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Effects of Global Warming on Climate Change in Udon Thani Province in the Period in 60 Surrounding Years (A.D.1951-2010)

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***Abstract*—**This research were investigated, determined, and analyzed of the climate characteristically change in the provincial Udon Thani in the period of 60 surrounding years from 1951 to 2010 A.D. that it's transferred to effects of climatologically data for determining global warming. Statistically significant were not found for the 60 years' data (R^2<0.81). Statistically significant were found after adapted data followed as the Sun Spot cycle in 11 year periods, at the level 0.001 (R^2= 1.00). These results indicate the Udon Thani's weather are affected change; temperatures and evaporation were increased, but rainfall and number days of rainfall, cyclone storm, wind speed, and humidity, forest assessment were decreased. The effects of thermal energy from the sun radiation energy and human activities that they're followed as the sunspot cycle are able to be predicted from the last to the future of the uniformitarian's the climate change and global warming effect of the world.

***Keywords*—**Climate Change, Global Warming, Udon Thani Province Weather

I. INTRODUCTION

NOT only after the tidal waves of the Tsunami from the Indian Ocean earthquake was an undersea megathrust earthquake has not forgotten with an epicentre off the west coast of Sumatra, Indonesia that struck into southern of Thailand and many countries in Southeast Asia in 2004 was as a direct result of an "tsunamigenic earthquake" but also there were the great floods have covered in China, Taiwan, and Northern of Thailand, and powerful quake rocks Japan, Tsunami hit Japan in 2011 together. The 2011 China floods are a series of floods currently occurring in central and southern parts of China. They were caused by heavy rain that inundated portions of 12 provinces, leaving other provinces still suffering a prolonged drought, a total of over 36 million people have been affected, killing at least 239 and with direct economic losses of nearly US$6.5 billion. The major natural disaster from the effects of Hurricane Ivan in the Lesser Antilles and South America included 44 deaths and over $1 billion in damage primarily in Grenada where it was considered the worst hurricane in nearly 50 years. People have a question with themselves "what have happened of the weather of the world?' The hypothesis of scientists described on this situation, that it's the results from the climate change to build the increasing temperature to effect of air cycling pressure of the world with the climate system and increases in global mean temperature to develop to the heavy thunderstorm for each area. As South Africa prepares to host the United Nations climate change summit in Durban this year, Lake Chad is living proof of the continent's environment in crisis. It was almost double the area of Gauteng just four decades ago but has shrunk by 95%. It is now smaller than Johannesburg. A cyclone in the Indian Ocean hit the Indian state of West Bengal and neighboring Bangladesh, Bhutan has been hit with heavy rainfall and flash floods throughout most of the country, although it is hundreds of kilometers inland [1]. The most common cause of wildfires varies throughout the world. In the United States, Canada, and Northwest China, for example, lightning is the major source of ignition. In other parts of the world, human involvement is a major contributor. In Mexico, a wildfire is any uncontrolled fire in combustible vegetation that occurs in the countryside or a wilderness area. In Florida, during the drought in 1998, catastrophic wildfires burned numerous homes. Russia's record heat wave may already have taken 15,000 lives and cost the economy $15 billion as fires and drought ravage the country. At least 7,000 people have probably died in Moscow as a result of the heat, and the nationwide death toll is likely to be at least twice that figure, a 15-year-old Internet weather service that gathers information from around the world.

A *natural disaster* is the effect of a natural hazard (e.g., flood, tornado, hurricane, volcanic eruption, earthquake, or landslide). It leads to financial, environmental or human losses. The resulting loss depends on the vulnerability of the affected population to resist the hazard, also called their resilience. Natural Disasters are low-probability, high-impact events that can overwhelm physical infrastructure and human communities [2]. Major storm and flood disasters have occurred in the last two decades. The impacts of weather disasters are considerable and unequally distributed. For example, natural disasters have been shown to result in increased domestic violence against. In terms of deaths and populations affected, floods and tropical cyclones have the greatest impact example at as above regions. Vulnerability to weather disasters depends on the attributes of the person at risk, including where they live and their age, as well as other social and environmental factors. The effects of drought on health include deaths, malnutrition, infectious diseases and respiratory diseases [2]. In some regions, changes in temperature and precipitation are projected to increase the frequency and severity of fire events. Forest and bush fires

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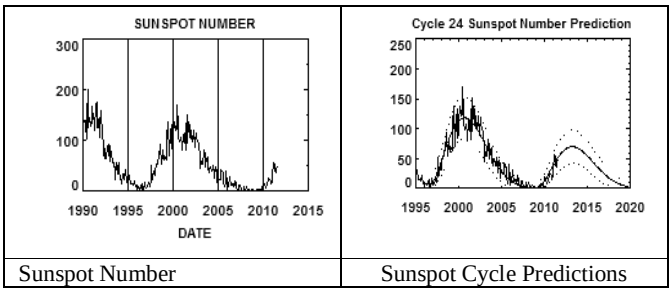
cause burns, damage from smoke inhalation and other injuries. The ratio of natural disaster as 30.7% from over flood disaster, 26.6 % from heavy storm disaster, 11.2% from epidemic disease disaster, and 8.6% from earthquake disaster that it's effected the entire world [3]. Focusing on the continental disaster, to be found that the natural disasters as heavy exploring epidemic disaster in Africa, heavy hurricane storm and over flood in North America, heavy tropical cyclone, over flood, earthquake and tsunami in Asia, flood and heat wave in Europe, and earthquake in Oceania. These situations are reflected of the variable of the world weather clearly [1].

This article is about the effects of global warming and climate change. The effects, or impacts, of climate change may be physical, ecological, social or economic. Evidence of observed climate change includes the instrumental temperature record, rising sea levels, and decreased snow cover in the Northern Hemisphere. According to the Intergovernmental Panel on Climate Change [4], "[most] of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in [human greenhouse gas] concentrations". It is predicted that future climate changes will include further global warming (i.e., an upward trend in global mean temperature), sea level rise, and a probable increase in the frequency of some extreme weather events. Signatories of the United Nations Framework Convention on Climate Change have agreed to implement policies designed to reduce their emissions of greenhouse gases.

The most general definition of *climate change* is a change in the statistical properties of the climate system when considered over long periods of time, regardless of cause [5]. Accordingly, fluctuations over periods shorter than a few decades, such as El Niño, do not represent climate change. The term sometimes is used to refer specifically to climate change caused by human activity, as opposed to changes in climate that may have resulted as part of Earths' natural processes and the differentiation of these two causes, human impact vs. natural processes is a key component of the climate change debate (UNFCCC, 2010). Climate change reflects a change in the energy balance of the climate system, i.e. changes the relative balance between incoming solar radiation and outgoing infrared radiation from Earth. When this balance changes it is called "radiative forcing", and the calculation and measurement of radiative forcing is one aspect of the science of climatology. The processes that cause such changes are called "forcing mechanisms" Climate change will impact agriculture and food production around the world due to: the effects of elevated CO_2 in the atmosphere, higher temperatures, altered precipitation and transpiration regimes, increased frequency of extreme events, and modified weed, pest, and pathogen pressure [7]. In general, low-latitude areas are at most risk of having decreased crop yields [8]. So far, the effects of regional climate change on agriculture have been relatively limited. Changes in crop phonology provide important evidence of the response to recent regional climate change.

