

# **Using ECMWF Products in Support of Mobile Weather Alert Pilot Project in Uganda**

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# Pilot Project Overview

## Project Partners:



MINISTRY OF WATER AND  
ENVIRONMENT,  
DEPARTMENT OF METEOROLOGY  
P.O. BOX 7025,  
KAMPALA  
UGANDA



# Project Objective

Utilise mobile phone technology to develop a sustainable warning service that reduces the vulnerability of communities in the Lake Victoria Region to weather hazards.



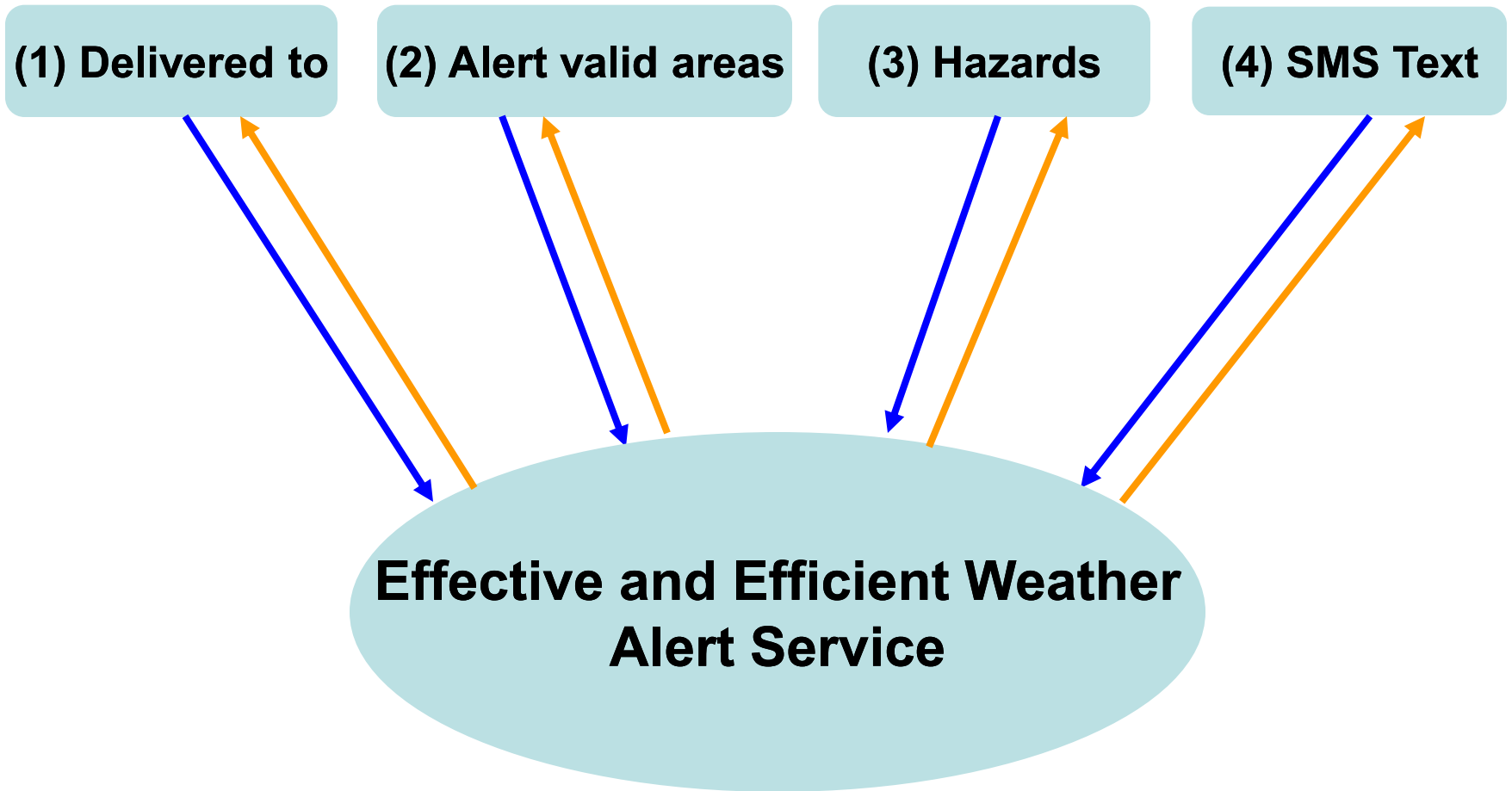
# Mission – outcomes sought

- To safeguard life and property of the fishing community and other users of Lake Victoria by providing an effective, efficient and tailor made weather alert service, 24x7 for social-economic development.

