

**DOCTORAL THESIS INFORMATION WITH NEW SCIENTIFIC  
CONTRIBUTION, THEORETICAL STUDY**

**1. Dissertation title:** Study of assessment and predictability of storm energy in the Vietnam East Sea

Code: 9440222

Major: Meteorology and Climatology

**2. PhD Candidate:**

Advisors: Trinh Hoang Duong

Training Institution: Viet Nam Institute of Meteorology, Hydrology, and Climate Change.

**3. Introduction to the Dissertation:**

With a coastline of more than 3000 km, Vietnam is economically and socially vulnerable to storm activity both at sea and on land. Therefore, forecasting storms in the Vietnam East Sea is very important for Vietnam both scientifically and socially. However, the seasonal range prediction of storms for the Vietnam East Sea is still challenging. Prediction for seasonal accumulated cyclone energy reflects the general trend of potential activity for storm season. They are additional information about the number of storms and the lifetime of storm in predicting seasonal storm trends. At the same time, they are being widely used in the fields of insurance, securities, financial investment related to disaster risk. Monitoring of real-time cumulated storm energy combined with prediction information of storm activity is used to provide business judgment or building a plan for disaster management caused by storms.

The thesis "Assessment of storm energy in the Vietnam East Sea and predictability" has been conducted to (1) clarify the characteristics of storm energy in the Vietnam East Sea and the relationship between storm energy in the Vietnam East Sea with sea surface temperature (SST), with subtropical jet stream; (2) Building a model to predict storm energy in the Vietnam East Sea.

In addition to the introduction, conclusions and recommendations, the main content of the thesis is structured and presented in 4 chapters:

Chapter 1: Overview of research on storm energy;

Chapter 2: Data, predicting and evaluating methods of storm energy;

Chapter 3: Assessment of storm energy and relationship with sea surface temperature, subtropical jet stream;

Chapter 4: Applicability of SST in the Southeastern Japan Sea and subtropical jet stream to predict accumulated cyclone energy in the Vietnam East Sea.

Based on geographical analysis methods and statistical analysis methods in meteorology and climatology, the study has been contributed:

(1) Scientific contributions: The research results contribute to provide a scientific basis on the characteristics of storm energy in the Vietnam East Sea and the relationship with sea surface temperature in the Southeastern Japan Sea and intensity of subtropical jet stream. The research results can be used as a reference for storm researches in the Vietnam East Sea.

(2) Practical contributions: The research results contribute to the conclusion of lessons in the assessment of storm in the Vietnam East Sea based on the SST in Southeastern Japan and the intensity of subtropical jet stream. The prediction results of accumulated cyclone energy contribute to reflect the general trend of the potential storm season and provide additional information about the number of storms and duration of storm in the prediction of storm season trend.

#### **4. New contributions of Dissertation:**

- The study has determined storm energy in the Vietnam East Sea is similar to that in the Western North Pacific basin from July to November. The time of peak concentration of storm energy in the Vietnam East Sea is about 1 month later, tends to decrease during the period 1982-2018 and to increased in the two decades 1999-2018.

- The study has identified and partly explained for the physical mechanism of the relationship between the accumulated cyclone energy in the Vietnam East Sea with the sea surface temperature in the Southeastern Japan Sea and the intensity of subtropical jet stream. This relationship is used as a scientific basis for seasonal predicting of the accumulated storm energy with leadtime about 1-2 months based on the product of the CFSv2 model.

**Representative of Advisors**

**PhD Candidate**



**Dr. Hoang Duc Cuong**

**Trinh Hoang Duong**