Focusing on this research that it was interested at the sunspot cycle, Duvall (1995) found that travel times were reduced for waves traveling through a sunspot with the effect being almost independent of distance. In this case the waves were not measured in the spot at all but by looking at the second time-distance curve [8]. The solar magnetic fields show a remarkable degree of organization on the global scale, displaying the 'butterfly' diagram and polarity reversals quite regularly with the 11-year cycle is believed to be the place of magnetic field generation and the source of the 11-year sunspot cycle [10]. The discovery two decades ago that sunspots act as both absorbers and refractors of incident solar acoustic waves (*p*-modes) offered the promise of probing the subsurface structure of sunspots [11]. Solar physicist David Hathaway [12] of the National Space Science & Technology Center (NSSTC) explains: "First, remember what sunspots are--tangled knots of magnetism generated by the sun's inner dynamo. A typical sunspot exists for just a few weeks. Then it decays, leaving behind a 'corpse' of weak magnetic fields." Current prediction for the next sunspot cycle maximum gives a smoothed sunspot number maximum of about 58 in July of 2013. They are currently two years into Cycle 24 and the predicted size continues to fall. The sunspot number is falling progressively below the sunspot number corresponding to the microwave flux, and the sunspot number will be rather useless as a measure of solar activity, so Hathaway will have to continually adjust the predicted SSN down, the next sunspot cycle would be 30% to 50% stronger than the previous one. If correct, the years ahead could produce a burst of solar activity second only to the historic Solar Max of 1958. The sun's conveyor belt is a current, not of water, but of electrically-conducting gas. It flows in a loop from the sun's equator to the poles and back again. Just as the Great Ocean Conveyor Belt controls weather on Earth, this solar conveyor belt controls weather on the sun. Specifically, it controls the sunspot cycle [13].



Sunspot Number | Sunspot Cycle Predictions

Fig.1 Sunspot number and Sunspot cycle predictions

Thailand is a country with a rich history and distinct cultural identity centered on the Buddhist religion and a respect for tradition. These things, combined with a warm climate and spectacular landscapes, from forested mountains to golden sandy beaches, make it one of the most popular tourist destinations in Asia today. Geographically Thailand can be divided into four regions. In the north, centered on Chiang Mai, and along almost the entire length of the border with Myanmar, are mountains. Thailand has begun implementing interesting strategies to adapt to climate change, to mitigate some of the effects that are already felt across sectors, and to protect farmland, coasts and cities. The lessons learned will prove useful to Thailand as it faces future climate

challenges, and can be referenced by other Southeast Asian countries with similar situations.

Thailand is the home to 65 million people, the majority of whom live in rural, agricultural areas. The country is the world's largest exporter of rice, and is often called *"the rice bowl of Asia."* Agriculture employs 49% of the population and contributes 10% of GDP. Tourism and fisheries abound on Thailand's 3,200 kilometers of coastline and play important roles in the economy, providing 6% of GDP and a livelihood to 10% of the population. The capital city, Bangkok, is home to 15% of the country's population and serves as the economic, political and social center not only for Thailand but for the greater Mekong region, giving it the status of a global city. Climate change threatens all three important sectors of Thailand's economy: agriculture, tourism, and trade.

Today, Thailand produces only 0.8% of the world's carbon dioxide emissions, and has a lower per capita emission rate than the global average (3.25 metric tons in 2002, compared with 3.97 per capita worldwide). However, Thailand's total CO_2 emissions doubled between 1991 and 2002 and the government recognized its contribution to global warming. In April 2007, Bangkok hosted an International Panel on Climate Change summit and in the following year hosted UN climate change talks. The following month, the Bangkok Metropolitan Administration published the 2007 Action Plan on Global Warming Mitigation, calling for reductions in Bangkok's greenhouse gas emissions by 15% below currently projected 2012 levels. [14].

During the past decade, weather patterns in Thailand have fluctuated from severe droughts to severe floods, leaving residential and agricultural areas reeling. Between 1990 and 1993, rainfall was below normal levels, causing water shortages in 1993. Intense rainfalls in 1994 and 1995 resulted in the worst floods in Thailand's recent history. In 2005, 11 million people in 71 provinces were affected by water shortages, in 2008; the population suffers from severe drought again, with over ten million people in the rural agricultural region affected. According to Thailand's Disaster Prevention and Mitigation department, 55 of the country's 76 provinces have suffered, damaging over 150,000 rai (60,000 acres) of farmland, primarily rice paddies. The drought has contributed to concerns of a global food **crisis** and soaring grain prices.

The effects of climate change, including higher surface temperatures, floods, droughts, severe storms and sea level rise, put Thailand's rice crops at risk and threaten to submerge Bangkok within 20 years [14]. The damage to agriculture, coastal tourism, and the capital city as consequences of climate change will have enormous economic, cultural and environmental impacts: one degree of warming will destroy the rice crops that are central to the economy, and a few centimeters of sea level rise will submerge the capital city and devastate coastal tourism. Thailand's mitigation and adaptation efforts include a slow shift to organic agriculture, a tsunami warning system along the Andaman Sea. On December 26, 2004, a magnitude 9.3 earthquake triggered the Indian Ocean tsunami, one of the most devastating natural disasters ever recorded. Anthropogenic climate change causes coastal erosion, mangrove loss and coral reef destruction; in the absence of these natural protective barriers, the giant wave carried its energy all the way to shore, killing over 250,000 people and causing billions of dollars of damage.

In term of the weather of the Northeast region in Thailand, can best be described as tropical and humid for the majority of the country during most of the year [15]. The area of Thailand northeast has a climate determined by three seasons. In northeast Thailand the seasons are clearly defined. Northeast region experiences Savanna (Aw) climate which marks humid hot and dry weather alternatively with medium rain volume. There are 3 seasons including winter, rainy season and summer. Summer is between February and May. It is influenced by southeast monsoon from South China Sea and the Gulf of Thailand. Due to the long distance from the sea, the weather is hot and dry. The province that has highest temperature is Udon Thani. Rainy season is between May and October with an influence of depression. However, the amount of the rainfall is quite uneven although 80% of the total rainfall occurs in August and September, average annual precipitation varies from 2,000 mm. Winter season is between October to February, the region is influenced by northeast monsoon. Then the cold wind and high pressure comes from China and covers the area in the north and northeast regions of Thailand. It can be relatively cool during the night. The average highest temperature is at 32.1 C and average lowest temperature is 21.2 C. The highest temperature recorded was 43.8 C in Udon Thani province, the lowest 0.1 C in Loei province. The lowest temperature is in January and highest in April [15].

Udon Thani (Thai: อุดรธานี) is one of twenty provinces of the north-eastern provinces (*changwat*) of Thailand. Neighboring provinces are (from north clockwise) Nong Khai, Sakon Nakhon, Kalasin, Khon Kaen, Nong Bua Lamphu and Loei. Udon Thani, province covering an area of 11,730 square kilometers, is a prime business center of I-San, is located in the north of the Khorat Plateau, use latitude 17°23'N and longitude 102°48'E in the form and elevation 177 m, in Roman script it is also often spelled *Udorn*. The province is subdivided into 20 districts (*amphoe*). The districts are further subdivided into 155 subdistricts (*tambon*) and 1,682 villages (*muban*). The province is most famous for the archeological site Ban Chiang dig uncovering pottery dating back over 5,000 years with its remains of the Bronze age. Udon is one of the more bustling markets for agricultural goods in the relatively dry northeast of Thailand, and received its biggest economic boost in the 1960s when the US built the Udon Royal Thai Air Force Base as a joint-force military base during the Vietnam War. Udon Thani is also known among Thais for producing fragrant Udon Sunshine perfume, made from an orchid of the same name -- orchids which bizarrely react to music.

Map of Southeast of Asia

Map of Thailand

Map of Udon Thani Province

Fig. 2 Maps of Southeast Asia, Thailand, and Udon Thani Province

Focused on the weather in Udon Thani is dominated by the two Asian monsoons. From May to October the south-west monsoon brings moisture from the Indian Ocean that falls as rain, peaking in August and September. From October to February the wind direction is reversed and a cooler drier north-east monsoon wind blows off the Asian landmass, bringing a dry season. Temperatures fall slightly in the dry season but this is only really noticeable at night. There is a short transitional period between the monsoons during March and April. This is the hottest time of the year over the whole country. With the onset of the monsoon in May temperatures drop slightly and cloudier conditions persist through to October. Udon Thani is largely protected from the full force of typhoons that affect the South China Sea by the landmass of Laos, Vietnam and Cambodia lying between it and the ocean.

