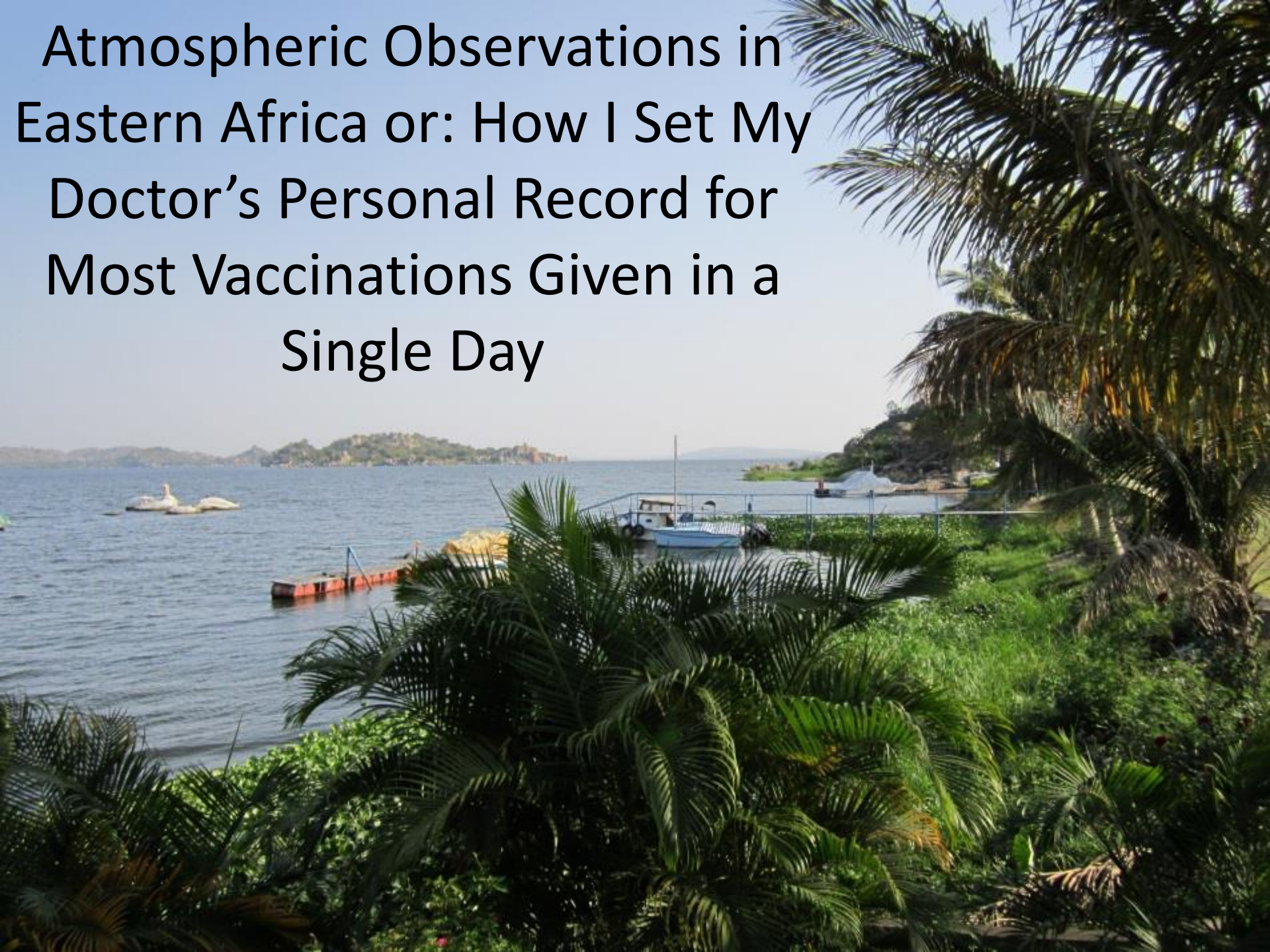
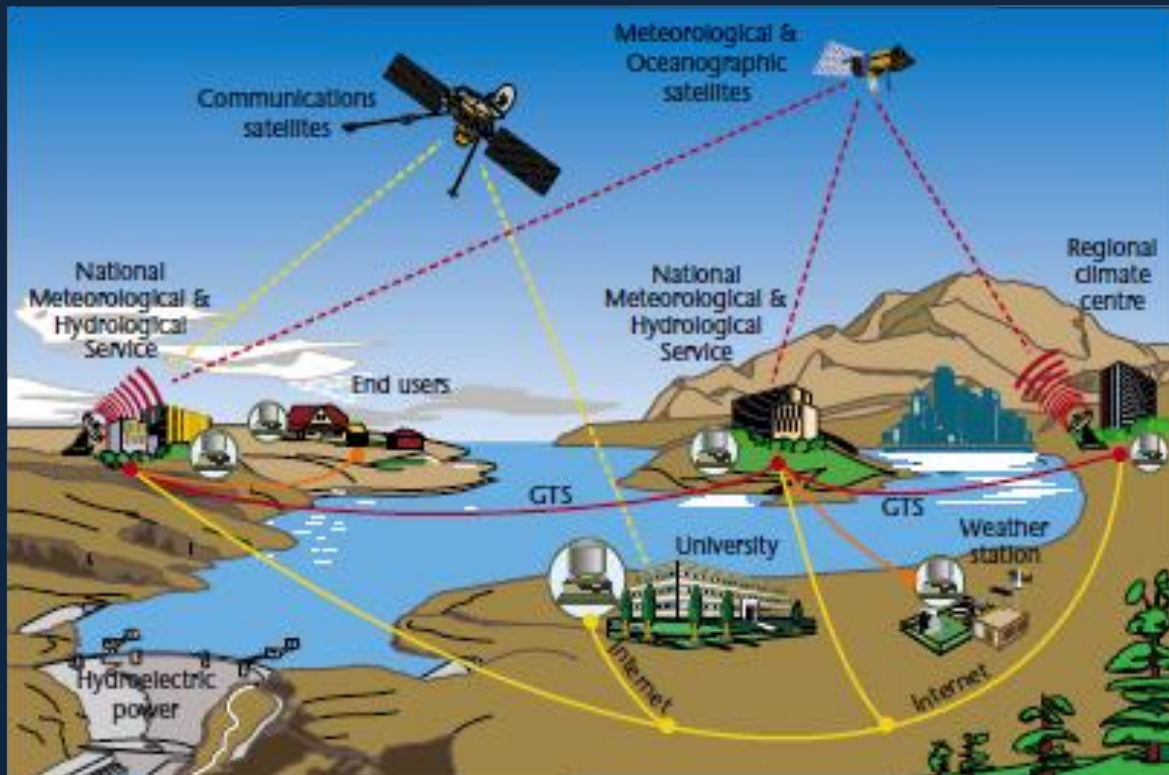


