VERIFICATION OF MOBILE WEATHER ALERT FORECASTS OVER LAKE VICTORIA IN UGANDA

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Abstract

Several studies suggest that weather patterns over Lake Victoria are highly variable, with wind gusts in the vicinity of thunderstorms suddenly thrashing up high waves capable of capsizing small fishing boats. In order to improve safety on the lake, the Mobile Weather Alert (MWA) service is implemented by utilising mobile phone technology to provide daily weather forecasts that reduces vulnerability of fishermen to weather hazards. This service was developed as a pilot scheme under the WMO Severe Weather Forecast Demonstration Project (SWFDP). An evaluation of MWA forecasts over Lake Victoria has been carried out using binary forecast verification methods based on a standard contingency table.

In MWA forecast verification, different observation thresholds are used to assess the accuracy of the MWA forecasting system in a binary (yes-no) situation: These include 0.1mm (Observation), 2mm, 5mm, 10mm and 20mm thresholds. Furthermore, three observation data sets are used in the study: averaged rainfall from three coastline rain-gauges, TAMSAT RFE, and ATD lightning data. Forecast performance was assessed using different scores; Frequency Bias Index, Proportion correct; Critical Success Index; Equitable Threat Score (ETS) and True Skill Statistics (TSS). The MWA forecasts were found to have high success rate of around 70% when verified against averaged rainfall and RFE, however 60% success rate was found when forecasts are verified against ATD data. These success rates are based on the frequency of hits and correct rejections forecasted during the period February – April 2012. The study illustrated that TSS and ETS are the best scores for verifying the MWA forecasts since both measures demonstrated that the forecasting process has skill in predicting severe storms as well as calm days over the Lake Victoria region.

On assessment of forecasting tools, interviews and questionnaires completed by forecasters at Uganda Department of Meteorology (UDoM) indicate a wide range of forecast tools are available to operational forecasters. The main limitation is lack of in situ observations over the lake which makes day-to-day forecast verifications a little difficult. Various suggestions are made on improving the accessible forecasting tools, among others, the need to develop hazard diagnostics from the available high- resolution model products and tuning the science configuration in the 4 km model for the tropical regions which is expected to improve model forecasts.