This research was thinking of shooting in weather the Udon Thani area, was the 60 surrounding years during from 1951 to 2010 A.D. of weather forecast for showing means of daily, monthly and yearly of the predominant weather conditions including means of temperature, maximum and minimum temperatures, extreme of maximum and minimum temperatures, means of rainfall, maximum and minimum rainfalls, accounting days of rainfall, extreme of maximum rainfall, humidity, air pressure, wind speed, yearly accounting cyclone storms, evaporation of water, forest assessment, and water quantitative of Maekhong river that they are indicators plus directing information analysis.

II. Procedure

This study is the first of its kind. It is unique because it: covers an entire Thailand government region, makes projections of climate change at a new and improved scale of resolution compared to this research, combines cutting-edge research and analyze nationally-recognized professional meteorological substances and the period of time that its' effect from sunspot cycle with the practical experience of staff working at the Udon Thani meteorological station's data, weather, averaged over time—usually a maximum of 60 years. Regional climate means the average weather trends in an area. Considers impacts across a wide range of different sectors, and provides practical advice on adaptation measures within a range of organizations and bodies of data.

A. Research Aims

1. To investigate of the weather in Udon Thani province, Thailand in the period of 60 surrounding years from 1951 to 2010.
2. To provide information on the climate changes that the Udon Thani province, Thailand will face, how these changes should be affected on the Global Warming impact, and what needs to be done now to adapt to the predicted impacts in 60 surrounding years from 1951 to 2010.
3. To compare and determine of the climate changes that the Udon Thani province, Thailand will change in 60 surrounding years from 1951 to 2010.

B. Research Framework

1. The atmosphere plays a major role in controlling the planets' temperature.
2. The climate is changing. The earth is warming up, and there is now overwhelming scientific consensus that it is happening, and human-induced.
3. An important thing to realize when thinking about climate is that, atmospheric and oceanic circulation carries different climatic features all over the planet.
4. The world mostly agrees that something needs to be done about global warming and climate change.
5. The Intergovernmental Panel on Climate Change (IPCC) was created by the United Nations Environment Programme (UNEP) and the World Meterological Organization (WMO) to assess the scientific knowledge on global warming.
6. The IPCC concluded in 1990 that there was broad international consensus that climate change was human-induced.
7. Researches have shown that air pollutants from fossil fuel use make clouds reflect more of the sun's rays back into space.
8. Carbon emissions don't respect borders and the sad fact is that the world's most vulnerable people are the ones that are suffering most from its impacts.
9. The Kyoto Protocol is a crucial first step but far, far more needs to be done.

10. There was a report led way to an international convention for climate change, the United Nations Framework Convention on Climate Change (UNFCCC), signed by over 150 countries at the Rio Earth Summit in 1992.
11. Some researchers have calculated that we have already experienced a rise of about 0.7°C since the start of the century.
12. For many years, large, influential businesses and governments have been against the idea of global warming.
13. An average temperature rise of around 1.3 degrees centigrade above pre-industrial levels is already inevitable and will bring with it some terrible impacts worldwide.
14. A strong consensus has finally been reached; the scientific community now agrees that climate change is real, it's caused by human activity and it's already happening.
15. Thailand plus a few other countries, and many large corporations, have been against climate change treaties due to the fear of the threat to their economy and profits if they have to make substantial changes.
16. Udon Thani Province is located in the north of the Khorat Plateau, between the provinces of Khon Kaen to its south, and Nong Khai to its north.
17. As temperatures in Udon Thani increase further, there will almost inevitably be more flooding, more droughts, more disease and more famine, creating hundreds of refugees and causing the destruction of entire ecosystems and species.
18. Sunspot cycle is an effected of increased temperature is a possible change in the community structure of the weather in Udon Thani.
19. There was the first time for recording data system of the meteorological substances at the Udon Thani Metrological Station in 1951.
20. Model of Climate Cahange of Udon Thani Weather.

C. Research Methodological Steps

1. Writing research proposal for administration by step system.
2. Previous research and literature reviews.
3. Policies and variable Targets; measuring, recording, organizing data and communication, and interpreting data conclusion.
4. Limiting conceptual research definitions.
5. Research example and population for recording data analyze of Udon Thani meteorogical substances in 60 surrounding years.
6. Provides practical advice on adaptation measuring data.
7. Using statistically analysis of data Microsoft Excel Program and SPSS.
8. Research conclusion, explanation and suggestion.

III. MATH

In statistics, a result is called statistically significant if it is unlikely to have occurred by chance.a regression line approximates real data points; an r-squared of 1.0 (100%) indicates a perfect fit. The formula for r is:

$$r(X,Y) = [\ Cov(X,Y)\ ] / [\ StdDev(X) \times StdDev(Y)\ ]$$

The Pearson product-moment correlation coefficient (sometimes referred to as the PPMCC, and typically denoted by *r*) is a measure of the correlation (linear dependence) between two variables *X* and *Y*, giving a value between +1 and −1 inclusive. It is widely used in the sciences as a measure of the strength of linear dependence between two variables.

$$r = \frac{1}{n-1}\sum_{i=1}^{n}\left(\frac{X_i-\bar{X}}{s_X}\right)\left(\frac{Y_i-\bar{Y}}{s_Y}\right)$$

The assessment of correlation via the familiar Pearson product-moment procedure applies only to those situations where one particular member of a bivariate pair of measures unequivocally belongs to the X (Yearly Mean Average Temperature variable) and the other unequivocally belongs to the Y (Others Yearly Mean Average) variables. Both of these measures of correlation have the same level of statistical significance as the F-ratio of the ANOVA from which they derive. The interpretation of eta^2 is straightforward: of the total variability contained within the 15 measures in this data set, that reflects on-average differences among the 15 pairs of twins, any particular pair to have approximately the same measures.

A ***t*-test** is any statistical hypothesis test in which the test statistic follows a yearly mean average temperature's *t* distribution if the null hypothesis is supported. Most *t*-test statistics have the form $T = Z/s$, where Z and s are functions of the data. Typically, this gives information about correlation and re association between variables. The table 2 shows the results of an analysis of variance performed upon this data set, along with two measures of correlation for unordered pairs that can be derived from these results. Statistically significant were found for investigating and analyzing data with multivariate analysis; polynomial function and linear function, the analysis of relative on climate characteristically change with Linear regression, Pearson correlation, and Compare mean (ANOVA-paired sample t-test) were used.

VI. RESULTS

This study is interested in the model of climate change of the provincial Udon Thani's weather in 60 surrounding years from A.D. 1951 – to 2010. The climate characteristically change were investigated, determined, and analyzed, that they're transferred to effects of climatologically substance data for determining of global warming; the mean of temperature, rainfall, relative humidity, air pressure, evaporation, wind speed, cyclone storm, forest assessment and water river at Maekhong river. Statistically significant were not found for investigating and analyzing data with multivariate analysis; polynomial function and linear function, the analysis of relative on climate characteristically change

with Linear regression, Pearson correlation, and Compare mean (ANOVA-paired sample t-test) were used ($R^2 < 0.81$). However, changing and adapted data that it's followed as the Sun Spot cycle for accounting of increasing and decreasing every 4.8 years (1955 – 1962, …, 1999 – 2003 A.D.) and 6.2 years (1951 – 1954, …, 2004 – 2010 A.D.), total is 11 years (1951 – 1954, …, 1999 – 2010 A.D.) surrounding years. In 2008 - 2010 is coming to a close with yet other spotless days according to the latest solar image (The 23rd Sunspot Cycle) and current prediction for the next sunspot cycle maximum gives a smoothed sunspot number maximum in 2013. The findings of this study are following as:

A. Relationships between the period yearly and Udon Thani region weathers in the 60 surrounding years (A.D. 1951 – 2010)

Most climate change simulations are created with models that simulate the global scale and produce global averages as these results, to understand how global warming will affect in regional simulations and impact studies are needed. The 60 surrounding yearly of Udon Thani's weather models show regional models depict the climate of a small area in more detail in Figure 3 (Colum 1). Many of the other equations created to represent physical processes in global models must have more spatial detail in Figure 3 (Colum 2), and both of these studies, along with many others, have been used in preparing the mean average yearly meteorological substances and the period weather changing with the 18 – 23 Sunspot cycle assessments detail in Figure 3 (Colum 3). The combination of tools will allow scientists to incorporate relatively small topographical features.