## **Lake Victoria users includes**

- Fishermen and other communities over Lake
- Ferry and other water transport operators
- Port Authority and Law Enforcement organisations
- Tourists

# Specific requirements for the Mobile Weather Alerts are;



# Specific requirements for the Mobile Weather Alerts are;

**Delivered to**

Alert valid areas

Hazards

SMS Text

## Currently Delivered to;

- Fishermen
- Radio stations currently only to Radio SSESE
- National Lake Rescue Institute (NLRI)

## Potential Future Users

- Ferry and other water transport operators
- Police and UPDF Marines
- Department of Disaster (OPM)
- National Environment Management Authority (NEMA)

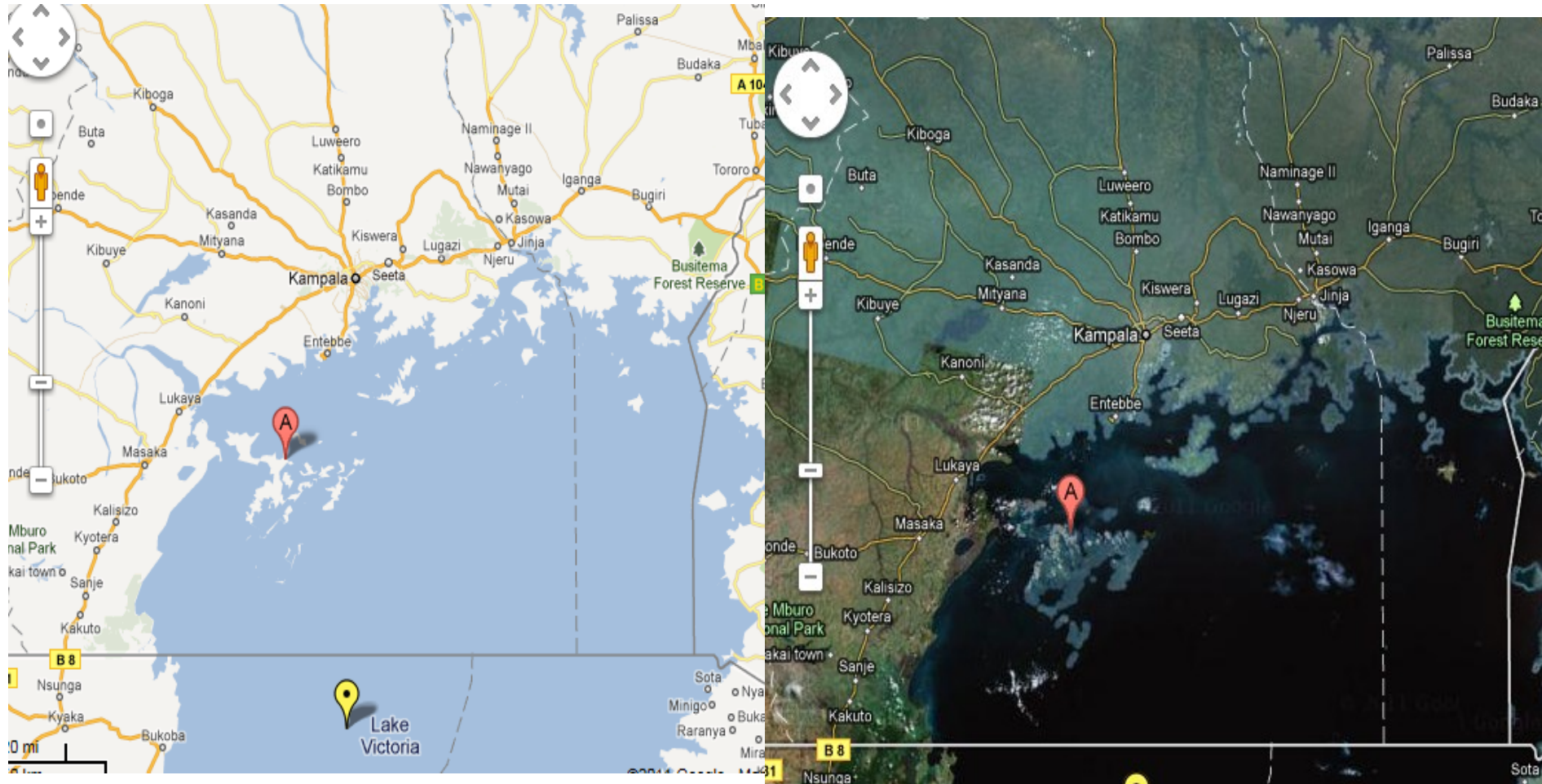
# Specific requirements

Delivered to

Alert valid areas

Hazards

SMS Text



# Specific requirements for the Mobile Weather Alerts are;

Delivered to

Alert valid areas

Hazards

SMS Text

## ■ Winds and high waves

Direction

Speed

## Thunderstorms

Strong winds

Heavy rains and hail

Lightening

Water spouts

Visibility (Fog and haze)



# Specific requirements for the Mobile Weather Alerts are;

Delivered to

Alert valid areas

Hazards

SMS Text

- **Hazard** (wind speed and direction, high waves, thunderstorms and visibility)
- **Severity** (Isolated, widespread, severe, heavy, moderate, strong, poor, clear, calm)
- **Validity** (03,06,12 hours)
- **Name of the hazard** (strong wind, heavy thunderstorm, high waves)
- **Issued from (UDoM) and issue date**
- **Advice information** (Business as usual, Be aware, Be prepared, Take action)

# Main Forecast Tools

- Station and Satellite observations
- Analysis of wind flow patterns
- Model predictions from specialized forecast centres.
- Climatology and experience
- Feedback from information users

# Model Prediction from World Centre

- UK Met Office: Africa LAM
- UK Met Office Lake Victoria Forecast
- ECMWF Products
- NCEP CPC Model Forecasts for Africa
- Guidance forecasts RSMC for Eastern Africa

