

## **Severe Thunderstorm Observation and Regional Modeling Pilot Field Experiment 2012 and Data Assimilation Impacts**

Mohan Kumar Das<sup>1</sup>, Sujit Kumar Debsarma<sup>1</sup>, Bishawjit Chowdhury<sup>2</sup>, Md. Majajul Alam Sarker<sup>1</sup>,  
Md. Mizanur Rahaman<sup>1</sup>, Nazlee Ferdousi<sup>1</sup> and U.C. Mohanty<sup>3</sup>

<sup>1</sup>SAARC Meteorological Research Centre (SMRC), Dhaka-1207, Bangladesh

<sup>2</sup>Main Meteorological Office (MMO), Shah Amanat International Airport, Chittagong, Bangladesh

<sup>3</sup>Centre for Atmospheric Sciences, Indian Institute of Technology, New Delhi-110016, India

Corresponding author: mohan28feb@yahoo.com, mkdas@saarc-smrc.org

### **Abstract**

SAARC (South Asian Association for Regional Cooperation) Meteorological Research Centre (SMRC) has taken up a long term programme namely SAARC Severe Thunderstorm Observation and Regional Modeling (STORM) Programme since 2009 and is being continued among Bangladesh, Bhutan, east and northeast India and Nepal. The main objective of the programme is to formulate ideas on modeling of mesoscale convective system (MCS) and validate models with the data collected during Field Experiments over the SAARC region. The Experiment focused on Nor'westers (locally known as "Kalbaishakhi") that occurred in Bangladesh, Bhutan, eastern and northeastern parts of India and Nepal. Afghanistan, northwest India and Pakistan have started the second phase in 2012 and will continue till 2014 to study the genesis of dry convective storms, dust storms and deep convections. Upon successful completion of the field campaign data collected during the Experiment are being prepared for assimilation in WRF-ARW Model. West Bengal of India and Sylhet, Bogra, Madaripur, Faridpur and Chittagong of Bangladesh experienced moderate/severe thunderstorm (60-100 km/hr) on 17 May 2012. Peshawar, Khyber Pakhtunkhwa, Lahore and Punjab of Pakistan were affected by a sand storm of 05 June 2012. These two cases of SAARC STORM phase I and II have been studied in this paper. Six hourly Final Reanalysis (FNL) data of National Centers for Environmental Prediction (NCEP) have been used as input to WRF-ARW Model for the simulations.

The WRF dynamical core ARW modeling system along with 3DVAR Data Assimilation technique has been used to improve the forecast scenarios of severe MCS during SAARC STORM Pilot Field Experiment 2012. The conventional and non-conventional data are used in the assimilation system. The results indicate that, compared to the control (CTRL) run, 3DVAR Data Assimilation technique substantially improves the overall forecast products over the SAARC STORM region.

**Keywords:** SAARC-STORM, MCS, WRF-ARW, NCEP, 3DVAR.