Atmospheric Observations in Eastern Africa or: How I Set My Doctor's Personal Record for Most Vaccinations Given in a Single Day

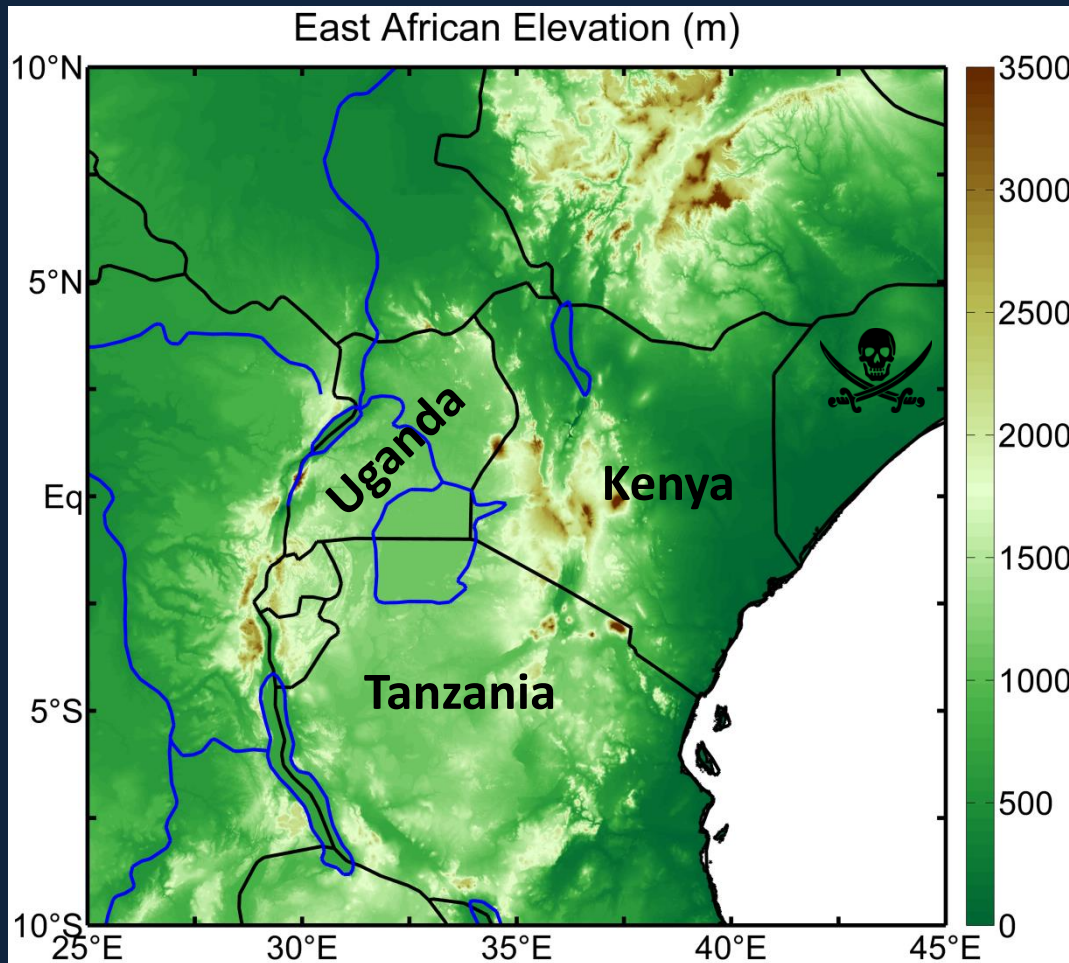


“Enhancing Safety of Navigation and Efficient Exploitation of Natural Resources over Lake Victoria and its Basin by Strengthening Meteorological Services on the Lake”



Dr. Fred Semazzi
Dr. Sandra Yuter
Dr. Lian Xie
Dr. Kiwanuka-Tondo

Lake Victoria Basin



- World's 2nd largest freshwater lake (area > 69,000 km²)
- Provides food and water to 30 million people in Kenya, Tanzania, and Uganda and over 300 million people in the entire Nile basin
- Fishing is the dominant economic activity for a significant portion of the population living around the lake