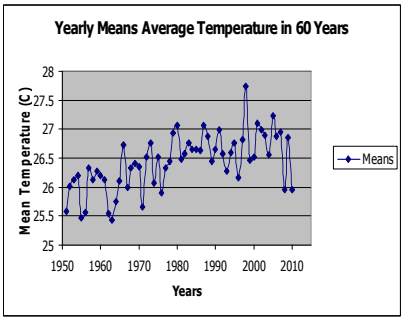
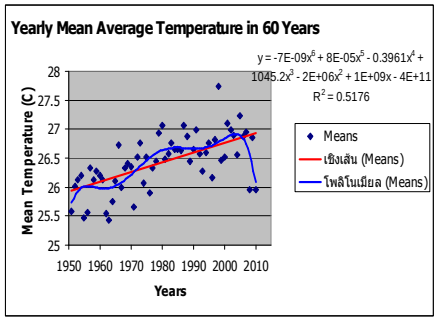
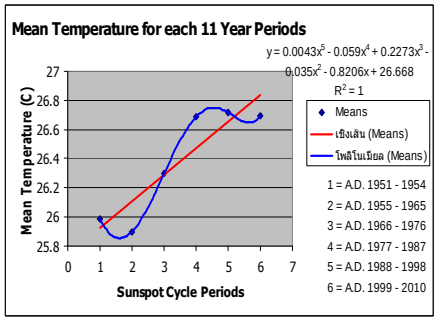
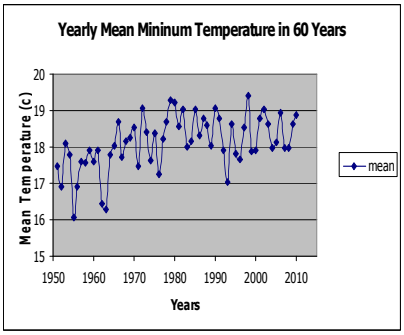
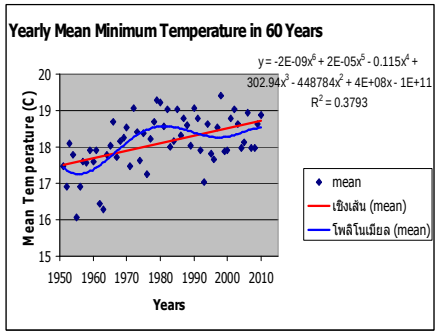
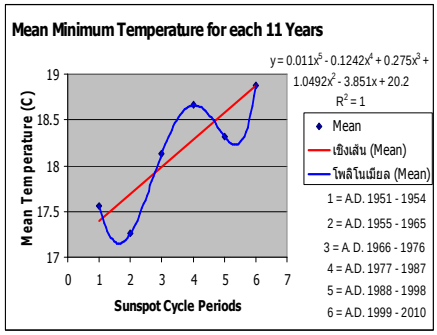
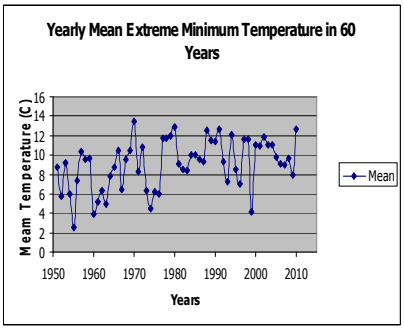
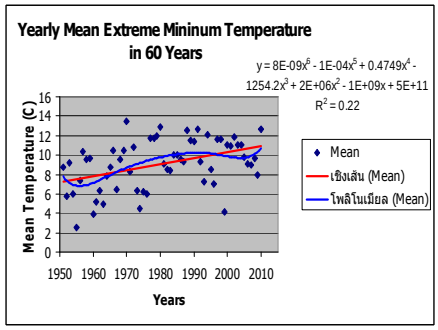
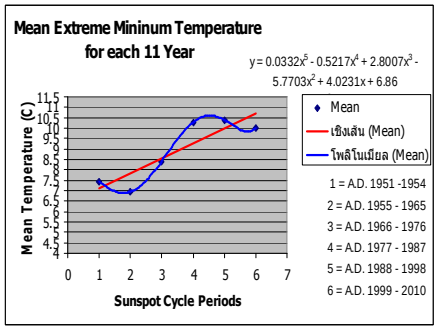
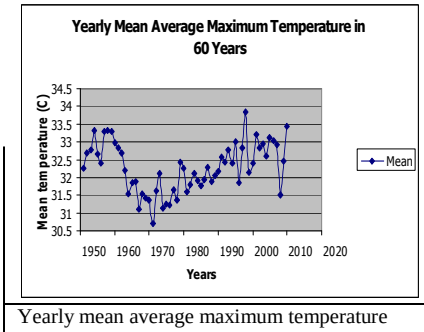
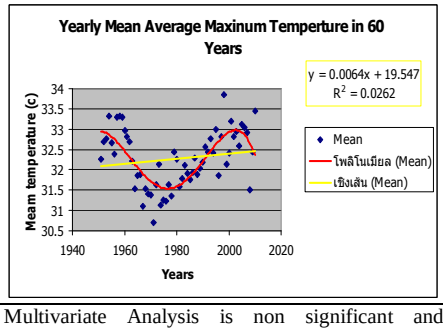
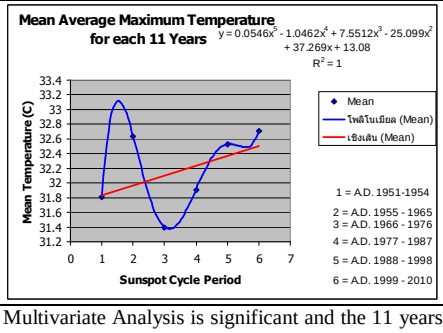
B. The weather of Udon Thani province characteristically in 60 surrounding years (A.D. 1951 – 2010.)

