**Report for International Internship**

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**Supervisor:** Dr. Bharath H. Aithal

**Place of Internship:** University of Illinois Urbana-Champaign, Illinois, USA

**Host Supervisor:**  Prof. Atul Jain

**Department at Host University:** Department of Atmospheric Sciences

**Duration:** Two months (Oct 01 – Nov 30, 2019)

**Research Topic:** Understanding weather simulation models for Indian climate variations with respect to urban areas

**Funding Source:** IIT Kharagpur Foundation

**RESEARCH DETAILS, OUTCOMES AND SUMMARY:**

**Details**

* The research was focused on understanding weather research and forecasting model (WRF) for Indian sub-climatic region
* The research aimed at correlating WRF simulations with the satellite data outputs over Kolkata Metropolitan Area for developing a model suitable to forecast the changes in LST over the study area for short and long term considering various RCP scenarios.

**Tasks Performed**

* Learned basics of WRF model and the concept of nesting
* Simulations were carried out with single and multiple (two and three) domains with varying input layers for KMA region
* Urban layer in the simulation input was replaced by second level urban classified layer (low, medium and high density) obtained from LCZ maps
* Learned to extract output layers from the simulated results

**Outcomes**

* Urban layer extracted from LCZ, was reclassified to low, medium and high urban density maps
* Land Surface Temperature (Skin Temperature) for each simulations as shown below were obtained

|  |  |  |  |
| --- | --- | --- | --- |
|  | Feedback ON | Feedback OFF | Urban Density Incorporation |
| Single Domain | NA | ✔ | ☓ |
| Two Domains | ✔ | ✔ | ☓ |
| Three Domains | ✔ | ✔ | ✔ |

**Summary**

* WRF model simulations (downscaling spatial resolution) were performed for KMA region with various number of domains and the outcomes were studied on hourly, two hourly and three hourly basis
* Alteration of input parameter was performed for making model compatible to Indian scenario

**Acknowledgement**

I would like to extend my warm regards to IITKGP foundation for providing this opportunity to students where they can have a great learning experience, exposure to state-of-art technologies and work on collaborative projects handled by IITKGP and various other institutions in the United States of America.