Phụ lục II.10.9

VIETNAM INSTITUTE OF METEOROLOGY, HYDROLOGY AND CLIMATE CHANGE

SOCIALIST REPUBLIC OF VIETNAM
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INFORMATION ON DOCTORAL THESIS' NEW ACADEMIC AND THEORETICAL CONTRIBUTIONS

1. **Thesis title**: A study on climate change projection and climate analog in Southeast Asia
   - **Major**: Climate change
   - **Mã số**: 9440221
2. **PhD candidate**: Nguyen Thi Tuyet

   Supervisors: Assoc. Prof. Dr. Ngo Duc Thanh

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3. **Introduction on thesis:**

In the thesis, the 2-m temperature and rainfall variables were evaluated and projected over SEA and Viet Nam. Climate analog, disappearing and novel climate analysis over SEA and Viet Nam were also implemented. The RegCM4.3 model was used to downscale six CMIP5 GCMs under the framework of SEACLID/CORDEX-SEA project. The results showed that:

i. Regional downscaling allowed a more accurate representation of temperature but displayed a higher variability of rainfall over SEA compared to the results of the GCMs.

ii. The ENS had advantages in reproducing temperature and rainfall variations compared to the individual GCM and RCM experiments in SEA and Viet Nam.

iii. A modified version of the existing formulation to estimate climate distance was introduced with weighting factors for temperature and precipitation, and for the ensemble.

iv. A common tendency of climatic relocation for the six big cities in SEA including Ha Noi, Manila, Kuala Lumpur, Bangkok, Jakarta and Hinthada towards warmer regions is prominent with the regional ENS experiment.

v. The percentages of novel climate areas in SEA at the end of the 21st century were projected to be 24% (RCM ENS) and 21% (GCM ENS) under the RCP8.5.

vi. Novel climate are mainly located in coastal areas and islands, especially near equatorial areas and disappearing climate are found in mountainous areas.

vii. In Viet Nam, the projection results of this study were also compared to those in the previous study. The results showed a high agreement in the temperature changes but a remarkable uncertainty in rainfall trend.

viii. 2.39% of Viet Nam land, mainly located in the Northern and Southern Central Highlands, was projected to experience disappearing climate by the ENS experiment under the RCP8.5.

ix. The results of the present study would provide worthwhile inputs for climate change impact assessment, adaptation and mitigation research. When conducting climate-related research using multi-models, it is necessary to evaluate their performance before implementing the following analyses. The results of novel climate and disappearing climate in Southeast Asia and Viet Nam could be linked to various sectors such as agriculture, infrastructure, urban, health, immigration, etc. to help people better adapt to and mitigate climate change.

4. New contributions of thesis

i. Evaluation on climate simulation in SEA and Viet Nam by 6 CMIP5 GCMs and 6 RCMs, and generally showing ENS's superior role.

ii. Identification of a modified version of an existing formulation to estimate climate distance with weighted parameters for temperature and rainfall, and for ENS and analog climate thresholds

iii. Distribution of good-analog, poor-analog, and novel climate over SEA and disappearing climate in Viet Nam under the Representative Concentration Pathway 4.5 (RCP4.5) and RCP8.5.

Người hướng dẫn		**Nghiên cứu sinh**
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