

Index-based Earthquake Insurance for Indonesia: Opportunities and Challenges

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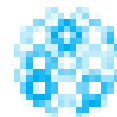
H.B. Price Professor, University of Kentucky, and
President, GlobalAgRisk, Inc.

Jason Hartell, GlobalAgRisk, Inc.

Ntongi McFadyen, Save the Children U.S.

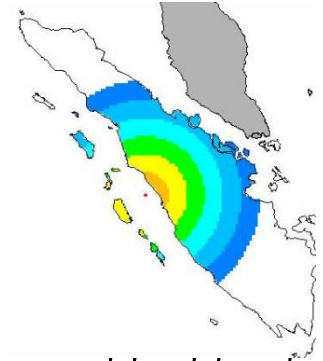
Jakarta Indonesia

November 15, 2010



FORDFOUNDATION

7.6 West Sumatra Earthquake, 2009



Humanitarian Impact

- *1,300+ lives lost; 1,214 severely injured*
- *250,000 families (1,250,000 people) affected by total or partial loss of homes and livelihoods*



Economic and Consequential Loss

- *Emergency water, food, and shelter (\$8 million in USG funds alone)*
- *Electricity / water infrastructure - est Rp 170 bn*
- *Two hospitals, several schools and largest university collapsed*
- *Building loss - est IDR 8.2 bn*
- *Cement factory closed 10 days; 150,000 tons of palm / rubber shipments delayed*
- *Up to 400 commercial and rural bank branches mobilized to restructure small loans*

Index Insurance: An Alternative

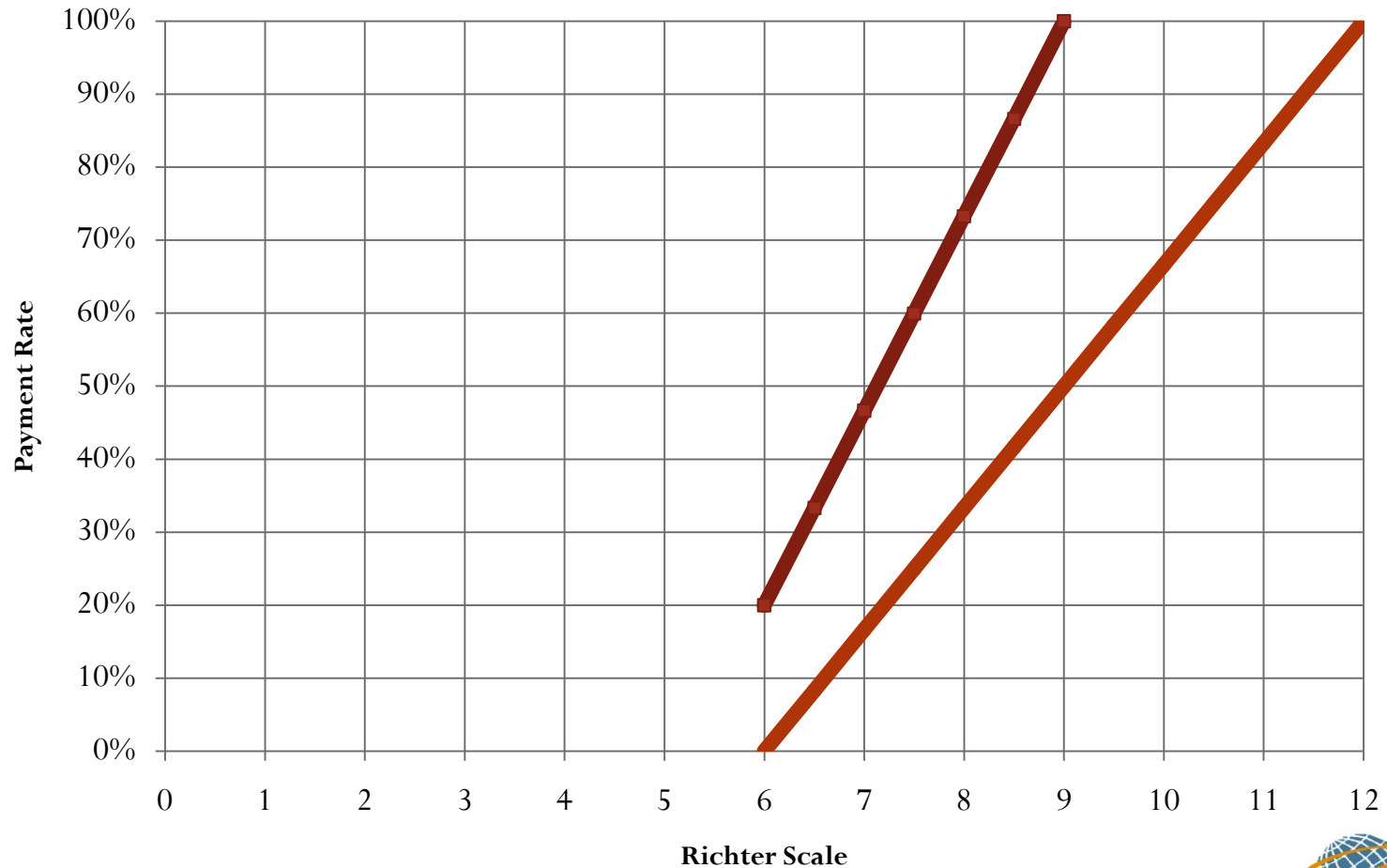
- Insurance where the claim is calculated based on an independent, external index designed to reflect as accurately as possible the loss experience of the insured, due to the catastrophic event.
 - Payments made when a predefined threshold of the index is exceeded
- Suitable for transferring correlated catastrophic risks - those which impact a large number of individuals and entities at the same time.