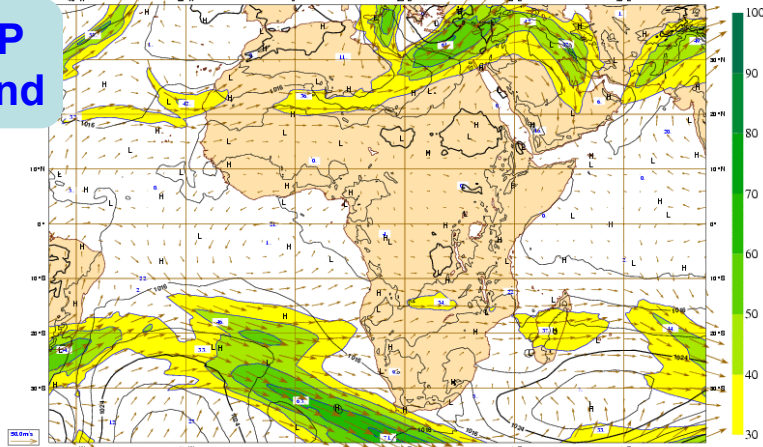
# Specific Reference to ECMWF Products

- Deterministic forecast: Analysis for Pressure and winds
- Probability forecast for precipitation
- Ensemble Prediction System (EPS) for MSLP and Humidity
- EFI for Wind, Wind gusts and PPT
- EPSgram

# ECMWF Deterministic Forecast Model

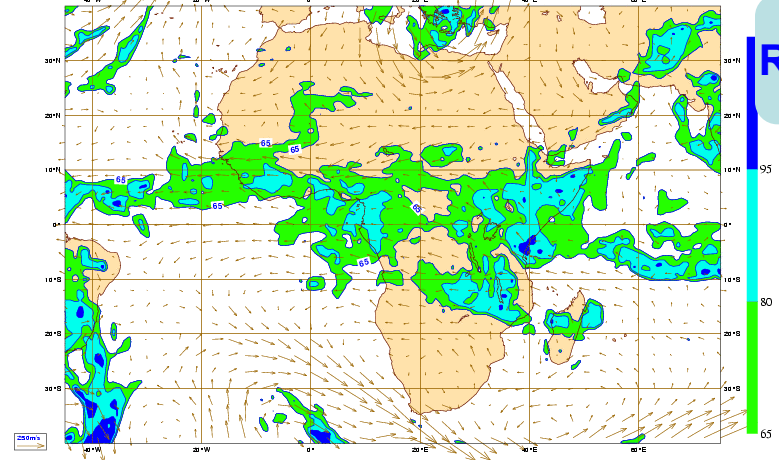
Tuesday 11 October 2011 00UTC ©ECMWF Analysis t+000 VT: Tuesday 11 October 2011 00UTC  
Surface: Mean sea level pressure/200 HPa Wind Speed

MSLP  
& Wind



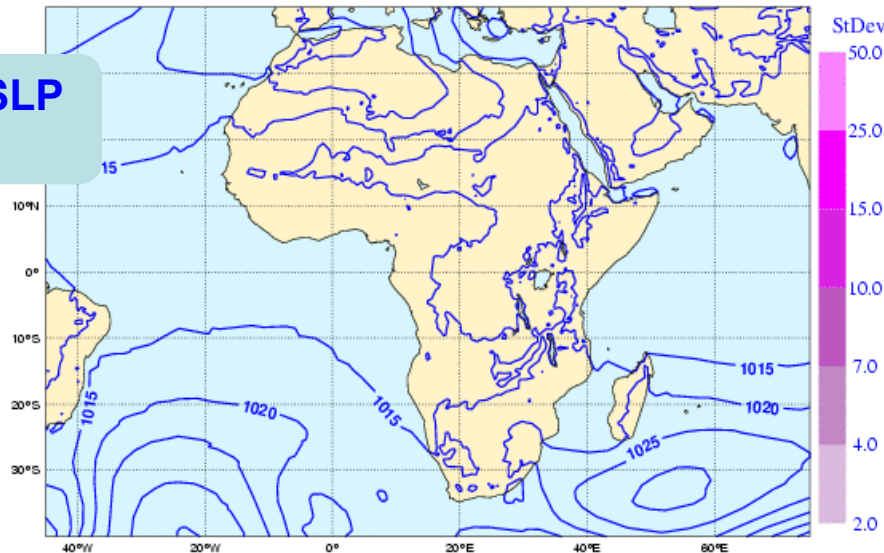
Tuesday 11 October 2011 00UTC ©ECMWF Analysis t+000 VT: Tuesday 11 October 2011 00UTC  
700 hPa Relative humidity / Winds