Fishing on Lake Victoria

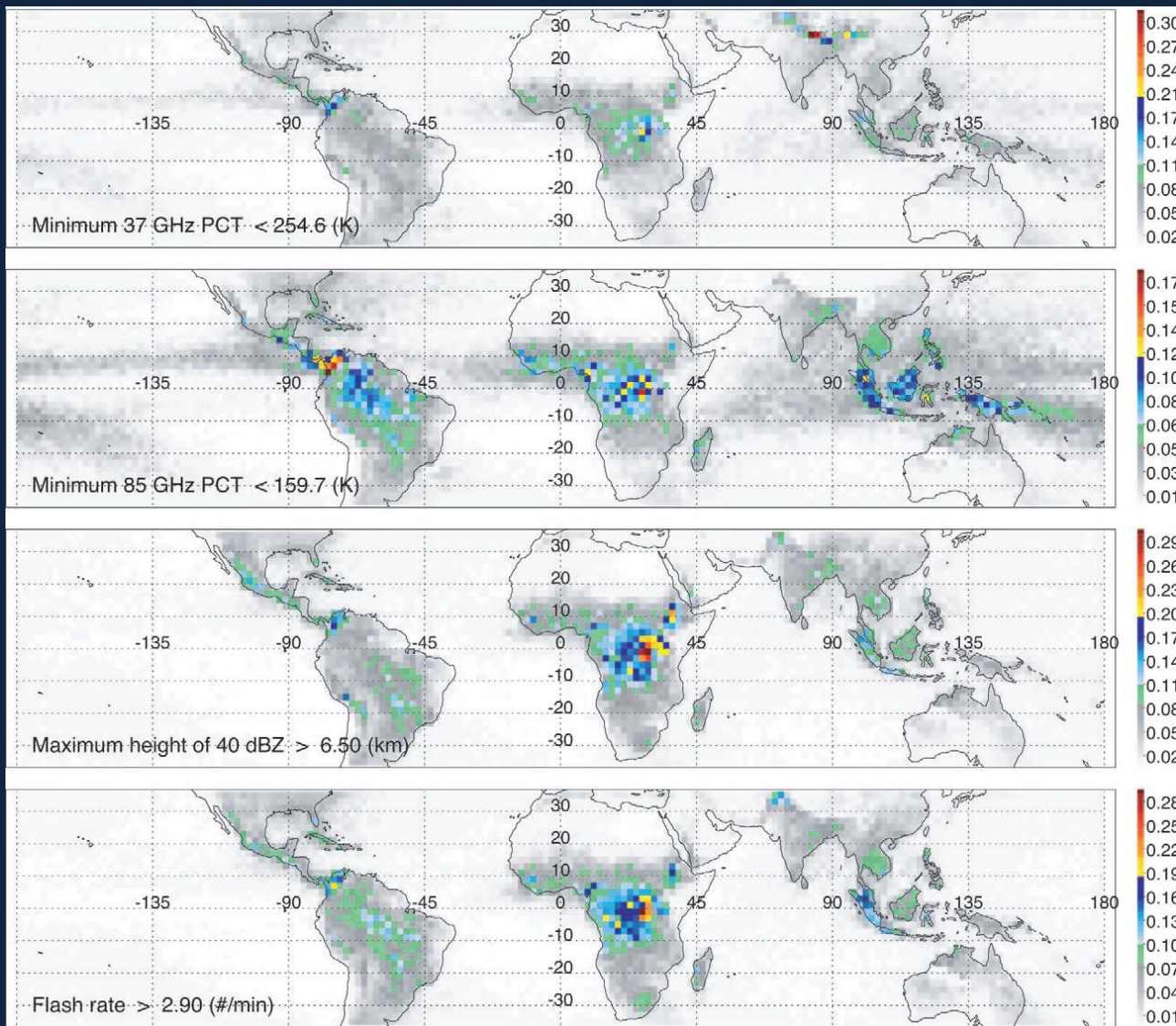


200,000 fishermen + 50,000 small boats = \$350-400 mil (USD) revenue

\$1,875.00 fisherman⁻¹ yr⁻¹