Characteristics of an Index

- Observable and easily measured
- Objective
- Transparent
- Independently verifiable
- Ability to make a timely payment when it is most needed
- Stable and sustainable over time
- Cannot be influenced by the insured
 - Secure and tamper proof
 - Cannot alter the probability of payment

Earthquake Product Design

Example Payout Function



Basic Idea for Index-based Earthquake Insurance

- Use Risk Maps to develop premium rates
- Use Shake Maps as the basis for payouts
- Beyond a certain threshold, payments begin
- It may work best with a step function

Quick payout

No loss assessment

Can be used for a wide range of stakeholders

Market Development Process

Important – Reach Scale Quickly

- To reach scale quickly, target risk aggregators first
- Introducing products with potential for significant scale engages the interest of key stakeholders (e.g., insurer, insurance regulator, global reinsurer) to provide input and services that are appropriate for longer-term sustainability
- Pilot projects that sell a few hundred policies to small households (small insured value) are often viewed as experimental and are less likely to receive the same attention

Target Market: The Demand-Side Marketplace

Our Focus

Government

- Ex ante financing
- Infrastructure

Industry

- Asset protection
- Business interruption

Private Financial Sector

- MFI risk management and business continuity

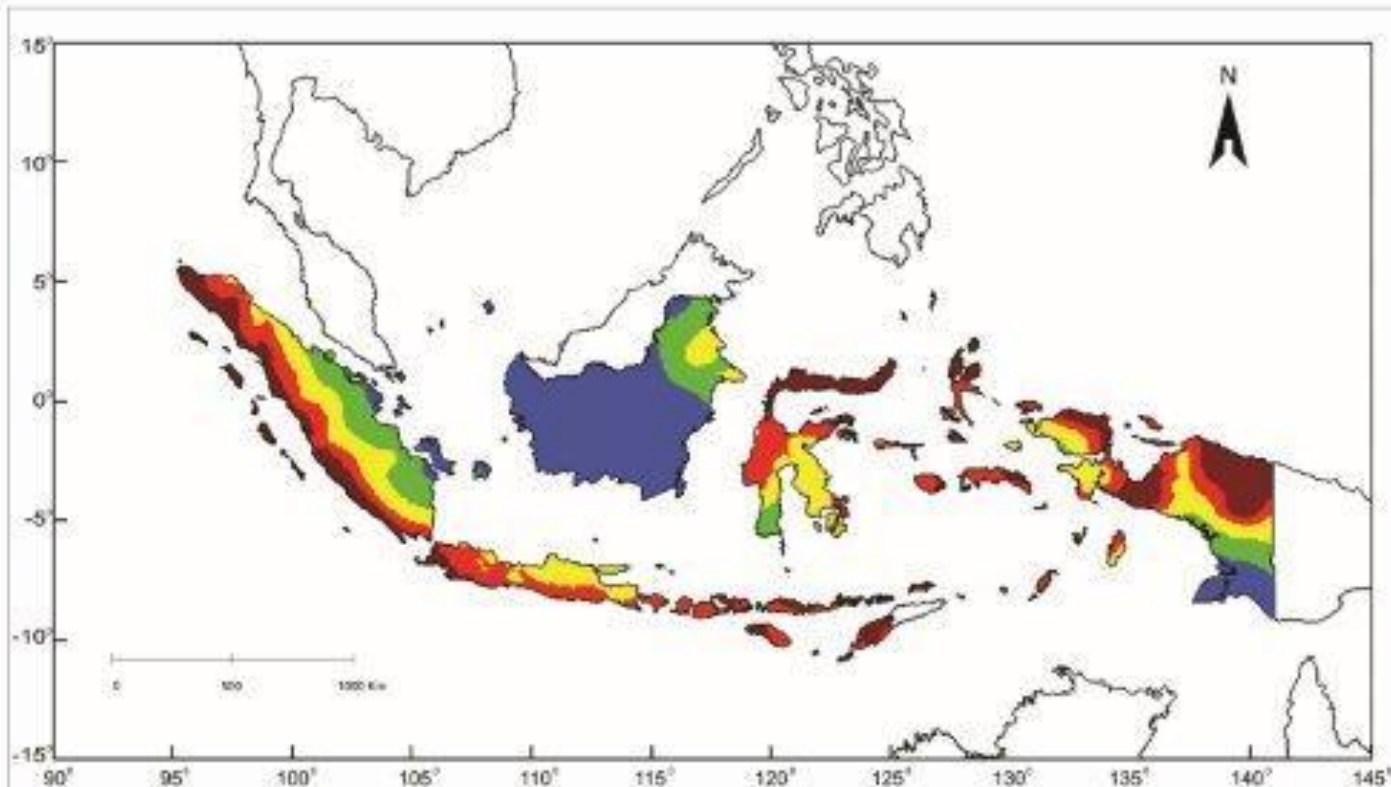
Households and MSME's

- Livelihood resiliency
- Access to goods and services

Significant investment in science-based modeling

- Strong knowledge base in Indonesia for understanding and mapping earthquake risk.
- MAIPARK's pooling and transfer of earthquake risk to global reinsurers is testimony to the acceptance of this knowledge
- Significant resources are being allocated to further improve and refine the technology for measuring severity
- Need to learn more about the accelerograph technology, but the accompanying development of Shake Maps opens the way for future development of index-based insurance products that can be used among a broad range of stakeholders

EARTHQUAKE RISK ZONE MAP OF INDONESIA



SOURCE ZONES



50 source zones used
Analyzed independently; b-value
Maximum magnitude, dip rate and dimension

SEISMIC HAZARD MAP



0.1 0.5 0.8 PGA (g)

SEISMIC INTENSITY MAP



Low Medium High



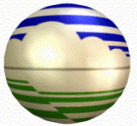
LEGEND

- Zone I
- Zone II
- Zone III
- Zone IV
- Zone V

The risk increases from a minimum risk (zone I) to the maximum risk (zone V).

Prepared by :