RH & Wind



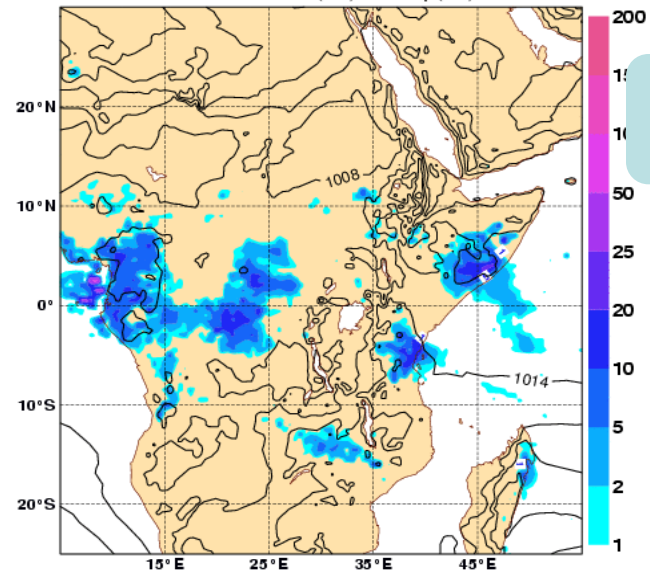
Tuesday 11 October 2011 00UTC ECMWF Forecast t+0 VT: Tuesday 11 October 2011 00UTC  
Mean sea level pressure (MSLP) Deterministic Forecast and Standard Deviation (shaded)

MSLP



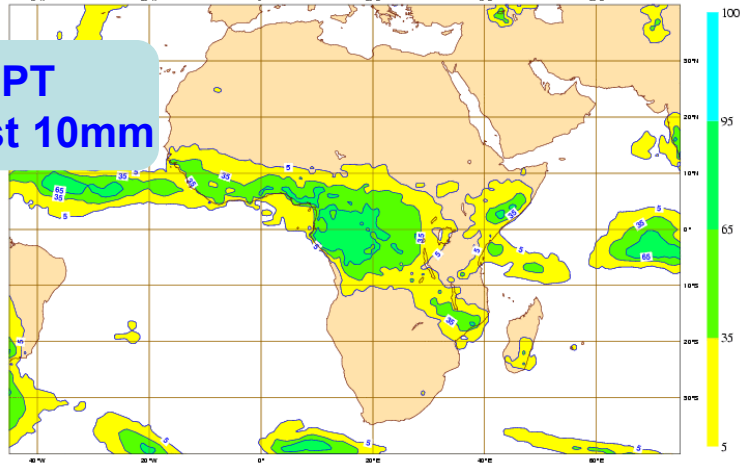
ECMWF Fc 2011101112 +6 h MSLP (hPa) and Precip (mm) since last 6 h

MSLP  
& PPT



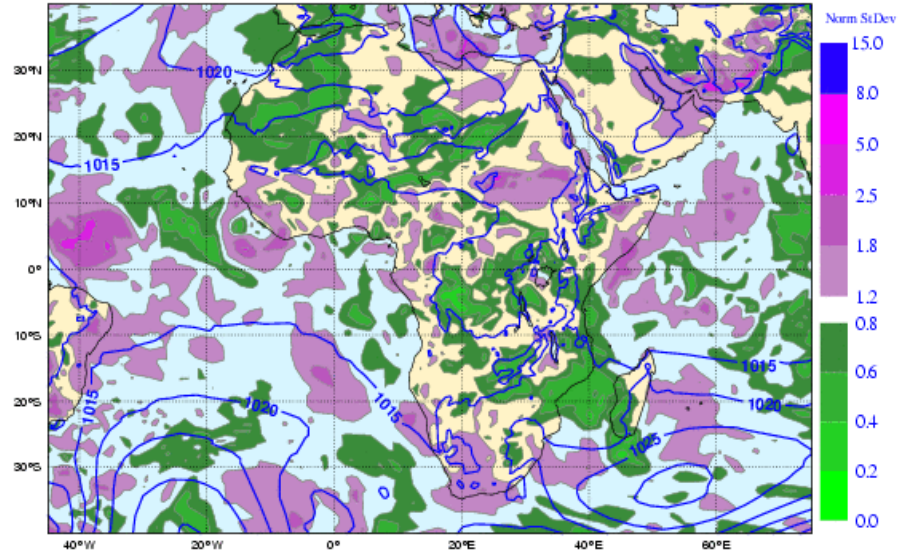
# ECMWF EPS

Tuesday 11 October 2011 00UTC ©ECMWF Forecast probability 1+048-072 VT: Thursday 13 October 2011 00UTC - Friday 14 October 2011 00UTC  
Surface: Total precipitation of at least 10 mm



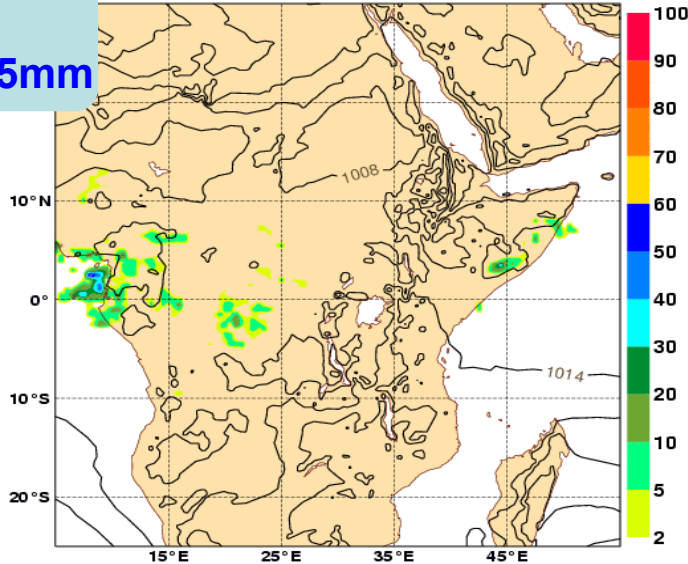
**PPT  
at least 10mm**

Tuesday 11 October 2011 00UTC ECMWF Forecast t+0 VT: Tuesday 11 October 2011 00UTC  
Mean sea level pressure (MSLP) Ensemble Mean and Normalised Standard Deviation (shaded)