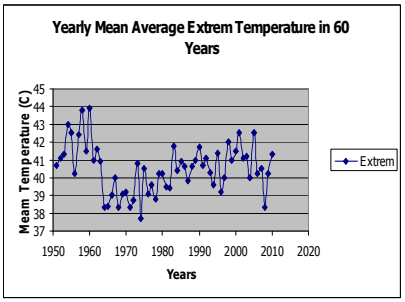
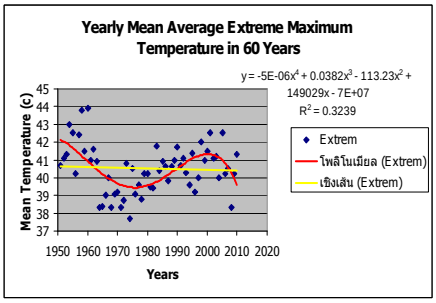
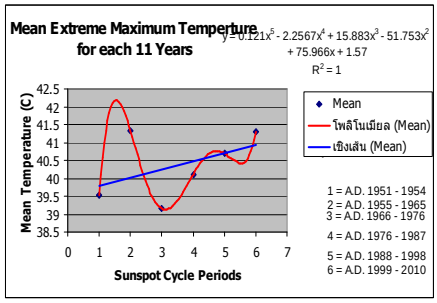
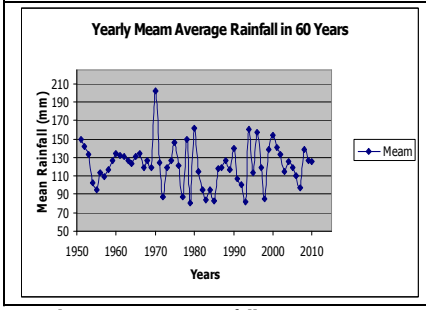
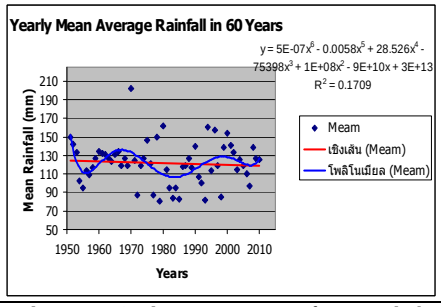
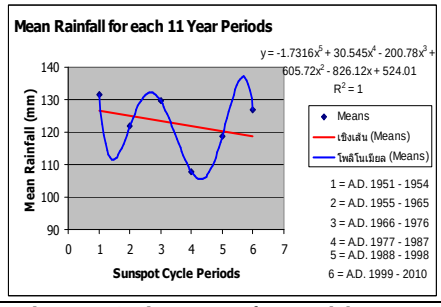
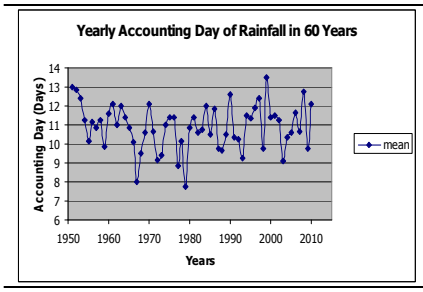
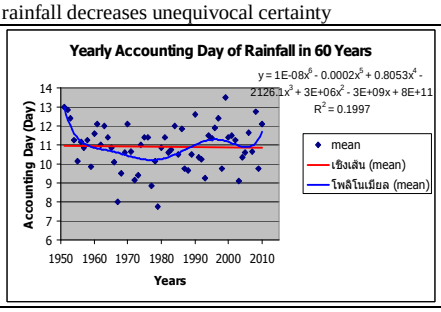
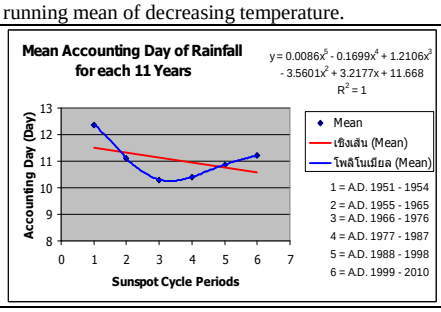
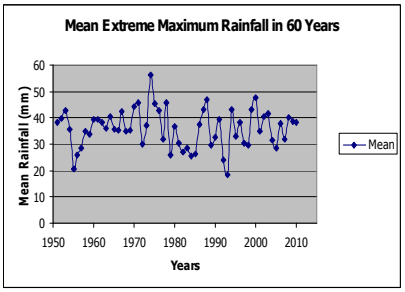
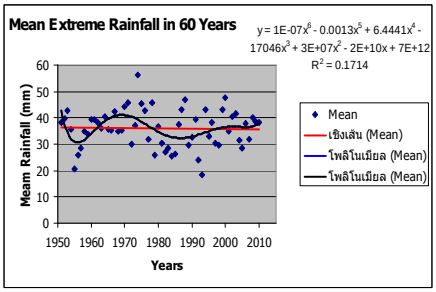
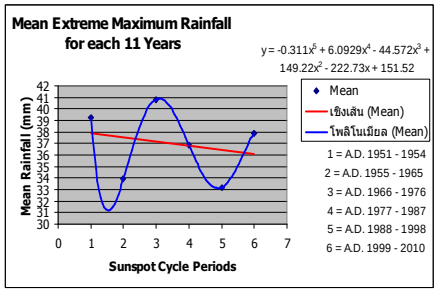
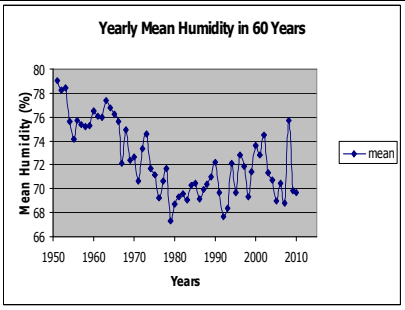
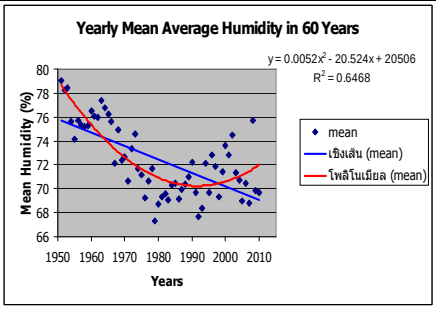
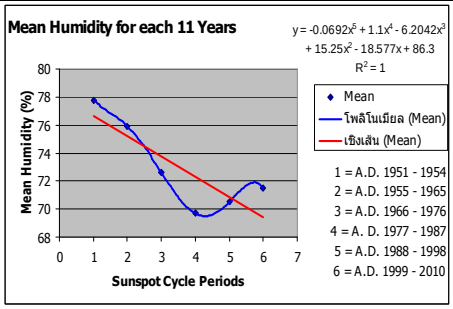
An important research benefit of the effort, which is designed to complement in the period time of 18th – 23rd Sunspot cycle, will be the ability to compare the results of the weather of Udon Thani modeling to more clearly determine the added value of the 60 years ago climate. The yearly mean average of the variables and the impact of climate change are followed as:

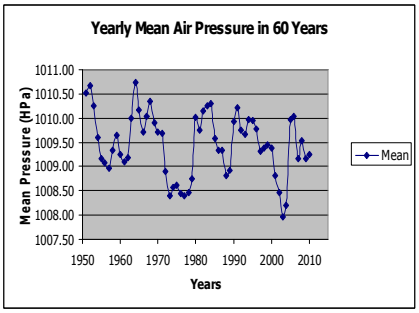
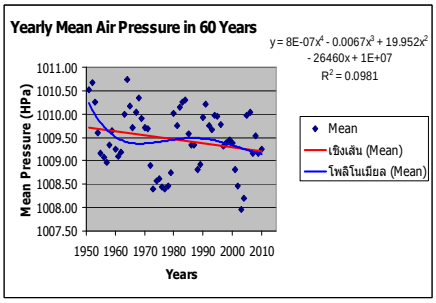
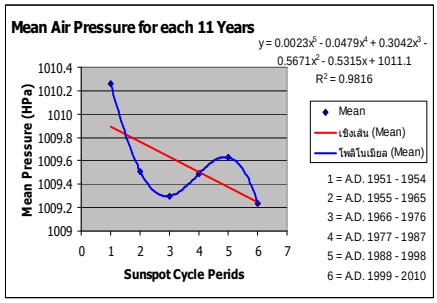
1. Temperature was 26.4 C, and increased by 2.69%.
2. Minimum temperature is 21.7 C, and increased by 5.31%
3. Extreme minimum temperature was 9.1 C, and increased by 8.63%
4. Maximum temperature was 36.3 C, and increased 3.41%
5. Extreme maximum temperature was 40.5 C, and increased by 1.50%.
6. Rainfall was 1476.0 mm, and decreased by 1.52%.
7. Accounting rainfall is 131.8 days, and decreased by 3.34%
8. Extreme rainfall was 438.8 mm, and decreased by 3.42%.
9. Humidity was 72.4%, and decreased by 8.13%.
10. Air pressure was 1009.5 HPa, and decreased by 0.11%.
11. Wind speed was 2.5 Knot mm., and decreased by 18.44%.
12. Water evaporation was 4.5 mm, and increased by 2.03%.
13. Accounting cyclone storm was 3.1 times, and decreased by 42.86%.
14. Forest area assessment in Udon Thani province was 27.3%, and decreased by 77.07%.
15. Forest area assessment in Northeast region was 25.8%, and decreased by 86.32%.
16. Forest area assessment in Thailand was 39.9%, and decreased by 48.65%.
17. Maekhong river level was 6.2 m, and the decreased by 4.63%.
18. Accounting cyclone storm was 3.1 times, and decreased by 42.86%.
19. Forest area assessment in Udon Thani province was 27.3%, and decreased by 77.07%.
20. Forest area assessment in Northeast region was 25.8%, and decreased by 86.32%.
21. Forest area assessment in Thailand was 39.9%, and decreased by 48.65%.
22. Maekhong river level was 6.2 m, and the decreased by 4.63%.