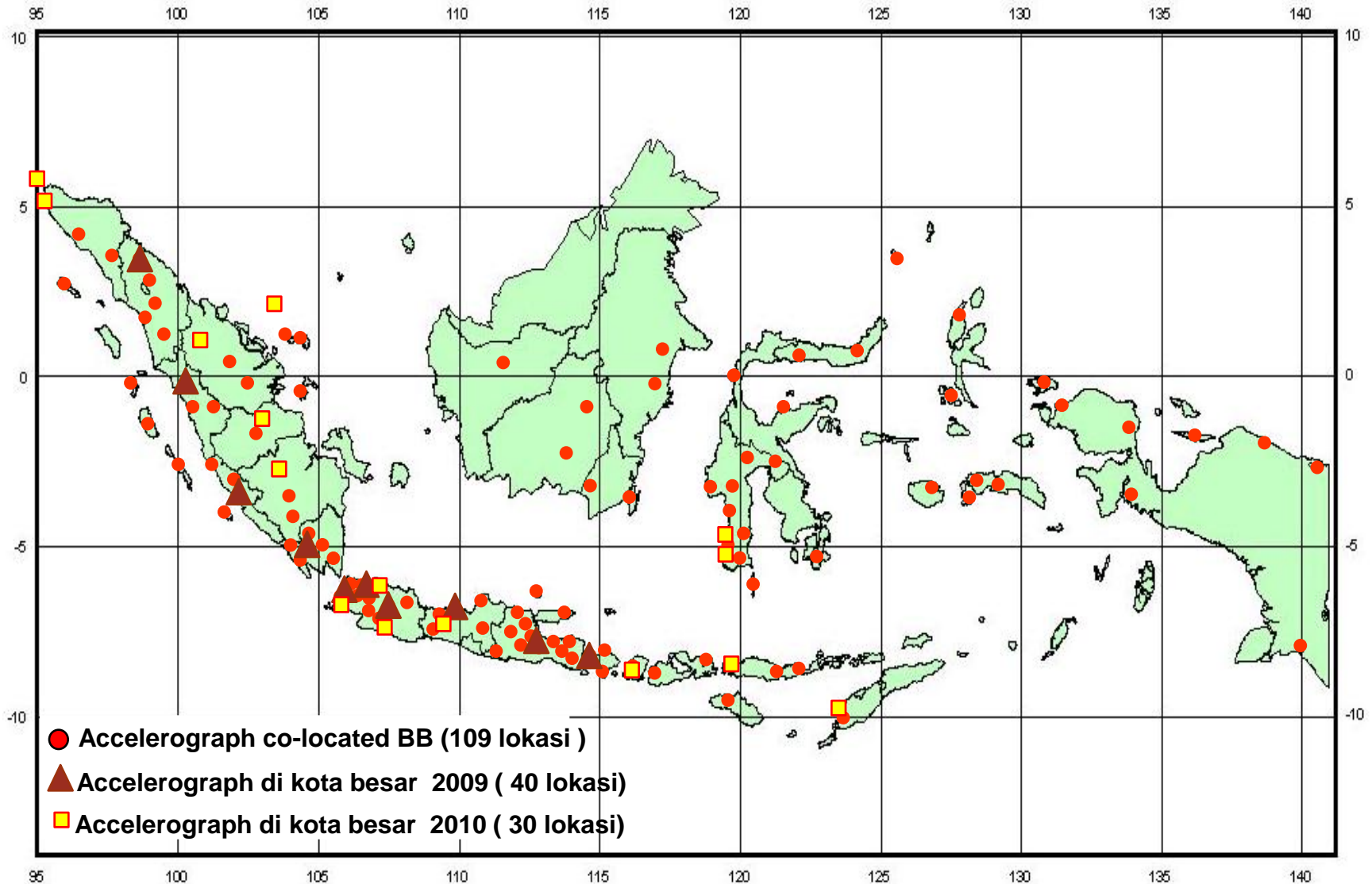
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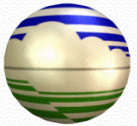


