

Q&A

Dr Mark Saunders

Dr. Mark Saunders is lead scientist of the Benfield Greig Hazard Research Centre at University College London (UCL). The Centre operates TropicalStormRisk.com (TSR), a venture that developed from the UK government-supported Tsunami project on seasonal tropical cyclone prediction. The TSR scientific grouping brings together climate physicists, meteorologists and statisticians. Mark Saunders talked to ERisk's Ronald Giff Mullins about its work



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between 10 and 20 degrees north and 20 to 60 degrees west. Our model uses temperature and wind readings from this area that are updated throughout the year to predict what the temperature and wind conditions will be in August and September in that region. We know from historical data the optimum temperature and wind conditions that produce tropical storms and the closer the model predicts these conditions occurring, the more accurate our forecast.

Was TropicalStormRisk.com developed by insurance companies? Do they support the TSR effort?

Yes, TSR is supported by the CGNU Group, the Royal and Sun Alliance insurance company, and Benfield Greig. TSR was formed in December 2000, but we had previously issued our first forecast in December 1998, when we were part of the Tsunami project. We named it TropicalStormRisk.com because "tropical storm" is the only generic name that is known around the world as indicative of turbulent weather. Paul Rockett and I are the two lead scientists. Benfield Greig also funds various other projects at the research center.

What do the companies actually get out of it?

Sponsoring companies feel the forecasts offer real value. By sharing forecasts with customers, risk awareness increases and risk mitigation strategies can be developed. The sponsors also feel it is sound public relations to be supporting innovative research with long-term potential.

Is interest increasing, and from whom?

Hits on the TSR website are increasing steadily, and negotiations are under way with additional sponsors. These include insurance and risk management companies. The US power and energy industry is also interested in long range hurricane outlooks.

What climatic indicators or data do you use to make your predictions?

Our forecasts for hurricanes and tropical storms are based on readings of temperature and trade winds in the Atlantic Main Development Region, which is

Have these predictive factors changed over the years?

Over the past 20 years, the link between the two climate indicators has become stronger. This could be a reflection of the improved accuracy of the measurements, or these indicators may have become more reliable predictors. Our model was built using historical data, going back 100 years. The measurements were originally obtained by ships in the area in question. Now they are taken by satellites, which have been operating since the late 1960s. We get our data from the National Oceanic & Atmospheric Administration (NOAA).

Why do you provide forecasts at particular times during the season? And do your forecasts become more reliable as the season goes on?

As the season develops, we provide updated forecasts so that companies can prepare for what may be a disaster by taking out additional insurance or reinsurance for the months of the hurricane season – or not, if the season looks uneventful. Our forecasts have applications for anyone involved in risk mitigation, such as tourism and agriculture. The more useful the forecast the better chance of it being used in a risk mitigation strategy. And, yes, our forecasts increase in accuracy as we approach August and September.

What is your level of predictability?

Last year we were almost bang on for the number of intense hurricanes. In 1999, we were not very good for intense hurricanes, but about average for overall storm predictions and the number of storms hitting the mainland of the US. I think the model we were using in 1999 was perhaps not quite good enough. It has now been

revised to include the wind speed over the Atlantic and Caribbean.

Our 2000 forecasts for the Northwest Pacific were remarkably bang on, especially about the number of storms and intense typhoons hitting Japan. It was our most successful forecast to date. While there is a lot of interest in hurricane forecasting in the US, there is high interest in typhoon forecasting in Japan, Taiwan, the Philippines, Korea and China. In fact the Far East gets hit by more typhoons each year than hurricanes hit the US. In the future I know we will improve on our predictability of hurricanes. At present, our model is based on statistics but soon we will be helped by incorporating dynamic model data from vast climate models run by government agencies in the UK and the US.

But there is still a lot of scepticism about this approach, given the unreliability of long-range forecasting. How do you answer critics who say there is little evidence to support this methodology?

The only true proof of a forecast is its long-term track record. Thus it takes time to judge the accuracy and usefulness of a new forecasting methodology and to build confidence. Based on careful hindcasting – in other words, assessing what the models would have predicted in prior years had they been available – we are confident the forecasts are useful. We plan to convince the sceptics of this through improved marketing and education.

How do you provide your forecasts and to whom?

We provide our forecasts free via email subscriptions for those registered via the Internet and to others that have an interest. We may start charging for some of the monthly updated forecasts when we start issuing those next year.

Our forecasts for typhoons in the Northwest Pacific are distributed by email announcements to those who are registered, especially to the three companies that support us. I believe all three have offices in the Far East and they distribute our forecasts to their clients. We have had some interest from insurance and trade publications in our forecasts.

The forecasts of hurricane activity provided by Prof. William Gray and his team at Colorado State University are widely known in the United States. Do you follow each other's predictions?

Yes, we both have a lot of interest in what the other team is doing. Gray has been issuing predictions since

1986 and his forecasts are treated like gospel in the US. In the UK, we have a fairly good reputation, but are not well known in the US. We hope to change this over the next year or so. He uses one statistic – the amount of sub-Saharan rainfall in West Africa from the previous year – that we don't. We have looked into this information and did use it to work back in our predictions for the 1950s, 1960s and 1970s. But we think its influence in recent years has been low. We have not found it a very strong predictor.

Who has the better prediction record?

Using our model we did a hindcast and saw what we would have predicted compared with what he predicted. We found that for Atlantic hurricanes our pre-

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dictions have been slightly better than his, but topical storm prediction is comparable. However, it is not fair to do a one-on-one comparison as the prediction factors have changed over time. It is possible his more recent hurricane model may be doing better.

In our summary of 2000 Atlantic activity we reported that the number of intense hurricanes was correctly forecast by TSR and Gray in the August 2000 forecast, but under-predicted by TSR and over-predicted by Gray in the early June forecast. Unlike Gray, we do predict the number of hurricanes or storms that may reach landfall. He just provides the probability that one or more major hurricanes will make landfall.

For the 2001 season, in early June, Gray predicted three intense hurricanes, four other hurricanes and 12 tropical named storms. TSR forecasts 2.4 intense ones, 5.8 other hurricanes and 10.9 tropical named storms. Is there a statistical difference between these predictions?

Very little. Marginal differences at most. We do predict that 1.5 hurricanes will hit the US in 2001 and 3.1 tropical storms. Gray predicts there is a 69 per cent probability of one or more hurricanes hitting somewhere on the US coastline.■

Ronald Gift Mullins, ERisk