C.Relationships between Yearly Mean Average Temperature and Others Yearly Mean Average Meteorological Data for each 11 Yearly Time followed as Sunspot Cycle Period.

In Figure 3 and Table 1 indicate that the determinants of 60 surrounding years of Udon Thani's climatologically changes are affected of increasing in temperature, minimum and extreme minimum temperatures, and evaporation of water. Weather characteristically decreasing in rainfall and accounting days of rainfall, heavy storm, heavy wind speed, number of cyclone storm, and dry humidity, forest assessment were found. Global warming may be detected in natural, ecological or social systems as a change having statistical significance. Some of these changes, e.g., based on the instrumental temperature record, have been described in the section on meteorological substance changes in Udon Thani, Thailand; adaptation to climate change may be planned. This finding is recognized by the national science academies of all the major agriculture country. The instruments of metrological substances record show that the average global surface temperature increased by 0.71 °C (+2.69%) (1.28 °F), minimum temperature (+5.31%), extreme minimum temperature (+8.63%), maximum temperature (+3.41%), extreme maximum temperature (+1.50%), rainfall (-1.52%), accounting rainfall (-3.34%), extreme rainfall (-3.42%), humidity (-8.13%), air pressure (-0.11%), wind (-18.44%), water evaporation (-2.03%), accounting cyclone storm (-42.86%), forest area assessment in Udon Thani province (-77.07%), forest area assessment in Northeast region (-86.32%), forest area assessment in Thailand (-48.65%), and Maekhong river level (+4.63%) during from 1951 to 2010 A.D. They indicate that during the 21st century the global surface temperature is likely to rise a further 1.5 to 1.9 °C.

Modeling the Weather of Udon Thani in 60 Surrounding years (A.D. 1951 – 2010)	Associations Graphics of the Weather of Udon Thani in 60 Surrounding years (A.D. 1951 – 2010)	Associations Graphics of the Weather of Udon Thani in 60 Surrounding years (A.D. 1951 – 2010) followed as for each 11 Years of Sunspot Cycle Period Times
		
Yearly mean average temperature	Multivariate Analysis is non significant and this temperature rise is unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of increasing temperature.
		
Yearly mean average minimum temperature	Multivariate Analysis is non significant and this minimum temperature rise is unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of increasing minimum temperature.
		
Yearly mean average extreme minimum temperature	Multivariate Analysis is non significant and extreme minimum temperature rise is unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of increasing extreme minimum temperature.
		
Yearly mean average maximum temperature	Multivariate Analysis is non significant and maximum temperature rise is unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of increasing maximum temperature.

		
Yearly mean average extreme maximum temperature	Multivariate Analysis is non significant and extreme maximum temperature rise is unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of increasing extreme maximum temperature.
		
Yearly mean average rainfall	Multivariate Analysis is non significant and this rainfall decreases unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of decreasing temperature.
		
Yearly mean average accounting day rainfall	Multivariate Analysis is non significant and accounting days of rainfall decrease unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of decreasing temperature.
		
Yearly mean average extreme rainfall	Multivariate Analysis is non significant and extreme rainfall decreases unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of increasing temperature.
		