BMKG

Accelerograph Network in Indonesia

180 Locations



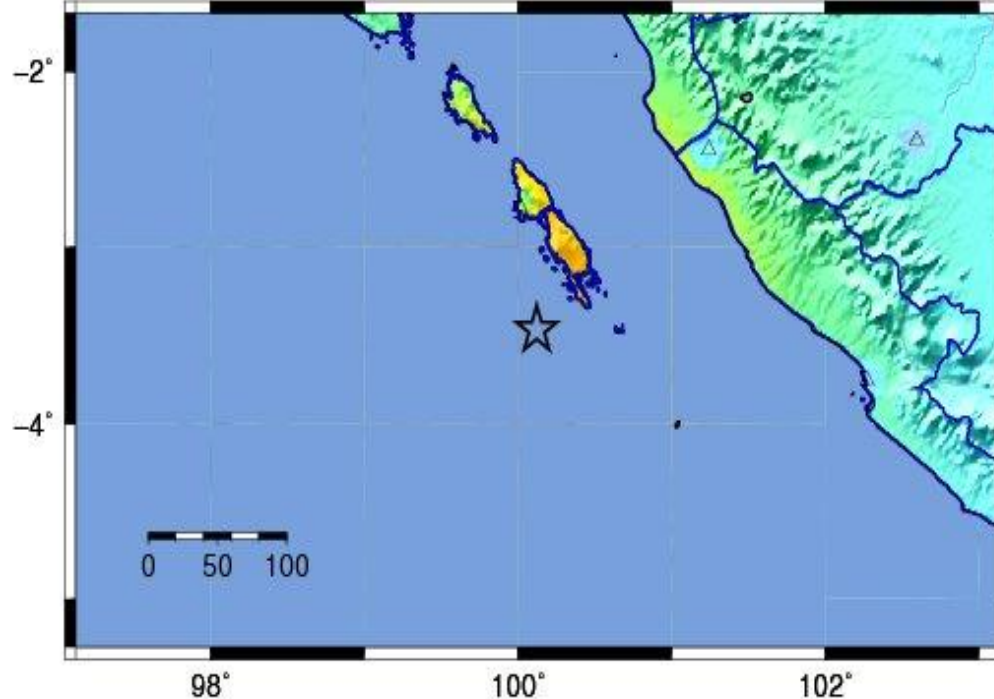


BMKG

Shake Map: Mentawai Earthquake, 2010

