Sensitivity of Background Error Modeling Methods in the WRF-Var data assimilation approach for Indian Ocean Tropical Cyclone Prediction

Gaurav Tiwari and Pankaj Kumar
Department of Earth and Environmental Sciences,
Indian Institute of Science Education and Research Bhopal, India

Abstract
Tropical cyclones are one of the deadliest natural hazards to forecast in terms of intensity and location to mitigate the devastation. Through the data assimilation approach, various conventional and satellite observations are used to produce better initial conditions for numerical weather prediction models. While the specification and quality of background error statistics (BES) is a crucial component of data assimilation technique, considerable uncertainties are associated with prescribing BES. The influence of BES can also be governed by the geographical domain and the weather regime. The dimensions of the BES matrix are enormous in the variational data assimilation system applied in geophysical sciences. So it needs to be determined explicitly. The north Indian Ocean tropical cyclones have different characteristics from those over the Pacific and Atlantic. Therefore, it is imperative to quantify the impact of different BES for the prediction of such cyclonic storms. In this work, the characteristics of the background error covariance matrix via the National Meteorological Center (NMC) and Ensemble methods are investigated for the WRF 3D-Var/4D-Var Model.
Respected Sir/Madam,

I am Gaurav Tiwari, a third-year Ph.D. scholar from India. I am working in the field of tropical cyclones and its prediction over the Indian Ocean. Being a regular follower of Waves to Weather homepage, I came to know about 19th Cyclone Workshop to be held in Kloster Seeon, Germany. I am the recipient of the prestigious Ph.D. fellowships (DST-INSPIRE) with contingency grant from Govt. of India. I have successfully installed the WRF model with its data assimilation components and performing various simulations. Recently one of my works has been published in a peer-reviewed journal. I am highly interested and motivated to attend this workshop because it will provide a platform to meet the global experts in my field. Since my funding agency doesn’t provide travel support; therefore, it is requested that organizers to kindly consider my application with travel and lodging support.

Sincerely,
Gaurav Tiwari
Research Scholar,
Indian Institute of Science Education and Research Bhopal,
India
Estimated Travel Costs

Total Air fare from New Delhi to Munich (Round Trip): Approx. **Euro 700**
Accommodation cost: Approx. **Euro 800**

Total cost: **Euro 1500**
Resume/CV

Name: GAURAV TIWARI
Gender: Male
D.O.B.: 20/12/1993
Email: gtiwari506@gmail.com

Current Position
Ph.D. Student from August 2016 onwards
Department of Earth and Environmental Sciences,
Indian Institute of Science Education and Research Bhopal, India
Ph.D. Supervisor: Dr. Pankaj Kumar

Professional Experiences
- Research Assistant at SEOCS, Indian Institute of Technology Bhubaneswar, India from August 2015 – June 2016.
- Engineer (Trainee) at RMSI Pvt. Ltd., Noida, NCR from July 2014 –August 2015.

Education
- M.Sc. (Applied Mathematics) from Gautam Buddha University, India
  CGPA - 7.18 on 10 point scale
  Year: 2012-2014
- B.Sc. (Mathematics, Physics, Chemistry) from CSJM University, Kanpur, India
  Year: 2009-2012

Academic Achievement
- Recipient of Department of Science and Technology, Govt. of India Ph.D. Fellowship (DST-INSPIRE Fellowship) for five years from 2016
- Recipient of Department of Science and Technology, Govt. of India Undergraduate and Postgraduate Scholarship (DST-INSPIRE Scholarship) for five years (2009-2014)

Publications

Conferences/ Workshop
- SMART Research Programme at Space Applications Centre, ISRO from August 17 to November 15, 2018.

International Tropical Meteorology Symposium, "INTROMET 2017", 7-10 NOVEMBER 2017, Ahmedabad, Organized by SAC, ISRO.


A one day workshop on Computational Science, Supercomputer Education and Research Center, Indian Institute of Science, Bangalore.

11th Biennial Conference of ISIAM to Commemorate the 125th Birth Year of Srinivasa Ramanujan at Gautam Buddha University, Greater Noida, (U.P.) India.

Training program for MATLAB and MATHEMATICA, Sponsored by CSIR, NBHM, DRDO, DST and Gautam Buddha University.

Workshop on Scientific Writing using LaTeX & Bibliography at Gautam Buddha University, Greater Noida, (U.P.) India.

Conference Presentations


Sushil Kumar, Gaurav Tiwari and Rashmi Chauhan, “Simulation of Tropical Cyclone ‘PHAILIN’ Using WRF Modeling System” presented at National Workshop on Enhanced and Unique Cyclonic Activity during 2013, India Meteorological Department, New Delhi.


Project Works

Project Name: “Timor-Leste Natural Hazards Risk Assessment in Communities along Dilli-Ainaro and Linked Road Corridor”
Duration: July, 2014 to February, 2015

Project Name: “Consultancy Services for Establishing of a System for Climate Risk Assessment”
Duration: July, 2014 to March, 2015