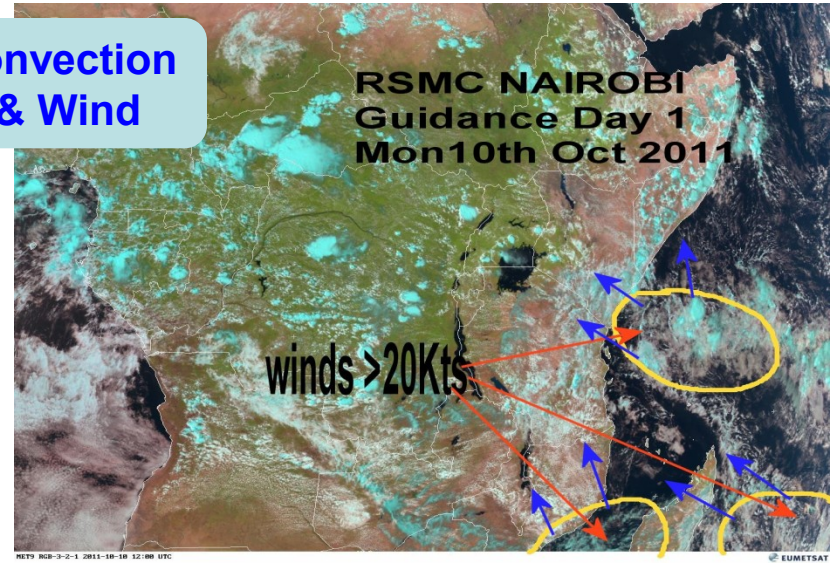


**Convection  
& Wind**

Fc20111011 12UTC +6 h MSLP (hPa) and Probability of Precip exceeding 25mm since last 6 h(%)