Yearly mean average humidity	Multivariate Analysis is non significant and Humidity decreases unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of decreasing humidity.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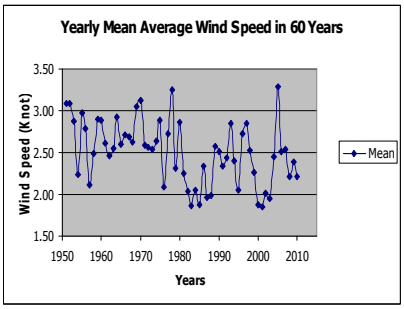
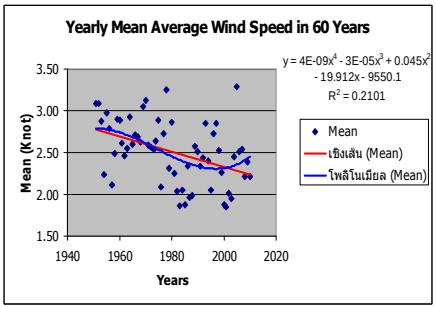
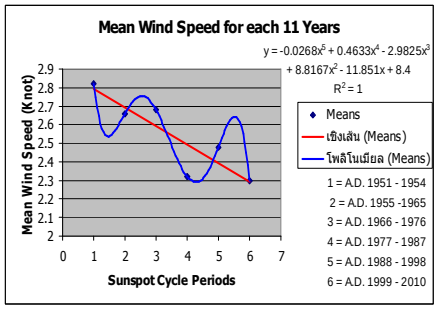
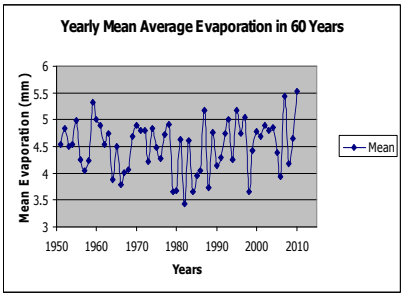
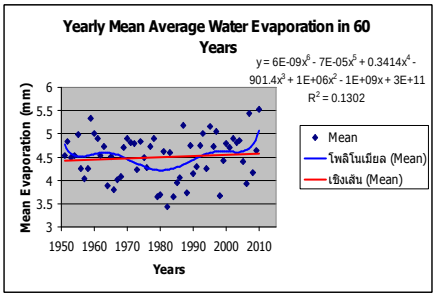
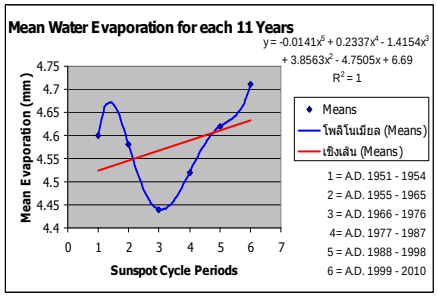
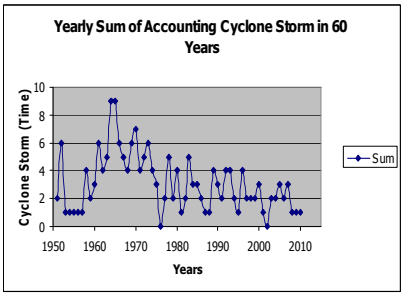
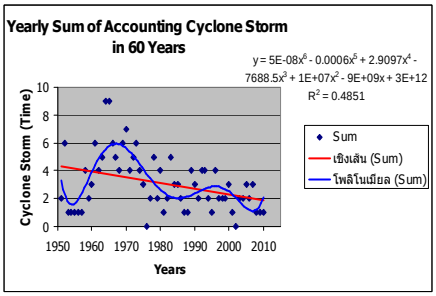
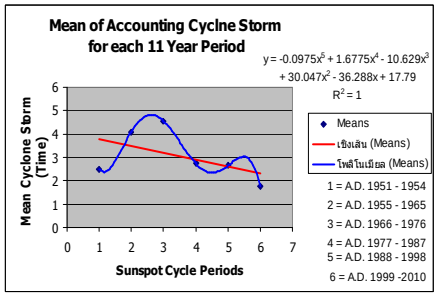
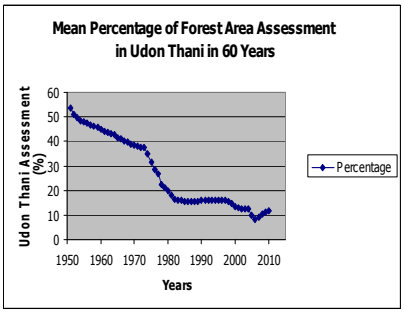
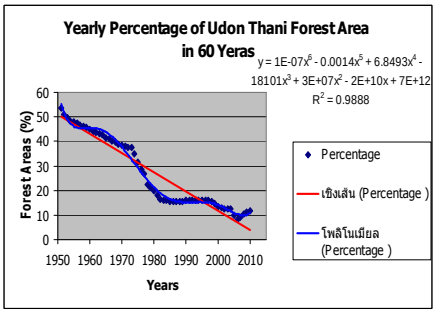
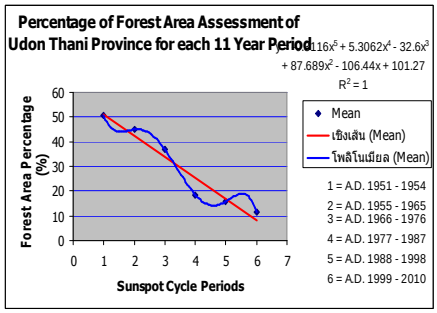
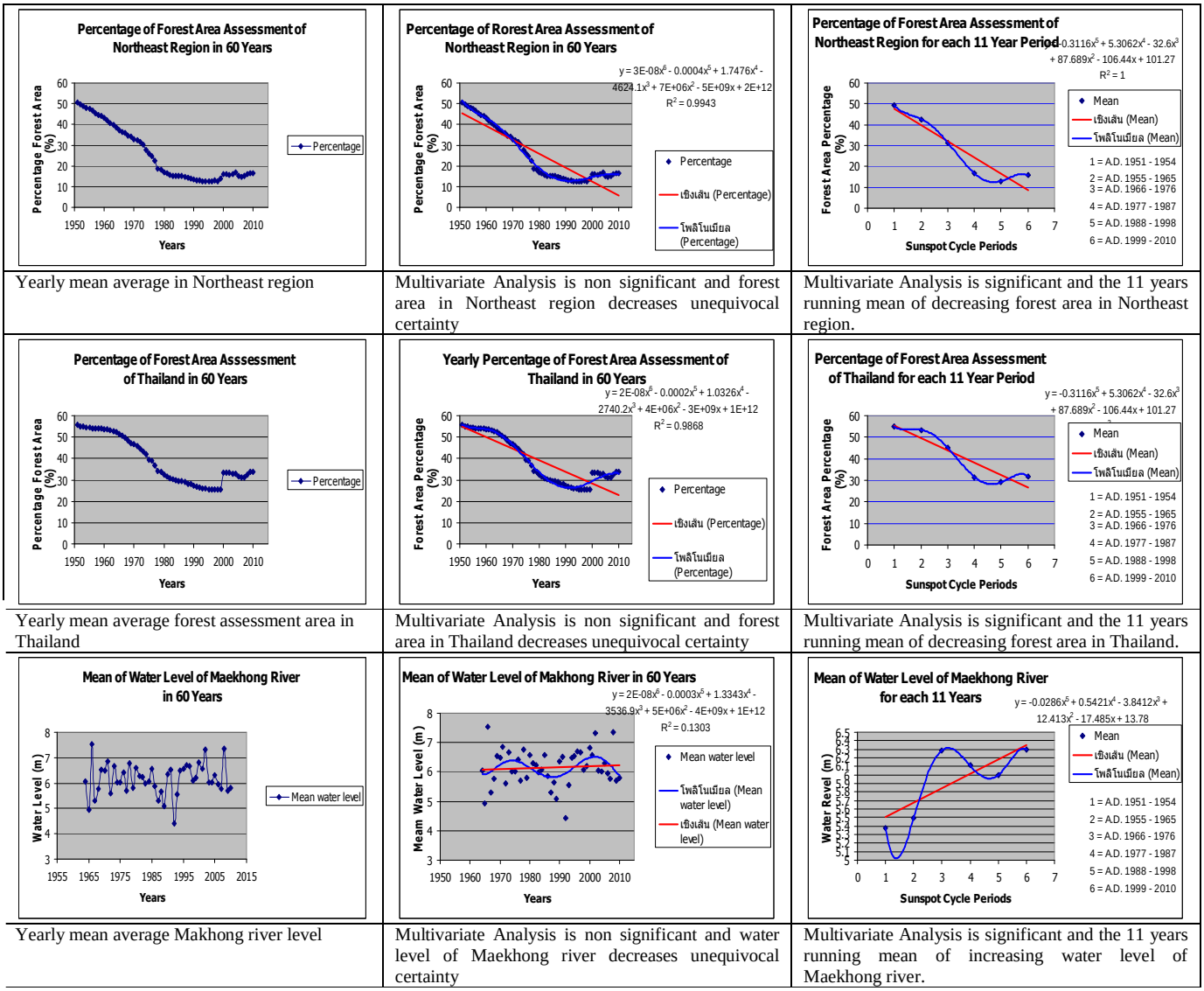
		
Yearly mean average wind speed	Multivariate Analysis is non significant and this temperature rise is unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of decreasing wind speed.
		
Yearly mean average water evaporation	Multivariate Analysis is non significant and water evaporation rise is unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of increasing water evaporation.
		
Yearly sum of accounting cyclone storm	Multivariate Analysis is non significant, accounting cyclone storm decreases unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of decreasing cyclone storm.
		
Yearly mean average forest assessment in Udon Thani	Multivariate Analysis is non significant and forest area in Udon Thani decreases equivocal certainty	Multivariate Analysis is significant, the 11 years running mean of decreasing forest in Udon Than



Yearly mean average in Northeast region	Multivariate Analysis is non significant and forest area in Northeast region decreases unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of decreasing forest area in Northeast region.
Yearly mean average forest assessment area in Thailand	Multivariate Analysis is non significant and forest area in Thailand decreases unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of decreasing forest area in Thailand.
Yearly mean average Makhong river level	Multivariate Analysis is non significant and water level of Maekhong river decreases unequivocal certainty	Multivariate Analysis is significant and the 11 years running mean of increasing water level of Maekhong river.

Fig.3 Modeling and graph weathers of Udon Thani province in 60 surrounding years (Colum 1-2) and weather's graphs for each 11 years of Sunspot Cycle period times

V. Some Common Mistake

1. Generally we do mistake while dealing with the two words, climate and weather. But even how weather is not the same as the climate. Where the Climate is the average condition of the weather, such as average temperatures, wind, humidity, the number of days when certain weather conditions may be expected in a month or year.
2. The mistake has called into question the credibility of the weather forecast data record, which has been considered an meteorological source for information about climate change because of its policy of carefully reviewing and analyzing hundreds and even thousands years, but in this study that it's uncovered the error say that the mistake on news reports and unpublished studies only 60 years to key to identifying the original sources of the information in the Udon Thani Meteorological Station report.
3. GISS's computerised temperature maps seemed to show readings normal after adapted data from the previous day had simply been carried over and repeated each day running.
4. The creation and maintenance of a server database environment is no simple task. There are many parameters to consider for design, support, and troubleshooting. Making mistakes in this area or missing important details will makes these tasks much more difficult.
5. Over the last 23 sunspot cycles, ~300 years, sunspot cycles have varied in length from ~8.5 years to ~14 years. The oft stated, erroneous claim that average ~11 years is only true for 23 cycles. A mere 23 cycles, is insufficient observation of solar variation to establish any long term pattern, and sunspot cycle 23 was 12 years 6 months.

