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Event Response Activities for the Near-Real Time Assessment of Financial Losses in Landfalling Hurricanes

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1. INTRODUCTION

The insurance and reinsurance industry is in need of rapid information about expected losses when any catastrophe occurs, for various resource allocation purposes. For example, loss estimates are needed to plan rapidly the deployment of claim adjusters into the most impacted areas, to ensure adequate capital is ready to face the catastrophe, and to provide loss estimates to shareholders.

The 2004-2005 U.S. Hurricane activity has amplified the need for insurers and reinsurers alike to quickly obtain information and presents the industry and catastrophe (CAT) modelers with a new set of challenges in responding to catastrophes. The rapid succession of storms within close spatial and temporal proximity has shown the importance of business interruption and demand surge (the lack of material and manpower compared to the damage and needs to rebuild) in assessing losses. The potentially very significant role of non-modeled hazards on the total losses, such as the Great New Orleans flood, is also influencing the way the response needs to be conducted.

Insurers and reinsurers turn towards CAT modeling firms to provide rapid initial estimates of industry-wide losses. In this paper, we cover the various components involved in hurricane event response at RMS and open issues that can affect the validity of initial CAT response loss assessments.

2. GENERAL APPROACH TO EVENT RESPONSE

A CAT model usually comprises the following modules: 1) an assessment of the perils; 2) an estimation of the behavior (vulnerability) of buildings and their contents in the region exposed to the perils; 3) the monetary (financial) losses, which are constructed by mapping the severity of expected damage to properties to the financial losses by knowing the insured property values and other insurance program characteristics.

When such a model is used in real-time, all components beyond the hazard assessment use pre-compiled datasets such as loss functions that link the hazard (i.e. the wind speed) to the expected loss. The hazard footprint, however, is prepared in real-time during an event using various sources of public or private data sources. In general, the RMS hazard footprint covers wind damage and a measure of surge; additional secondary perils such as inland flooding have traditionally not been modeled for hurricanes.

Figure 1 shows the RMS hazard (wind) footprint produced in the wake of Hurricane Frances. Typical data used to reconstruct a wind field include Mark Powell's group (NOAA/Hurricane Research Division) H*Wind products near the landfall point, supplemented with surface observations such as those obtained from the Florida Coastal Monitoring Program (FCMP), sea-based observations from the National Data Buoy Center (NDBC) and METAR data obtained from NOAA. The windfield reconstructions act as footprints of the peak gust wind speed at any location near the storm track within the landfall region. Peak gust wind speed is utilized as engineering research demonstrates that damage is best correlated with peak gusts, and not maximum sustained winds.

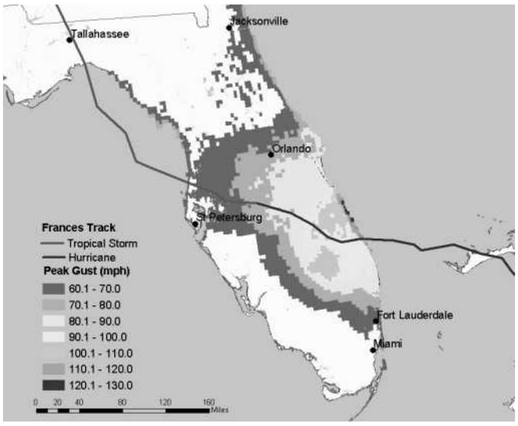

Figure 1: RMS onshore wind field footprint of 3-second peak gust (mph) wind speeds for Hurricane Frances which made landfall in Florida on 5 September, 2004.

Creating the footprint through interpretation of multiple data sources is an intensive process faced with many challenges. For example, data quality needs to be checked in real time to avoid spurious information that may affect the optimization of the wind distribution. More importantly, the process needs to be robust enough to cope with data interruption and change in data type and coverage. In many instances, data sources may change as the storm progresses or some stations may cease transmitting during the passage of the storm.

3. ADDITIONAL ISSUES

Non-modeled perils such as the Great New Orleans flood can potentially significantly increase the real-time loss estimates. For example, inland flooding is generally not modeled in current hurricane CAT models. Yet, a storm such as TS Allison (2001) resulted in more than $2 billion total insured losses in water-related claims in the Houston area. RMS have recently implemented a flood assessment component to the CAT Response process whereby the regions at risk are assessed by using real-time rainfall maps and the relationship between rainfall amount and losses based on analysis of historical insurance claim data for past events.

4. SUMMARY

This presentation will cover the steps involved in the real-time assessment of losses in hurricanes, and the challenges facing modelers in such an undertaking. Particular focus will be put on open issues and the importance of accounting for non-modeled perils and business uncertainties in the wake of large events to produce proper estimates of industry losses.

The presentation will also demonstrate how these real-time windfield reconstructions of hurricanes, when used alongside insured loss data, are beneficial in the development and improvement of the underlying damage functions used to estimate insured loss.

References available upon request

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