

**INFORMATION PAGE ON NEW ACADEMIC AND THEORETICAL  
CONTRIBUTIONS OF PhD DISSERTATION**

**1. Dissertation title: Assessment and projection for the variability of Vietnam summer monsoon characteristics**

- Code: 62440222

- Specialization: Meteorology and climatology

**2. Ph.D. Candidate: Nguyen Dang Mau**

Advisors: 1) Assoc. Prof. Ph.D. Nguyen Van Thang  
2) Ph.D. Mai Van Khiem

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

**3. Introduction to the Dissertation:**

**❖ The urgency**

Vietnam is located in the interaction area of the three Asia-Pacific summer monsoon system (Wang, B. et al., 2004). As a result, the variability of the Vietnam summer monsoon (VSM) is related to the variability of these three summer monsoon systems. During summer, above the ground level, the wind direction and stream flow are southwest in the South (SVN) and south or southeast in the North (NVN). The prevailing air currents are equatorial and tropical air, originating from the Southern Hemisphere and the tropical sea originating from the northern Pacific subtropical high pressure (Nguyen Duc Ngu, Nguyen Trong Hieu, 2004). In addition, during the pre-onset and summer, the westly winds originated from South Asian low pressure (Nguyen Duc Ngu, Nguyen Trong Hieu, 2004) and extratropical region (Wang, B. et al., 2004) also effect on the NVN.

Due to the impacts of mountainous terrain conditions in the NVN and Truong Son Mountains lying along Vietnam and Laos's boundary, the Vietnam climate and VSM weather have significant spatial distribution. In addition, El Nino - Southern Oscillator (ENSO) is also considered to be the main cause of annual variability of VSM (Nguyen Duc Ngu, Nguyen Trong Hieu, 2004, Nguyen Thi Hien Thuan, 2008).

VSM is a major factor in leading weather, climate and extreme events during the summer months. The variability of VSM and its weathers resulted affect the socio-economic activities and people. Especially in the context of global warming, the information about the variability of VSM projected is important for the response to climate change. As a result, PhD candidate chosen to undertake a doctoral dissertation on "**Assessment and projection for the variability of Vietnam summer monsoon characteristics**".

❖ **The objective**

- (1) Results of assessing the variability of the VSM characteristics;
- (2) Based on the climate scenarios, the variability of VSM characteristics due to effects of climate change are projected.

**4. New contributions of Dissertation:** List the new contributions of dissertation (specific quantitative, clear, concise, bulleted for each new contribution)

(1) Result of research proposed the new summer monsoon index for Vietnam region (VSMI) defined by averaging 850hPa zonal wind (U850hPa) over the area of 5-15°N and 100-110°E using the 1981-2010 CFSR reanalysis data. The VSMI index can reflect well the inter-annual variability of both low and high broad-scale circulation of the summer monsoon as well as its rainfall resulted.

(2) The ISV and IAV variability of the VSM characteristics are clearly assessed. The ISV of the VSM is broadly falling in the range of 35–85 days and showing two peak times at the pentad of 36<sup>th</sup> and 40<sup>th</sup>. The VSM has strong IAV and significantly depended on the ENSO phases. In the El Nino summer, the VSN has the later onset and earlier withdrawal date, shorter season duration and fewer break event as well as stronger intensity compared with annual mean. In contrast to La Nina summer, the VSM has the earlier onset and later withdrawal data, longer season duration and more break event as well as weaker intensity compared with annual mean.

(3) Initially, the IAV results of the VSM for mid-21<sup>st</sup> (2046-2065) and end-21<sup>st</sup> century (2080-2099) from the PRECIS model projections are implemented. The IAV of the onset date is projected to decrease slightly in the mid-21<sup>st</sup> and end-21<sup>st</sup> century. In contrast, other characteristics (withdrawal, season duration, break event, intensity as well as rainfall resulted in the CHVN and SVN) are projected to increase in the mid-21<sup>st</sup> and end-21<sup>st</sup> century.

**Representative of Advisors**

**PhD. Candidate**

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