“We didn’t know”

On the flank of the East African Rift Valley, near Nakuru, Kenya
They don’t know either

Earthquakes from Bilham (Science, 2006)
Population from Landscan (Oak Ridge Nat. Lab., 2004)
Neither do they
They know

2005 M=7.6 Kashmir, Pakistan earthquake (80,000 deaths)
Data → Earthquakes, strain, faults, shaking, building inventory, fragilities, consequences
How can we forecast global earthquakes in a more uniform, testable manner?

ISC-GEM Seismic Catalog

<table>
<thead>
<tr>
<th>Magnitude</th>
<th>Depth (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>10</td>
</tr>
<tr>
<td>7.0</td>
<td>30</td>
</tr>
<tr>
<td>8.0</td>
<td>300</td>
</tr>
</tbody>
</table>

Complete for $M \geq 6.8$ since 1918
GEM Strain Rate Model captures the forces that drive earthquake occurrence.

Higher strain rate means higher hazard.

Kreemer et al. (in prep.)
Global Earthquake Activity Rate (GEAR) model: A blend of strain and $M \geq 5.75$ quakes

Forecast for $M \geq 6.8$ earthquakes

Bird et al (in prep.)
GEAR is consistent with the independent 1918-1976 M≥6.8 quakes

Bird et al (in prep.)
Working to banish ‘We didn’t know’

Graeme Weatherill
GEM Fdn

Peter Bird
UCLA

Martin Käser
Munich Re

Olga Kagan
UCLA

Mark Stirling
GNS Science NZ

Dave Jackson
UCLA

Yan Kagan
UCLA

Corne Kreemer
Univ. Nevada

Yufang Rong
FM Global