Robinson Cano's current contract = \$148,148.15 per game*

Storms on Lake Victoria



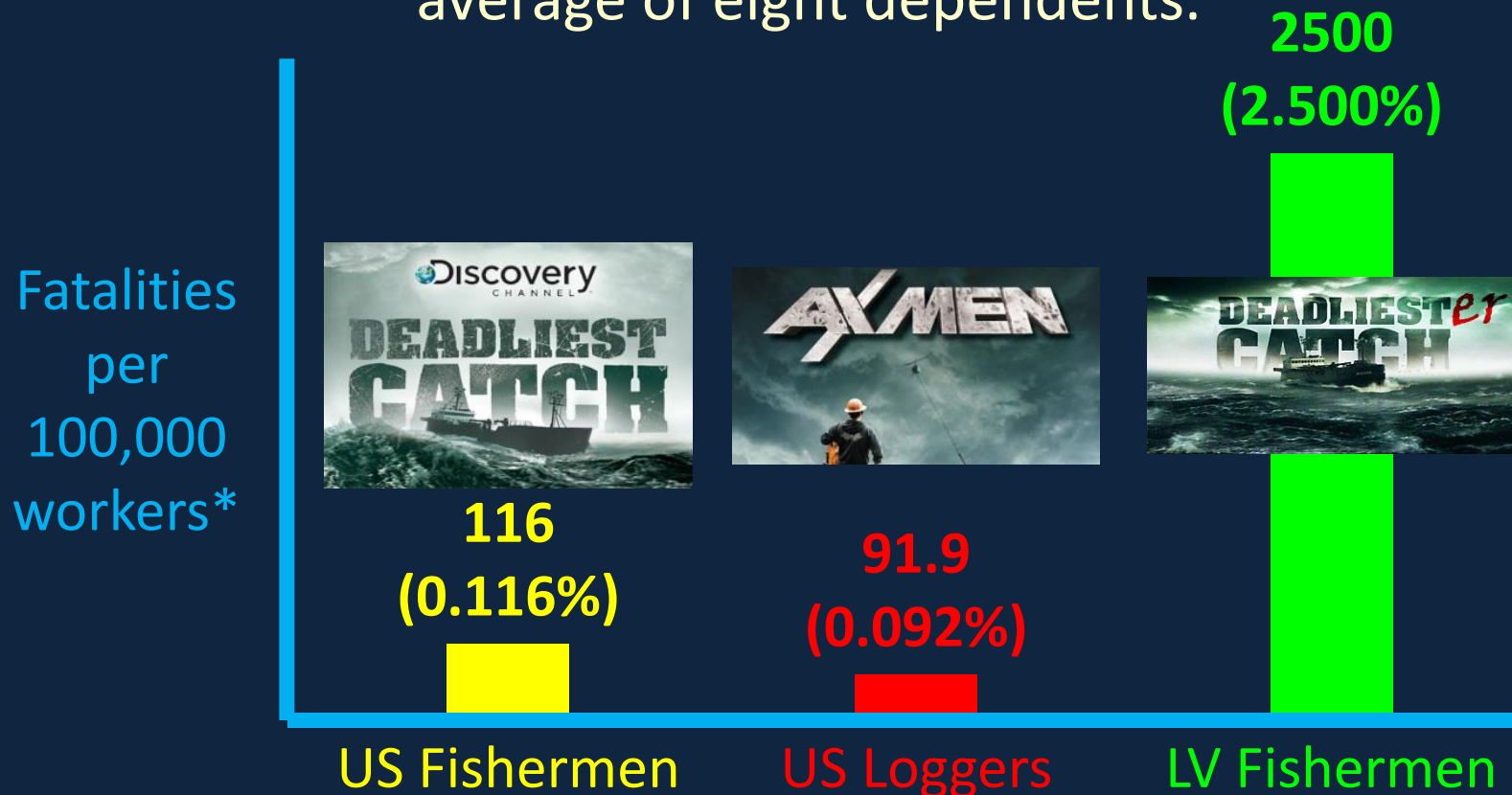
“Where Are the
Most Intense
Thunderstorms
on Earth?”