BMKG ShakeMap : KEP. MENTAWAI REGION, INDONESIA

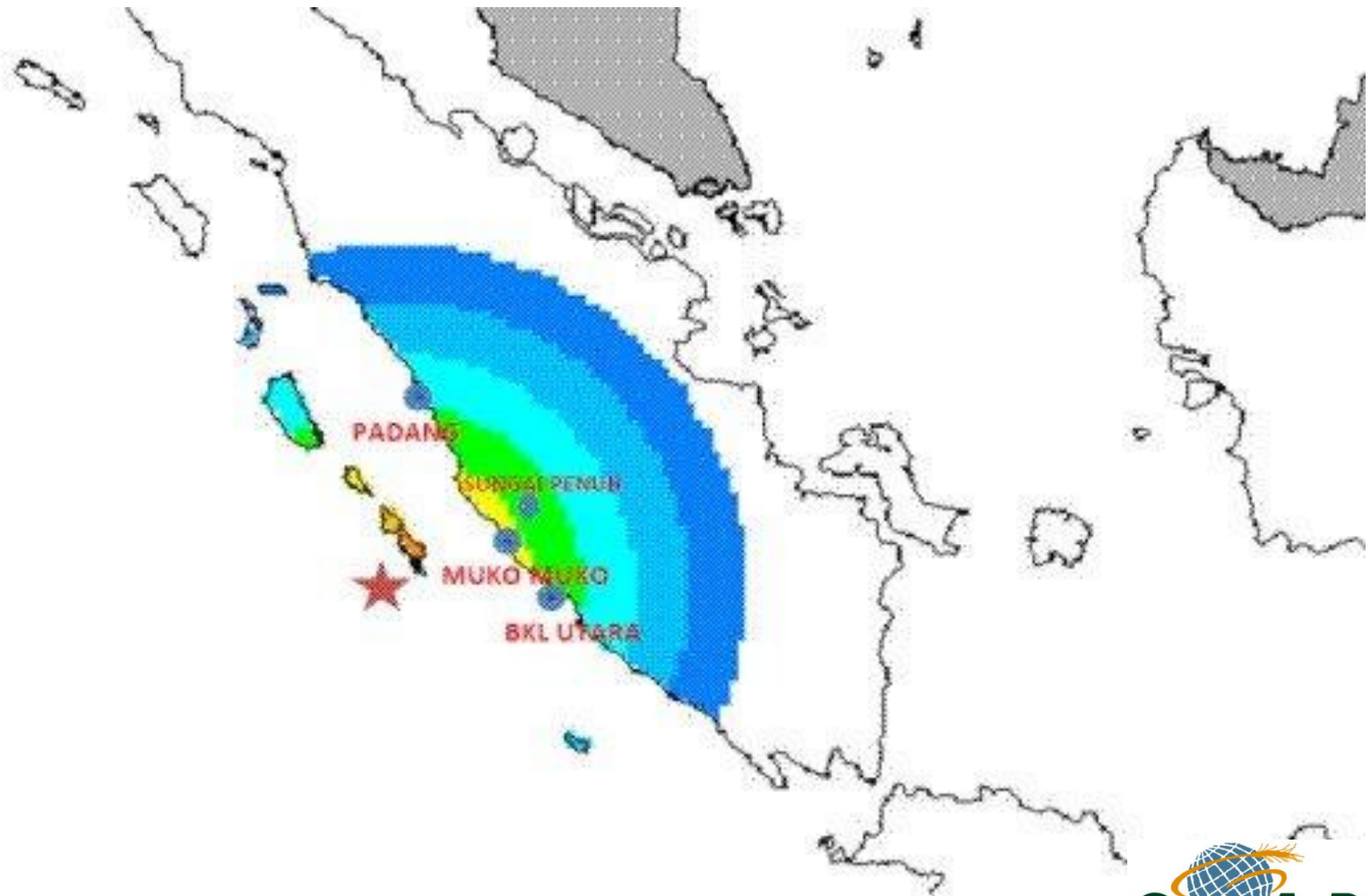
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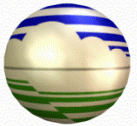


