Enhancing USGS NSHM Data for Insurance Risk Scoring

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Reinsurance Broking and Analytics as Client Services; Supporting Insurance Underwriting Processes

Underwriting guidelines for insurance companies are to assess current and future business in these main areas:

- Risk selection
- Growth strategies

Guy Carpenter delivers deep technical insights and vast transactional capabilities to address complex and unique risk management challenges.

Reinsurance brokerage services for 90+ years
Background & Business Purpose

• Applying catastrophe risk loads to insurance rates increasingly important for insurance companies

• Analytical tools for providing efficient, technically ‘correct’ estimation of hazards historically limited for earthquake peril

• Until more recently, distance to nearest earthquake fault was used as a proxy for estimating a cat loss ratio for policy premium

• Providing MMI hazard layers advances state-of-knowledge for underwriting (UWs) and more informed portfolio management
MMI layers for Insurance Risk Scoring Workflow
Soil-Specific MMI Hazard Maps for US

USGS 2014 with 2018 Soil Type B/C [OFR 2018-1111] +


Applying Worden et al. (2012) → MMI
Integrating big data with the latest risk management and visualization techniques

GC AdvantagePoint®

A global advanced risk management platform featuring a suite of applications to transform your data into actionable business strategies

Portfolio Risk Management

Underwriting Support

Location Hazard

<p>| USGS Soil Specific MMI Hazard Maps - 10 Pct Probability in 50 years (475 years) |
| Exposure By Severity |</p>
<table>
<thead>
<tr>
<th>Severity</th>
<th>TRV</th>
<th>Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>133,166,853,790</td>
<td>-</td>
</tr>
<tr>
<td>II - Weak (Imperceptible)</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>III - Weak (Perceptible)</td>
<td>41,204,499,672</td>
<td>-</td>
</tr>
<tr>
<td>IV - Light</td>
<td>36,583,357,871</td>
<td>-</td>
</tr>
<tr>
<td>V - Moderate</td>
<td>8,539,674,198</td>
<td>-</td>
</tr>
<tr>
<td>VI - Strong</td>
<td>7,833,963,481</td>
<td>-</td>
</tr>
<tr>
<td>VII - Very Strong</td>
<td>14,860,704,336</td>
<td>-</td>
</tr>
<tr>
<td>VIII - Severe</td>
<td>26,057,156,979</td>
<td>-</td>
</tr>
<tr>
<td>IX - Violent</td>
<td>87,597,253</td>
<td>-</td>
</tr>
</tbody>
</table>
Leveraging Qualitative Insights from Technical, Highly Quantitative Information

• Using MMI scale ticks many boxes for insurance user:
  – Risk planning without location-specific information (e.g., exposure type)
  – Incorporation of potential damageability
  – Regional comparison compatibility

• Reinsurance broking analytics serve as arbiter between advancing science and insurance industry business needs
  – Need to present consistency and manage change over time
  – Insurance industry cannot react on same time scales as technical advances
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