Zipser et al. 2006
Bull. Amer. Met. Soc.

Figure 7: Percentage of “extreme events” in a 2° box

Fishing + Storms on Lake Victoria

On average, 5,000 deaths occur each year among 200,000 fishermen on Lake Victoria due to navigation accidents. Each person lost on the lake leaves behind an average of eight dependents.



*Huffington Post, 8/22/2012

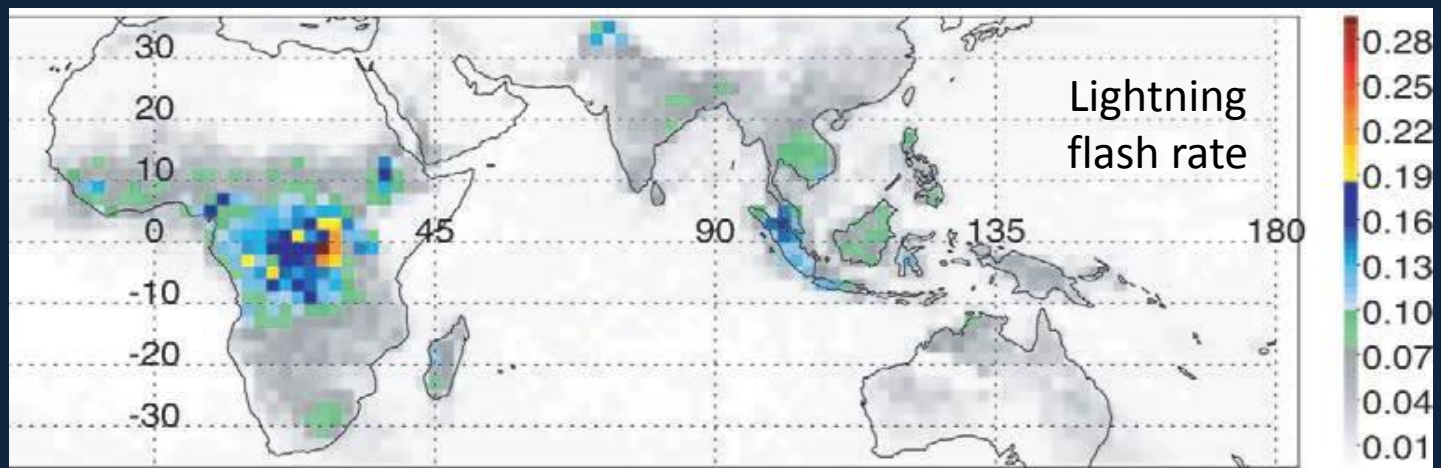
“Enhancing Safety of Navigation and Efficient Exploitation of Natural Resources over Lake Victoria and its Basin by Strengthening Meteorological Services on the Lake”

