global weather disturbances. If it refers to the previous years especially last years both over those areas, there were only a few tropical cyclones development over both hemispheres surrounding Indonesia.

The last year of 2017 during tropical cyclone season over Northwest Pacific Ocean, it seems that the number of the tropical cyclone development to be below normal of the growth of the tropical storm. Even over southern hemisphere area of Indonesia Maritime Continent, from operational meteorologist observed to be less development of the tropical storm during last 5 years. This aspect would be interesting to be studied through analytic and descriptive with regard the atmospheric condition. From the global point of view, it can be stated that the global climate and weather especially starting at the beginning of the years 2018 especially entering into second quarter 2018, some meteorological condition showed the unusual condition in term of the low surface air temperature observed in the lowest atmosphere. The condition of the winter season 2017/2018 could be one of the unusual conditions with increasing the winter storm activities over Northern Hemisphere to affect aerodrome closed for certain airports in big cities of the United States of America and Canada in Northern America Continent, it could be over European Countries and North Asian Continent.

The freezing water Niagara for the first time during last 50 years could be the additional condition from coolest than normal and it might longer than usual based upon public information and collecting the global climatic chart from National Climate Centers under coordination from the World Meteorological Organization. If the condition winter season 2017/2018 compared with the previous condition especially in the 17 years or it could be longest than usual period, the winter season 2017/2018 could be worst condition and situation especially with winter storm occurrences over most northern hemisphere middle of March. Reversal condition over the southern hemisphere with summer season with few day occurrences of the heat wave over Australia continent last January 2018. In the next Figure 1, it would describe the global air temperature (in Kelvin or in Centigrade it should be subtracted 273) at the low level (about 1500 meters from Mean Sea Level) [1] as follows, (Figure 1). Until the end of March 2018 from Figure 1 would present below 273 degrees Kelvin or 0 degrees Centigrade, otherwise until March 2018 most of middle latitude up

to the Arctic areas over Northern Hemisphere has wider than over middle latitude-Antarctic areas of Southern Hemisphere. Based on the operational experience as the meteorologist, the winter season over this area takes place between December-February yearly. The warming area would concentrate over the tropical area in the range 292-302 Kelvin or between 19-29 centigrade. These warm air condition could support the tropical storm generation over southern and northern of East Indonesia Maritime Continent area [2].

From the operational weather analyses with the regard, unusual long winter season over Northern Hemisphere or long summer season over Southern Hemisphere during the end 2018 up to beginning 2018 could encourage unusual weather pattern especially in the regional scale of Indonesia Maritime Continent area. As the area of Indonesia prevails the mostly westerly wind in the lower troposphere would be monsoonal wind system, the activating of the monsoonal wind over Indonesia would take place during December-February normally. Until the beginning of April 2018, the westerly wind system would be active to encourage wind shear as part of vortex development that it would be required for tropical storm development. Even without any support from the global scale weather disturbances such as La Nina episode and pulse of the Madden Julian Oscillation, regional weather disturbance would be enough to support the development tropical storm into two super tropical storms during period mid-March up to beginning April 2018. Where warming of the lower troposphere with supporting cold air advection from the North Pole and the South Pole surrounding Indonesia Maritime Continent would support convective cloud over the tropical area both Southern and Northern hemisphere over the tropical area of Indonesia.

So, the unusual super tropical storm “Marcus”, it generated starting 15 March 2018 in the water’s border between Australia-Indonesia with west-southwestward movement. On twenty-second March 2018, tropical storm “Marcus” became super tropical storm according to Saffir-Simpson (Hurricane/Tropical Storm) [3] source Scale category 5 with wind speed more than 125 Knots and central pressure 916 hectopascal (millibars). This super tropical storm “Marcus” could be strongest of the wind speed surrounding

its center and lowest pressure comparing from the record of the super tropical storm from historical data starting 1980 up to 2018. Because the trajectory of this super tropical storm Marcus would be far away (more than 1000 kilometers) from the islands of Indonesia and continent of Australia, this super tropical storm would give impact in the increasing number of rainfalls over some big islands over Indonesia Maritime Continent such as Sumatera, Java, Bali, Kalimantan, and Celebes Islands (Information from Indonesia Meteorological Services) [2].

The increasing rainfall encouraged natural disaster of the flash flood, flood, and land-slide over populated areas in Indonesia. This super tropical storm Marcus would become weak after entering into high latitude as low-pressure starting 25 March 2018. In the next day of 26 March 2018, over Northwest Pacific Ocean and North of Papua island generated the tropical storm “Jelawat”. It moved toward the north-northwestward direction and it became into the super tropical cyclone on second April 2018 with maximum wind near the center of 85 knots and with the central pressure of 950 hectopascal (millibars). Based on the previous record starting 1980 up to 2018, most every year in March - April the tropical storm never become the super tropical storm in the category between 4 to 5. Based on the weather impact from the area surrounding the track of the super tropical storm Jelawat, then there is no impact as this storm far away from islands. Even though, the two super tropical storms generated during March without any significant impact to the environment, the activity of super tropical storm would be classified into the unusual super tropical storm.

The further study of existing unusual of the tropical storm surrounding Indonesia Maritime Continent to be considered for further study where meteorological science would be varied and dynamic with respect with the time and the air circulation over the lower atmosphere and the environment over earth surface.

**References**

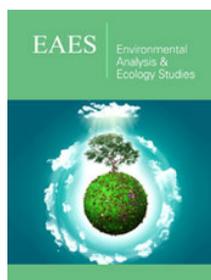
1. Australian Government (2018) Bureau of meteorology. Australia.
2. BMKG (2018) Meteorology climatology and geophysics council. Indonesia.
3. NOAA (2018) National hurricane center. Miami, Florida, USA.



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