**PPT  
at least 25mm**

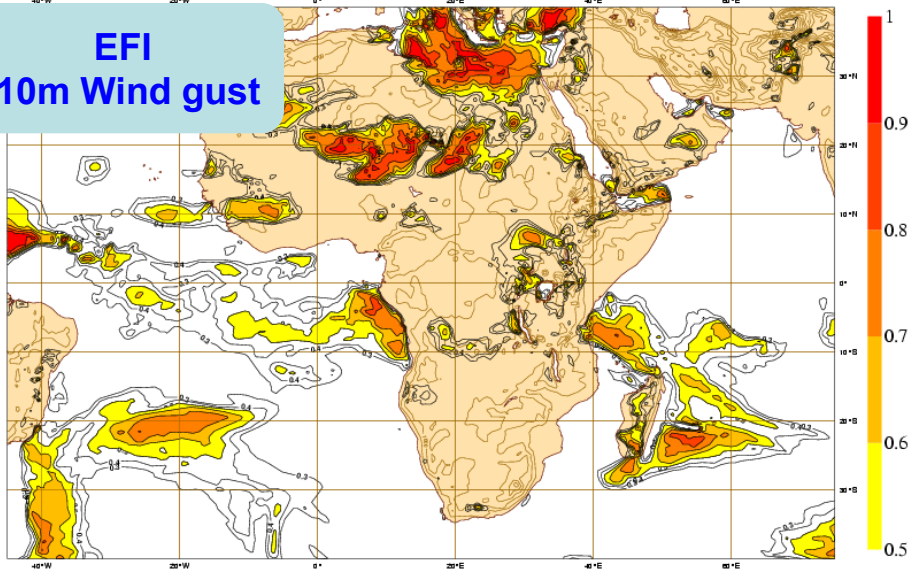


**RSMC NAIROBI  
Guidance Day 1  
Mon10th Oct 2011**

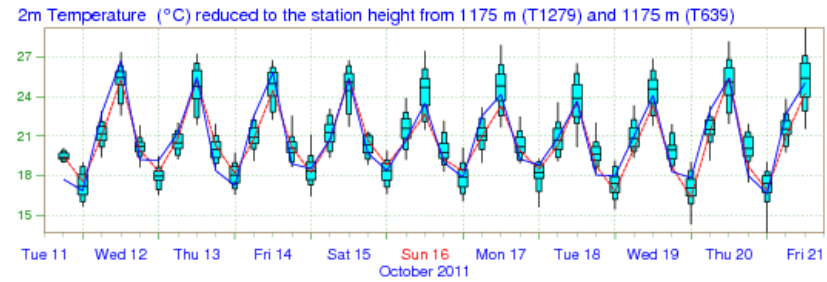
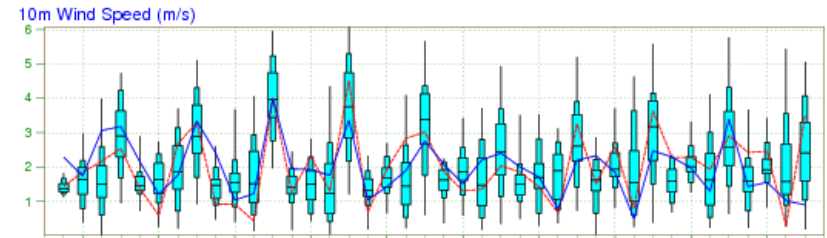
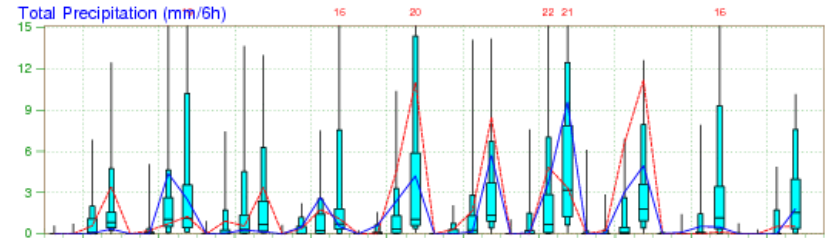
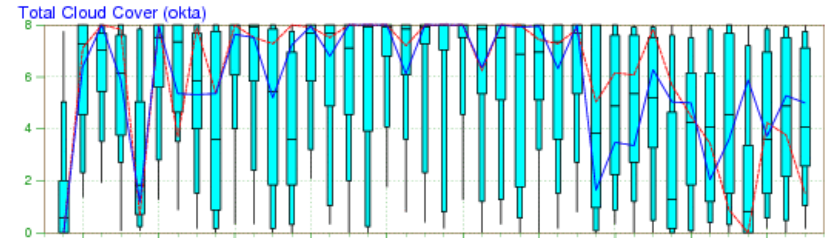
winds >20Kts

EUMETSAT

**EFI  
10m Wind gust**

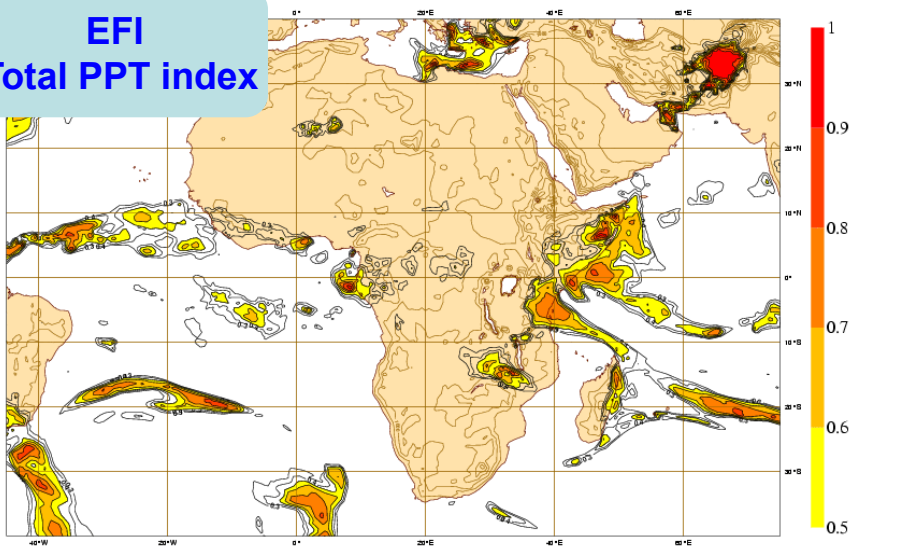


EPS Meteogram  
 Entebbe Airport 0.14°N 32.34°E (EPS land point) 1155 m  
 Deterministic Forecast and EPS Distribution Tuesday 11 October 2011 12 UTC