- 1) Develop a summary of precipitation characteristics over Lake Victoria
- 2) Understand how the current observation networks are used operationally to make daily weather forecasts
- 3) Develop recommendations for new sensors to deploy to improve the nowcasting capabilities of the meteorological services in the region and improve the navigational safety of the users of the lake

Precipitation Climatology

Storm Characteristics

- Storms are numerous and relatively small in area
- Storms are intense – lots of rainfall falling in a confined area in a short period of time
- Storms often have frequent lightning, high winds and significant hail



Zipser et al. 2006

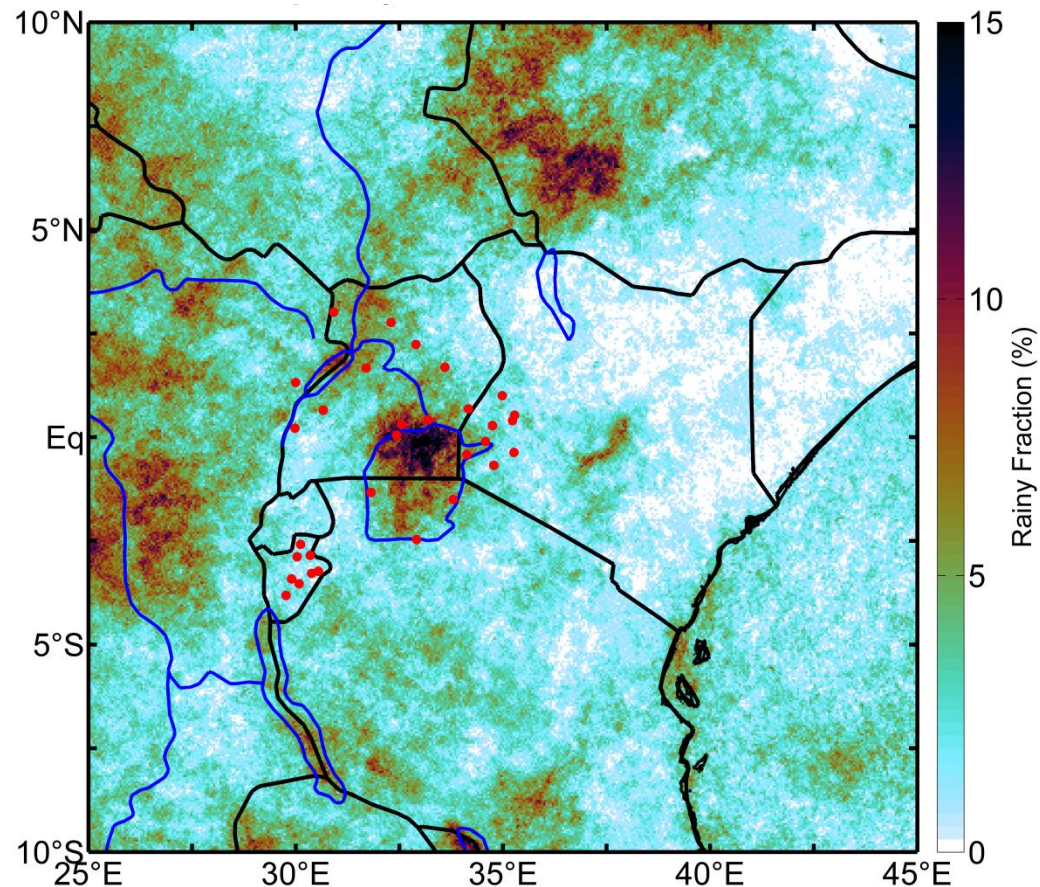
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Forecasting in the Region

What Observations Are They Collecting?

