

To commemorate 25 years of establishment of NCMRWF, an international conference on **“Prediction of Weather and Climate Systems Seamlessly (PROWESS)”** was organized during 17-19 February 2014 at NCMRWF.

The conference provided a platform for discussions on the present status and future prospects in model development, data assimilation, physical processes, etc. towards building a seamless prediction system. A number of eminent modeling/data-assimilation scientists from world reputed institutes like Met Office (UK), NCEP(USA), IGES(USA), COLA(USA), NCAR(USA), ESRL(USA) and CAWCR (Australia) and several leading tropical/monsoon specialist from USA and UK universities participated in the conference. From India, all the major institutes and universities related to weather/climate modeling also participated. This included scientists from IMD, IITM, INCOIS, NIOT, NCAOR, MoES, ISRO, IISc., CMMACS, NAL, NCAER, IAF, Indian Navy, C-WET, Manikaran Wind Power Ltd., IIT Delhi, IIT Bhubaneshwar, BHU, Andhra University and Allahabad University

During the conference, various invited talks from national and international experts on different themes right from the observing systems, data assimilation, modeling , physical processes, applications, high performance computing and economic benefits that are accrued from improved forecasts were presented.

One of the major consensus arrived at the conference was that a seamless approach across spatial and temporal scales is the key for providing realistic prediction of weather and climate.

Improved prediction skills of models over Indian monsoon region remain a challenge. One of the aspects that require special attention is the representation of convection by contemporary convective parameterization schemes which drive much of the uncertainties in prediction. Systematic errors associated with convective precipitation emerge very early in an NWP model. Concerted R & D efforts will be required to reduce these systematic errors.

Sophisticated land surface models need to be developed to include the complex land-surface processes on a variety of land, ice and snow conditions. Land surface models also need to be initialized, for which advanced land data assimilations systems need to be developed and integrated to the modelling system. The Indian data (Landuse/Landcover pattern, soil moisture, albedo, snow depth/extent) need to be utilized in collaboration with ISRO/NRSC.

Efforts have to be made to make optimum use of the data from the different Indian satellite missions and assimilate them.

Recent studies suggest that an interactive ocean in a high resolution fully coupled general circulation model significantly enhance the prediction skill of weather upto two weeks. The upper ocean should also have a very high vertical resolution (1 m), and the

ocean model has to be called more frequently (1 hour) from the atmosphere model. Ocean data assimilation is required to initialize the ocean model properly. Similarly a land surface model with its assimilation has to be also coupled to form the fully 'Coupled Earth System Model'. The whole issue of monsoon model development has to be dealt in a holistic way where the scales from hours to a season are considered together in a seamless manner.

A lot of efforts have been made by NCMRWF in various applications. There is a need to further enhance the same by understanding the user requirements.

The improved modeling of the weather processes through advances in the representation of the physical and dynamical processes and data assimilation is a slow process and requires a large team of dedicated trained scientists. Efforts have to be made to attract young people to take up the challenging work of modelling and data assimilation and develop new applications. The academic community needs to be involved in the national effort on improving the forecast skill of the models at all spatial and temporal ranges.