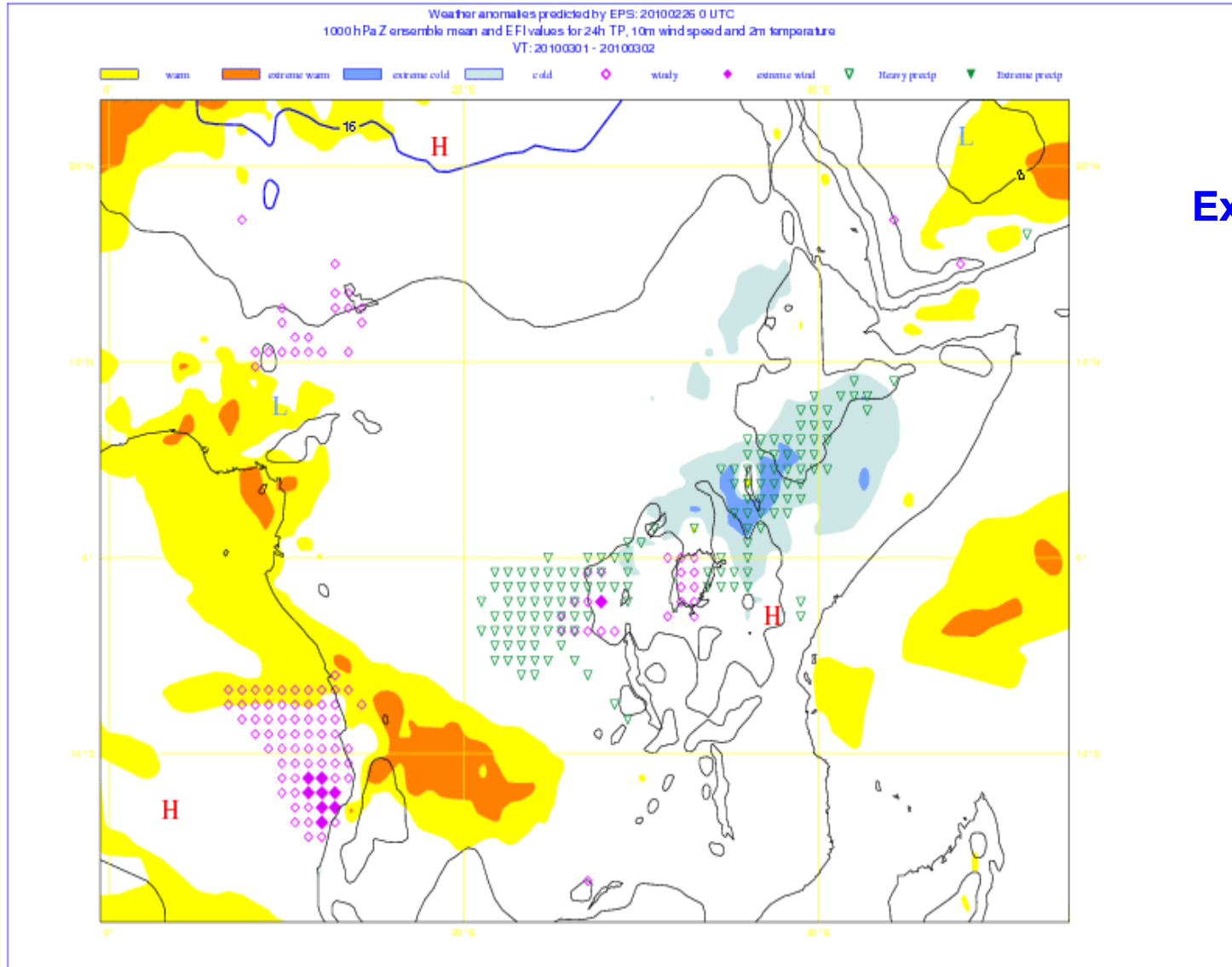


max 90% 75% median 25% 10% min  
 EPS Control(31 km) High Resolution Deterministic(16 km)

**EFI  
Total PPT index**



# Useful Product not available to WMO Members



**Extreme Forecast  
Index for All  
Parameters**



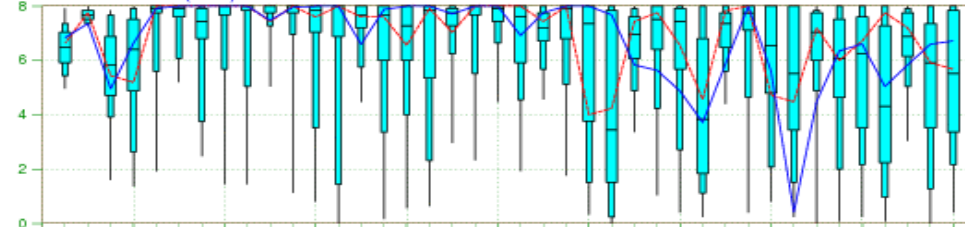
# Special Request: Additional EPSgram over Kalangala

EPS Meteogram

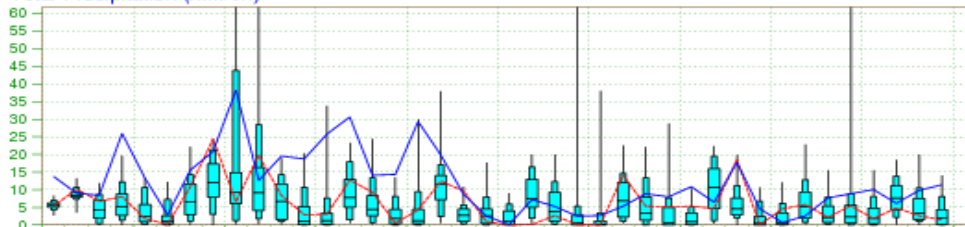
Bududa24 0.98°N 34.31°E (EPS land point) 1501 m (T1279)

Deterministic Forecast and EPS Distribution Wednesday 24 February 2010 00 UTC

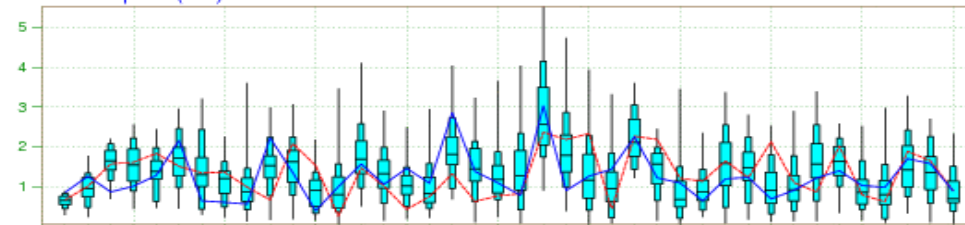
Total Cloud Cover (okta)