Precipitation Frequency \sim 2 am – 5 am

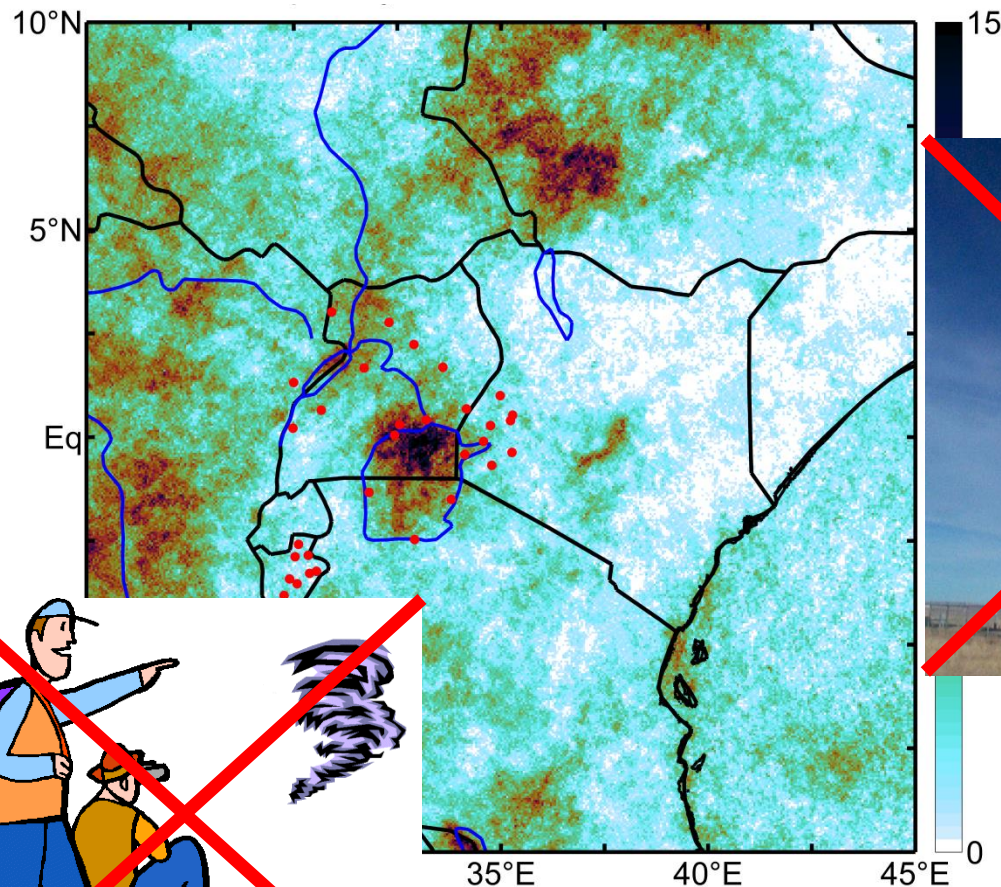


Forecasting in the Region

What Observations Are They Collecting?



Precipitation Frequency $\sim 2 \text{ am} - 5 \text{ am}$



Forecasting in the Region

How Do They Make Their Forecast?



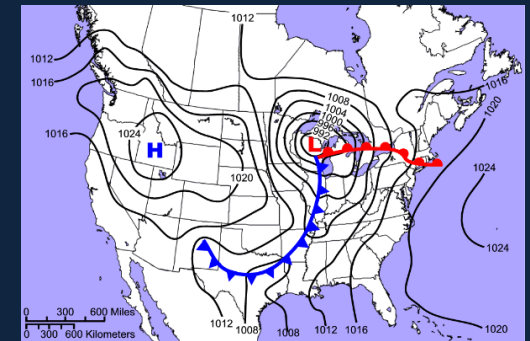
Take the global models (GFS, ECMWF, etc)...



Downscale them to regional models and assimilate some surface observations...



Mix in some hand map analysis based on the surface data...



Issue a once-daily (morning) 24-hr and 4-day forecast

“Enhancing Safety of Navigation and Efficient Exploitation of Natural Resources over Lake Victoria and its Basin by Strengthening Meteorological Services on the Lake”

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Our Recommendations

Nowcasting Challenges

To generate an accurate nowcast you really need three pieces of information...



1) Where are the storms now and where are they moving?



2) How intense are the storms? Do they pose a threat to the public?

