Met Office

Case study: Guidance and mentoring of regional forecasting centres in Africa

Capacity building for severe weather forecasting

Background

The World Meteorological Organization (WMO) Severe Weather Forecasting Demonstration Project (SWFDP) builds on the co-operative work among meteorological centres across the globe. The project seeks to enhance the forecasting and warning of severe weather by National Meteorological and Hydrological Services (NMHSs) in participating countries.

The ultimate aim of the project is to protect life and infrastructure. This is achieved by the sustainable development of national meteorological services, including building collaborative working relationships with government officials and disaster risk reduction departments and organisations.

Using Numerical Weather Prediction (NWP) products to their full potential and delivery of timely and authoritative forecasts and early warnings, contributes to capacity development and disaster risk reduction. There are five SWFDP regions in which an array of observational data and NWP products from global producing centres are used by the leading regional centres to cascade severe weather guidance service to NMHSs in their region.

This case study looks at the SWFDP in East Africa where there are two regional centres: the Regional Specialized Meteorological Centre (RSMC) Nairobi, which is the lead centre for the project, and Regional Forecasting Support Centre (RFSC) Dar es Salaam, which coordinates and provides specialized products from a high-resolution, local area model over Lake Victoria. The regional centres provide essential services to NMHSs in the region: Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda.

Challenge

In 2012 it was identified that the SWFDP East Africa regional teams needed support to enable them to best utilise new science and technologies to improve:

- severe weather forecasting;
- lead-time of warnings;
- interaction of NMHSs with media and disaster management and civil protection authorities.

WMO requested the Met Office to provide a service from its UK Global Guidance Unit (GGU) to support RSMC Nairobi and RFSC Dar es Salaam alongside the array of observational data and NWP products already supplied for the project. The objective was to improve the model knowledge of the regional forecasting teams and make the best possible use of available data, improving confidence in and accuracy of their severe weather forecasts. This would ultimately contribute to the consistency of advice across East Africa.

By understanding key meteorological and environmental triggers in NWP and observational data, regional forecasting teams can issue earlier severe weather warnings. Increased lead time enables people to prepare in advance to protect life and infrastructure.

Solution

From September 2012, a pilot project was run during the four month rainy season. Initially, Met Office staff visited Tanzania and Kenya to understand their capability, operations and service delivery processes to ensure a guidance service was tailored to the specific needs of RSMC Nairobi and RFSC Dar es Salaam.

We provided daily graphical and written guidance to regional centres to deepen their understanding of the strengths and weaknesses of global NWP output from a variety of global centres. For the first week this was overseen by visiting Met Office staff to gather feedback and support amendments where needed. Using this guidance, regional centres were able to issue more relevant and timely forecasts.

To further embed the knowledge transfer, a second project started in March 2013 using training and mentoring tools to support regional centres in creating the guidance themselves.

Forecasters from RSMC Nairobi and RFSC Dar es Salaam visited the Met Office headquarters in Exeter to shadow forecasting experts and engage with Met Office scientists. Through this they gained a deeper knowledge of model performance and development, including how to interpret signals where there are inconsistencies within these models.

Our forecasting colleagues from East Africa then designed the structure of the next phase of the project before returning to their centres. The agreed new service included:

- initial creation of a guidance document by the Met Office containing visual model and observational data for discussion at a daily video conference;
- using collaborative working tool “Huddle” to share information;
- displaying model information by all parties during the video conference to explain thinking or stimulate questions;
- Met Office forecasting experts helping identify and resolve issues, knowledge gaps and misunderstandings in real time;
- reviewing previous warning accuracy and recommendations for case studies;
- transferring the lead role from the Met Office to RSMC Nairobi as confidence grew so that the regional centre now generates the guidance and leads discussions.

Benefits

SWFDP, with this focussed support by the Met Office Global Guidance Unit, has demonstrated how the capacity of NMHS in developing countries can be built through mentoring, access to and use of existing NWP products and Ensemble Prediction Systems (EPSs).

The improved capacity has led to:

- increased confidence of regional forecasters in their own ability, improving trust and respect with response agencies;
- stronger relationships between regional NMHS to share meteorological data and knowledge, discuss ideas and deliver consistency across borders;
- a desire to seek improved services better matched to the needs to response organisations; improving lead time for severe weather forecasts and incorporating risk and impacts;
- an increased ability to better support regional objectives and stimulate improved working with national centres.

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