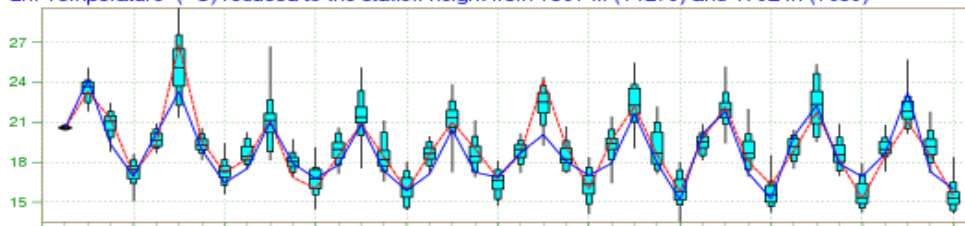
Total Precipitation (mm/6h)



10m Wind Speed (m/s)



2m Temperature (°C) reduced to the station height from 1501 m (T1279) and 1702 m (T639)



Wed 24 Thu 25 Fri 26 Sat 27 Sun 28 Mon 1 Tue 2 Wed 3 Thu 4 Fri 5  
February 2010 March 2010



EPS Control(31 km) High Resolution Deterministic(16 km)

## Other issues considered

- Available daily, 24x7
- Forecast colour risk based on Hazard Matrix and Daily assessment
- Forecast advice available by phone to NMC on [0414320920](tel:0414320920)/[321403](tel:0321403)
- Alert validity should be flexible
- Alert amendable (Correction, update, amendment, cancellation)

# Other issues cont...

- Post event analysis, verification and evaluation completed daily by 1500 UTC and filed in 'Mobile Weather Alert Pilot' folder
- Daily assessment also filed in 'Mobile Weather Alert Pilot' folder by 1500 UTC.
- User feedback is also important in improving the forecasts and alerts issued.

# DoM Success Criteria

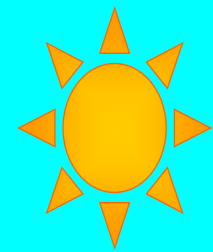
- Lives are saved and property protected in a cost effective manner
- Increased reach and enhanced trust and integrity
- Alerts should be timely i.e. received by users within 3 hours of issue, on time, in full
- Alert seen as a success if lead times of more than 3 hours is achieved and satellite/observations validates hazard.
- Alert seen as a success if fishermen take proportionate and appropriate actions based on the SMS text advice.
- The alert issued will be validated by a targeted questionnaire (email, letter, phone?) issued no more than 36 hours after alert issue.

# Colour codes: Meaning and implications

Colour coding	Green	Yellow	Orange	Red
<b>Hazard thresholds</b>				
<b>Mean Wind</b>	<b>0 – 5 KT</b>	<b>6 – 10 KT</b>	<b>11 – 20 KT</b>	<b>Over 20 KT</b>
<b>Wind gusts</b>	<b>5 – 10 KT</b>	<b>11 – 20 KT</b>	<b>21 – 30 KT</b>	<b>Over 30 KT</b>
<b>Thunderstorms</b>	<b>Light</b>	<b>Moderate</b>	<b>Strong</b>	<b>Severe</b>
<b>Visibility</b>	<b>&gt; 1Km</b>	<b>500 – 1000m</b>	<b>100 – 500m</b>	<b>&lt; 50m</b>
<b>Response Level</b>	Appropriate individual response under BAU.	Some multi-agency response but mostly BAU.	Multi-agency response needed.	Multi-agency Strategic response needed, mutual aid necessary perhaps national co-ordination.
<b>Implications for users of Lake Victoria</b>	Business as Usual (BAU)	Forecast weather may lead to hazardous conditions. Be aware	Weather conditions are likely to lead to hazardous conditions. Be prepared should the situation worsen	Weather conditions will lead to life threatening conditions on the Lake. Take action.
<b>Public Advice</b>	<b>Nil</b>	<b>Be Aware</b>	<b>Be Prepared</b>	<b>Take Action</b>

## Green Alert

**No alert:** No hazardous weather expected. Take normal precautions.



## Yellow Alert

**Be aware:** There might be changes in the weather. Be watchful and look out for signs of storm such as clouds, wind gusts, higher waves.



## Amber Alert

**Be prepared:** The weather is likely to change. Consider moving to safer areas and be prepared to take necessary actions.



## Red Alert

**Take action:** The weather will change soon. Take the necessary actions to get to a safe area.



# Weather Alert input URL



ERICSSON 

SUBMIT WEATHER

SECTOR

AREA

ALERT TYPES

WIND TYPES

FORECAST

ACTION TO TAKE

## Forecast

Forecast Segment:

Area:

Alert:

From:

To:

Action To Take:

Wind:

Weather:

Visibility:

Type:

Fishing

Kalangala

Green

12am

12am

No Action

Very Low

Clear

High

Forecast

SUBMIT FORECAST

ERICSSON 

**END**

**Thank you**