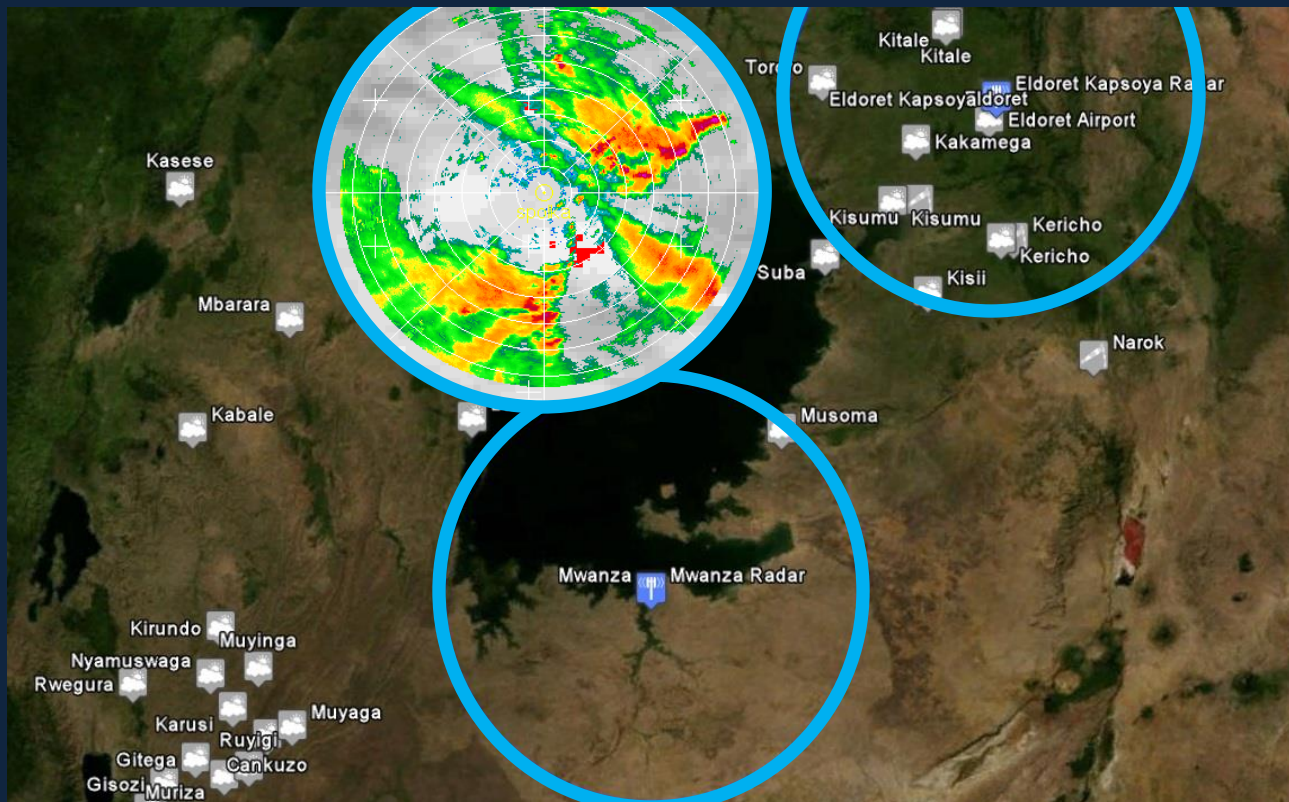


3) Can we communicate the danger to people who are in or will be in the way?

Our Recommendations

Additional Observations

What they really need for this type of problem is radar...



Mwanza, Entebbe and Eldoret radars with 150 km range rings

Our Recommendations

Additional Observations

Upper air soundings assimilated into the regional downscaling of models could probably help as well...

Broader Recommendations

- Issue evening forecasts
- Pursue the cell phone alert system
- Install a land-based beacon navigational system
- Satellite communications to make rural observational data available in real-time

Outcomes

Since the submission of the final project report in October 2011, several things have happened...

- Our recommendations for additional sensors (i.e. radars) was funneled to the WMO through Dr. Semazzi. From the WMO the European Union got wind of the report and has since tentatively agreed to fund the purchase and installation of one radar for the region as a pilot project (Tanzania).
- Our report was used as the basis for a letter to GEWEX (Global Energy and Water Cycle Experiment) that led to an international meeting about using the LVB region as a basis for a long-term regional hydroclimate experiment.
- Jim Wilson from NCAR has been working with the WMO Nowcasting Committee and used our report as the basis for a field-experiment proposal to test and improve nowcasting methods in the region.