TABLE I
RELATIONSHIPS BETWEEN YEARLY MEAN AVERAGE TEMPERATURE AND THE OTHER UNEQUIVOCALLY BELONGS TO THE OTHERS YEARLY MEAN AVERAGE DATA ANALYSIS

Yearly data	Means (X)	Std. Deviat. (SD.)	Std. Coeff (β)	R^2	eta^2	*t*-test	Sig.
Mean average minimum temperature (C)	21.67	0.26	0.70	0.36	1.00	44.10	.000
Mean average minimum temperature (C)	9.14	1.19	0.17	0.37	0.90	36.04	.000
Mean average maximum temperature (C)	36.29	0.59	-0.36	0.15	1.00	-97.50	.000
Mean extreme maximum temperature (C)	40.47	1.02	-0.10	0.20	0.84	-33.73	.000
Humidity (%)	72.39	3.24	0.55	0.19	0.88	-110.11	.000
Rainfall (mm.)	1476.00	7.34	-0.24	0.24	.0.94	-88.11	.000
Accounting rainfall (days)	131.83	6.53	-0.38	0.28	0.69	-39.56	.000
Extreme rainfall (mm)	438.82	28.89	-0.12	0.22	0.99	-34.97	.000
Air Pressure (hPa)	1009.52	0.62	-0.11	0.45	0.87	-3.90	.029
Water evaporation (mm)	4.52	0.42	0.25	0.27	0.99	127.58	.000
Wind speed (Knots)	2.53	0.58	0.40	0.39	0.84	100.65	.000
Cyclone storm((Time)	3.08	1.06	-0.55	0.30	0.94	-67.43	.000
Mekhong river level (m)	6.17	0.34	-0.11	0.19	0.90	-144.93	.000
Forest assessment in Udon Thani (%)	27.32	23.90	-0.48	0.23	0.98	-201.69	.000
Forest assessment in Northeast region (%)	25.83	15.90	-0.45	0.21	0.89	-178.55	.000
Forest assessment in Thailand (%)	39.92	12.48	-0.44	0.20	0.92	-106.65	.000

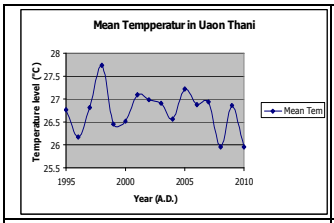
VI. CONCLUSION

Most of the modern measurement systems have been employed primarily for weather forecasting purposes. The instrumental temperature record from Udon Thani Provincial Meteorological Station, Thailand was supplemented by radiosonde balloons and others, extensive atmospheric monitoring from in 1951, with global satellite data as well, only over have been actively measuring the atmosphere for 60 years, measurements by thermometers and other surface instruments on land have been available along with measurements. The samples used to deduce land temperature in the distant past is an example of a temperature proxy method, as are other climate metrics noted in subsequent categories. Climate change is a significant and lasting change in the statistical distribution of weather patterns over periods ranging from 1951 to 2010 of years. It may be a change in average weather conditions or the distribution of events around that average (e.g., more or fewer extreme weather events). The result has been changes in instrumentation and practice which, whilst likely improving the absolute accuracy of the measurement, also compromise the historical continuity of the record for long-term climate monitoring purposes. To create a climate data record requires the identification and removal of as many such non-climatic influences as possible (homogenisation) to yield an estimate of the true climate evolution. Humidity, rainfall, air pressure, water evaporation, wind speed, cyclone storm (add typhoon, monsoon, and tropical storms), forest area assessment, and water level of Maekhong river both relative and absolute, are potentially a very insightful tool for this research.

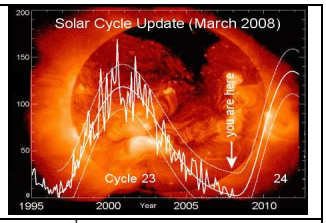
Climatologically temperatures and other factors substantially affect precipitation and other meteorological substances can be estimated in the modern era with the global network of meteorological instruments. Climate change may be limited to a specific Udon Thani province, Northeast region, Thailand may occur across the whole Earth. Udon Thani's climate changes in response to changes in the global energy balance. On the broadest scale, the rate at which energy is received from the sun and the rate at which it is lost to space determine the equilibrium temperature and climate of this area. This energy is then distributed around the globe by winds, and other mechanisms to affect the climates from different regions. Factors that can shape climate are such processes as variations in solar radiation, that it's external forcing mechanisms. The sun is the predominant source for energy input to Udon Thani province, a small part of Earth. Both long- and short-term variations in solar intensity are known to affect global climate. Solar output also varies on shorter time scales, including the 11-year solar cycle and longer-term modulations (Sunspot cycle). This finding indicates similar as the solar intensity variations are considered to have been influential in triggering and some of the warming observed from 1900 to 1950. The cyclical nature of the sun's energy output is not yet fully understood; it differs from the very slow change that is happening within the sun as it ages and evolves. This research indicates that solar variability has had effects including which was marked by relative cooling and greater glacier extent than the centuries before and afterward. Some studies point toward solar radiation increases from cyclical sunspot activity affecting global warming, and climate may be influenced by the sun of all effects. Interestingly, this 2010 study suggests that the effects of solar variability on temperature throughout the atmosphere may be contrary to current expectations. The results indicate that solar energy significantly enhances the effect of climate change and must be involved onto Udon Thani's global change. Other factors, including whether they are of natural or human origin, ozone depletion, animal agriculture and deforestation, are also of concern in the roles they play - both separately and in conjunction with other factors - in affecting climate, and measures of climate variables (see in Figure 2).

Evidence for warming of the climate system includes observed increases in Figure 1 shows graphical significantly global average temperature (minimum, maximum, extreme minimum and maximum temperatures), water evaporation, and wind speed, and decreases in rainfall (accounting rainfall

day, extreme rainfall), air humidity, air pressure, forest assessment area, account cyclone storm, and level of Maekhong river. This important result is the same as the studies on Earth's average surface temperature, expressed as a linear trend, rose by 0.74 ± 0.18 °C over the period 1906–2005, the rate of warming over the last half of that period was almost double that for the period as a whole (0.13 ± 0.03 °C per decade, versus 0.07 °C ± 0.02 °C per decade), and climate model projections are summarized in the 2007 Fourth Assessment Report (AR4) by the Intergovernmental Panel on Climate Change (IPCC), significantly. In this study, the phrase "global warming" refers to the change in the Udon Thani's global average surface temperature. Measurements show a global temperature increase of 1.4 °F (0.78 °C) between the years 1900 and 2005. Global warming is closely associated with a broad spectrum of other climate changes, such as increases in the frequency of extreme minimum and maximum temperatures, intent wind speed, or water evaporation, decreases in intense and rainfall accounting rainfall, accounting cyclone storm, more frequent and intense forest assessing reduce predicted that future climate changes will include further global warming in Udon Thani province or Northeast region or Thailand, to high-impact events that can overwhelm physical infrastructure heavy storm, draught, and flood disasters have occurred in the last six decades.



Udon Thani's Weather Modeling in the 23rd Sunspot



The 23rd Sunspot Cycle

Fig. 4 Comparison between the modeling Udon Thani's weather and solar cycle follow as the 23rd Sunspot cycle period.

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