Map Version 1 Processed Thu Oct 28, 2010 07:53:56 AM GST

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Modeled Shake Map: Mentawai Earthquake, 2010



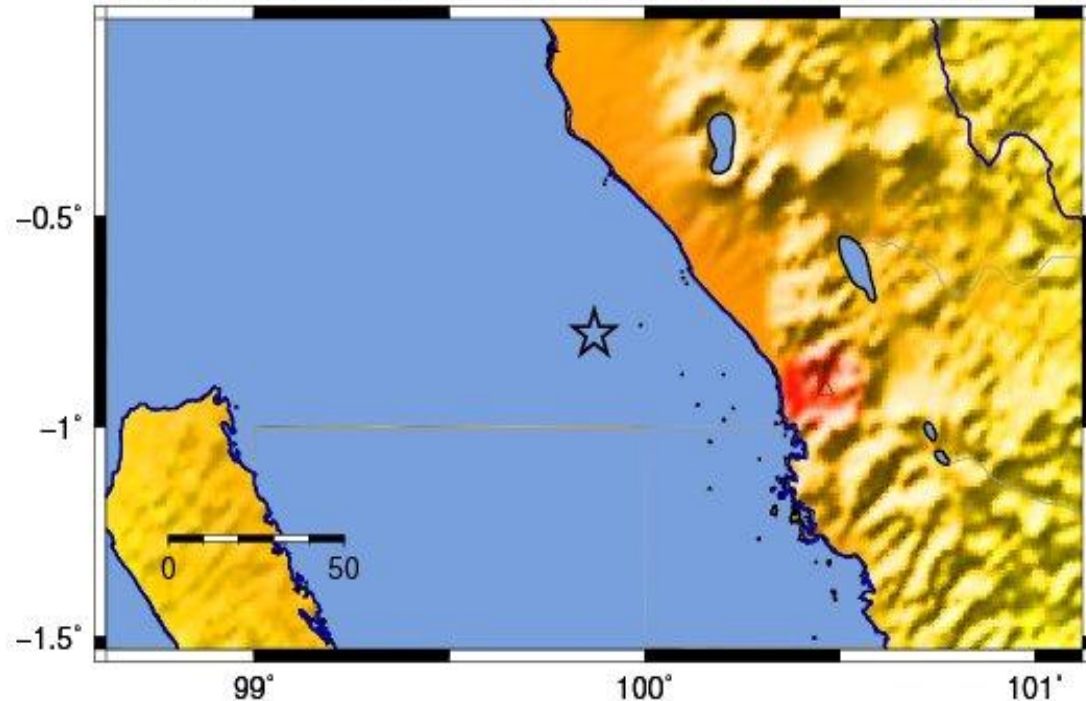


BMKG

Shake Map: Padang Earthquake, 2009

BMKG ShakeMap : Southern Sumatra, Indonesia

Wed Sep 30, 2009 10:16:09 GMT M 7.7 S0.78 E99.87 Depth: 80.0km ID:20090930



Map Version 1 Processed Tue Oct 5, 2010 04:01:00 AM GST

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
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